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Volume 2 of 2 (Part 1 of 3)

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Utility FGD Survey January - December 1987

Design Performance Data for Operating FGD Systems

Volume 2 (Part 1 of 3)

June 1989

DOE Contract No. DE-AC05-84OR21400

Prepared for:

U.S. Department of Energy
Office of Policy, Planning and Analysis
Office of Environmental Analysis

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Prepared by:

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Prepared for:

U.S. Department of Energy
Office of Policy, Planning and Analysis
Office of Environmental Analysis
Washington, DC 20585

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UTILITY FLUE GAS DESULFURIZATION SURVEY

JANUARY - DECEMBER 1987

ACKNOWLEDGMENT

The authors of this report appreciate the assistance provided by the U.S. Environmental Protection Agency (Air & Energy Engineering Research Laboratory, Research Triangle Park, North Carolina) for the Flue Gas Desulfurization Information System (FGDIS), in extending technical support for this project.

NOTICE

The data in this information transfer document are supplied voluntarily by utility representatives, flue gas desulfurization (FGD) system suppliers and designers, regulatory agencies, and others. The accuracy or completeness of the information contained herein is not warranted by the Department of Energy or the designated contractor. Portions of the work upon which this publication is based were performed pursuant to Contract Nos. RP982-32 with the Electric Power Research Institute and 68-02-3173 with the Environmental Protection Agency.

Copies of preceding issues of this report through December 1981 and reports after the October 1983-September 1984 issue can be purchased from the National Technical Information Service (NTIS), Springfield, Virginia 22161, (703) 487-4650. Succeeding issues of this report through the October 1983-September 1984 issue can be purchased from the Electric Power Research Institute Research Reports Center, P.O. Box 50490, Palo Alto, California 94303, (415) 965-4081. Reports following the October 1983-September 1984 issue may be obtained through NTIS as above.

This report summarizes the FGD system design and performance data contained in a computerized data base known as the Flue Gas Desulfurization Information System (FGDIS). Access to the FGDIS is available through NTIS for a nonprofit user's fee. Users also have access to additional design and performance data stored within the data base that cannot conveniently be printed in this report. Direct access to the data base affords analyses of the data (e.g., averages, maxima, minima, and standard deviations of various parameters), the use of simple mathematical functions, the capability of virtually unlimited data cross-referencing, and data tabulation to fit the user's individual information needs. An FGDIS users manual is available from NTIS (NTIS No. PB 83 146 209).

Requests for further information concerning the FGDIS should be directed to Michael Melia or Skip Jones, PEI Associates, Inc. (513/782-4700). Information concerning access to the FGDIS can be obtained from Walter Finch, NTIS, 5285 Port Royal Road, Springfield, Virginia 22161 (703/487-4808).

USE OF THIS REPORT

This report is the first fully compiled edition since the January-December 1986 issue released in April 1988, which contains more complete design and performance data from individual FGD system startup dates through the end of 1987. This report supersedes all previous issues. Volume 1 includes several categorial summaries of key data and the appendix sections. Volume 2 contains basic design and performance data for operational FGD systems (Section 13).

The Executive Summary contains the number and capacity of FGD systems as of the end of December 1987, future (December 1997) projections of controlled and uncontrolled generating capacity, and unit-by-unit summaries of status changes (e.g., contract awarded, under construction, or operational) and performance and status highlights for the period.

Appendix sections include definitions, a table of unit notation and simplified process flow diagrams, as well as data on terminated FGD systems, particle scrubbers and Japanese FGD systems.

Several ways are available for identifying individual power plant units. Power plants are usually represented by turbine or boiler number in government and industry documents. Because more than one boiler may feed a given turbine in some cases, or a particular boiler may not be dedicated to a single power plant turbine, such identification can be misleading. This situation may be further complicated when FGD systems are being identified. In general, a one-to-one relationship exists between boilers or turbines and FGD systems for power plants included in this report. For the most part, the power plant boiler designation is used to identify FGD systems in this document. When several boilers feed a single FGD system, however, the boilers feeding the FGD system are indicated in the FGD system name. For example, Duquesne Light's Elrama plant consists of four boilers, the exhausts of which are ducted to a common header that serves a single multimodule FGD system. The plant is thus identified in the data base as "Elrama 1-4."

The Utility FGD Survey tracks the status and performance of FGD systems. The method of identifying FGD systems described in the preceding paragraph is the convention for this document and for the FGDIS.

ABSTRACT

The Utility FGD Survey report, which is generated by a computerized data base management system, represents a survey of operational and planned domestic utility flue gas desulfurization (FGD) systems. It summarizes information contributed by the utility industry, system and equipment suppliers, system designers, research organizations, and regulatory agencies. The data cover system design, fuel characteristics, operating history, and actual system performance. Also included is a unit-by-unit discussion of problems and solutions associated with the boilers, scrubbers, and FGD systems.

The development status (operational, under construction, or in the planning stages), system supplier, process, waste disposal practice, and regulatory class are tabulated alphabetically by utility company. Simplified process flow diagrams of FGD systems, definitions, and a glossary of terms are attached to the report. Current data for domestic FGD systems show 151 systems in operation, 7 systems under construction, and 50 systems planned. The current total FGD-controlled capacity in the United States is 65,520 MW.

CONTENTS

		Page
Acknowledgment		ii
Notice		iii
Use of This Report		iv
Abstract		v
Section 13	Design and Performance Data for Operational Domestic FGD Systems	
	Alabama Electric	
	Tombigbee 2	13-1
	Tombigbee 3	13-20
	Alamito Co.	
	Springerville 1	13-39
	Applied Energy Service	
	Beaver Valley 1	13-45
	Deepwater 1	13-48
	Arizona Electric Power	
	Apache 2	13-53
	Apache 3	13-73
	Arizona Public Service	
	Cholla 1	13-92
	Cholla 2	13-115
	Cholla 4	13-126
	Four Corners 1	13-134
	Four Corners 2	13-144
	Four Corners 3	13-154
	Four Corners 4	13-164
	Four Corners 5	13-170
	Associated Electric	
	Thomas Hill 3	13-176
	Basin Electric Power	
	Antelope Valley 1	13-196
	Antelope Valley 2	13-203
	Laramie River 1	13-209
	Laramie River 2	13-228
	Laramie River 3	13-242
	Big Rivers Electric	
	D.B. Wilson 1	13-250
	Green 1	13-256
	Green 2	13-272
	Central Illinois Light	
	Duck Creek 1	13-286

(continued)

CONTENTS (continued)

	Page
Central Illinois Public Service	
Newton 1	13-316
Cincinnati Gas & Electric	
East Bend 2	13-336
City Utilities of Springfield	
Southwest 1	13-348
Colorado Ute Electric	
Craig 1	13-379
Craig 2	13-405
Craig 3	13-434
Columbus & Southern Ohio Electric	
Conesville 5	13-440
Conesville 6	13-463
Cooperative Power Association	
Coal Creek 1	13-482
Coal Creek 2	13-496
Delmarva Power & Light	
Delaware City 1	13-508
Delaware City 2	13-521
Delaware City 3	13-535
Deseret Generation & Transmission	
Bonanza 1	13-549
Duquesne Light	
Elrama 1-4	13-554
Phillips 1-6	13-577
East Kentucky Power	
Spurlock 2	13-607
Grand Haven Board of Light and Power	
J.B. Sims 3	13-614
Grand River Dam Authority	
GRDA 2	13-623
Hoosier Energy	
Merom 1	13-628
Merom 2	13-642
Houston Lighting and Power	
Limestone 1	13-658
Limestone 2	12-664
W. A. Parish 8	13-669

SECTION 13

DESIGN AND PERFORMANCE FOR OPERATIONAL DOMESTIC FGD SYSTEMS

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ALABAMA ELECTRIC	
PLANT NAME	TOMBIGBEE	
UNIT NUMBER	2	
CITY	LEROY	
STATE	ALABAMA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	525	
GROSS UNIT GENERATING CAPACITY - MW	255	
NET UNIT GENERATING CAPACITY W/FGD - MW	233	
NET UNIT GENERATING CAPACITY WO/FGD - MW	241	
EQUIVALENT SCRUBBED CAPACITY - MW	179	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	449.72	(953000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	143.9	(291 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	5.0	(16.5 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26572.	(11424 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10000-11000
AVERAGE ASH CONTENT - %	14.73	
RANGE ASH CONTENT - %	15-18	
AVERAGE MOISTURE CONTENT - %	6.64	
RANGE MOISTURE CONTENT - %	3.0-20.0	
AVERAGE SULFUR CONTENT - %	1.61	
RANGE SULFUR CONTENT - %	1.5-1.75	
AVERAGE CHLORIDE CONTENT - %	0.04	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	HOT SIDE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	449.7	(953000 ACFM)
INLET FLUE GAS TEMPERATURE - C	143.9	(291 F)
PRESSURE DROP - KPA	0.1	(1. IN-H2O)
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS	
A-E FIRM	BURNS & MCDONNELL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	59.50	
ENERGY CONSUMPTION - %	3.1	
CURRENT STATUS	1	
COMMERCIAL START-UP	9/1978	
INITIAL START-UP	9/1978	
CONTRACT AWARDED	8/1975	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	1.48	
DESIGN COAL HEAT CONTENT - J/G	29075.0	(12500 BTU/LB)
DESIGN COAL ASH CONTENT - %	10.00	
DESIGN MOISTURE CONTENT - %	8.00	
DESIGN CHLORIDE CONTENT - %	0.04	
SPACE REQUIREMENTS - SQ M	4645.0	(50000 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	72.0	
** QUENCHER/PRESATURATOR		
NUMBER	2	
TYPE	SPRAY	
INLET GAS FLOW - CU. M/S	127.41	(270000 ACFM)
INLET GAS TEMPERATURE - C	143.9	(291 F)
LIQUID RECIRCULATION RATE - LITERS/S	35.	(550 GPM)
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM	
** ABSORBER		
NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	PEABODY PROCESS SYSTEMS	
DIMENSIONS - FT	24.0 DIA X 90.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER	
LINER MATERIAL TRADE NAME/COMMON TYPE	RESISTA-FLAKE 1151	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	6	
LIQUID RECIRCULATION RATE - LITER/S	1259.	(19980 GPM)
L/G RATIO - L/CU.M	9.9	(74.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.0	(4.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	127.41	(270000 ACFM)
INLET GAS TEMPERATURE - C	54.4	(130 F)
SO2 REMOVAL EFFICIENCY - %	85.0	
PARTICLE REMOVAL EFFICENCY - %	99.5	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	2	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
MANUFACTURER	SHAH-HEIL	
CONFIGURATION	HORIZONTAL	

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	1	
FREEBOARD DISTANCE - M	1.22	(4.0 FT)
PRESSURE DROP - KPA	0.1	(0.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	MAKEUP	
WASH FREQUENCY	INTERMITTENTLY	

** REHEATER

NUMBER	1	
GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
LOCATION	ABSORBER OUTLET DUCT	
PERCENT GAS BYPASSED - AVG	30.0	
TEMPERATURE INCREASE - C	26.7	(48 F)
INLET FLUE GAS FLOW RATE - CU. M/S	134.92	(285900 ACFM)
INLET FLUE GAS TEMPERATURE - C	143.9	(291 F)
OUTLET FLUE GAS TEMPERATURE - C	81.1	(178 F)
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	PEABODY PROCESS SYSTEMS	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	225.10	(477000 ACFM)
FLUE GAS TEMPERATURE - C	143.9	(291 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	HIGH ALLOY
LINER SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	HIGH ALLOY
LINER SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM

** DAMPERS

NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	SCRUBBER INLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	7 FT X 12 FT
SHELL GENERIC MATERIAL TYPE	CARBON STEEL

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

SHELL SPECIFIC MATERIAL TYPE	AISI 1110	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	
** DUCTWORK		
LOCATION	SCRUBBER OUTLET TO STACK	
CONFIGURATION	RECTANGULAR	
DIMENSIONS	5.5 FT X 12 FT AND 13 FT X 16 FT	
SHELL GENERIC MATERIAL TYPE	CARBON STEEL	
SHELL SPECIFIC MATERIAL TYPE	AISI 1110	
LINER GENERIC MATERIAL TYPE	ORGANIC	
LINER SPECIFIC MATERIAL TYPE	FLUOROELASTOMER	
** REAGENT PREPARATION EQUIPMENT		
FUNCTION	WET BALL MILL	
DEVICE	COMPARTMENTED	
DEVICE TYPE	NR	
MANUFACTURER	KENNEDY VAN SAUN	
NUMBER	1	
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	9.1	(10 TPH)
PRODUCT QUALITY - % SOLIDS	35.0	

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	1
MIST ELIMINATOR WASH	1
LIMESTONE SLURRY STORAGE	1
HYDROCLONE UNDERFLOW	****
MILL RECYCLE SUMP	1
WASTE SLURRY SUMP	1

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	6
LIMESTONE MILL SLURRY RECIRCULATION	2
LIMESTONE SLURRY FEED	2
MIST ELIMINATOR WASH	3
WASTE SLURRY	2
SUPERNATE RETURN	1

** SOLIDS CONCENTRATING/DEWATERING		
DEVICE	NONE	
*** SALEABLE BYPRODUCTS		
NATURE	NONE	
DISPOSITION	N/A	
*** SLUDGE		
FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	5.6	(6.2 TPH)
% CASO3 - DRY	17.0	
% CASO4 - DRY	70.0	
% CAOH2 - DRY	0.0	
% CACO3 - DRY	5.0	
% ASH - DRY	1.0	
% OTHER COMPOUNDS - DRY	7.0	
** TREATMENT		
METHOD	BLEED	
DEVICE	N/A	
PROPRIETARY PROCESS	N/A	
** DISPOSAL		
NATURE	FINAL	
TYPE	POND	
LOCATION	ON-SITE	

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	CLAY LINING
SITE DIMENSIONS	34.8 ACRE X 25 FT
SITE SERVICE LIFE - YRS	20

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	PERCENT SOLIDS
CONTROL LEVELS	PH 5.8-6.0
MONITOR TYPE	TBI
MONITOR LOCATION	RECYCLE TANK
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	CLOSED
EVAPORATION WATER LOSS - LITER/S	10.5 (166 GPM)
SLUDGE HYDRATION WATER LOSS - LITER/S	0.3 (4 GPM)
POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	0
RECEIVING WATER STREAM	TOMBIGBEE RIVER
MAKEUP WATER ADDITION - LITERS/S	9.9 (157 GPM)
SOURCE OF MAKEUP WATER	COOLING TOWER BLOWDOWN

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	95% CACO3
SOURCE/SUPPLIER	ALLIED PRODUCTS CO.
CONSUMPTION	3.5 TPH '1.1 MOL/MOL SO2!
UTILIZATION - %	90.0
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	0.0

** FGD SPARE COMPONENT INDICES

ABSORBER	0.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/78	A		81.4		20.7						
	B		63.9		16.3						
	SYSTEM	81.4	72.7		18.5			720	183	133	

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATION OF THE FGD SYSTEM BEGAN ON SEPTEMBER 23. THE SCRUBBER MODULES WERE FORCED OUT OF SERVICE 34 HOURS WHEN, AFTER CLOSING THE SYSTEM ISOLATION DAMPERS THE UTILITY WAS UNABLE TO OPEN THEM AGAIN.

10/78	A		57.0		45.7						
	B		57.7		46.2						
	SYSTEM	66.3	57.4		46.0			744	596	342	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER SHUTDOWN.

ON OCTOBER 18 THE SUPERNATE LINE STARTED LEAKING. REPAIRS WERE MADE TO THE FIBERGLASS PIPING.

11/78	A		82.4		78.2						
	B		49.3		46.8						
	SYSTEM	88.9	65.9		62.5			720	684	450	

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			IN LATE OCTOBER AND EARLY NOVEMBER A FIBERGLASS ELBOW IN THE WASTE SLURRY PIPE RUPTURED AND HAD TO BE REPLACED.								
			THE WASTE SLURRY AND SUPERNATE PIPING FAILURES WERE CORRECTED BY THE ARCHITECT-ENGINEER.								
12/78	A		97.6		91.8						
	B		93.2		87.6						
	SYSTEM	97.8	95.4		89.7			744	700	668	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DOWNTIME DURING DECEMBER WAS NOT ATTRIBUTABLE TO THE FGD SYSTEM.								
1/79	A		75.3		75.1						
	B		65.8		65.6						
	SYSTEM	89.2	70.6		70.4			744	742	524	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			SOME PLUGGING WAS ENCOUNTERED IN THE MIST ELIMINATOR DUE TO AN ESP OUTAGE. THE SYSTEM WAS DOWN FOR 75 HOURS SO THAT THE MIST ELIMINATORS COULD BE CLEANED.								
2/79	A		95.0		42.0						
	B		96.3		42.6						
	SYSTEM	98.4	95.7		42.3			672	297	284	
3/79	A		93.1		92.2						
	B		94.4		93.6						
	SYSTEM	94.5	93.8		92.9			744	737	691	
4/79	A		100.0		40.6						
	B		100.0		40.6						
	SYSTEM	100.0	100.0		40.6			720	292	292	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY HAS REPORTED THAT NO UNUSUAL PROBLEMS HAVE OCCURRED.								
5/79	A		48.8		47.6						
	B		58.9		57.4						
	SYSTEM	92.7	53.9		52.5			744	725	391	
6/79	A		1.8		1.0						
	B		95.4		51.8						
	SYSTEM	98.3	48.6		26.4			720	391	190	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT THE FGD SYSTEM OPERATED WELL DURING MAY AND JUNE WITH THE EXCEPTION OF DOWN TIME REQUIRED TO REPLACE THE MIST ELIMINATORS. THE MIST ELIMINATORS WERE DEFORMED DURING A TEMPERATURE EXCURSION.								
7/79	A		21.0		16.5						
	B		70.9		55.9						
	SYSTEM	93.0	46.0		36.2			744	587	270	
8/79	A		88.9		67.6						
	B		24.9		19.0						
	SYSTEM	99.2	56.9		43.3			744	566	322	

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE SCRUBBER WAS NOT OPERATED FOR ABOUT 6 HOURS DUE TO A NECESSARY ADJUSTMENT TO THE MODICON CONTROLLER.								
			THE SCRUBBER WAS BYPASSED FOR ABOUT 37 HOURS DUE TO AN ESP OUTAGE.								
9/79	A		83.3		68.3						
	B		21.8		17.9						
	SYSTEM	100.0	52.6		43.1			720	591	311	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT THE SYSTEM WAS AVAILABLE AT ALL TIMES DURING SEPTEMBER.								
10/79	SYSTEM	100.0			0.0			744	0	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UNIT NO. 2 GENERATOR WAS DOWN THE ENTIRE MONTH OF OCTOBER.								
11/79	SYSTEM	100.0			0.0			720	0	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE GENERATOR REMAINED DOWN THROUGH NOVEMBER.								
12/79	A		22.6		4.0						
	B		6.0		1.1						
	SYSTEM	96.7	14.3		2.6			744	133	19	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE OPERABILITY OF THE FGD UNIT WAS LOW DUE TO THE START-UP OF THE BOILER.								
			THE FGD SYSTEM WAS NOT AVAILABLE FOR 24 HOURS DUE TO A RUPTURED WASTE SLURRY LINE.								
1/80	A		35.8		21.1						
	B		56.7		33.5						
	SYSTEM	90.7	46.3		27.3			744	439	203	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING JANUARY UNIT 2 WAS UNAVAILABLE 69 HOURS DUE TO REPAIRS NEEDED ON AN ABRADED EXPANSION JOINT AND A RUPTURED WASTE SLURRY LINE.								
2/80	A		84.3		84.3						
	B		74.7		74.7						
	SYSTEM	99.3	79.5		79.5			696	696	554	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UNIT 2 FGD SYSTEM OPERATED ALL BUT 5 HOURS DURING FEBRUARY, IN WHICH TIME THE BOILER WAS BEING BROUGHT ON-LINE.								
3/80	A		81.6		75.0						
	B		79.4		73.0						
	SYSTEM	100.0	80.5		74.0			744	684	551	

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE ENCOUNTERED DURING MARCH. THE FGD SYSTEM WAS AVAILABLE 100% OF THE TIME.									
4/80	A		61.3		61.3						
	B		86.6		86.5						
	SYSTEM	100.0	74.0		73.9			720	719	532	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT FOR THE MONTH OF APRIL THE SYSTEM WAS AVAILABLE 100% OF THE TIME.									
5/80	A		34.9		34.7						
	B		92.8		92.2						
	SYSTEM	100.0	63.9		63.5			744	739	472	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS AVAILABLE 100% OF THE MONTH OF MAY.									
6/80	A	100.0	88.0	100.0	11.0						
	B	0.0	0.0	0.0	0.0						
	SYSTEM	50.0	44.0	50.0	5.5			720	90	40	7.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE B WAS OUT OF SERVICE THE ENTIRE MONTH OF JUNE DUE TO A DAMAGED DAMPER DRIVE MOTOR.									
		MODULE A WAS AVAILABLE FOR OPERATION THE ENTIRE MONTH, BUT WAS NEEDED ONLY 79 HOURS.									
7/80	A	100.0	97.6	100.0	54.5						
	B	0.0	0.0	0.0	0.0						
	SYSTEM	50.0	48.8	50.0	27.3			744	415	203	26.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE B-MODULE REMAINED OUT OF SERVICE THROUGH JULY DUE TO THE DAMAGED DAMPER DRIVE MOTOR.									
		THE A-MODULE OPERATED ON AN AS NEEDED BASIS WITH NO PROBLEMS.									
8/80	A	100.0	84.0	84.0	18.3						
	B	0.0	0.0	0.0	0.0						
	SYSTEM	50.0	42.0	42.0	9.2			744	162	68	14.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING AUGUST MODULE B REMAINED OUT OF SERVICE DUE TO DAMAGED DAMPER OPERATOR MOTORS.									
9/80	A	100.0	78.4	78.4	45.4						
	B	0.0	0.0	0.0	0.0						
	SYSTEM	50.0	39.2	39.2	22.7			720	417	164	42.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING SEPTEMBER MODULE B DID NOT OPERATE DUE TO A BURNED-UP DAMPER DRIVE MOTOR.									

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/80	A	100.0	0.0		0.0						
	B	0.0	0.0		0.0						
	SYSTEM	50.0	0.0		0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER THE UNIT WAS OUT OF SERVICE FOR A TURBINE/GENERATOR INSPECTION.									
		REPAIR ON MODULE B DAMPER MOTOR DRIVE CONTINUED THROUGHOUT THE MONTH.									
11/80	A	100.0	74.3	74.3	15.5						
	B	0.0	0.0	0.0	0.0						
	SYSTEM	50.0	37.2	37.2	7.8			720	150	56	10.0
12/80	A	100.0	90.5	90.5	86.4						
	B	62.4	62.9	62.9	60.1						
	SYSTEM	81.2	76.7	76.7	73.2			744	710	545	45.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE B DAMPER REPAIRS WERE COMPLETED BY MID-DECEMBER. THE UTILITY REPORTED THAT NO OTHER MAJOR PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER 1980.									
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION FOR THE FIRST QUARTER 1981 WAS NOT AVAILABLE AT THIS TIME.									
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.									
7/81	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION FOR THE MONTH OF JULY WAS NOT AVAILABLE AT THIS TIME.									
8/81	A	100.0	51.6	100.0	51.6						
	B	96.5	87.7	100.0	87.7						
	SYSTEM	98.2	69.7	100.0	69.7			744	744	518	51.8
9/81	A	100.0	99.9	100.0	49.9						
	B	95.1	95.2	100.0	92.0						
	SYSTEM	97.6	70.9	100.0	70.9			720	720	511	6.2

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF AUGUST AND SEPTEMBER.									
10/81	A	16.9	3.5	3.5	0.6						
	B	16.9	99.6	99.6	16.8						
	SYSTEM	16.9	51.5	51.5	8.7			744	125	65	4.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT AND THE FGD SYSTEM WERE OUT OF SERVICE FOR MOST OF OCTOBER FOR SCHEDULED MAINTENANCE.									
11/81	A	41.2	89.4	89.6	41.1						
	B	41.2	68.9	86.9	31.7						
	SYSTEM	41.2	79.1	88.2	36.4			720	331	262	22.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER THE SCHEDULED MAINTENANCE STARTED IN OCTOBER WAS COMPLETED									
12/81	A	100.0	97.1	100.0	96.8						
	B	100.0	10.7	100.0	10.7						
	SYSTEM	100.0	53.9	100.0	53.8			744	742	400	42.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER.									
1/82	A	93.3	93.4	93.4	93.4						
	B	93.3	0.6	0.8	0.6						
	SYSTEM	93.3	45.5	47.1	45.5			744	744	350	46.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY THE LIMESTONE FEED SYSTEM FROZE CAUSING AN UNAVAILABILITY OF LIMESTONE SLURRY TO THE FGD SYSTEM.									
2/82	A	100.0	98.3	100.0	81.5						
	B	100.0	0.0		0.0						
	SYSTEM	100.0	49.1	100.0	40.7			672	557	274	38.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.									
3/82	A	78.2	48.5	66.9	44.0						
	B	98.6	52.7	97.3	47.8						
	SYSTEM	88.4	50.6	82.1	45.9			744	675	342	38.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH THE MODULE A HYDROCLONE MALFUNCTIONED CAUSING SOME OUTAGE TIME.									
4/82	A	84.3	74.2	82.5	74.0						
	B	86.0	43.8	99.7	43.8						
	SYSTEM	85.1	59.0	91.1	58.9			720	718	424	54.0
5/82	A	100.0	84.2	100.0	20.7						

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	93.7	100.0	23.0						
	SYSTEM	100.0	88.9	100.0	21.9			744	183	163	14.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE MONTHS OF APRIL AND MAY.									
6/82	SYSTEM	99.2	99.5	99.5	99.5			720	720	716	52.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED EXPERIENCING PROBLEMS WITH THE 2A OUTLET DAMPER DURIN JUNE.									
7/82	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	58.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JULY.									
8/82	SYSTEM	90.2	88.8	88.8	88.8			744	744	661	57.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED EXPERIENCING PROBLEMS WITH THE 2A AND 2B DAMPERS DURING AUGUST.									
9/82	SYSTEM	97.8	97.1	97.1	97.8			720	664	704	48.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE 2A DAMPERS WERE OUT OF SERVICE DURING PART OF SEPTEMBER FOR REPAIRS.									
		THE SCRUBBER WAS TAKEN OUT OF SERVICE DURING PART OF SEPTEMBER WHILE THE PRECIPITATOR WAS TURNED OFF.									
10/82	SYSTEM	0.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE BOILER WAS SHUT DOWN DURING OCTOBER.									
11/82	SYSTEM	74.7	98.4	98.4	73.9			720	540	532	49.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A BROKEN DAMPER CHAIN RESULTED IN DOWN TIME DURING NOVEMBER.									
12/82	SYSTEM	95.2	95.0	95.0	90.8			744	711	676	48.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER.									
1/83	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	59.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED BY THE UTILITY DURING JANUARY.									
2/83	SYSTEM	100.0	99.4	99.4	93.2			672	630	626	66.5

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS SHUT DOWN DURING PART OF FEBRUARY.									
3/83	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	74.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED BY THE UTILITY DURING MARCH.									
4/83	SYSTEM	89.7	98.1	98.1	82.0			720	602	591	60.6
5/83	SYSTEM				0.0			744	0	0	
6/83	SYSTEM				0.0			720	0	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE BOILER WAS SHUT DOWN DURING MAY AND JUNE FOR A SCHEDULED MAINTENANCE OUTAGE.									
7/83	A	83.9	73.6		62.9						
	B	83.9	22.6		19.4						
	SYSTEM	83.9	48.1		41.1			744	637	306	51.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JULY.									
8/83	A	96.9	78.3		78.2						
	B	100.0	21.7		21.7						
	SYSTEM	98.5	50.0		49.9			744	743	372	65.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS OUT OF SERVICE DURING PART OF AUGUST FOR PRESATURATOR MAINTENANCE.									
9/83	A	100.0	25.7		25.4						
	B	100.0	73.8		73.1						
	SYSTEM	100.0	49.8		49.3			720	712	355	51.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING SEPTEMBER.									
10/83	A	81.5	13.1		10.8						
	B	81.5	97.4		80.5						
	SYSTEM	81.5	55.2	55.2	45.6			744	615	340	53.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING OCTOBER.									
11/83	SYSTEM				0.0			720	0	0	0.0

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OFF LINE DURING NOVEMBER FOR A SCHEDULED FALL OUTAGE.									
12/83	A	0.0	0.0		0.0						
	B	0.0	0.0		0.0						
	SYSTEM	0.0	0.0	0.0	0.0			744	149	0	9.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SUB-FREEZING WEATHER CONDITIONS FORCED THE FGD SYSTEM OUT OF SERVICE DURIN DECEMBER. PIPING ASSOCIATED WITH LIMESTONE SLURRY FEED AND REAGENT PREPARATION HAD FROZEN, PLUGGED, AND/OR BURSTED.									
1/84	A	45.4	18.8		18.8						
	B	80.0	62.5		62.5						
	SYSTEM	62.7	40.6	40.6	40.6			744	744	302	55.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE ABSORBER WAS INOPERABLE DUE TO FROZEN PIPES.									
		THE UTILITY REPORTED LIMESTONE FEED AND BALL MILL PROBLEMS DURING JANUARY.									
2/84	A	100.0	81.4		81.4						
	B	100.0	90.5		90.5						
	SYSTEM	100.0	85.9	85.9	85.9			696	696	598	62.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING FEBRUARY.									
3/84	A	31.9	85.5		30.2						
	B	31.9	84.7		29.9						
	SYSTEM	31.9	85.1	30.1	30.1			744	263	224	25.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE ABSORBER WAS REMOVED FROM SERVICE DURING MARCH TO HELP DRY OUT THE STACK.									
		THE UTILITY REPORTED THAT A UNIT TURBINE OUTAGE INSPECTION OCCURRED.									
4/84	A	0.0			0.0						
	B	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED A UNIT SHUT DOWN DUE TO A TURBINE OUTAGE.									
5/84	A	12.9	3.4		0.8						
	B	12.9	54.3		12.2						
	SYSTEM	12.9	28.8	6.5	6.5			744	167	48	10.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE ABSORBER WAS DOWN SEVERAL DAYS DURING MAY TO ALLOW HOT FLUE GAS TO DRY THE STACK.									
6/84	A	100.0	77.0		77.0						

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	53.7		53.7						
	SYSTEM	100.0	65.3	65.3	65.3			720	720	470	61.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.

7/84	A	100.0	75.3		75.3						
	B	100.0	98.2		98.2						
	SYSTEM	100.0	86.7		86.7			744	744	645	64.2

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS ENCOUNTERED BY THE UTILITY DURING JULY.

8/84	A	100.0	83.7		83.7						
	B	100.0	91.4		91.4						
	SYSTEM	100.0	87.6		87.6			744	744	651	62.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF AUGUST.

9/84	A	96.4	48.3		47.9						
	B	99.6	88.1		87.3						
	SYSTEM	98.0	68.2		67.6			720	714	487	55.3

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS SHUT DOWN IN SEPTEMBER TO CLEAN PLUGGED MIST ELIMINATOR.

10/84	A	100.0	96.6		96.7						
	B	100.0	95.0		95.1						
	SYSTEM	100.0	95.8		95.9			744	745	714	83.3
11/84	A	100.0	85.0		85.0						
	B	99.4	52.5		52.5						
	SYSTEM	99.7	68.7		68.7			720	720	495	55.3
12/84	A	87.6	91.6		78.8						
	B	67.7	12.4		10.7						
	SYSTEM	77.7	52.0		44.7			744	630	333	40.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED HAVING PROBLEMS WITH THE MODULE B OUTLET DAMPER DURING THE FOURTH QUARTER OF 1984. THE MOTOR DRIVE, DRIVE CHAIN, AND SHAFT BEARINGS WERE REPAIRED.

1/85	A	86.0	78.5	78.5	71.9						
	B	86.0	49.4	49.4	45.3						
	SYSTEM	86.0	63.9	63.9	58.6			744	682	436	50.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OUT OF SERVICE THROUGH THE MONTH OF JANUARY DUE TO FROZEN PIPE LINES.

2/85	A	100.0	60.7	60.7	60.7						
	B	100.0	57.0	57.0	57.0						
	SYSTEM	100.0	58.9	58.9	58.9			672	672	396	48.2

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF FEBRUARY, 1985.									
3/85	A	29.2	27.1	27.1	8.9						
	B	29.2	82.2	82.2	27.1						
	SYSTEM	29.2	54.6	54.6	18.0			744	245	134	17.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS OUT OF SERVICE DURING THE MONTH DUE TO A BOILER OUTAGE.									
4/85	A	97.8	89.5	89.5	89.3						
	B	99.9	62.9	62.9	62.8						
	SYSTEM	98.8	76.2	76.2	76.0			720	719	548	82.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ABSORBER A WAS TAKEN OUT OF SERVICE FOR SPRAY NOZZLE CLEANING.									
5/85	A	100.0	39.6	39.6	39.6						
	B	100.0	71.6	71.6	71.6						
	SYSTEM	100.0	55.6	55.6	55.6			744	744	414	60.7
6/85	A	99.4	91.0	91.0	91.0						
	B	99.7	89.3	89.3	89.3						
	SYSTEM	99.6	90.2	90.2	90.2			720	720	649	80.5
7/85	A	98.7	67.5	67.5	67.5						
	B	98.4	89.4	89.4	89.4						
	SYSTEM	98.5	78.4	78.4	78.4			744	744	583	80.8
8/85	A	100.0	85.4	85.4	85.4						
	B	100.0	81.1	81.1	81.1						
	SYSTEM	100.0	83.3	83.3	83.3			744	744	619	83.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE ENCOUNTERED MAY THROUGH AUGUST 1985.									
9/85	A	63.9	95.9	95.9	63.9						
	B	63.5	76.1	76.1	50.7						
	SYSTEM	63.7	86.0	86.0	57.3			720	480	412	49.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS OUT OF SERVICE FOR THE REGULAR FALL OUTAGE. THE OUTAGE BEGAN ON THE 20TH OF SEPTEMBER 1985 AND CONTINUED THROUGH THE END OF THE MONTH.									
10/85	A	62.9	73.0	73.0	50.4						
	B	62.9	49.0	49.0	33.8						
	SYSTEM	62.9	61.0	61.0	42.1			744	513	313	61.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS REMOVED FROM SERVICE IN ORDER TO INSPECT SPRAY NOZZLES AND MIST ELIMINATORS.									
11/85	A	100.0	95.5	95.5	95.5						
	B	100.0	75.4	75.4	75.4						
	SYSTEM	100.0	85.5	85.5	85.5			720	720	616	83.8

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF NOVEMBER 1985.									
12/85	A	99.6	66.6	66.6	66.6						
	B	99.6	78.5	78.5	78.5						
	SYSTEM	99.6	72.5	72.5	72.5			744	744	539	70.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE ABSORBERS WERE TAKEN OUT OF SERVICE AFTER PH CONTROL WAS LOST AS A RESULT OF A PLUGGED/FROZEN LIMESTONE SLURRY FEED LINE.									
1/86	A	99.7	84.3		84.3						
	B	100.0	78.6		78.6						
	SYSTEM	99.9	81.4		81.4			744	744	606	62.0
2/86	A	100.0	14.6		14.6						
	B	100.0	74.3		74.3						
	SYSTEM	100.0	44.5		44.5			672	672	299	53.4
3/86	A	100.0	23.4		9.7						
	B	100.0	29.8		12.4						
	SYSTEM	100.0	26.6		11.1			744	310	82	23.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE ENCOUNTERED JANUARY THROUGH MARCH 1986. FGD SYSTEM UTILIZATION DURING THE MONTH OF MARCH WAS LIMITED DUE TO THE BURNING OF LOW SULFUR COMPLIANCE COAL.									
4/86	A	99.9	57.6		52.0						
	B	99.9	32.2		29.1						
	SYSTEM	99.9	44.9		40.6			720	651	292	65.8
5/86	A	100.0	42.4		42.4						
	B	100.0	64.1		64.1						
	SYSTEM	100.0	53.3		53.3			744	744	396	59.4
6/86	A	100.0	88.5		88.5						
	B	100.0	81.0		81.0						
	SYSTEM	100.0	84.8		84.8			720	720	611	72.8
7/86	A	98.7	91.3		91.3						
	B	98.9	87.2		87.2						
	SYSTEM	98.8	89.2		89.2			744	744	664	74.7
8/86	A	100.0	78.6		78.6						
	B	98.8	56.3		56.3						
	SYSTEM	99.4	67.4		67.4			744	744	502	70.8
9/86	A	100.0	49.7		49.7						
	B	100.0	45.1		45.1						
	SYSTEM	100.0	47.4		47.4			720	720	341	69.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE ENCOUNTERED DURING THE SECOND AND THIRD QUARTERS OF 1986.									
10/86	A		56.0		56.1						
	B		46.1		46.1						
	SYSTEM		51.0		51.1			744	745	380	69.4

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
11/86	A		26.6		7.9						
	B		21.8		6.5						
	SYSTEM		24.2		7.2			720	214	52	15.7
12/86	A		0.7		0.7						
	B		5.7		5.7						
	SYSTEM		3.2		3.2			744	744	24	57.7

** PROBLEMS/SOLUTIONS/COMMENTS

HIGH SYSTEM AVAILABILITIES DURING THE FOURTH QUARTER OF 1986 WERE DUE IN PART TO BURNING LOW SULFUR COMPLIANCE COAL AND A SCHEDULED ONE MONTH BOILER MAINTENANCE OUTAGE. NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD.

1/87	A	100.0	14.1		14.1						
	B	100.0	11.7		11.7						
	SYSTEM	100.0	12.9		12.9			744	744	96	61.3
2/87	A	100.0	29.2		29.2						
	B	100.0	43.0		43.0						
	SYSTEM	100.0	36.1		36.1			672	672	242	56.5
3/87	A	100.0	70.0		70.0						
	B	100.0	93.6		93.6						
	SYSTEM	100.0	81.8		81.8			744	744	608	70.0
4/87	A	99.9	55.4		18.5						
	B	99.9	75.2		25.1						
	SYSTEM	99.9	65.3		21.8			720	240	157	20.7
5/87	A	100.0	78.9		77.6						
	B	100.0	62.5		61.5						
	SYSTEM	100.0	70.7		69.5			744	731	517	58.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO MAJOR FGD-RELATED PROBLEMS DURING THE PERIOD OF JANUARY THROUGH MAY 1987.

6/87	A	91.8	91.1		91.1						
	B	91.8	33.1		33.1						
	SYSTEM	91.8	62.1		62.1			720	720	447	65.9

** PROBLEMS/SOLUTIONS/COMMENTS

IN JUNE THE LIMESTONE BALL MILL WAS OUT OF SERVICE FOR REPAIRS. NO LIMESTONE SLURRY WAS AVAILABLE.

7/87	A	100.0	74.5		74.5						
	B	100.0	71.9		71.9						
	SYSTEM	100.0	73.2		73.2			744	744	545	72.6
8/87	A	100.0	81.7		81.7						
	B	100.0	77.5		77.5						
	SYSTEM	100.0	79.6		79.6			744	744	592	76.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO MAJOR FGD-RELATED PROBLEMS DURING THE MONTHS OF JULY AND AUGUST.

9/87	A	99.4	63.2		63.2						

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	99.4	93.6		93.6						
	SYSTEM	99.4	78.4		78.4			720	720	565	66.7

** PROBLEMS/SOLUTIONS/COMMENTS

AN ELECTRICAL PROBLEM PREVENTED THE SUPERNATANT PUMPS FROM RUNNING. SUPERNATANT WAS UNAVAILABLE FOR FGD SYSTEM USE.

10/87	A	100.0	0.9		55.3						
	B	100.0	1.0		61.4						
	SYSTEM	100.0	1.0		58.4			744	607	434	48.6
11/87	A	100.0	71.4		29.7						
	B	100.0	64.5		26.9						
	SYSTEM	100.0	67.9		28.3			720	300	204	23.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO MAJOR FGD-RELATED PROBLEMS DURING THE MONTHS OF OCTOBER AND NOVEMBER 1987.

12/87	A	95.4	29.8		29.8						
	B	95.4	85.4		85.4						
	SYSTEM	95.4	57.6		57.6			744	744	428	61.1

** PROBLEMS/SOLUTIONS/COMMENTS

AN AGITATOR GEAR FAILURE FORCED THE FGD SYSTEM OUT OF SERVICE IN DECEMBER. THE LIMESTONE SLURRY MAKEUP WAS UNAVAILABLE.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ALABAMA ELECTRIC	
PLANT NAME	TOMBIGBEE	
UNIT NUMBER	3	
CITY	LEROY	
STATE	ALABAMA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	525	
GROSS UNIT GENERATING CAPACITY - MW	255	
NET UNIT GENERATING CAPACITY W/FGD - MW	233	
NET UNIT GENERATING CAPACITY WO/FGD - MW	241	
EQUIVALENT SCRUBBED CAPACITY - MW	179	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	449.72	(953000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	143.9	(291 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	5.0	(16.5 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26572.	(11424 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10000-11000
AVERAGE ASH CONTENT - %	14.73	
RANGE ASH CONTENT - %	15-18	
AVERAGE MOISTURE CONTENT - %	6.64	
RANGE MOISTURE CONTENT - %	3.0-20.0	
AVERAGE SULFUR CONTENT - %	1.61	
RANGE SULFUR CONTENT - %	1.5-1.75	
AVERAGE CHLORIDE CONTENT - %	0.04	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	HOT SIDE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	449.7	(953000 ACFM)
INLET FLUE GAS TEMPERATURE - C	143.9	(291 F)
PRESSURE DROP - KPA	0.1	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.5	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS	
A-E FIRM	BURNS & MCDONNELL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	59.50	
ENERGY CONSUMPTION - %	3.1	
CURRENT STATUS	1	
COMMERCIAL START-UP	6/1979	
INITIAL START-UP	6/1979	
CONTRACT AWARDED	8/1975	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	1.48	
DESIGN COAL HEAT CONTENT - J/G	29075.0	(12500 BTU/LB)
DESIGN COAL ASH CONTENT - %	10.00	
DESIGN MOISTURE CONTENT - %	8.00	
DESIGN CHLORIDE CONTENT - %	0.04	
SPACE REQUIREMENTS - SQ M	4645.0	(50000 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	72.0	
** QUENCHER/PRESATURATOR		
NUMBER	2	
TYPE	SPRAY	
INLET GAS FLOW - CU. M/S	127.41	(270000 ACFM)
INLET GAS TEMPERATURE - C	143.9	(291 F)
LIQUID RECIRCULATION RATE - LITERS/S	35.	(550 GPM)
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM	
** ABSORBER		
NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	PEABODY PROCESS SYSTEMS	
DIMENSIONS - FT	24.0 DIA X 90.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER	
LINER MATERIAL TRADE NAME/COMMON TYPE	RESISTA-FLAKE 1151	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	6	
LIQUID RECIRCULATION RATE - LITER/S	1259.	(19980 GPM)
L/G RATIO - L/CU.M	9.9	(74.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.0	(4.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	127.41	(270000 ACFM)
INLET GAS TEMPERATURE - C	54.4	(130 F)
SO2 REMOVAL EFFICIENCY - %	85.0	
PARTICLE REMOVAL EFFICENCY - %	99.5	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	2	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
MANUFACTURER	SHAH-HEIL	
CONFIGURATION	HORIZONTAL	

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	1	
FREEBOARD DISTANCE - M	1.22	(4.0 FT)
PRESSURE DROP - KPA	0.1	(0.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	MAKEUP	
WASH FREQUENCY	INTERMITTENTLY	

** REHEATER

NUMBER	1	
GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
LOCATION	ABSORBER OUTLET DUCT	
PERCENT GAS BYPASSED - AVG	30.0	
TEMPERATURE INCREASE - C	26.7	(48 F)
INLET FLUE GAS FLOW RATE - CU. M/S	134.92	(285900 ACFM)
INLET FLUE GAS TEMPERATURE - C	143.9	(291 F)
OUTLET FLUE GAS TEMPERATURE - C	81.1	(178 F)
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	PEABODY PROCESS SYSTEMS	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	225.10	(477000 ACFM)
FLUE GAS TEMPERATURE - C	143.9	(291 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	HIGH ALLOY
LINER SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	HIGH ALLOY
LINER SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM

** DAMPERS

NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	SCRUBBER INLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	7 FT X 12 FT
SHELL GENERIC MATERIAL TYPE	CARBON STEEL

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	SCRUBBER OUTLET TO STACK
CONFIGURATION	RECTANGULAR
DIMENSIONS	5.5 FT X 12 FT AND 13 FT X 16 FT
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	FLUOROELASTOMER

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	1
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	9.1 (10 TPH)
PRODUCT QUALITY - % SOLIDS	35.0

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	1
MIST ELIMINATOR WASH	1
LIMESTONE SLURRY STORAGE	1
HYDROCLONE UNDERFLOW	****
MILL RECYCLE SUMP	1
WASTE SLURRY SUMP	1

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	6
LIMESTONE MILL SLURRY RECIRCULATION	2
LIMESTONE SLURRY FEED	2
MIST ELIMINATOR WASH	3
WASTE SLURRY	2
SUPERNATE RETURN	1

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	5.6 (6.2 TPH)
% CASO3 - DRY	17.0
% CASO4 - DRY	70.0
% CAOH2 - DRY	0.0
% CACO3 - DRY	5.0
% ASH - DRY	1.0
% OTHER COMPOUNDS - DRY	7.0

** TREATMENT

METHOD	BLEED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	CLAY LINING
SITE DIMENSIONS	34.8 ACRE X 25 FT
SITE SERVICE LIFE - YRS	20
** PROCESS CONTROL AND INSTRUMENTATION	
CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	PERCENT SOLIDS
CONTROL LEVELS	PH 5.8-6.0
MONITOR TYPE	TBI
MONITOR LOCATION	RECYCLE TANK
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
EVAPORATION WATER LOSS - LITER/S	10.5 (166 GPM)
SLUDGE HYDRATION WATER LOSS - LITER/S	0.3 (4 GPM)
POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	0
RECEIVING WATER STREAM	TOMBIGBEE RIVER
MAKEUP WATER ADDITION - LITERS/S	9.9 (157 GPM)
SOURCE OF MAKEUP WATER	COOLING TOWER BLOWDOWN
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	95% CACO3
SOURCE/SUPPLIER	ALLIED PRODUCTS CO.
CONSUMPTION	3.5 TPH '1.1 MOL/MOL SO2!
UTILIZATION - %	90.0
POINT OF ADDITION	BALL MILL
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	0.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	0.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/79	A		23.7		9.4						
	B		27.8		11.0						
	SYSTEM	72.7	25.8		10.2			744	295	76	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM IS CURRENTLY UNDERGOING SHAKEDOWN/DEBUGGING OPERATIONS.

8/79	A		59.4		39.1						
	B		44.5		29.3						
	SYSTEM	99.7	52.0		34.2			744	490	255	

** PROBLEMS/SOLUTIONS/COMMENTS

AN ADJUSTMENT TO THE MODICON CONTROLLER CAUSED A SCRUBBER OUTAGE OF ABOUT TWO HOURS.

THE SCRUBBER WAS DOWN DURING AN ESP OUTAGE FOR APPROXIMATELY 34 HOURS.

9/79	A		73.0		13.9						
	B		11.0		2.1						
	SYSTEM	100.0	42.0		8.0			720	137	58	

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			CONTINUING GENERATOR PROBLEMS RESULTED IN LOW FGD SYSTEM UTILIZATION DURING SEPTEMBER.								
10/79	A		82.7		82.7						
	B		90.9		90.9						
	SYSTEM	99.5	86.8		86.8			744	744	646	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE FGD SYSTEM WAS SHUT DOWN FOR 37 HOURS FOR BOILER START-UPS AND ESP TESTS.								
			PROBLEMS WITH THE LIMESTONE BALL MILL LUBRICATION SYSTEM, WHICH CAUSED A SHORTAGE OF REAGENT SLURRY, KEPT THE FGD SYSTEM OFF LINE FOR 4 HOURS.								
11/79	A		78.6		78.6						
	B		89.3		89.3						
	SYSTEM	96.7	84.0		84.0			720	720	605	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING NOVEMBER THE FGD UNIT WAS DOWN 23 HOURS BECAUSE THE ESP FLYASH HANDLING SYSTEM JAMMED AND THE ESP WAS SHUT DOWN.								
			THE WASTE SLURRY LINE RUPTURED, FORCING THE UNIT OUT OF SERVICE FOR 24 HOURS.								
12/79	A		78.4		68.7						
	B		87.6		76.8						
	SYSTEM	100.0	83.0		72.8			744	652	541	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			NO FGD SYSTEM PROBLEMS WERE ENCOUNTERED DURING DECEMBER. THE FGD SYSTEM WAS AVAILABLE FOR THE ENTIRE MONTH.								
1/80	A		69.2		30.5						
	B		45.4		20.0						
	SYSTEM	100.0	57.3		25.3			744	328	188	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING JANUARY UNIT 3 WAS AVAILABLE THE ENTIRE MONTH.								
2/80	A		33.3		1.2						
	B		100.0		3.5						
	SYSTEM	100.0	66.7		2.4			696	24	16	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING FEBRUARY THE UNIT 3 BOILER AND FGD SYSTEM OPERATED ONLY 24 HOURS. THE FGD SYSTEM WAS AVAILABLE THE ENTIRE MONTH.								
3/80	SYSTEM	100.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING MARCH THE UNIT 3 GENERATOR WAS KEPT OUT OF SERVICE. THE FGD SYSTEM WAS AVAILABLE THE ENTIRE MONTH.								
4/80	SYSTEM				0.0			720	0	0	0.0

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT DURING APRIL THE BOILER DID NOT OPERATE.								
5/80	A		8.3		0.7						
	B		0.0		0.0						
	SYSTEM	95.8	4.2		0.3			744	60	5	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE FGD SYSTEM WAS AVAILABLE 713 HOURS DURING MAY; HOWEVER, THE BOILER ONL OPERATED 60 HOURS DUE TO BOILER RELATED PROBLEMS.								
			THE B MODULE WAS OUT FOR 31 HOURS WHEN THE INLET DAMPER SWITCH FAILED CAUSING THE DRIVE MOTOR TO BURN OUT.								
6/80	A	100.0	59.1	100.0	52.8						
	B	100.0	58.6	100.0	52.4						
	SYSTEM	100.0	58.9	100.0	52.6			720	643	379	52.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			NO FGD SYSTEM-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.								
7/80	A	100.0	45.5	100.0	39.7						
	B	100.0	90.0	100.0	78.6						
	SYSTEM	100.0	67.8	100.0	59.2			744	650	440	47.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE FGD SYSTEM WAS AVAILABLE FOR OPERATION THE ENTIRE MONTH OF JULY. THE MODULES ARE UTILIZED ON AN AS NEEDED BASIS.								
8/80	A	100.0	95.7	100.0	75.8						
	B	100.0	91.6	100.0	72.6						
	SYSTEM	100.0	93.7	100.0	74.2			744	590	552	63.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
			NO FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF AUGUST.								
9/80	A	90.6	91.4	91.4	46.8						
	B	90.6	73.7	73.7	37.8						
	SYSTEM	90.6	82.4	82.4	42.2			720	369	304	32.4
10/80	A	97.4	68.4	68.4	68.4						
	B	97.4	60.9	60.9	60.9						
	SYSTEM	97.4	63.4	63.4	63.4			744	744	472	69.4
11/80	A	99.3	83.6	83.6	83.6						
	B	99.3	87.9	87.9	87.9						
	SYSTEM	99.3	85.7	85.7	85.7			720	720	617	55.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING SEPTEMBER THROUGH NOVEMBER PROBLEMS WERE ENCOUNTERED WITH THE PROGRAMABLE CONTROLLER. THE UTILITY REPLACED THE CENTRAL PROCESSING UNIT IN OCTOBER AND IN NOVEMBER A NEW PROGRAM WAS RUN. THE UTILITY REPORTED THAT NO OTHER MAJOR FGD-RELATED PROBLEMS WERE EXPERIENCED DURING THIS TIME.								
12/80	A	100.0	88.8	88.8	88.8						

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	66.0	66.0	66.0						
	SYSTEM	100.0	77.4	77.4	77.4			744	744	576	41.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO PROBLEMS WERE ENCOUNTERED WITH THE UNIT OR THE FGD SYSTEM DURING DECEMBER.										
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION FOR THE FIRST QUARTER 1981 WAS NOT AVAILABLE AT THIS TIME.										
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.										
7/81	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION FOR THE MONTH OF JULY WAS NOT AVAILABLE AT THIS TIME.										
8/81	A	87.6	56.4	100.0	56.0						
	B	99.6	50.6	100.0	50.3						
	SYSTEM	93.6	53.5	100.0	53.1			744	739	395	45.0
9/81	A	30.1	99.7	100.0	24.1						
	B	30.1	99.7	100.0	26.8						
	SYSTEM	30.1	99.7	100.0	25.4			720	217	183	18.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
	DURING SEPTEMBER LOW SYSTEM UTILIZATION WAS DUE TO THE FACT THAT THE UNIT AND THE FGD SYSTEM WERE SHUTDOWN FOR SCHEDULED REPAIRS.										
10/81	A	96.8	40.2	92.4	39.5						
	B	96.8	76.0	95.9	74.8						
	SYSTEM	96.8	58.1	94.1	57.2			744	732	425	62.8
11/81	A	99.2	95.3	98.9	74.5						
	B	99.2	56.5	98.1	44.2						
	SYSTEM	99.2	75.9	98.5	59.3			720	563	427	43.4
12/81	A	95.6	87.8	95.2	87.7						
	B	95.6	15.4	77.6	15.4						
	SYSTEM	95.6	51.6	86.4	51.5			744	743	383	48.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
	DURING THE FOURTH QUARTER THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.										

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/82	A	93.3	78.6	91.9	76.2						
	B	93.3	14.7	67.9	14.2						
	SYSTEM	93.3	46.6	79.9	45.2			744	721	336	45.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
	DURING JANUARY THE LIMESTONE FEED SYSTEM FROZE CAUSING AN UNAVAILABILITY OF LIMESTONE SLURRY TO THE FGD SYSTEM.										
2/82	A	98.7	61.8	97.9	61.8						
	B	98.7	45.9	97.2	45.9						
	SYSTEM	98.7	53.8	97.5	53.8			672	672	362	51.7
3/82	A	100.0	86.6	100.0	86.6						
	B	100.0	13.4	100.0	13.4						
	SYSTEM	100.0	50.0	100.0	50.0			744	744	372	45.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF FEBRUARY AND MARCH.										
4/82	A	98.7	63.5	97.1	41.3						
	B	98.9	40.8	96.0	26.5						
	SYSTEM	98.8	52.2	96.5	33.9			720	468	244	26.9
5/82	A	98.8	98.8	98.8	98.3						
	B	99.2	99.2	99.0	79.3						
	SYSTEM	99.0	99.0	98.9	88.8			744	744	661	78.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
	DURING APRIL AND MAY NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.										
6/82	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	68.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.										
7/82	SYSTEM	100.0	99.4	99.4	99.4			744	744	740	64.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
	MODULE A WAS OUT OF SERVICE DURING PART OF JULY DUE TO DAMPER PROBLEMS.										
8/82	SYSTEM	100.0	95.3	95.3	95.3			744	744	709	67.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST.										
9/82	SYSTEM	100.0	99.7	99.7	99.7			720	720	718	57.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED BY THE UTILITY DURING SEPTEMBER.										
10/82	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	76.3

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED BY THE UTILITY DURING OCTOBER.									
11/82	SYSTEM	100.0	98.5	98.5	36.2			720	265	261	24.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE SCRUBBER WAS TAKEN OUT OF SERVICE DURING NOVEMBER WHILE THE PRECIPITATOR WAS OUT OF SERVICE.									
12/82	SYSTEM	100.0	91.5	91.5	49.0			744	398	365	24.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS OUT OF SERVICE DURING PART OF DECEMBER DUE TO PLUGGED INLET NOZZLES.									
1/83	SYSTEM	100.0	99.6	99.6	66.6			744	498	496	30.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS SHUT DOWN DURING PART OF JANUARY FOR A SCHEDULED OUTAGE.									
		THE 3A QUENCHER EXPERIENCED LOW FLOW PROBLEMS DURING JANUARY.									
2/83	SYSTEM	0.0			0.0			672	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS SHUT DOWN DURING FEBRUARY FOR A SCHEDULED OUTAGE.									
3/83	SYSTEM	0.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SCHEDULED SHUTDOWN CONTINUED THROUGH MARCH.									
4/83	SYSTEM	16.1	66.5	66.5	16.3			720	177	118	14.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MAKE-UP WATER LINES WERE REPAIRED DURING APRIL.									
5/83	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	81.3
6/83	SYSTEM	99.9	99.4	99.4	99.4			720	720	716	78.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS OUT OF SERVICE DURING PART OF JUNE FOR MAINTENANCE.									
7/83	A	100.0	85.0		84.7						
	B	100.0	99.9		99.6						
	SYSTEM	100.0	92.4		92.2			744	742	686	71.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JULY.									
8/83	A	97.7	40.6		40.6						

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	59.5		59.5						
	SYSTEM	98.9	50.1		50.1			744	744	373	63.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS OUT OF SERVICE DURING PART OF AUGUST FOR PRESATURATOR MAINTENANCE.

9/83	A	70.1	32.4		22.7						
	B	70.1	66.6		46.7						
	SYSTEM	70.1	49.5		34.7			720	505	250	34.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS SHUT DOWN DURING SEPTEMBER FOR A SCHEDULED FALL OUTAGE.

10/83	A	18.0	57.7		11.7						
	B	18.0	64.8		13.2						
	SYSTEM	18.0	61.3	61.3	12.5			744	151	93	11.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN DURING MOST OF OCTOBER FOR A SCHEDULED FALL OUTAGE.

11/83	A	77.9	69.4		69.4						
	B	82.4	61.0		61.0						
	SYSTEM	80.1	65.2	65.2	65.2			720	720	470	66.0

** PROBLEMS/SOLUTIONS/COMMENTS

BROKEN LIMESTONE FEED LINES WERE REPORTED DURING NOVEMBER.

A FOUR-HOUR OUTAGE OCCURRED DURING NOVEMBER FOR MAINTENANCE ON THE LIMESTONE PREPARATION EQUIPMENT.

THE UTILITY REPORTED PROBLEMS PLACING MODULE A IN SERVICE DURING NOVEMBER DUE TO COMPUTER-RELATED PROBLEMS.

THE FGD SYSTEM WAS OUT OF SERVICE FOR FIVE DAYS DURING NOVEMBER TO DRY OUT THE STACK.

12/83	A	85.2	63.7		63.7						
	B	91.5	72.9		72.9						
	SYSTEM	88.4	68.3	68.3	68.3			744	744	508	68.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED PROBLEMS WITH AN INLET DAMPER AT MODULE A DURING DECEMBER.

SUB-FREEZING WEATHER CONDITIONS FORCED THE FGD SYSTEM OUT OF SERVICE DURIN DECEMBER CAUSING FROZEN, PLUGGED, AND/OR BURSTED PIPE LINES.

INCLEMENT WEATHER FORCED THE LIMESTONE PREPARATION EQUIPMENT OUT OF SERVICE DURING DECEMBER.

1/84	A	74.2	74.2		74.2						
	B	25.3	0.0		0.0						
	SYSTEM	49.7	37.1	37.1	37.1			744	744	276	51.3

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE ABSORBER WAS INOPERABLE DURING JANUARY DUE TO FROZEN PIPES.									
		MECHANICAL PROBLEMS WITH MODULE B DISCHARGE DAMPER OCCURRED IN JANUARY.									
		LIMESTONE FEED AND BALL MILL PROBLEMS WERE REPORTED DURING THE MONTH.									
2/84	A	47.0	95.9		46.5						
	B	0.0	0.0		0.0						
	SYSTEM	23.5	47.9	23.2	23.2			696	337	162	22.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MECHANICL PROBLEMS CONTINUED ON THE MODULE B DISCHARGE DAMPER DURING FEBRUARY.									
3/84	A	55.2	58.4		40.3						
	B	59.7	48.5		33.4						
	SYSTEM	57.5	53.4	36.8	36.8			744	513	274	40.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE 3B DISCHARGE DAMPER WAS INOPERABLE IN MARCH DUE TO MECHANICAL PROBLEMS.									
		MODULE A WAS INOPERABLE DUE TO A PLUGGED HYDROCLONE.									
4/84	A	73.8	72.6		72.5						
	B	73.8	48.8		48.7						
	SYSTEM	73.8	60.7	60.6	60.6			720	719	436	73.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS OUT OF SERVICE DURING PART OF APRIL TO ALLOW HOT FLUE GAS TO DRY THE STACK. WATER CARRYOVER HAD COLLECTED IN THE BASE OF THE STACK MAKING IT DIFFICULT TO MAINTAIN ADEQUATE TEMPERATURES ABOVE DEW POINT.									
5/84	A	98.5	94.0		92.6						
	B	98.5	74.1		73.0						
	SYSTEM	98.5	84.1	82.8	82.8			744	733	616	73.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE ABSORBER WAS UNAVAILABLE IN MAY DUE TO THE REPLACEMENT OF MAKE-UP WATER VALVES AND THE ROTATION OF MAKE-UP WATER NOZZLES.									
6/84	A	100.0	82.4		82.4						
	B	99.4	77.1		77.1						
	SYSTEM	99.7	79.7	79.7	79.7			720	720	574	67.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.									
7/84	SYSTEM	96.8	91.3		91.3			744	744	679	65.7

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MODULE B WAS DOWN PART OF JULY TO CLEAN THE PLUGGED MIST ELIMINATOR. THIS MODULE WAS ALSO OUT OF SERVICE FOR INTERFACE TRAY REPAIRS.									
8/84	A	99.6	91.6		91.6						
	B	99.6	93.3		93.3						
	SYSTEM	99.6	92.4		92.4			744	744	688	63.8
9/84	A	92.4	72.7		67.2						
	B	92.4	74.4		68.8						
	SYSTEM	92.4	73.6		68.0			720	666	480	51.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF AUGUST AND SEPTEMBER.									
10/84	A	32.5	80.7		28.0						
	B	19.5	40.6		14.1						
	SYSTEM	26.0	60.7		21.1			744	259	157	28.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ABSORBER B WAS DOWN PART OF OCTOBER DUE TO A BROKEN OUTLET DAMPER DRIVE SHAFT.									
11/84	A	100.0	65.0		65.0						
	B	98.1	69.1		69.1						
	SYSTEM	99.0	67.0		67.0			720	720	482	55.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		WORK ON THE OUTLET DAMPER FOR MODULE B WAS COMPLETED DURING THE MONTH OF NOVEMBER.									
12/84	A	100.0	24.2		24.2						
	B	100.0	93.6		93.6						
	SYSTEM	100.0	58.9		58.9			744	744	438	51.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER.									
1/85	A	77.2	77.1	77.1	77.1						
	B	70.8	51.5	51.5	51.4						
	SYSTEM	74.0	64.3	64.3	64.3			744	744	478	60.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS OUT OF SERVICE DURING PART OF THE MONTH AS A RESULT OF SUBFREEZING WEATHER AND FROZEN SLURRY LINES.									
2/85	A	100.0	16.0	16.0	16.0						
	B	100.0	94.0	94.0	94.0						
	SYSTEM	100.0	55.0	55.0	55.0			672	672	370	46.5

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTH OF FEBRUARY.									
3/85	A	87.9	63.6	63.6	59.2						
	B	87.9	84.5	84.5	78.7						
	SYSTEM	87.9	74.1	74.1	68.9			744	693	513	59.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SCRUBBING SYSTEM WAS TAKEN OUT OF SERVICE FOR A SHORT TIME SO THAT A LIMESTONE SLURRY FEED TANK COULD BE EMPTIED AND INSPECTED.									
		THE SCRUBBER WAS SHUTDOWN JUST PRIOR TO A SCHEDULED BOILER SHUTDOWN IN ORDER TO ALLOW THE STACK TO DRY OUT.									
4/85	A	2.7	100.0	100.0	2.7						
	B	0.0	0.0	0.0	0.0						
	SYSTEM	1.4	50.0	50.0	1.4			720	20	10	1.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SCRUBBING SYSTEM WAS OUT OF SERVICE DURING MOST OF THE MONTH FOR A SCHEDULED UNIT OUTAGE.									
5/85	A	98.0	93.4	93.4	93.4						
	B	98.8	14.5	14.5	14.5						
	SYSTEM	98.4	54.0	54.0	54.0			744	744	401	58.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INLET WASH NOZZLE CLEANING ACCOUNTED FOR A BRIEF FGD SYSTEM OUTAGE TIME DURING THE MONTH.									
6/85	A	100.0	83.6	83.6	83.6						
	B	100.0	73.7	73.7	73.7						
	SYSTEM	100.0	78.6	78.6	78.6			720	720	566	75.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTH OF JUNE.									
7/85	A	99.7	94.2	94.2	94.1						
	B	99.7	49.3	49.3	49.2						
	SYSTEM	99.7	71.8	71.8	71.7			744	743	533	75.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A BOILER TRIP OCCURRED DURING THE MONTH ACCOUNTING FOR THE BRIEF DOWNTIME. NO FGD SYSTEM PROBLEMS WERE REPORTED.									
8/85	A	100.0	97.9	97.9	97.9						
	B	100.0	55.5	55.5	55.5						
	SYSTEM	100.0	76.7	76.7	76.7			744	744	570	77.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTH OF AUGUST.									
9/85	A	99.9	50.0	50.0	50.0						

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	99.9	75.1	75.1	75.1						
	SYSTEM	99.9	62.6	62.6	62.6			720	720	451	80.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SCRUBBING SYSTEM SHUT ITSELF DOWN DURING THE MONTH. NO PROBLEMS WERE DISCOVERED AND THE SYSTEM WAS QUICKLY PUT BACK INTO SERVICE.									
10/85	A	30.8	83.1	83.1	29.6						
	B	30.8	17.8	17.8	6.3						
	SYSTEM	30.8	50.4	50.4	17.9			744	265	134	28.2
11/85	A	0.0			0.0						
	B	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS TAKEN OFF LINE FOR A MAJOR TURBINE INSPECTION IN OCTOBER. THE OUTAGE CONTINUED THROUGH NOVEMBER.									
12/85	A	80.4	21.1	21.1	18.4						
	B	80.4	71.3	71.3	62.1						
	SYSTEM	80.4	46.2	46.2	40.2			744	647	299	51.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS REMOVED FROM SERVICE FOLLOWING A BOILER TRIP. THE SYSTEM WAS NOT RETURNED TO SERVICE UNTIL THE BOILER HAD STABILIZED.									
1/86	A	100.0	47.4		47.4						
	B	100.0	62.5		62.5						
	SYSTEM	100.0	54.9		54.9			744	744	409	55.6
2/86	A	100.0	88.7		88.7						
	B	100.0	1.1		1.1						
	SYSTEM	100.0	44.9		44.9			672	672	302	49.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR JANUARY OR FEBRUARY.									
3/86	A	98.8	39.0		39.0						
	B	85.9	60.4		60.3						
	SYSTEM	92.3	49.7		49.6			744	743	369	63.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE 3B INLET AND OUTLET DAMPERS WERE TAKEN OUT OF SERVICE TO REPAIR THE DRIVE MECHANISMS.									
		A BALL MILL REDUCER GEAR FAILURE FORCED THE FGD SYSTEM OUT OF SERVICE FOR 9 HOURS IN MARCH. THE LIMESTONE SLURRY MAKEUP WAS UNAVAILABLE.									
4/86	A	99.9	90.9		13.0						
	B	99.9	22.3		3.2						
	SYSTEM	99.9	56.6		8.1			720	103	58	9.0
5/86	A		75.1		73.8						
	B		24.8		24.4						
	SYSTEM		50.0		49.1			744	731	365	52.7

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE FGD SYSTEM WAS SHUT DOWN AND THE WASH WATER TANK WAS DRAINED SO THAT A WASH WATER PUMP SUCTION VALUE COULD BE REPLACED.								
6/86	A	99.9	78.0	78.0							
	B	100.0	74.8	74.8							
	SYSTEM	99.9	76.4	76.4				720	720	550	67.6
7/86	A	59.5	46.0	45.2							
	B	59.5	52.9	52.1							
	SYSTEM	59.5	49.4	48.7				744	732	362	73.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE MAINFRAME CONTROLLER INSTRUMENTATION EXPERIENCED PROBLEMS THAT CAUSED THE SCRUBBING SYSTEM TO SHUT DOWN ON SEVERAL OCCASIONS IN JULY.								
8/86	A	100.0	67.7	66.3							
	B	100.0	39.8	38.9							
	SYSTEM	100.0	53.7	52.6				744	728	391	64.0
9/86	A	100.0	44.4	43.7							
	B	100.0	18.0	17.7							
	SYSTEM	100.0	31.2	30.7				720	709	221	59.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
			NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF AUGUST OR SEPTEMBER.								
10/86	A		15.3	8.4							
	B		7.6	4.2							
	SYSTEM		11.5	6.3				744	405	47	30.6
11/86	A		54.6	51.5							
	B		5.0	4.7							
	SYSTEM		29.8	28.1				720	678	202	67.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
			A BROKEN SUPERNATANT LINE WAS THE CAUSE OF THE LOWER NOVEMBER AVAILABILITY.								
12/86	SYSTEM		2.2	2.2				744	742	16	50.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
			LOW SULFUR COAL WAS BURNED PERIODICALLY THROUGHOUT THE FOURTH QUARTER OF 1986. THIS ACCOUNTS FOR THE LOW OPERABILITY AND UTILIZATION NUMBERS COMPARED TO THE HIGH AVAILABILITY AND RELIABILITY OF THE FGD SYSTEM. ALSO THE ANNUAL FALL OUTAGE BEGAN IN DECEMBER.								
1/87	A	99.2	29.0	29.0							
	B	100.0	0.3	0.3							
	SYSTEM	99.6	14.6	14.6				744	744	109	56.3
2/87	A	100.0	37.8	37.8							
	B	100.0	36.1	36.1							
	SYSTEM	100.0	36.9	36.9				672	672	248	

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED NO MAJOR FGD-RELATED PROBLEMS DURING THE MONTHS OF JANUARY AND FEBRUARY 1987.									
3/87	A	84.1									
	B	84.1									
	SYSTEM	84.1						744	164		10.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE INLET DAMPER WAS TAKEN OUT OF SERVICE TO REPAIR THE SHAFT, CHAIN, AND BEARINGS.									
4/87	A	99.9	74.3		66.9						
	B	99.9									
	SYSTEM	99.9	74.3		66.9			720	648	482	62.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED NO MAJOR FGD-RELATED PROBLEMS DURING APRIL.									
5/87	A	97.7	94.1		93.8						
	B	90.2	19.3		19.2						
	SYSTEM	94.0	56.7		56.5			744	741	421	56.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE 3B MODULE WAS OUT OF SERVICE DUE TO PLUGGED INLET WASHER NOZZLES.									
6/87	A	90.3	76.0		76.0						
	B	93.9	47.2		47.2						
	SYSTEM	92.1	61.6		61.6			720	720	443	62.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE LIMESTONE BALL MILL WAS OUT OF SERVICE FOR REPAIRS CAUSING A SHORTAGE OF LIMESTONE SLURRY.									
		THE 3A MODULE WAS OUT OF SERVICE DUE TO PLUGGED INLET WASHER NOZZLES.									
7/87	A	100.0	86.9		86.9						
	B	100.0	54.0		54.0						
	SYSTEM	100.0	70.4		70.4			744	744	524	70.5
8/87	A	99.9	81.1		81.1						
	B	99.9	78.6		78.6						
	SYSTEM	99.9	79.8		79.8			744	744	594	74.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED NO MAJOR FGD-RELATED PROBLEMS DURING THE MONTHS OF JULY AND AUGUST.									
9/87	A	99.4	48.3		48.3						
	B	99.4	73.0		73.0						
	SYSTEM	99.4	60.6		60.6			720	720	437	61.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		AN ELECTRICAL PROBLEM PREVENTED THE SUPERNATANT PUMPS FROM RUNNING. SUPERNATANT WAS UNAVAILABLE FOR FGD SYSTEM USE .									

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
10/87	A	100.0	98.7		37.9						
	B	100.0	92.6		35.6						
	SYSTEM	100.0	95.6		36.7			744	286	273	29.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO MAJOR FGD-RELATED PROBLEMS DURING OCTOBER.

11/87	A	99.7	99.1		98.9						
	B	57.5	59.5		59.4						
	SYSTEM	78.6	79.3		79.1			720	719	570	72.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE INLET ISOLATION DAMPERS WERE TAKEN OUT OF SERVICE TO REPAIR THE DRIVE MECHANISMS.

12/87	A	94.0	93.9		93.9						
	B	0.1	0.0		0.0						
	SYSTEM	47.0	47.0		47.0			744	744	349	56.7

** PROBLEMS/SOLUTIONS/COMMENTS

AN AGITATOR GEAR REDUCER FAILURE FORCED THE FGD SYSTEM OUT OF SERVICE IN DECEMBER. THE LIMESTONE SLURRY MAKEUP WAS UNAVAILABLE.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ALAMITO CO	
PLANT NAME	SPRINGERVILLE	
UNIT NUMBER	1	
CITY	SPRINGERVILLE	
STATE	ARIZONA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	*****	
GROSS UNIT GENERATING CAPACITY - MW	400	
NET UNIT GENERATING CAPACITY W/FGD - MW	370	
NET UNIT GENERATING CAPACITY WO/FGD - MW	383	
EQUIVALENT SCRUBBED CAPACITY - MW	360	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	********	(******* ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	152.	(500 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	19771.	(8500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8500-8900
AVERAGE ASH CONTENT - %	20.00	
RANGE ASH CONTENT - %	14.5-20.0	
AVERAGE MOISTURE CONTENT - %	20.00	
RANGE MOISTURE CONTENT - %	20.0-23.0	
AVERAGE SULFUR CONTENT - %	0.61	
RANGE SULFUR CONTENT - %	0.5-0.7	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** FABRIC FILTER		
NUMBER	1	
PRESSURE DROP - KPA	1.5	(6.0 IN-H2O)
TYPICAL GAS/CLOTH RATIO - M/MIN	0.6	(1.9 FT/MIN)
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	SPRAY DRYING	
PROCESS TYPE	LIME/SPRAY DRYING	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	JOY MFG/NIRO ATOMIZER	

ALAMITO CO: SPRINGERVILLE 1 (CONT.)

A-E FIRM	BECHTEL
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.90
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	70.00
ENERGY CONSUMPTION - %	3.3
CURRENT STATUS	1
COMMERCIAL START-UP	6/1985
INITIAL START-UP	2/1985
CONTRACT AWARDED	12/1979

** DESIGN AND OPERATING PARAMETERS

DESIGN CHLORIDE CONTENT - %	********

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	3
GENERIC TYPE	SPRAY DRYER
SPECIFIC TYPE	CROSSFLOW
TRADE NAME/COMMON TYPE	ROTARY ATOMIZER
SUPPLIER	JOY MFG/NIRO ATOMIZER
DIMENSIONS - FT	46 FT DIAMETER
SHELL GENERIC MATERIAL	NR
SHELL SPECIFIC MATERIAL	NR
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR
LINER GENERIC MATERIAL	NONE
LINER SPECIFIC MATERIAL	N/A
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A
GAS CONTACTING DEVICE TYPE	NONE
INLET GAS TEMPERATURE - C	124.4 (256 F)
SO2 REMOVAL EFFICIENCY - %	61.0
PARTICLE REMOVAL EFFICENCY - %	99.9

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	NONE
GENERIC TYPE	N/A
SPECIFIC TYPE	N/A
TRADE NAME/COMMON TYPE	N/A
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** REHEATER

NUMBER	0
GENERIC TYPE	BYPASS
SPECIFIC TYPE	N/A
TRADE NAME/COMMON TYPE	N/A
PERCENT GAS BYPASSED - AVG	10.0
CONSTRUCTION MATERIAL GENERIC TYPE	NONE
CONSTRUCTION MATERIAL SPECIFIC TYPE	N/A

** FANS

DESIGN	NR
FUNCTION	NR
APPLICATION	INDUCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** DAMPERS

FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

ALAMITO CO: SPRINGERVILLE 1 (CONT.)

** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
** PUMPS	
SERVICE	NUMBER
-------	------
NA	****
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	NONE
*** SALEABLE BYPRODUCTS	
NATURE	NONE
DISPOSITION	N/A
*** SLUDGE	
** TREATMENT	
METHOD	UNSTABILIZED
DEVICE	N/A
PROPRIETARY PROCESS	N/A
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
SITE TREATMENT	NONE
** WATER BALANCE	
WATER LOOP TYPE	CLOSED

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/85	SYSTEM							672			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY ANNOUNCED THAT INITIAL OPERATIONS AT THE SPRINGERVILLE 1 FACILITY COMMENCED IN FEBRUATY 1985. THE PLANT WENT THROUGH STARTUP AND SHUTDOWN OPERATIONS ALL OF FEBRUARY.

3/85	SYSTEM							744			
4/85	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE PLANT WAS REPORTEDLY DOWN ALL OF MARCH AND APRIL DUE TO A SCHEDULED TURBINE/BOILER OUTAGE.

5/85	SYSTEM							744			
6/85	SYSTEM							720			

ALAMITO CO: SPRINGERVILLE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE PLANT CAME BACK ON LINE IN MAY AND WAS DECLARED COMMERCIAL DURING JUNE 1985.										
7/85	SYSTEM								744		
8/85	SYSTEM								744		
9/85	SYSTEM								720		
10/85	SYSTEM								744		
11/85	SYSTEM								720		
12/85	SYSTEM								744		
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE MONTHS OF JULY THROUGH DECEMBER. HOWEVER, SEVERAL MODIFICATIONS TO THE SLURRY HANDLING SYSTEM WERE REQUIRED DUE TO INCREASED INLET FLUE GAS TEMPERATURES TO SPRAY DRYER. ADDITIONAL SLURRY AND SOLIDS HANDLING (FLYASH) HAD TO BE INCREASED TO REDUCE INLET FLUE GAS TEMPERATURES CAUSED BY BURNING A "DIFFERENT THAN DESIGN" COAL.										
1/86	SYSTEM								774		
2/86	SYSTEM								672		
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE MONTHS OF JANUARY OR FEBRUARY 1986.										
3/86	SYSTEM								774		
4/86	SYSTEM								720		
5/86	SYSTEM								774		
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UNIT WAS SHUTDOWN IN MARCH FOR A MINOR 5-WEEK SCHEDULED MAINTENANCE OUTAGE BUT REMAINED DOWN UNTIL MAY DUE TO LACK IN POWER DEMAND.										
6/86	SYSTEM								720		
7/86	SYSTEM								774		
8/86	SYSTEM								774		
9/86	SYSTEM								720		
10/86	SYSTEM								774		
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UNIT EXPERIENCED A SECOND RESERVE SHUTDOWN IN OCTOBER DUE TO THE LACK OF POWER DEMAND. THIS HAS BEEN LARGELY DUE TO THE STARTUP OF NUCLEAR CAPACITY AND THE DROP IN OIL PRICES. MOST OF THE POWER GENERATED BY THE UTILITY IS SOLD TO CALIFORNIA WHICH HAS STANDBY GAS AND OIL CAPACITY.										
11/86	SYSTEM								720		

ALAMITO CO: SPRINGERVILLE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

FGD MODIFICATIONS DURING 1986 INCLUDED INCREASING THE FLYASH RECYCLE SYSTEM. NO MAJOR FGD-RELATED OUTAGES FOR 1986 WERE REPORTED. FGD SYSTEM AVAILABILITY WAS REPORTED TO BE GREATER THAN 99%. THE UNIT OPERATED 5255 HOURS, WAS AVAILABLE FOR APPROXIMATELY 82%, AND HAD A CAPACITY FACTOR OF 37.5%.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE MONTHS OF JANUARY TO DECEMBER 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	APPLIED ENERGY SERVICE	
PLANT NAME	BEAVER VALLEY	
UNIT NUMBER	1	
CITY	MONACA	
STATE	PENNSYLVANIA	
REGULATORY CLASSIFICATION	****	
PARTICULATE EMISSION LIMITATION - NG/J	49.	(0.113 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	322.	(0.750 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	*****	
GROSS UNIT GENERATING CAPACITY - MW	126	
NET UNIT GENERATING CAPACITY W/FGD - MW	113	
NET UNIT GENERATING CAPACITY WO/FGD - MW	119	
EQUIVALENT SCRUBBED CAPACITY - MW	126	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK AND WILCOX / CE	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	********	(******* ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	******	(**** FT)
STACK SHELL	****	
STACK TOP DIAMETER - M	*******	(***** FT)
*** PARTICLE CONTROL		
** ESP		
NUMBER	4	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME	
SYSTEM SUPPLIER	FMC	
A-E FIRM	BECHTEL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
ENERGY CONSUMPTION - %	4.8	
CURRENT STATUS	1	
INITIAL START-UP	8/1980	
** DESIGN AND OPERATING PARAMETERS		
DESIGN CHLORIDE CONTENT - %	********	
** ABSORBER		
NUMBER	4	
GENERIC TYPE	IMPINGEMENT TOWER	
SPECIFIC TYPE	FIXED BAFFLE	
TRADE NAME/COMMON TYPE	DISC CONTACTOR	
SUPPLIER	FMC	
** REHEATER		
GENERIC TYPE	N/A	
PERCENT GAS BYPASSED - AVG	0.0	
** SOLIDS CONCENTRATING/DEWATERING		
DEVICE	THICKENER	
NUMBER	1	
** SOLIDS CONCENTRATING/DEWATERING		
DEVICE	VACUUM FILTER	
NUMBER	2	
*** SLUDGE		

APPLIED ENERGY SERVICE: BEAVER VALLEY 1 (CONT.)

** TREATMENT
METHOD — STABILIZATION

** DISPOSAL
NATURE — FINAL
TYPE — LANDFILL

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP FACTOR
1/87	SYSTEM							744	9999		999.9
2/87	SYSTEM							672	9999		999.9
3/87	SYSTEM							744	9999		999.9
4/87	SYSTEM							720	9999		999.9
5/87	SYSTEM							744	9999		999.9
6/87	SYSTEM							720	9999		999.9
7/87	SYSTEM							744	9999		999.9
8/87	SYSTEM							744	9999		999.9
9/87	SYSTEM							720	9999		999.9
10/87	SYSTEM							744	9999		999.9
11/87	SYSTEM							720	9999		999.9
12/87	SYSTEM							744	9999		999.9

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED BY THE UTILITY FOR THE YEAR 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	APPLIED ENERGY SERVICE	
PLANT NAME	DEEPWATER	
UNIT NUMBER	1	
CITY	PASADENA	
STATE	TEXAS	
REGULATORY CLASSIFICATION	B	
PARTICULATE EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	129	
GROSS UNIT GENERATING CAPACITY - MW	165	
NET UNIT GENERATING CAPACITY W/FGD - MW	129	
NET UNIT GENERATING CAPACITY WO/FGD - MW	134	
EQUIVALENT SCRUBBED CAPACITY - MW	165	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	FOSTER WHEELER	
BOILER TYPE	PULVERIZED COKE	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	299.18	(634000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	182.2	(360 F)
STACK HEIGHT - M	145.	(475 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	4.5	(14.6 FT)
** FUEL DATA		
FUEL TYPE	COKE	
FUEL GRADE	PETROLEUM COKE	
AVERAGE HEAT CONTENT - J/G	30238.	(13000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		12000 - 135000
AVERAGE ASH CONTENT - %	0.50	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	8.75	
RANGE MOISTURE CONTENT - %	8-15	
AVERAGE SULFUR CONTENT - %	4.00	
RANGE SULFUR CONTENT - %	4-8	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	BABCOCK & WILCOX	
INLET FLUE GAS CAPACITY - CU.M/S	299.2	(634000 ACFM)
INLET FLUE GAS TEMPERATURE - C	182.2	(360 F)
PRESSURE DROP - KPA	0.5	(2. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	97.0	
** PARTICLE SCRUBBER		
NUMBER	2	
NUMBER OF SPARES	1	
INITIAL START-UP DATE	86/1903	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	FIXED THROAT	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	BABCOCK & WILCOX	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
LINER GENERIC MATERIAL	RUBBER	
LIQUID RECIRCULATION RATE - LITER/S	3906.0	(62000 GPM)
L/G RATIO - LITER/CU.M	1.7	(12.7 GAL/1000ACF)
PRESSURE DROP - KPA	0.4	(1.5 IN-H2O)
INLET GAS FLOW RATE - CU.M/S	228.9	(485000 ACFM)
INLET GAS TEMPERATURE - C	54.4	(130 F)
SO2 REMOVAL EFFICENCY - %	90.0	

APPLIED ENERGY SERVICE: DEEPWATER 1 (CONT.)

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	SALEABLE PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	BABCOCK & WILCOX	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
ENERGY CONSUMPTION - %	3.0	
CURRENT STATUS	1	
COMMERCIAL START-UP	6/1986	
INITIAL START-UP	3/1986	
CONTRACT AWARDED	3/1984	

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	8.00	
DESIGN COAL HEAT CONTENT - J/G	30238.0	(13000 BTU/LB)
DESIGN COAL ASH CONTENT - %	0.50	
DESIGN MOISTURE CONTENT - %	8.00	
DESIGN CHLORIDE CONTENT - %	********	

** ABSORBER

NUMBER	2	
NUMBER OF SPARES	1	
GENERIC TYPE	SPPAY TOWER	
SUPPLIER	BABCOCK & WILCOX	
SHELL GENERIC MATERIAL	C/S	
LINER GENERIC MATERIAL	RUBBER	
GAS CONTACTING DEVICE TYPE	SPRAY	
LIQUID RECIRCULATION RATE - LITER/S	4032.	(64000 GPM)
L/G RATIO - L/CU.M	2.9	(21.7 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.0	(0.0 IN-H2O)
INLET GAS FLOW - CU. M/S	228.87	(485000 ACFM)

** REHEATER

GENERIC TYPE	IN-LINE	
SPECIFIC TYPE	STEAM	

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER	
FEED STREAM SOURCE	ABSORBER BLEED	

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	CENTRIFUGE	
FEED STREAM SOURCE	THICKENER UNDERFLOW	

*** SALEABLE BYPRODUCTS

NATURE	GYPSUM	
FULL LOAD QUANTITY - M T/H	18.14	(20.00 TPH)
DISPOSITION	MARKETED	
NATURE OF END PRODUCT	CASO4 (WALL BOARD MATERIAL)	

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION	
DEVICE	OXIDATION TOWERS	

** DISPOSAL

NATURE	FINAL	
TYPE	NONE	
LOCATION	OFF-SITE	

APPLIED ENERGY SERVICE: DEEPWATER 1 (CONT.)

** WATER BALANCE
WATER LOOP TYPE CLOSED

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATIONS AT DEEPWATER 1 STARTED ON MARCH 12, 1986 THE UNIT WAS DECLARED COMMERCIAL ON JUNE 26, 1986.

7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

VANDAIUM IN THE COKE BURNED PROMOTES THE FORMATION OF SO3 FROM SO2 BY ACTING AS A CATALYST. MUCH OF THE SO3 PASSES THROUGH THE FGD SYSTEM UNCOLLECTED. A WET ESP IS REQUIRED DOWN-STREAM OF THE LIMESTONE SO2 SCRUBBER FOR ITS REMOVAL. PLASTIC COATED ELECTRICALLY CHARGED PLATES SPRAYED WITH A FILM OF WATER ATTRACT AND COLLECT THE SO3 VIA GASEOUS ABSORPTION. THE RESULTANT COLLECTED H2SO4 ACID FROM THE WET ESP IS THEN USED TO NEUTRALIZE ANY UNREACTED LIMESTONE IN THE SCRUBBER SLUDGE WHICH IS LATER FORCIBLY OXIDIZED TO PRODUCE A SALEABLE GYPSUM BY-PRODUCT. APPROXIMATELY 450 TONS/DAY OF THIS GYPSUM IS PRODUCED FOR A MAJOR WALLBOARD COMPANY. THE WALLBOARD COMPANY CURRENTLY USES 75% UTILITY PRODUCED GYPSUM IN THEIR FINAL WALLBOARD PRODUCT.

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED FOR THE YEAR 1986. FIRST YEAR FGD SYSTEM AVAILABILITY WAS REPORTED TO BE GREATER THAN 92%.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			

APPLIED ENERGY SERVICE: DEEPWATER 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

AES REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS OR OUTAGES WERE ENCOUNTERED DURING THE YEAR. THE PLANT WAS SHUTDOWN IN 1987 DURING THE MONTHS OF APRIL AND OCTOBER FOR SCHEDULED BOILER/FGD MAINTENANCE.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA ELECTRIC POWER	
PLANT NAME	APACHE	
UNIT NUMBER	2	
CITY	COCHISE	
STATE	ARIZONA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	344.	(0.800 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	530	
GROSS UNIT GENERATING CAPACITY - MW	195	
NET UNIT GENERATING CAPACITY W/FGD - MW	172	
NET UNIT GENERATING CAPACITY WO/FGD - MW	180	
EQUIVALENT SCRUBBED CAPACITY - MW	98	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	520.98	(1104000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	376.7	(710 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	4.9	(16.2 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	23260.	(10000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		9500-10800
AVERAGE ASH CONTENT - %	15.00	
RANGE ASH CONTENT - %	15-20	
AVERAGE MOISTURE CONTENT - %	13.00	
RANGE MOISTURE CONTENT - %	9.0-15.0	
AVERAGE SULFUR CONTENT - %	0.70	
RANGE SULFUR CONTENT - %	0.4-0.6	
AVERAGE CHLORIDE CONTENT - %	0.01	
RANGE CHLORIDE CONTENT - %	0.00-0.03	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	HOT SIDE	
SUPPLIER	AIR CORRECTION DIVISION, UOP	
INLET FLUE GAS CAPACITY - CU.M/S	521.0	(1104000 ACFM)
INLET FLUE GAS TEMPERATURE - C	376.7	(710 F)
PRESSURE DROP - KPA	0.1	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.6	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	RESEARCH-COTTRELL	
A-E FIRM	BURNS & MCDONNELL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.60	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	85.00	
ENERGY CONSUMPTION - %	4.1	
CURRENT STATUS	1	
COMMERCIAL START-UP	1/1979	
INITIAL START-UP	8/1978	
CONTRACT AWARDED	7/1974	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	1.00	
DESIGN COAL HEAT CONTENT - J/G	23260.0	(10000 BTU/LB)
DESIGN COAL ASH CONTENT - %	17.00	
DESIGN MOISTURE CONTENT - %	18.00	
DESIGN CHLORIDE CONTENT - %	0.00	
SPACE REQUIREMENTS - SQ M	4046.7	(43560 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	72.0	
** QUENCHER/PRESATURATOR		
NUMBER	2	
TYPE	CYCLONIC SPRAY QUENCHER	
SUPPLIER	RESEARCH-COTTRELL	
INLET GAS FLOW - CU. M/S	188.76	(400000 ACFM)
INLET GAS TEMPERATURE - C	132.2	(270 F)
PRESSURE DROP - KPA	0.2	(1.0 IN-H2O)
LIQUID RECIRCULATION RATE - LITERS/S	567.	(9000 GPM)
L/G RATIO - L/CU. M	2.7	(20.0 GAL/1000 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	
** ABSORBER		
NUMBER	2	
NUMBER OF SPARES	1	
GENERIC TYPE	COMBINATION TOWER	
SPECIFIC TYPE	SPRAY/PACKED	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	RESEARCH-COTTRELL	
DIMENSIONS - FT	30.0 DIA X 110.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER	
LINER MATERIAL TRADE NAME/COMMON TYPE	FLAKELINE 103	
GAS CONTACTING DEVICE TYPE	SPRAY ZONE & VERTICAL CROSS CHANNEL FIXED GRID P	
NUMBER OF CONTACTING ZONES	2	
LIQUID RECIRCULATION RATE - LITER/S	567.	(9000 GPM)
L/G RATIO - L/CU.M	5.3	(40.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.6	(2.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	94.38	(200000 ACFM)
INLET GAS TEMPERATURE - C	68.3	(155 F)
SO2 REMOVAL EFFICIENCY - %	97.0	
PARTICLE REMOVAL EFFICENCY - %	99.6	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	2	
NUMBER OF SPARES PER SYSTEM	1	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

TRADE NAME/COMMON TYPE	CLOSED VANE		
MANUFACTURER	MUNTERS		
CONFIGURATION	HORIZONTAL		
NUMBER OF STAGES	2		
NUMBER OF PASSES PER STAGE	3		
FREEBOARD DISTANCE - M	0.61	(2.0 FT)	
DISTANCE BETWEEN STAGES - CM	30.48	(12.0 IN)	
DISTANCE BETWEEN VANES - CM	10.2	(4.00 IN)	
VANE ANGLES - DEGREES	45		
PRESSURE DROP - KPA	0.2	(1.0 IN-H20)	
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)	
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC		
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYVINYL CHLORIDE		
WASH WATER SOURCE	FRESH		
WASH FREQUENCY	INTERMITTENT 'LOWER STAGE!; ONCE EVERY HOUR 'UPP		
WASH RATE - L/S	12.6	(200 GAL/MIN)	

** REHEATER

NUMBER	0		
GENERIC TYPE	NONE		
SPECIFIC TYPE	N/A		
TRADE NAME/COMMON TYPE	N/A		
PERCENT GAS BYPASSED - AVG	50.0		
TEMPERATURE INCREASE - C	43.3	(78 F)	
INLET FLUE GAS TEMPERATURE - C	46.1	(115 F)	
OUTLET FLUE GAS TEMPERATURE - C	89.4	(193 F)	
CONSTRUCTION MATERIAL GENERIC TYPE	NONE		
CONSTRUCTION MATERIAL SPECIFIC TYPE	N/A		

** FANS

NUMBER	2		
NUMBER OF SPARES	0		
DESIGN	CENTRIFUGAL		
SUPPLIER	WESTINGHOUSE		
FUNCTION	UNIT		
APPLICATION	FORCED DRAFT		
SERVICE	DRY		
FLUE GAS FLOW RATE - CU.M/S	188.76	(400000 ACFM)	
FLUE GAS TEMPERATURE - C	132.2	(270 F)	
PRESSURE DROP - KPA	6.2	(20.5 IN-H20)	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL		

** DAMPERS

NUMBER	2		
FUNCTION	SHUT-OFF		
GENERIC TYPE	LOUVER		
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER		
MODULATION	OPEN/CLOSED		
SEAL AIR FLOW - CU. M/S	0.24	(500 ACFM)	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL		
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR		
LINER GENERIC MATERIAL TYPE	NONE		
LINER SPECIFIC MATERIAL TYPE	N/A		

** DAMPERS

NUMBER	2		
FUNCTION	SHUT-OFF		
GENERIC TYPE	GUILLOTINE		
SPECIFIC TYPE	TOP-ENTRY GUILLOTINE		
MODULATION	OPEN/CLOSED		
SEAL AIR FLOW - CU. M/S	0.24	(500 ACFM)	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL		
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR		
LINER GENERIC MATERIAL TYPE	HIGH ALLOY		
LINER SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM		

** DAMPERS

NUMBER	2		
FUNCTION	SHUT-OFF		
GENERIC TYPE	LOUVER		
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER		

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

MODULATION	OPEN/CLOSED
SEAL AIR FLOW - CU. M/S	0.24 (500 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	HIGH ALLOY
LINER SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM

** DUCTWORK

LOCATION	ABSORBER INLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	12.0 X 14.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	ABSORBER OUTLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	12.0 X 14.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	FLUOROELASTOMER

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	4.5 (5 TPH)
PRODUCT QUALITY - % SOLIDS	45.0

** TANKS

SERVICE	NUMBER
ABSORBER FEED	1
REAGENT FEED	1
MILL SLURRY SUMP	1
WASTE SLURRY SUMP	1

** PUMPS

SERVICE	NUMBER
ABSORBER	3
QUENCHER	4
MILL SLURRY RECYCLE	2
ADDITIVE FEED	2
WASTE SLURRY TRANSFER	1

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

MOISTURE CONTENT - % TOTAL FREE WATER	70.0
% CASO4 - DRY	80.0

** TREATMENT

METHOD	BLEED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

** DISPOSAL	
NATURE	FINAL
TYPE	POND
LOCATION	OFF-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	NONE
SITE DIMENSIONS	25 TO 30 ACRES BY 18 FT DEEP
SITE CAPACITY - CU.M	611500 (500.0 ACRE-FT)
SITE SERVICE LIFE - YRS	30
** PROCESS CONTROL AND INSTRUMENTATION	
PROCESS STREAM	QUENCHER RECYCLE LINE
CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	PERCENT SOLIDS
CONTROL LEVELS	5.0 PH
PROCESS CONTROL MANNER	MANUAL
PROCESS CHEMISTRY MODE	FEEDBACK
** WATER BALANCE	
WATER LOOP TYPE	OPEN
MAKEUP WATER ADDITION - LITERS/S	115.9 (1840 GPM)
SOURCE OF MAKEUP WATER	WELL WATER
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	>93% CACO3
SOURCE/SUPPLIER	PAUL LIME
UTILIZATION - %	99.0
POINT OF ADDITION	BALL MILL
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	100.0
MIST ELIMINATOR - %	0.0
FAN - %	0.0
BALL MILL - %	0.0
EFFLUENT HOLD TANK - %	0.0
RECIRCULATION PUMP - %	50.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	1.0
MIST ELIMINATOR	0.0
FAN	0.0
BALL MILL	0.0
EFFLUENT HOLD TANK	0.0
RECIRCULATION PUMP	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/78	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATIONS BEGAN IN AUGUST WITH THE BOILER AND SCRUBBER SYSTEM FOR TESTING PURPOSES.

9/78	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

SCRUBBER AND BOILER TESTING CONTINUED THROUGH SEPTEMBER. FINAL FACILITY CONSTRUCTION SHOULD BE COMPLETE BY OCTOBER.

10/78	SYSTEM							744	303		59.5

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS SHUTDOWN IN EARLY OCTOBER TO MAKE ADDITIONAL BOILER MODIFICATIONS. NO PROBLEMS WERE REPORTED FOR THE FGD SYSTEM. COMPLIANCE TESTIN IS SCHEDULED FOR EARLY NOVEMBER. THE UTILITY HAS DECIDED THAT IN APPROXIMATELY A YEAR THE SCRUBBER INLET DUCTWORK WILL BE CHANGED FROM CARBON STEEL TO STAINLESS STEEL.									
11/78	A		24.8		16.8						
	B		43.7		29.6						
	SYSTEM		68.5		46.4			720	488	334	82.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SO2 STACK MONITORS HAVE NEVER BEEN OPERABLE. THE MONITORS HAVE BEEN SENT BACK TO THE FACTORY AND ARE NOT EXPECTED BACK ON SITE UNTIL LATE DECEMBER.									
		THE LIMESTONE CRUSHER HAS BEEN UNABLE TO OPERATE AT DESIGN CAPACITY.									
		A COMPLIANCE TEST WAS COMPLETED BUT THE RESULTS ARE NOT YET AVAILABLE. THE ACCEPTANCE IS SCHEDULED FOR THE BEGINNING OF 1979.									
12/78	SYSTEM		0.0		0.0			744	512	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		RESULTS OF THE RECENT COMPLIANCE TEST INDICATED THAT SO2 EMISSIONS WERE BETWEEN 1.2 LB/MM BTU, THE FEDERAL APPLICABLE STANDARD; AND 0.8 LB/MM BTU, THE STATE STANDARD, WITHOUT THE FGD SYSTEM. THE UTILITY IS CURRENTLY BURNING LOW SULFUR COAL (0.6% S). IT IS BELIEVED THAT THE STATE STANDARD COUL BE MET WITHOUT FGD SYSTEM OPERATION WHEN THE FURNACE IS "FINE TUNED".									
		A 30 HOUR OUTAGE OCCURRED DUE TO A RUPTURE IN THE REAGENT FEED LINE.									
1/79	SYSTEM		0.0		0.0			744	662	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SHAKEDOWN/DEBUGGING OPERATION CONTINUED THROUGH JANUARY.									
		COMMERCIAL OPERATIONS BEGAN ON JANUARY 15.									
2/79	SYSTEM		0.0		0.0			672	504	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS NOT IN SERVICE DURING DECEMBER, JANUARY, OR FEBRUARY DU TO VARIOUS SHAKEDOWN/DEBUGGING PROBLEMS ESPECIALLY IN MAINTAINING RECYCLE PUMP OPERATION.									
3/79	SYSTEM		0.0		0.0			744	372	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A BOILER EXPLOSION AT THE BURNER FACE CAUSED THE UNIT TO BE DOWN FROM THE LAST WEEK IN FEBRUARY THROUGH THE MIDDLE OF MARCH.									
4/79	SYSTEM							720	720		

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		COMPLIANCE TESTS WERE RUN ON THIS UNIT LAST NOVEMBER AND THE UNIT WAS DECLARED COMMERCIAL IN FEBRUARY. THE FGD SYSTEM OPERATES ONLY ABOUT 50 % OF THE BOILER HOURS BECAUSE THE UNIT OPERATES AT SUCH A LOW RATING 50% OF THE TIME THAT THE FGD SYSTEM IS NOT NEEDED.									
5/79	SYSTEM							744			
6/79	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		IN GENERAL THE FGD SYSTEM AND BOILER OPERATED WELL THROUGH MAY AND JUNE.									
		THE FRP REAGENT FEED PIPING HAS BEEN A CONTINUAL PROBLEM AREA. THE FRP HAS BEEN RUPTURING PARTICULARLY AT PIPING CONNECTIONS. THE UTILITY IS IN THE PROCESS OF REPLACING THE FRP PIPING WITH CARBON STEEL PIPING.									
		THE BALL MILL APPEARS TO HAVE BEEN UNDERDESIGNED. THE MILL PRODUCES 4 TONS/HOUR OF GROUND LIMESTONE AT BEST ALTHOUGH IT WAS RATED AT 5 TON/HOU CAPACITY.									
7/79	SYSTEM							744			
8/79	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED HAVING EXTENSIVE PROBLEMS WITH THE REAGENT HANDLING SYSTEM PARTICULARLY WITH RESPECT TO FEED LINE FAILURES, PIPING PLUGGING AND GRINDING OPERATIONS. THE REAGENT HANDLING SYSTEM ACCOMODATES BOTH UNITS 2 AND 3.									
9/79	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE THIRD QUARTER OF 1979 THE BOILER AND FGD SYSTEM ONLY OPERATED ABOUT 25% OF THE TIME BECAUSE OF CONTINUING PROBLEMS WITH THE REAGENT FEED LINE. THE FRP SECTION FROM THE GRINDER TO THE SCRUBBERS FAILED. THE LINE WAS REPAIRED AT THE END OF SEPTEMBER.									
		ON NOVEMBER 3 THE UNIT WILL BE SHUT DOWN FOR A FOUR TO SIX WEEK SCHEDULED OUTAGE.									
10/79	SYSTEM	0.0	0.0	0.0				744		0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY IS IN THE PROCESS OF REPLACING THE REAGENT HANDLING SYSTEM; THEREFORE, THE FGD SYSTEM DID NOT OPERATE DURING OCTOBER.									
11/79	SYSTEM	100.0	100.0	100.0	6.3			720	41	41	2.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OUT OF SERVICE FOR MOST OF NOVEMBER FOR AN ANNUAL INSPECTION.									
12/79	SYSTEM	100.0	0.0	0.0	0.0			744	130	0	5.7

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
					THE EXTENSIVE PROBLEMS ENCOUNTERED EARLIER WITH THE REAGENT HANDLING SYSTE HAVE BEEN RESOLVED. THE SYSTEM REPLACEMENT WAS COMPLETED IN DECEMBER.						
					DURING DECEMBER THE BOILER OPERATED 130 HOURS FOR WHICH THE SCRUBBER WAS AVAILABLE 100% OF THE TIME.						
					THE BOILER ENCOUNTERED DAMPER PROBLEMS THAT ACCOUNTED FOR MOST OF THE DECEMBER DOWN TIME.						
1/80	SYSTEM	91.0	58.3	88.8	57.3			744	731	426	56.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
					DURING JANUARY SOME OUTAGE TIME WAS DUE TO A PUMP MALFUNCTION.						
					OUTAGE TIME WAS ALSO CAUSED BY A BROKEN FEED BELT TO THE LIMESTONE BALL MILL.						
2/80	SYSTEM	92.8	96.7	92.8	92.8			696	668	646	87.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
					DURING FEBRUARY OUTAGE TIME RESULTED FROM AN ESP FAILURE.						
					FORCED OUTAGE TIME WAS ALSO CAUSED BY A PUMP MALFUNCTION.						
3/80	SYSTEM	99.1	99.1	99.0	99.1			744	744	738	74.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
					SOME OF THE OUTAGE TIME DURING MARCH OCCURRED BECAUSE OF PUMP FAILURES.						
					OUTAGE TIME RESULTED FROM STICKING VALVES AND LIMESTONE FEED-BELT PROBLEMS.						
4/80	SYSTEM	67.2	65.2	65.2	61.4			720	678	442	
	** PROBLEMS/SOLUTIONS/COMMENTS										
					DURING APRIL THE FGD SYSTEM WAS FORCED DOWN DUE TO PUMP FAILURES AND A RUPTURE IN THE SLURRY RECIRCULATION LINE.						
5/80	SYSTEM	90.5	90.5	90.5	90.5			744	744	673	
	** PROBLEMS/SOLUTIONS/COMMENTS										
					DURING MAY THE UNIT WAS FORCED OFF LINE WHEN THE LIMESTONE CRUSHER MALFUNCTIONED.						
					THE UNIT WAS ALSO FORCED OUT DUE TO PUMP AND VALVE FAILURES.						
6/80	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
					THE UTILITY REPORTED THAT THE DATA FOR THE MONTH OF JUNE HAS BEEN MISPLACED.						
7/80	202	100.0	0.0		0.0						
	203	85.0	85.7	85.7	85.0						
	SYSTEM	100.0	85.7	85.7	85.0			744	738	633	77.8

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE 202 WAS AVAILABLE THE ENTIRE MONTH, BUT WAS NOT OPERATED.									
		THE FGD SYSTEM WAS DOWN IN JULY BECAUSE OF A CIRCUIT BREAKER MALFUNCTION.									
		FAILURE OF BOTH THE BYPASS DAMPER AND THE PACKING PUMP ALSO CAUSED OUTAGE TIME DURING THE MONTH.									
8/80	202	0.0	0.0		0.0						
	203	96.8	66.0	95.2	63.3						
	SYSTEM	96.8	66.0	95.2	63.3			744	714	471	61.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TOWER 202 WAS UNAVAILABLE IN AUGUST BECAUSE OF THE LINER BEING REPLACED.									
		A SAMPLE LINE FAILURE CAUSED TOWER 203 TO GO DOWN FOR 24 HOURS.									
		THE OPERATION OF THE FGD SYSTEM WAS REDUCED BECAUSE OF LOW LOAD CAPACITY.									
9/80	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO INFORMATION WAS AVAILABLE FOR SEPTEMBER 1980.									
10/80	202	0.0	0.0		0.0						
	203	92.6	87.7	98.6	82.4						
	SYSTEM	92.7	87.7	98.6	82.4			744	699	613	62.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE 202 WAS NOT OPERATED DURING THE MONTH OF OCTOBER DUE TO A SCHEDULED ANNUAL OVERHAUL.									
		DURING OCTOBER FORCED OUTAGES OCCURRED AS A RESULT OF PH INSTABILITY IN TH SYSTEM.									
		THE LOSS OF OPERATION TIME ON MODULE 203 WAS PRIMARILY DUE TO REDUCED LOAD CAPACITY DURING OCTOBER.									
11/80	202	20.0	22.4	40.0	6.7						
	203	0.0	0.0		0.0						
	SYSTEM	20.0	22.4	40.0	6.7			720	214	48	25.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER THE BOILER WAS NOT IN SERVICE THE FIRST 21 DAYS. THE BOILER WAS OPERATED AT REDUCED LOAD FOR THE FIRST 96 HOURS AFTER STARTUP UNTIL THE FGD SYSTEM WAS ON-LINE.									
		FAILURE OF THE LIMESTONE BALLMILL ACCOUNTED FOR 72 HOURS OF OUTAGE TIME.									
12/80	202	100.0	100.0	100.0	99.9						
	203	0.0	0.0		0.0						
	SYSTEM	100.0	100.0	100.0	99.9			744	743	743	87.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF DECEMBER.									
1/81	202	100.0	62.9	100.0	62.9						

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	203	0.0	0.0		0.0						
	SYSTEM	100.0	62.9	100.0	62.9			744	744	468	86.6

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 202 WAS NOT OPERATED DURING THE LAST 276 HOURS OF THE MONTH AS A RESULT OF THE LOW SULFUR CONTENT OF THE COAL BEING FIRED.

MODULE 203 WAS NOT AVAILABLE FOR OPERATION DURING JANUARY.

2/81	202	100.0	10.7	100.0	10.7						
	203	0.0	0.0		0.0						
	SYSTEM	100.0	10.7	100.0	10.7			672	672	72	77.4

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE OPERATION OF THE FGD SYSTEM WAS REDUCED DUE TO THE LOW SULFUR CONTENT OF THE COAL.

REPAIRS WERE MADE ON TOWER 203 DURING FEBRUARY.

3/81	202	0.0	0.0		0.0						
	203	100.0	53.7	100.0	43.7						
	SYSTEM	100.0	53.6	100.0	43.7			744	605	325	70.2

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH MODULE 202 WAS NOT AVAILABLE DUE TO EROSION PROBLEMS.

THE SYSTEM WAS BY-PASSED DURING PART OF THE MONTH BECAUSE THE UNIT WAS FIRING LOW SULFUR COAL.

4/81	202	0.0	0.0		0.0						
	203	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	98.2

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL MODULE 202 WAS NOT AVAILABLE FOR OPERATION DUE TO ERROSION OF THE BOWL AREA OF THE MODULE. THIS HAS BEEN A CONTINUAL PROBLEM AND THE UTILITY IS PRESENTLY CONDUCTING STUDIES TO ALLEVIATE THE PROBLEM.

5/81	202	100.0	0.0		0.0						
	203	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	87.4

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

MODULE 202 WAS AVAILABLE THE ENTIRE MONTH, BUT WAS NOT OPERATED.

6/81	202	100.0	0.0		0.0						
	203	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			720	716	720	91.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR PROBLEMS WERE EXPERIENCED DURING THE MONTH OF JUNE.

7/81	202	100.0	45.2	100.0	45.2						

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	203	46.2	46.2	100.0	46.2						
	SYSTEM	100.0	91.4	100.0	91.4			744	744	680	91.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 203 WAS TAKEN OUT OF SERVICE ON JULY 15 FOR PREVENTIVE MAINTENANCE AND REPAIRS, AT WHICH TIME MODULE 202 WAS PUT INTO SERVICE.

8/81	202	100.0	39.9	100.0	35.5						
	203	0.0	0.0		0.0						
	SYSTEM	100.0	39.9	100.0	35.5			744	661	264	75.2

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 202 WAS REMOVED FROM SERVICE ON AUGUST 8 AS A RESULT OF PROBLEMS ENCOUNTERED WITH THE ELECTROSTATIC PRECIPITATOR. THE MODULE WAS PLACED BACK IN SERVICE ON AUGUST 21.

9/81	202	100.0	99.3	100.0	99.0						
	203	0.0	0.0		0.0						
	SYSTEM	100.0	99.3	100.0	99.0			720	718	713	85.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE ONLY PROBLEMS ENCOUNTERED DURING THE MONTH WERE BOILER RELATED.

10/81	202	100.0	100.0	100.0	41.5						
	203	0.0	0.0		0.0						
	SYSTEM	100.0	100.0	100.0	41.5			744	303	309	29.2

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 2 WAS DOWN FROM OCTOBER 3 UNTIL OCTOBER 20 FOR ANNUAL MAINTENANCE AND REPAIRS.

11/81	202	65.4	63.6	64.8	63.6						
	203	0.0	0.0		0.0						
	SYSTEM	65.4	63.6	64.8	63.6			720	720	458	74.2

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 202 WAS TAKEN OUT OF SERVICE TWICE DURING NOVEMBER BECAUSE OF LOW SLURRY DENSITY.

ON NOVEMBER 22 THE SYSTEM WAS TAKEN OUT OF SERVICE FOR THE REMAINDER OF THE MONTH FOR REPAIRS ON THE DAMPER SEALS.

ADDITIONAL OUTAGE TIME DURING THE MONTH WAS DUE TO BOILER-RELATED PROBLEMS

12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE ORIGINAL COPY OF THE DECEMBER UPDATE INFORMATION WAS LOST IN THE MAIL.

1/82	202	80.5	90.5	80.5	80.5						
	203		0.0		0.0						
	SYSTEM	80.5	90.5	80.5	80.5			744	662	599	70.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY MODULE 202 WAS DOWN APPROXIMATELY 145 DUE TO RESTRICTIONS IN A FEED LINE.

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
2/82	202		0.0		0.0						
	203	98.6	96.2	99.0	96.2						
	SYSTEM	98.6	96.2	99.0	96.2			672	672	646	81.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY MODULE 202 WAS DOWN FOR REPAIRS AND MAINTENANCE.									
		MODULE 203 WAS OUT OF SERVICE FOR APPROXIMATELY SIX HOURS DUE TO A QUENCHER PUMP FAILURE.									
3/82	202		0.0		0.0						
	203	100.0	99.0	100.0	87.3						
	SYSTEM	100.0	99.0	100.0	87.3			744	656	649	50.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH MODULE 203 WAS OUT OF SERVICE PART OF THE TIME DUE TO A UNIT 2 WATER WALL RUPTURE.									
4/82	202	100.0	0.0		0.0						
	203	87.2	87.2	87.2	87.2						
	SYSTEM	87.2	87.2	87.2	87.2			720	720	627	70.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING APRIL OUTAGE TIME FOR MODULE 203 WAS DUE TO PUMP PROBLEMS.									
5/82	202	3.9	5.3	100.0	3.9						
	203	0.0	0.0		0.0						
	SYSTEM	3.9	5.3	100.0	3.9			744	541	29	48.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE 203 WAS UNAVAILABLE DURING MAY DUE TO SOME MAJOR REPAIRS AND RECONSTRUCTION.									
6/82	202	100.0	97.0	100.0	97.0						
	203	100.0	0.0		0.0						
	SYSTEM	100.0	97.0	100.0	97.0			720	720	698	82.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.									
7/82	202	100.0	99.9	100.0	99.9						
	203	100.0	0.0		0.0						
	SYSTEM	100.0	99.9	100.0	99.9			744	744	743	85.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED BY THE UTILITY DURING JULY.									
8/82	202	100.0	98.4	100.0	87.3						
	203	100.0	0.0		0.0						
	SYSTEM	100.0	98.4	100.0	87.3			744	660	650	79.3

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST.									
9/82	202	100.0	87.7	100.0	87.7						
	203	100.0	0.0		0.0						
	SYSTEM	100.0	87.7	100.0	87.7			720	720	631	73.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING SEPTEMBER.									
10/82	202	100.0	100.0	100.0	2.9						
	203	100.0	0.0		0.0						
	SYSTEM	100.0	100.0	100.0	2.9			744	22	22	2.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ON OCTOBER 1 THE UNIT WAS DOWN FOR ANNUAL MAINTENANCE AND REPAIR OUTAGES.									
11/82	202	100.0	0.0		0.0						
	203	19.4	31.1	94.4	9.4						
	SYSTEM	19.4	31.1	94.4	9.4			720	217	68	15.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS PUT ON LINE NOVEMBER 21 AFTER THE COMPLETION OF ANNUAL MAINTENANCE AND REPAIR OUTAGE.									
		MODULE 203 WAS PLACED BACK IN SERVICE ON NOVEMBER 24.									
12/82	202	100.0	0.0		0.0						
	203	90.2	68.8	87.6	68.8						
	SYSTEM	90.2	68.8	87.6	68.8			744	744	512	65.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER.									
1/83	202	100.0	0.0		0.0						
	203	100.0	68.7	100.0	64.2						
	SYSTEM	100.0	68.7	100.0	64.2			744	696	478	57.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JANUARY.									
2/83	202	100.0	0.0		0.0						
	203	99.9	61.8	99.8	61.8						
	SYSTEM	99.9	61.8	99.8	61.8			672	672	415	62.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED BY THE UTILITY DURING FEBRUARY.									
3/83	202	100.0	0.0		0.0						
	203	98.8	56.1	95.1	23.4						
	SYSTEM	98.8	56.1	95.1	23.4			744	311	174	25.2

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OFF LINE FROM MARCH 1 TO MARCH 17 DUE TO LOW DEMAND.									
4/83	202	100.0	0.0		0.0						
	203	99.2	54.4	98.5	54.4						
	SYSTEM	99.2	54.4	98.5	54.4			720	720	392	54.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING APRIL.									
5/83	202	100.0	0.0		0.0						
	203	99.7	42.3	99.4	42.3						
	SYSTEM	99.7	42.3	99.4	42.3			744	744	315	50.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MAY.									
6/83	202	100.0	0.0		0.0						
	203	100.0	26.9	100.0	8.5						
	SYSTEM	100.0	26.9	100.0	8.5			720	229	62	13.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 2 WAS TAKEN OFF LINE ON JUNE 10 AS A RESULT OF LOW DEMAND.									
7/83	202	90.3	2.4	100.0	1.4						
	203	100.0	49.2	100.0	29.4						
	SYSTEM	100.0	51.5	100.0	30.8			744	445	229	35.9
8/83	202	100.0	0.0		0.0						
	203	100.0	75.6	100.0	13.6						
	SYSTEM	100.0	75.6	100.0	13.6			744	134	101	12.3
9/83	202	100.0	7.9	100.0	7.9						
	203	99.9	42.2	99.7	42.0						
	SYSTEM	100.0	50.1	100.0	49.9			720	718	360	59.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED FOR THE PERIOD OF JULY THROUGH SEPTEMBER, 1983.									
10/83	202	100.0	0.0		0.0						
	203	100.0	0.0		0.0						
	SYSTEM	100.0	0.0		0.0			744	47	0	1.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT UNIT 2 WAS DOWN THE ENTIRE MONTH OF OCTOBER EXCEPT FOR OCTOBER 1 TO OCTOBER 3. ANNUAL MAINTENANCE AND REPAIR BEGAN ON OCTOBER 15.									
11/83	202	100.0			0.0						
	203	100.0			0.0						
	SYSTEM	100.0			0.0			720	0	0	0.0

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 2 WAS DOWN THE ENTIRE MONTH OF NOVEMBER FOR ANNUAL MAINTENANCE AND REPAIR.									
12/83	202	100.0			0.0						
	203	100.0			0.0						
	SYSTEM	100.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ANNUAL MAINTENANCE AND REPAIRS WERE COMPLETED ON DECEMBER 14. THE UNIT WA DOWN FOR THE REMAINDER OF THE MONTH DUE TO LOW POWER DEMAND.									
1/84	202	100.0			0.0						
	203	100.0			0.0						
	SYSTEM	100.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
2/84	202	100.0			0.0						
	203	100.0			0.0						
	SYSTEM	100.0			0.0			696	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 2 WAS OFF LINE DURING JANUARY AND FEBRUARY DUE TO LOW POWER DEMAND.									
3/84	202	100.0	0.0		0.0						
	203	99.3	27.1	89.5	5.8						
	SYSTEM	100.0	27.1	89.5	5.8			744	158	43	8.3
4/84	202	100.0	40.9	100.0	33.3						
	203	35.5	43.6	100.0	35.5						
	SYSTEM	100.0	84.5	100.0	68.8			720	587	496	40.4
5/84	202	100.0	39.9	100.0	39.9						
	203	98.8	60.1	98.0	60.1						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	73.0
6/84	202	99.6	6.5	100.0	5.0						
	203	98.8	98.1	100.0	74.6						
	SYSTEM	100.0	100.0	100.0	79.6			720	548	573	46.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF MARCH THROUGH JUNE 1984.									
7/84	202	88.2	87.3	87.6	79.9						
	203	0.0	0.0		0.0						
	SYSTEM	44.1	43.6	87.6	40.0			744	682	297	60.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MAINTENANCE WAS COMPLETED ON MODULE 202 AND IT WAS PLACED BACK INTO SERVIC ON JULY 4, 1984.									
		MODULE 203 WAS OUT OF SERVICE DURING THE ENTIRE MONTH OF JULY.									
8/84	SYSTEM							744			

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR AUGUST 1984.									
9/84	202	100.0	100.0	100.0	100.0						
	203	0.0	0.0		0.0						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	80.4
10/84	202	100.0	100.0	100.0	100.0						
	203	0.0	0.0	0.0	0.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	74.5
11/84	202	100.0	100.0	100.0	100.0						
	203	0.0	0.0		0.0						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	87.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TOWER 203 WAS OUT OF SERVICE FOR THE MONTHS OF SEPTEMBER, OCTOBER AND NOVEMBER FOR GENERAL CLEANING AND REPAIRS.									
12/84	202	13.1	79.6	80.2	13.1						
	203	0.0	0.0	0.0	0.0						
	SYSTEM	13.1	79.6	80.2	13.1			744	123	97	12.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT ON DECEMBER 5, 1984, UNIT 2 WAS SHUT DOWN FOR ANNUAL MAINTAINENCE AND REPAIRS. MAJOR REPAIRS ON UNIT 2 SCRUBBER TOWERS WERE ALSO BEGUN. ON DECEMBER 13, 1984, UNIT 2 WAS STARTED UP AND RAN FOR APPROXIMATELY 24 HOURS TO EMPTY THE COAL BURNERS. NO SCRUBBER TOWERS WERE AVAILABLE FOR SERVICE DURING THIS TIME.									
1/85	202	0.0			0.0						
	203	0.0			0.0						
	SYSTEM	0.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		APACHE 2 WAS OUT OF SERVICE DURING THE MONTH FOR ANNUAL MAINTENANCE AND REPAIR. THE ABSORBERS UNDERWENT MAJOR REPAIRS AND WERE UNAVAILABLE FOR SERVICE.									
2/85	202	83.6	72.1	79.9	11.5						
	203	0.0	0.0	0.0	0.0						
	SYSTEM	83.6	72.1	79.9	11.5			672	108	77	7.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE ANNUAL OUTAGE CONTINUED UNTIL 2/12/85. ON 2/16/86 THE BOILER WAS TAKEN OUT OF SERVICE FOR BOILER REPAIRS. MODULE 203 WAS DOWN FOR MAJOR REPAIRS.									
3/85	202	100.0	97.9	100.0	89.0						
	203	0.0	0.0	0.0	0.0						
	SYSTEM	100.0	97.9	100.0	89.0			744	676	662	76.1
4/85	202	100.0	99.2	100.0	98.2						
	203	0.0	0.0	0.0	0.0						
	SYSTEM	100.0	99.2	100.0	98.2			720	713	707	69.2
5/85	202	100.0	100.0	100.0	100.0						

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	203	0.0	0.0	0.0	0.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	54.3
6/85	202	48.8	48.8	98.6	48.8						
	203	59.8	59.8	95.3	59.8						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	69.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE MAJOR REPAIR WORK BEGUN IN FEBRUARY CONTINUED THROUGH MAY AND INTO THE EARLY PART OF JUNE.

MODULE 202 WAS OUT OF SERVICE FOR REPAIRS FROM 6/16/85 THROUGH 6/30/85.

7/85	202	0.0	0.0	0.0	0.0						
	203	98.7	76.3	76.2	76.2						
	SYSTEM	98.7	76.3	76.2	76.2			744	743	567	74.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE MAJOR REPAIR WORK THAT BEGAN ON MODULE 202 IN JUNE CONTINUED THROUGH JULY.

8/85	202	100.0	65.0	97.6	65.0						
	203	100.0	48.1	96.0	48.1						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	82.5
9/85	202	100.0	0.0		0.0						
	203	100.0	100.0	100.0	79.4						
	SYSTEM	100.0	100.0	100.0	79.4			720	572	572	60.1

** PROBLEMS/SOLUTIONS/COMMENTS

ALTHOUGH THE FGD SYSTEM WAS NOT OPERATED AT FULL LOAD THROUGH THE AUGUST AND SEPTEMBER PERIOD NO FGD SYSTEM PROBLEMS WERE REPORTED BY THE UTILITY.

10/85	202	100.0			0.0						
	203	100.0			0.0						
	SYSTEM	100.0			0.0			744	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

APACHE 2 WAS DOWN FOR THE MONTH OF OCTOBER FOR ANNUAL MAINTENANCE AND REPAIR.

11/85	202	100.0	0.0	0.0	0.0						
	203	100.0	95.3	100.0	74.4						
	SYSTEM	100.0	95.3	100.0	74.4			720	562	536	64.6
12/85	202	100.0	27.9	98.6	27.7						
	203	100.0	75.2	99.5	74.7						
	SYSTEM	100.0	100.0	100.0	100.0			744	740	744	77.5

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM PROBLEMS WERE REPORTED BY THE UTILITY DURING THE MONTHS OF NOVEMBER AND DECEMBER.

1/86	202	100.0			0.0						
	203	100.0			0.0						
	SYSTEM	100.0			0.0			744	0	0	0.0
2/86	202	14.9			0.0						

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	203	14.9			0.0						
	SYSTEM	29.8			0.0			672	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BECAUSE OF LOW CONSUMER DEMAND, APACHE 2 WAS OUT OF SERVICE FOR THE MONTHS OF JANUARY AND FEBRUARY.									
3/86	202	99.2	97.8	98.2	45.2						
	203	11.6	0.0		0.0						
	SYSTEM	100.0	97.8	98.2	45.2			744	344	337	27.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TOWER 203 WAS UNAVAILABLE FOR SERVICE DURING THE MONTH SO THAT QUENCHER LINES, TOWER PACKING AND NOZZLES COULD BE CLEANED.									
4/86	202	99.9	100.0	100.0	99.9						
	203	0.0	0.0		0.0						
	SYSTEM	99.9	100.0	100.0	99.9			720	720	719	57.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TOWER 203 WAS UNAVAILABLE FOR THE MONTH OF APRIL FOR CLEANING OF ALL QUENCHER LINES, AND PREPARATION OF THE TOWER FOR STRUCTURAL REPAIRS AND ABSORBER FLOOR RELINING.									
5/86	202	77.4	77.3	99.5	77.3						
	203	20.7	20.4	96.2	20.4						
	SYSTEM	98.1	97.7	100.0	97.7			744	744	727	66.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TOWER 203 WAS DOWN FOR MOST OF THE MONTH OF MAY FOR STRUCTURAL REPAIR OF THE TOWER FLOOR.									
6/86	202	38.9	0.0		0.0						
	203	100.0	91.5	100.0	91.5						
	SYSTEM	100.0	91.5	100.0	91.5			720	720	658	65.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TOWER 202 WAS UNAVAILABLE FOR SERVICE 6/1/86 THROUGH 6/19/86 WHILE GENERAL CLEANING, WASHING, AND FLOOR INSPECTION OPERATIONS WERE PERFORMED.									
7/86	202	100.0	0.0		0.0						
	203	100.0	94.5	100.0	94.5						
	SYSTEM	100.0	94.5	100.0	94.5			744	744	703	52.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF JULY OR AUGUST.									
8/86	202	99.8	76.6	99.6	64.1						
	203	100.0	0.0		0.0						
	SYSTEM	100.0	76.6	99.6	64.1			744	623	477	51.6
9/86	202	100.0			0.0						
	203	100.0			0.0						
	SYSTEM	100.0			0.0			720	0	0	0.0

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		APACHE 2 WAS OFF-LINE THROUGH SEPTEMBER AS A RESULT OF LOW CONSUMER DEMAND.									
10/86	202	61.3			0.0						
	203	61.3			0.0						
	SYSTEM	100.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BOTH TOWERS 202 AND 203 WERE UNAVAILABLE FOR SERVICE 10/16/86 THROUGH 10/28/86 SO THAT THE OUTLET DUCT TO THE STACK COULD BE RELINED.									
11/86	202	100.0			0.0						
	203	100.0			0.0						
	SYSTEM	100.0			0.0			720	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BECAUSE OF LOW CONSUMER DEMAND, APACHE 2 WAS OUT OF SERVICE THROUGH THE MONTH OF NOVEMBER.									
12/86	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY ANNOUNCED THAT UNIT 2 WAS SHUTDOWN IN DECEMBER AND PUT ON COLD STANDBY. THE UNIT IS EXPECTED TO REMAIN OFF-LINE ALL OF 1987.									
1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT REMAINED ON COLD STANDBY ALL OF 1987. THE UNIT IS NOT EXPECTED TO OPERATE UNTIL 1990. THIS IS LARGELY DUE TO THE CURRENT LACK OF POWER DEMAND AND THE LOW COST OF NATURAL GAS.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA ELECTRIC POWER	
PLANT NAME	APACHE	
UNIT NUMBER	3	
CITY	COCHISE	
STATE	ARIZONA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	344.	(0.800 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	530	
GROSS UNIT GENERATING CAPACITY - MW	195	
NET UNIT GENERATING CAPACITY W/FGD - MW	172	
NET UNIT GENERATING CAPACITY WO/FGD - MW	180	
EQUIVALENT SCRUBBED CAPACITY - MW	98	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	520.98	(1104000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	376.7	(710 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	4.9	(16.2 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	23260.	(10000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		9500-10800
AVERAGE ASH CONTENT - %	15.00	
RANGE ASH CONTENT - %	15-20	
AVERAGE MOISTURE CONTENT - %	13.00	
RANGE MOISTURE CONTENT - %	9.0-15.0	
AVERAGE SULFUR CONTENT - %	0.70	
RANGE SULFUR CONTENT - %	0.4-0.6	
AVERAGE CHLORIDE CONTENT - %	0.01	
RANGE CHLORIDE CONTENT - %	0.00-0.03	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	HOT SIDE	
SUPPLIER	AIR CORRECTION DIVISION, UOP	
INLET FLUE GAS CAPACITY - CU.M/S	521.0	(1104000 ACFM)
INLET FLUE GAS TEMPERATURE - C	376.7	(710 F)
PRESSURE DROP - KPA	0.1	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.6	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	RESEARCH-COTTRELL	
A-E FIRM	BURNS & MCDONNELL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.60	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	85.00	
ENERGY CONSUMPTION - %	4.1	
CURRENT STATUS	1	
COMMERCIAL START-UP	6/1979	
INITIAL START-UP	6/1979	
CONTRACT AWARDED	8/1974	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	1.00	
DESIGN COAL HEAT CONTENT - J/G	23260.0	(10000 BTU/LB)
DESIGN COAL ASH CONTENT - %	17.00	
DESIGN MOISTURE CONTENT - %	18.00	
DESIGN CHLORIDE CONTENT - %	0.00	
SPACE REQUIREMENTS - SQ M	4046.7	(43560 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	72.0	
** QUENCHER/PRESATURATOR		
NUMBER	2	
TYPE	CYCLONIC SPRAY QUENCHER	
SUPPLIER	RESEARCH-COTTRELL	
INLET GAS FLOW - CU. M/S	188.76	(400000 ACFM)
INLET GAS TEMPERATURE - C	132.2	(270 F)
PRESSURE DROP - KPA	0.2	(1.0 IN-H2O)
LIQUID RECIRCULATION RATE - LITERS/S	567.	(9000 GPM)
L/G RATIO - L/CU. M	2.7	(20.0 GAL/1000 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	
** ABSORBER		
NUMBER	2	
NUMBER OF SPARES	1	
GENERIC TYPE	COMBINATION TOWER	
SPECIFIC TYPE	SPRAY/PACKED	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	RESEARCH-COTTRELL	
DIMENSIONS - FT	30.0 DIA X 110.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER	
LINER MATERIAL TRADE NAME/COMMON TYPE	FLAKELINE 103	
GAS CONTACTING DEVICE TYPE	SPRAY ZONE & VERTICAL CROSS CHANNEL FIXED GRID P	
NUMBER OF CONTACTING ZONES	2	
LIQUID RECIRCULATION RATE - LITER/S	567.	(9000 GPM)
L/G RATIO - L/CU.M	5.3	(40.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.6	(2.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	94.38	(200000 ACFM)
INLET GAS TEMPERATURE - C	68.3	(155 F)
SO2 REMOVAL EFFICIENCY - %	97.0	
PARTICLE REMOVAL EFFICENCY - %	99.6	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	2	
NUMBER OF SPARES PER SYSTEM	1	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

TRADE NAME/COMMON TYPE	CLOSED VANE	
MANUFACTURER	MUNTERS	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	2	
NUMBER OF PASSES PER STAGE	3	
FREEBOARD DISTANCE - M	0.61	(2.0 FT)
DISTANCE BETWEEN STAGES - CM	30.48	(12.0 IN)
DISTANCE BETWEEN VANES - CM	10.2	(4.00 IN)
VANE ANGLES - DEGREES	45	
PRESSURE DROP - KPA	0.2	(1.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYVINYL CHLORIDE	
WASH WATER SOURCE	FRESH	
WASH FREQUENCY	INTERMITTENT 'LOWER STAGE!; ONCE EVERY HOUR 'UPP	
WASH RATE - L/S	12.6	(200 GAL/MIN)

** REHEATER

NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	50.0	
TEMPERATURE INCREASE - C	43.3	(78 F)
INLET FLUE GAS TEMPERATURE - C	46.1	(115 F)
OUTLET FLUE GAS TEMPERATURE - C	89.4	(193 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NONE	
CONSTRUCTION MATERIAL SPECIFIC TYPE	N/A	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	WESTINGHOUSE	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	188.76	(400000 ACFM)
FLUE GAS TEMPERATURE - C	132.2	(270 F)
PRESSURE DROP - KPA	6.2	(20.5 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	2	
FUNCTION	SHUT-OFF	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER	
MODULATION	OPEN/CLOSED	
SEAL AIR FLOW - CU. M/S	0.24	(500 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** DAMPERS

NUMBER	2	
FUNCTION	SHUT-OFF	
GENERIC TYPE	GUILLOTINE	
SPECIFIC TYPE	TOP-ENTRY GUILLOTINE	
MODULATION	OPEN/CLOSED	
SEAL AIR FLOW - CU. M/S	0.24	(500 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
LINER GENERIC MATERIAL TYPE	HIGH ALLOY	
LINER SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM	

** DAMPERS

NUMBER	2	
FUNCTION	SHUT-OFF	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER	

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

MODULATION	OPEN/CLOSED
SEAL AIR FLOW - CU. M/S	0.24 (500 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	HIGH ALLOY
LINER SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM

** DUCTWORK

LOCATION	ABSORBER INLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	12.0 X 14.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	ABSORBER OUTLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	12.0 X 14.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	FLUOROELASTOMER

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	4.5 (5 TPH)
PRODUCT QUALITY - % SOLIDS	45.0

** TANKS

SERVICE	NUMBER
ABSORBER FEED	1
REAGENT FEED	1
MILL SLURRY SUMP	1
WASTE SLURRY SUMP	1

** PUMPS

SERVICE	NUMBER
ABSORBER	3
QUENCHER	4
MILL SLURRY RECYCLE	2
ADDITIVE FEED	2
WASTE SLURRY TRANSFER	1

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

MOISTURE CONTENT - % TOTAL FREE WATER	70.0
% CASO4 - DRY	80.0

** TREATMENT

METHOD	BLEED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

**** DISPOSAL**	
NATURE	FINAL
TYPE	POND
LOCATION	OFF-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	NONE
SITE DIMENSIONS	25 TO 30 ACRES BY 18 FT DEEP
SITE CAPACITY - CU.M	611500 (500.0 ACRE-FT)
SITE SERVICE LIFE - YRS	30
**** PROCESS CONTROL AND INSTRUMENTATION**	
PROCESS STREAM	QUENCHER RECYCLE LINE
CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	PERCENT SOLIDS
CONTROL LEVELS	5.0 PH
PROCESS CONTROL MANNER	MANUAL
PROCESS CHEMISTRY MODE	FEEDBACK
**** WATER BALANCE**	
WATER LOOP TYPE	OPEN
MAKEUP WATER ADDITION - LITERS/S	115.9 (1840 GPM)
SOURCE OF MAKEUP WATER	WELL WATER
**** CHEMICALS AND CONSUMPTION**	
FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	>93% CACO3
SOURCE/SUPPLIER	PAUL LIME
UTILIZATION - %	99.0
POINT OF ADDITION	BALL MILL
**** FGD SPARE CAPACITY INDICES**	
ABSORBER - %	100.0
MIST ELIMINATOR - %	0.0
FAN - %	0.0
BALL MILL - %	0.0
EFFLUENT HOLD TANK - %	0.0
RECIRCULATION PUMP - %	50.0
**** FGD SPARE COMPONENT INDICES**	
ABSORBER	1.0
MIST ELIMINATOR	0.0
FAN	0.0
BALL MILL	0.0
EFFLUENT HOLD TANK	0.0
RECIRCULATION PUMP	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/79	SYSTEM					50.00	99.50	720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE APACHE 3 BOILER AND FGD SYSTEM BEGAN OPERATIONS DURING JUNE. THE UTILITY REPORTED THAT THE START-UP WAS TYPICAL WITH NUMEROUS MINOR SHAKEDOWN PROBLEMS.

7/79	SYSTEM		744
8/79	SYSTEM		744

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT EXTENSIVE PROBLEMS WITH THE REAGENT HANDLING SYSTEM ARE CONTINUING PARTICULARLY WITH RESPECT TO FEED LINE FAILURES, PIPING PLUGGING AND GRINDING OPERATIONS. THE REAGENT HANDLING SYSTEM ACCOMODATES BOTH UNITS 2 AND 3.									
9/79	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE THIRD QUARTER OF 1979 THE BOILER AND FGD SYSTEM ONLY OPERATED ABOUT 25% OF THE TIME BECAUSE OF CONTINUING PROBLEMS WITH THE REAGENT FEED LINE. THE FRP SECTION FROM THE GRINDER TO THE SCRUBBERS FAILED. THE LINE WAS REPAIRED AT THE END OF SEPTEMBER.									
		COMMERCIAL OPERATIONS AT APACHE 3 BEGAN ON SEPTEMBER 1.									
10/79	SYSTEM	0.0	0.0		0.0			744		0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY IS IN THE PROCESS OF REPLACING THE REAGENT HANDLING SYSTEM; THEREFORE, THE FGD SYSTEM DID NOT OPERATE DURING OCTOBER.									
11/79	302	89.4	39.8	39.4	39.4						
	303	89.4	50.5	50.0	50.0						
	SYSTEM	100.0	90.3	89.4	89.4			720	713	644	92.7
12/79	SYSTEM	99.5	99.5	99.5	99.5			744	744	741	95.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE REAGENT HANDLING SYSTEM REPLACEMENT WAS COMPLETED IN DECEMBER.									
		THE OUTAGE TIME DURING DECEMBER WAS CAUSED BY A FAULTY BOILER FLUE DAMPER.									
1/80	SYSTEM	91.7	91.7	91.7	91.7			744	744	682	89.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY SOME OUTAGE TIME WAS DUE TO A PUMP MALFUNCTION.									
		OUTAGE TIME WAS ALSO CAUSED BY A BROKEN FEED BELT TO THE LIMESTONE BALL MILL.									
2/80	SYSTEM	95.6	74.1	96.0	71.4			696	671	497	83.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY OUTAGE TIME RESULTED FROM AN ESP FAILURE.									
		FORCED OUTAGE TIME WAS ALSO CAUSED BY A PUMP MALFUNCTION.									
3/80	SYSTEM	90.9	90.9	90.9	90.9			744	744	677	91.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SOME OF THE OUTAGE TIME DURING MARCH OCCURRED BECAUSE OF PUMP FAILURES.									
		OUTAGE TIME RESULTED FROM STICKING VALVES AND LIMESTONE FEED-BELT PROBLEMS.									

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/80	SYSTEM	99.0	96.9	96.9	30.6			720	227	220	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE FGD SYSTEM WAS FORCED DOWN DUE TO PUMP FAILURES AND A RUPTURE IN THE SLURRY RECIRCULATION LINE.

5/80	SYSTEM	0.0	0.0		0.0			744	39	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER AND FGD SYSTEM WERE DOWN FOR A SCHEDULED OVERHAUL. THE LINERS IN THE ABSORBER QUENCHER HAD TO BE REPAIRED. THE BOILER RETURNED TO SERVICE BEFORE REPAIR WORK FOR THE FGD SYSTEM WAS COMPLETE. THE FGD SYSTEM WAS UNAVAILABLE IN MAY BECAUSE OF THIS OVERHAUL.

6/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE DATA FOR THE MONTH OF JUNE HAS BEEN MISPLACED.

7/80	302	29.0	30.0	90.0	29.0						
	303	0.0	0.0		0.0						
	SYSTEM	29.0	30.0	90.0	29.0			744	721	216	49.3

** PROBLEMS/SOLUTIONS/COMMENTS

BOTH MODULES WERE UNAVAILABLE BECAUSE OF REPLACEMENT OF THE ABSORBER LINER. MODULE 302 WAS OUT OF SERVICE FOR 22 DAYS, WHILE MODULE 303 WAS OUT OF SERVICE DURING ALL OF JULY.

A PACKING PUMP FAILURE CAUSED THE FGD SYSTEM TO GO DOWN.

8/80	302	98.5	47.8	96.3	38.4						
	303	98.5	19.3	91.3	15.5						
	SYSTEM	98.5	67.1	94.8	54.0			744	599	402	41.5

** PROBLEMS/SOLUTIONS/COMMENTS

TOWER 302 WAS UNAVAILABLE DURING PART OF AUGUST BECAUSE OF A QUENCHER PUMP FAILURE.

DUE TO A SAMPLING LINE FAILURE IN AUGUST, TOWER 303 WAS SHUT DOWN FOR PART OF THE MONTH.

THE REDUCED RATE OF FGD OPERATION IN AUGUST WAS A RESULT OF BOILER UNIT PROBLEMS AND REDUCED LOAD CAPACITY.

9/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

NO INFORMATION WAS AVAILABLE FOR SEPTEMBER 1980.

10/80	302	76.2	87.7	97.1	68.1						
	303	0.0	0.0		0.0						
	SYSTEM	76.2	87.7	97.1	68.1			744	567	507	52.5

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS OPERATED AT A REDUCED LOAD FOR 60 HOURS AND WAS TAKEN OFF LINE FOR SIX DAYS DURING OCTOBER.									
		UNAVAILABLE FGD SYSTEM TIME WAS DUE TO A QUENCHER PUMP FAILURE AND PH INSTABILITY.									
11/80	302	78.4	78.1	95.4	77.8						
	303	100.0	17.8	100.0	17.8						
	SYSTEM	100.0	96.0	100.0	95.6			744	717	688	99.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER THE FGD SYSTEM WAS FORCED OUT OF SERVICE DUE TO FAILURE OF THE QUENCHER PUMPS, SAMPLE LINE AND TRANSFORMER.									
		THE BOILER UNIT TRIPPED CAUSING APPROXIMATELY FIVE HOURS OF OUTAGE TIME DURING THE MONTH.									
12/80	302	0.0	0.0		0.0						
	303	100.0	98.6	100.0	96.6						
	SYSTEM	100.0	98.6	100.0	96.6			744	729	719	86.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF DECEMBER.									
1/81	302	0.0	0.0		0.0						
	303	100.0	52.9	100.0	46.1						
	SYSTEM	100.0	52.9	100.0	46.1			744	649	343	80.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS OUT OF SERVICE APPROXIMATELY 123 HOURS DURING JANUARY.									
		MODULE 303 WAS TAKEN OUT OF SERVICE FOR APPROXIMATELY 272 HOURS DUE TO THE LOW SULFUR CONTENT OF THE COAL. MODULE 302 WAS NOT AVAILABLE FOR OPERATIO DURING JANUARY.									
2/81	302	0.0	0.0		0.0						
	303	100.0	27.4	100.0	27.4						
	SYSTEM	100.0	27.4	100.0	27.4			672	672	184	95.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY THE OPERATION OF THE FGD SYSTEM WAS REDUCED DUE TO THE LOW SULFUR CONTENT OF THE COAL.									
		REPAIRS WERE MADE ON TOWER 302 DURING THE MONTH.									
3/81	302	78.5	23.7	52.5	23.7						
	303	0.0	0.0		0.0						
	SYSTEM	78.5	23.7	52.5	23.7			744	744	177	87.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH LOW OPERABILITY OF MODULE 302 WAS DUE TO THE FIRING OF LOW SULFUR COAL.									
		MODULE 303 WAS UNAVAILABLE DUE TO A MALFUNCTION OF THE LIMESTONE GRINDING CIRCUIT.									

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	302	100.0	75.3	100.0	35.8						
	303	0.0	0.0		0.0						
	SYSTEM	100.0	75.3	100.0	35.8			720	342	258	44.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOILER WAS UNAVAILABLE DUE TO A 2 WEEK SCHEDULED MAINTENANCE OUTAGE.

MODULE 303 WAS NOT AVAILABLE FOR OPERATION DUE TO ERROSION PROBLEMS DISCOVERED IN THE MODULE BOWL AREA. THIS HAS BEEN A CONTINUAL PROBLEM AND THE UTILITY IS PRESENTLY CONDUCTING STUDIES TO ALLEVIATE THE PROBLEM.

5/81	302	100.0	87.1	100.0	87.1						
	303	100.0	0.0		0.0						
	SYSTEM	100.0	87.1	100.0	87.1			744	648	648	90.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE BOILER WAS TAKEN OUT OF SERVICE APPROXIMATELY 96 HOURS DUE TO MAINTENANCE.

6/81	302	100.0	86.7	100.0	86.7						
	303	100.0	0.0		0.0						
	SYSTEM	100.0	86.7	100.0	86.7			720	720	624	87.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE MODULE 303 WAS OUT OF SERVICE DUE TO REPAIRS ON THE ESP.

7/81	302	45.2	11.9	100.0	10.8						
	303	100.0	57.3	100.0	51.6						
	SYSTEM	100.0	69.2	100.0	69.2			744	670	464	77.6

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 302 WAS REMOVED FROM SERVICE ON JULY 1 AS A RESULT OF PROBLEMS WITH THE ELECTROSTATIC PRECIPITATOR. MODULE 303 WAS PLACED IN SERVICE ON JULY 17 SO THAT PREVENTIVE MAINTENANCE COULD BE PERFORMED ON MODULE 302

8/81	302	0.0	0.0		0.0						
	303	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	89.1
9/81	302	0.0	0.0		0.0						
	303	62.4	62.5	62.4	62.4						
	SYSTEM	62.4	62.5	62.4	62.4			720	718	449	80.8

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 303 WAS OFF LINE FOR APPROXIMATELY ELEVEN DAYS DURING SEPTEMBER AS A RESULT OF A MALFUNCTION THAT CAUSED THE INLET AND OUTLET DAMPERS TO CLOSE.

10/81	302	0.0	0.0		0.0						
	303	96.2	98.2	96.2	96.2						
	SYSTEM	96.2	98.2	96.2	96.2			744	729	716	78.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER TOWER 303 WAS OUT OF SERVICE FOR THREE HOURS TO CHANGE THE QUENCHER PUMPS.

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			ADDITIONAL FGD SYSTEM OUTAGE TIME RESULTED FROM UNIT TRIPS.								
11/81	302	0.0	0.0		88.1						
	303	100.0	100.0	88.1	88.1						
	SYSTEM	100.0	100.0	88.1	88.1			720	634	634	63.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE 303 WAS OUT OF SERVICE FROM NOVEMBER 3 THROUGH NOVEMBER 11 DUE TO ESP PROBLEMS.								
12/81	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE ORIGINAL COPY OF THE DECEMBER UPDATE INFORMATION WAS LOST IN THE MAIL.								
1/82	302	95.1	84.0	93.7	73.2						
	303		0.0		0.0						
	SYSTEM	95.1	84.0	93.7	73.2			744	648	544	62.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING JANUARY MODULE 302 WAS OUT OF SERVICE PART OF THE TIME DUE TO A LEAK IN THE COLLECTION BOWL BELOW THE ABSORBER PACKING.								
2/82	302	95.5	93.9	95.5	93.6						
	303		0.0		0.0						
	SYSTEM	95.5	93.9	95.5	93.6			672	670	635	84.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING FEBRUARY APPROXIMATELY 25 HOURS OF OUTAGE TIME WAS REQUIRED FOR MAINTENANCE ON THE COLLECTION BOWL.								
3/82	302	21.9	24.6	20.6	20.3						
	303	0.0	0.0		0.0						
	SYSTEM	21.9	24.6	20.6	20.3			744	615	151	47.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
			ON MARCH 6, BOTH MODULES WERE TAKEN OUT OF SERVICE FOR MAJOR REPAIR AND RECONSTRUCTION. THIS RESULTED IN SUSPENSION OF SCRUBBING OPERATIONS FOR THE REMAINDER OF THE MONTH.								
4/82	302	0.0	0.0		0.0						
	303	0.0	0.0		0.0						
	SYSTEM	0.0	0.0		0.0			720	53	0	3.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
			ON APRIL 1 AND APRIL 2, BOTH MODULES WERE OUT OF SERVICE FOR MAJOR REPAIR AND RECONSTRUCTION.								
			AS OF APRIL 3, THE UNIT WAS DOWN FOR ANNUAL MAINTENANCE AND REPAIR.								
5/82	302	0.0	0.0		0.0						
	303	0.0	0.0		0.0						
	SYSTEM	0.0	0.0		0.0			744	510	0	49.6

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE FGD SYSTEM WAS OUT OF SERVICE FOR THE MONTH OF MAY FOR MAJOR REPAIR AND RECONSTRUCTION.								
6/82	302		0.0		0.0						
	303	52.4	49.2	45.0	38.9						
	SYSTEM	52.4	49.2	45.0	38.9			720	569	280	66.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE 303 WAS PLACED BACK IN SERVICE ON JUNE 11 AFTER COMPLETION OF MAJOR REPAIRS AND RECONSTRUCTION.								
			MODULE 303 WAS TAKEN OFF-LINE FOR APPROXIMATELY THREE DAYS DUE TO HIGH OPACITY AND A QUENCHER PUMP MALFUNCTION.								
			ESP REPAIRS SHUT THE SYSTEM DOWN FOR APPROXIMATELY THREE DAYS.								
7/82	302	59.0	56.6	100.0	56.1						
	303	40.9	41.3	100.0	40.9						
	SYSTEM	99.9	97.9	100.0	97.0			744	738	722	87.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE 303 WAS TAKEN OUT OF SERVICE ON JULY 13 TO REPAIR A LEAK IN THE PACKING RETURN LINE TO THE ABSORBER FEED TANK.								
			MODULE 302 WAS PLACED IN SERVICE ON JULY 13 AFTER COMPLETION OF MAJOR REPAIRS AND RECONSTRUCTION.								
			MODULE 302 WAS OUT OF SERVICE APPROXIMATELY 11 HOURS ON JULY 21 FOR TESTIN PURPOSES.								
			MODULE 302 WAS OUT OF SERVICE 11 HOURS ON JULY 26 DUE TO A TRIP OF UNIT 3.								
8/82	302	96.8	95.3	96.4	87.6						
	303	100.0	0.0		0.0						
	SYSTEM	96.8	95.3	96.4	87.6			744	685	652	85.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST.								
9/82	302	100.0	85.3	100.0	72.8						
	303	100.0	0.0		0.0						
	SYSTEM	100.0	85.3	100.0	72.8			720	615	524	60.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING SEPTEMBER.								
10/82	302	100.0	91.0	100.0	90.9						
	303	100.0	0.0		0.0						
	SYSTEM	100.0	91.0	100.0	90.9			744	743	676	74.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING OCTOBER.								

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/82	302	98.4	65.4	97.1	53.8						
	303	100.0	0.0		0.0						
	SYSTEM	98.4	65.4	97.1	53.8			720	592	387	55.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING NOVEMBER.

12/82	302	100.0	69.2	100.0	61.6						
	303	100.0	0.0		0.0						
	SYSTEM	100.0	69.2	100.0	61.6			744	662	458	46.2

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED BY THE UTILITY DURING DECEMBER.

1/83	302	8.1	5.8	100.0	4.8						
	303	78.6	34.8	68.1	28.5						
	SYSTEM	86.7	40.6	100.0	33.2			744	609	247	40.2

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 302 WAS TAKEN OUT OF SERVICE ON JANUARY 3 DUE TO AN INDUCED DRAFT FAN MALFUNCTION.

MODULE 303 WAS PLACED BACK IN SERVICE ON JANUARY 6.

2/83	302	100.0	0.0		0.0						
	303	100.0	74.3	100.0	20.7						
	SYSTEM	100.0	74.3	100.0	20.7			672	187	139	17.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS TAKEN OFF LINE FEBRUARY 8 DUE TO LOW DEMAND.

3/83	302	100.0	17.6	100.0	10.7						
	303	100.0	50.9	100.0	31.0						
	SYSTEM	100.0	68.5	100.0	41.8			744	454	311	43.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF LINE FROM MARCH 18 TO MARCH 28 DUE TO LOW DEMAND.

4/83	302				0.0						
	303				0.0						
	SYSTEM				0.0			720	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 3 WAS DOWN DURING THE MONTH OF APRIL FOR ANNUAL MAINTENANCE AND REPAIR.

5/83	302				0.0						
	303				0.0						
	SYSTEM				0.0			744	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 3 WAS DOWN DURING MAY FOR ANNUAL MAINTENANCE AND REPAIR.

6/83	302	91.7	42.2	81.5	36.6						

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	303	100.0	0.0		0.0						
	SYSTEM	91.7	42.2	81.5	36.6			720	624	263	50.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.								
7/83	302	99.4	56.0	97.7	25.3						
	303	100.0	0.0		0.0						
	SYSTEM	99.4	56.0	97.7	25.3			744	336	188	28.7
8/83	302	97.6	56.4	95.4	48.5						
	303	100.0	0.0		0.0						
	SYSTEM	97.6	56.4	95.4	48.5			744	641	361	56.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JULY AND AUGUST.								
9/83	302	100.0	0.0		0.0						
	303	100.0	0.0		0.0						
	SYSTEM	100.0	0.0		0.0			720	7	0	0.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
			BOTH MODULES WERE OUT OF SERVICE DURING SEPTEMBER DUE TO THE UNIT OPERATIN AT REDUCED LOAD.								
10/83	302	100.0	0.0		0.0						
	303	98.5	38.8	95.9	35.2						
	SYSTEM	100.0	38.8	95.9	35.2			744	675	262	40.8
11/83	302	100.0	0.0		0.0						
	303	96.7	44.4	91.9	38.0						
	SYSTEM	100.0	44.4	91.9	38.0			720	616	274	41.0
12/83	302	100.0	0.0		0.0						
	303	99.8	21.6	98.9	18.0						
	SYSTEM	100.0	21.6	98.9	18.0			744	618	134	29.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
			NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE FOURTH QUARTER OF 1983.								
1/84	302	100.0	0.0		0.0						
	303	100.0	29.1	100.0	26.9						
	SYSTEM	100.0	29.1	100.0	26.9			744	690	201	35.7
2/84	302	100.0	0.0		0.0						
	303	99.9	46.0	99.7	46.0						
	SYSTEM	100.0	46.0	99.7	46.0			696	696	320	50.0
3/84	302	100.0	0.5	100.0	0.5						
	303	100.0	51.4	100.0	45.5						
	SYSTEM	100.0	51.9	100.0	45.9			744	659	342	45.6
4/84	302	100.0	0.0		0.0						
	303	100.0	91.6	100.0	18.1						
	SYSTEM	100.0	91.6	100.0	18.1			720	143	131	10.7
5/84	302	100.0	69.3	100.0	44.1						

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	303	77.4	27.7	100.0	17.6						
	SYSTEM	100.0	97.0	100.0	61.7			744	473	459	44.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF JANUARY THROUGH MAY 1984.									
6/84	302	77.6	78.1	78.2	77.6						
	303	0.0	0.0	0.0	0.0						
	SYSTEM	77.6	78.1	78.2	77.6			720	716	559	68.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ON JUNE 24, MODULE 302 WAS TAKEN OUT OF SERVICE FOR PACKING REPAIRS AND REMAINED OUT OF SERVICE FOR THE REST OF THE MONTH.									
7/84	302	0.0	0.0		0.0						
	303	88.0	87.9	88.0	87.9						
	SYSTEM	44.0	44.0	88.0	44.0			744	744	327	82.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MAINTENANCE WAS COMPLETED ON MODULE 303 AND IT WAS PLACED BACK INTO SERVIC ON JULY 4, 1984.									
		MODULE 302 WAS UNAVAILABLE FOR SERVICE DURING THE MONTH DUE TO ABSORBER PACKING REPAIRS.									
8/84	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR AUGUST 1984.									
9/84	302	100.0	99.8	100.0	99.8						
	303	0.0	0.0		0.0						
	SYSTEM	100.0	99.8	100.0	99.8			720	720	719	77.7
10/84	302	100.0	100.0	100.0	51.3						
	303	0.0	0.0	0.0	0.0						
	SYSTEM	100.0	100.0	100.0	51.3			744	382	382	38.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TOWER 303 WAS OUT OF SERVICE DURING THE MONTHS OF SEPTEMBER AND OCTOBER FOR PATCHING, RELINING, COATING AND GENERAL CLEANING.									
11/84	302	100.0			0.0						
	303	0.0			0.0						
	SYSTEM	100.0			0.0			720	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT UNIT 3 WAS OFF LINE FOR THE MONTH OF NOVEMBER AS A RESULT OF LOW CONSUMER DEMAND. TOWER 303 WAS UNAVAILABLE FOR SERVICE DURING THE MONTH DUE TO EXTENSIVE REPAIRS.									
12/84	302	89.4	95.9	97.1	88.5						
	303	0.0	0.0	0.0	0.0						
	SYSTEM	89.4	95.9	97.1	88.5			744	687	659	63.2

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT TOWER 303 WAS UNAVAILABLE FOR THE MONTH OF DECEMBER FOR RELINING, COATING, AND GENERAL REPAIRS.									
1/85	302	100.0	100.0	100.0	100.0						
	303	0.0	0.0	0.0	0.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	75.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE 303 WAS OUT OF SERVICE DURING JANUARY FOR ABSORBER RELINING, COATING AND GENERAL REPAIRS.									
2/85	302	99.6	98.6	99.6	97.8						
	303	0.0	0.0	0.0	0.0						
	SYSTEM	99.6	98.6	99.6	97.8			672	666	657	69.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE 303 WAS OUT OF SERVICE THROUGH THE MONTH FOR MAJOR REPAIRS.									
3/85	302	100.0	97.5	100.0	10.6						
	303	0.0	0.0		0.0						
	SYSTEM	100.0	97.5	100.0	10.6			744	81	79	5.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS TAKEN OFF LINE ON 3/4/85 FOR ANNUAL MAINTENANCE AND REPAIR. MODULE 303 MAJOR REPAIRS CONTINUED THROUGH THE MONTH.									
4/85	302	100.0	94.5	100.0	33.1						
	303	0.0	0.0	0.0	0.0						
	SYSTEM	100.0	94.5	100.0	33.1			720	253	239	13.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE MODULE 303 MAJOR REPAIRS INITIATED IN JANUARY 1985 CONTINUED THROUGH APRIL.									
5/85	302	87.1	71.4	100.0	71.4						
	303	100.0	31.9	100.0	31.9						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	50.4
6/85	302	99.6	30.7	98.7	30.7						
	303	98.4	98.4	98.4	98.4						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	71.1
7/85	302	98.5	66.4	97.7	66.3						
	303	98.6	67.1	93.6	67.1						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	75.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTHS OF MAY THROUGH JULY 1985.									
8/85	302	40.3	9.1	76.3	9.1						
	303	100.0	98.5	100.0	98.5						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	81.2
9/85	302	0.0	0.0	0.0	0.0						

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	303	100.0	98.7	100.0	57.1						
	SYSTEM	100.0	98.7	100.0	57.1			720	417	411	39.1
10/85	302	0.0	0.0	0.0	0.0						
	303	91.9	92.6	92.6	91.9						
	SYSTEM	91.9	92.6	92.6	91.9			744	739	684	76.7
11/85	302	0.0	0.0	0.0	0.0						
	303	99.8	83.6	84.2	48.4						
	SYSTEM	99.8	83.6	84.2	48.4			720	417	349	45.6
12/85	302	0.0	0.0		0.0						
	303	100.0	51.7	100.0	1.0						
	SYSTEM	100.0	51.7	100.0	1.0			744	15	8	0.6

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 302 WAS TAKEN OUT OF SERVICE ON 8/13/85 FOR MAJOR REPAIRS AND WAS UNAVAILABLE FOR SERVICE FOR THE REMAINDER OF THE MONTH. THE MODULE REMAINED OUT OF SERVICE THROUGH DECEMBER 1985.

1/86	302	20.8	14.7	94.8	14.7						
	303	100.0	86.0	99.5	86.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	72.7

** PROBLEMS/SOLUTIONS/COMMENTS

TOWER 302 WAS OUT OF SERVICE FOR MAINTENANCE FROM 1/1/86 THROUGH 1/25/86.

2/86	302	100.0	100.0	100.0	100.0						
	303	100.0	0.0	0.0	0.0						
	SYSTEM	100.0	100.0	100.0	100.0			672	672	672	77.6
3/86	302	80.6	100.0	100.0	68.5						
	303	80.6	0.0	0.0	0.0						
	SYSTEM	100.0	100.0	100.0	68.5			744	510	510	46.5
4/86	302	0.0			0.0						
	303	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

TOWERS 302 AND 303 WERE TAKEN OUT OF SERVICE ON 3/25/86 FOR MAINTENANCE DURING THE SCHEDULED UNIT SHUTDOWN WHICH CONTINUED THROUGH APRIL.

5/86	302	0.0			0.0						
	303	4.3			0.0						
	SYSTEM	4.3			0.0			744	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

APACHE 3 WAS NOT OPERATED IN MAY BECAUSE OF LOW CONSUMER DEMAND.

6/86	302	100.0	6.0	100.0	4.2						
	303	99.8	72.6	99.6	51.2						
	SYSTEM	100.0	78.6	100.0	55.5			720	508	399	27.9

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF JUNE.

7/86	302	100.0	44.0	100.0	26.2						

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	303	72.3	55.8	98.0	33.2						
	SYSTEM	100.0	99.8	100.0	59.3			744	443	442	27.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TOWER 303 WAS UNAVAILABLE FOR SERVICE FROM 7/22/86 THROUGH THE END OF THE MONTH FOR REPAIRS AND CLEANING.									
8/86	302	100.0	98.4	100.0	20.5						
	303	53.0	0.0		0.0						
	SYSTEM	100.0	98.4	100.0	20.5			744	155	152	11.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TOWER 303 REMAINED OUT OF SERVICE UNTIL 8/15/86 AS CLEANING, INSPECTION, AND REPAIR OF TOWER PACKING AND NOZZLES CONTINUED FROM LAST MONTH.									
9/86	302	67.8	100.0	100.0	62.8						
	303	78.6	1.1	100.0	0.7						
	SYSTEM	100.0	100.0	100.0	63.4			720	452	457	30.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TOWER 302 WAS OUT OF SERVICE FOR CLEANING AND INSPECTION OF TOWER PACKING AND NOZZLES FROM 9/21/86 THROUGH THE END OF OCTOBER. TOWER 303 WAS OUT OF SERVICE FOR TOWER PACKING, WASHING, AND INSPECTION FROM 9/24/86 THROUGH THE END OF OCTOBER.									
10/86	302	0.0			0.0						
	303	0.0			0.0						
	SYSTEM	0.0			0.0			744	0	0	0.0
11/86	302	100.0	0.0		0.0						
	303	100.0	95.9	99.8	56.1						
	SYSTEM	100.0	95.9	99.8	56.1			720	421	404	20.8
12/86	SYSTEM							774			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO INFORMATION WAS REPORTED BY THE UTILITY FOR THE MONTH OF DECEMBER.									
1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE MUNTERS PACKING IN THE ABSORBER TOWERS ON BOTH UNITS 2 AND 3 WERE REPLACED WITH A MATERIAL CALLED POLY-PAC. THE REPLACEMENT WAS CONDUCTED OVER A PERIOD OF 3 YEARS. THE TOWERS ARE ALSO BEING RELINED WITH A MATERIAL CALLED TROWEL-ON 325EXL AS THE ORIGINAL FLAKELINE 103 MATERIAL FAILS. THE MATERIAL IS BEING USED FROM THE BASE OF THE TOWER UP TO AND PAST THE BOWL ARM.

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE FIRST 3 QUARTERS OF 1987.

10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE THIRD QUARTER OF 1987, THE UTILITY BEGAN USING COMPLIANCE COAL BYPASSING THE FGD SYSTEM. THE UNIT IS EXPECTED TO OPERATE IN THIS MANNER ALL OF 1988.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA PUBLIC SERVICE	
PLANT NAME	CHOLLA	
UNIT NUMBER	1	
CITY	JOSEPH CITY	
STATE	ARIZONA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	84.	(0.196 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	430.	(1.000 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	344.	(0.800 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	615	
GROSS UNIT GENERATING CAPACITY - MW	126	
NET UNIT GENERATING CAPACITY W/FGD - MW	115	
NET UNIT GENERATING CAPACITY WO/FGD - MW	119	
EQUIVALENT SCRUBBED CAPACITY - MW	126	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	226.51	(480000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	135.6	(276 F)
STACK HEIGHT - M	76.	(250 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	3.7	(12.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	23609.	(10150 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		9650-10600
AVERAGE ASH CONTENT - %	13.50	
RANGE ASH CONTENT - %	9.7-22.5	
AVERAGE MOISTURE CONTENT - %	15.00	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	0.50	
RANGE SULFUR CONTENT - %	0.4-1.0	
AVERAGE CHLORIDE CONTENT - %	0.02	
RANGE CHLORIDE CONTENT - %	0.01-0.04	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	CYCLONE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	226.5	(480000 ACFM)
INLET FLUE GAS TEMPERATURE - C	135.6	(276 F)
PARTICLE REMOVAL EFFICENCY -%	75.0	
** ESP		
NUMBER	0	
TYPE	NONE	
** PARTICLE SCRUBBER		
NUMBER	2	
INITIAL START-UP DATE	10/1973	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/BOTTOM-ENTRY LIQUID DISTRIBUTION	
TRADE NAME/COMMON NAME	FLOODED DISC SCRUBBER	
SUPPLIER	RESEARCH-COTTRELL	
DIMENSIONS - FT	6.0 DIA X 45.0	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	MAT-REINFORCED EPOXY	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	336.4	(5340 GPM)

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

L/G RATIO - LITER/CU.M	2.9	(22.0 GAL/1000ACF)
PH CONTROL ADDITIVE	ABSORBER SLURRY 'TRAIN A ONLY!	
PRESSURE DROP - KPA	3.7	(15.0 IN-H2O)
INLET GAS FLOW RATE - CU.M/S	113.3	(240000 ACFM)
INLET GAS TEMPERATURE - C	136.7	(278 F)
PARTICLE REMOVAL EFFICIENCY - %	99.2	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	RESEARCH-COTTRELL
A-E FIRM	EBASCO
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	RETROFIT
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	55.00
ENERGY CONSUMPTION - %	3.2
CURRENT STATUS	1
COMMERCIAL START-UP	12/1973
INITIAL START-UP	10/1973
CONTRACT AWARDED	7/1971

** DESIGN AND OPERATING PARAMETERS

DESIGN CHLORIDE CONTENT - %	********
OPER. & MAINT. REQUIREMENT - MANHR/DAY	40.0

** QUENCHER/PRESATURATOR

NUMBER	0

** ABSORBER

NUMBER	1	
GENERIC TYPE	COMBINATION TOWER	
SPECIFIC TYPE	SPRAY/PACKED	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	RESEARCH-COTTRELL	
DIMENSIONS - FT	22.0 DIA X 70.0	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 316L	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
GAS CONTACTING DEVICE TYPE	VERTICAL CROSS CHANNEL FIXED GRID PACKING	
NUMBER OF CONTACTING ZONES	1	
DISTANCE BETWEEN GAS CONTACTING ZONES - CM	61.0	(24.0IN)
LIQUID RECIRCULATION RATE - LITER/S	586.	(9300 GPM)
L/G RATIO - L/CU.M	6.0	(45.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.1	(0.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	2.1	(6.9 FT/S)
INLET GAS FLOW - CU. M/S	96.74	(205000 ACFM)
INLET GAS TEMPERATURE - C	50.0	(122 F)
SO2 REMOVAL EFFICIENCY - %	92.0	
PARTICLE REMOVAL EFFICENCY - %	99.7	

** ABSORBER

NUMBER	1
GENERIC TYPE	SPRAY TOWER
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY
TRADE NAME/COMMON TYPE	N/A
SUPPLIER	RESEARCH-COTTRELL
DIMENSIONS - FT	22.0 DIA X 70.0
SHELL GENERIC MATERIAL	STAINLESS STEEL
SHELL SPECIFIC MATERIAL	AUSTENITIC
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 316L
LINER GENERIC MATERIAL	NONE
LINER SPECIFIC MATERIAL	N/A
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A
GAS CONTACTING DEVICE TYPE	NONE

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	586.	(9300 GPM)
L/G RATIO - L/CU.M	6.0	(45.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.1	(0.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	2.1	(6.9 FT/S)
INLET GAS FLOW - CU. M/S	96.74	(205000 ACFM)
INLET GAS TEMPERATURE - C	50.0	(122 F)
SO2 REMOVAL EFFICIENCY - %	25.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
NUMBER PER SYSTEM	2
NUMBER PER MODULE	1
GENERIC TYPE	CYCLONIC
SPECIFIC TYPE	CYCLONIC SEPARATOR
TRADE NAME/COMMON TYPE	CYCLONIC TOWER
CONFIGURATION	VERTICAL
NUMBER OF STAGES	1
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
WASH WATER SOURCE	NONE
WASH FREQUENCY	N/A

** REHEATER

NUMBER	2	
NUMBER PER MODULE	1	
GENERIC TYPE	IN-LINE	
SPECIFIC TYPE	STEAM	
TRADE NAME/COMMON TYPE	BARE TUBE	
LOCATION	SEPARATE VESSEL AFTER ABSORBER	
PERCENT GAS BYPASSED - AVG	0.0	
TEMPERATURE INCREASE - C	22.2	(40 F)
INLET FLUE GAS FLOW RATE - CU. M/S	115.62	(245000 ACFM)
INLET FLUE GAS TEMPERATURE - C	48.9	(120 F)
OUTLET FLUE GAS TEMPERATURE - C	71.1	(160 F)
NUMBER OF BUNDLES PER BANK	3	
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	WESTINGHOUSE	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	113.26	(240000 ACFM)
FLUE GAS TEMPERATURE - C	135.6	(276 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	WESTINGHOUSE	
FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	113.26	(240000 ACFM)
FLUE GAS TEMPERATURE - C	135.6	(276 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

LINER SPECIFIC MATERIAL TYPE	N/A
** DAMPERS	
NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DAMPERS	
NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DAMPERS	
NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DAMPERS	
NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	SCRUBBER INLET
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	SCRUBBER OUTLET TO REHEATER
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	MICA FLAKE-FILLED POLYESTER
** DUCTWORK	
LOCATION	BYPASS
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	NONE
DEVICE	N/A
DEVICE TYPE	N/A
NUMBER	0

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

** TANKS

SERVICE	NUMBER
SCRUBBER RECYCLE	1
WASTE SLURRY BLEED	2
ABSORBER RECYCLE	1
REAGENT PREP PRODUCT	2

** PUMPS

SERVICE	NUMBER
SCRUBBER RECIRCULATION	3
ABSORBER RECIRCULATION	2
MIST ELIMINATOR WASH	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

MOISTURE CONTENT - % TOTAL FREE WATER	87.0

** TREATMENT

METHOD	BLEED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	NONE
SITE DIMENSIONS	70-100 ACRES X 6 FT DEEP
SITE CAPACITY - CU.M	623730 (510.0 ACRE-FT)

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	SCRUBBER AND ABSORBER HOLD TANK
CHEMICAL PARAMETERS	PH
CONTROL LEVELS	PH 5.2 IN SCRUBBER HOLD TANK, 6.5 IN ABSORBER HO
PROCESS CONTROL MANNER	MANUAL

** WATER BALANCE

WATER LOOP TYPE	OPEN
MAKEUP WATER ADDITION - LITERS/S	7.6 (120 GPM)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
SOURCE/SUPPLIER	SUPERIOR CO.
POINT OF ADDITION	ABSORBER RECYCLE TANK

** FGD SPARE CAPACITY INDICES

ABSORBER - %	0.0

** FGD SPARE COMPONENT INDICES

ABSORBER	0.0

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/73	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL TESTING OF THE FGD SYSTEM BEGAN ON OCTOBER 2, 1973. THE SYSTEM OPERATED UNTIL THE SCHEDULED SHUTDOWN DATE OF OCTOBER 21. DURING THE THRE WEEK TEST PERIOD, PARTICULATE MATTER AND SO2 REMOVAL EFFICIENCIES, MIST CARRYOVER FROM THE TOWERS, MAXIMUM PROCESS GAS FLOW RATES, AND BYPASS GAS LEAKAGE RATES WERE DETERMINED.

THE DATA COLLECTED INCLUDED THE FOLLOWING:

FLOODED DISC SCRUBBER SO2 REMOVAL EFFICIENCY (MODULE A): 92%
SPRAY TOWER SCRUBBER SO2 REMOVAL EFFICIENCY (MODULE B): 25%
UNIT OVERALL SO2 REMOVAL EFFICIENCY: 58.5%
MIST CARRYOVER FROM MODULES A AND B: 0%
SOLIDS CARRYOVER FROM MODULE A: 0.005 GR/SCF
AIR LEAKAGE INTO SYSTEM DOWNSTREAM OF SCRUBBERS: 18,400 ACFM
CHLORIDE ION CONCENTRATION IN FLOODED DISC SCRUBBER RECIRCULATION: 1600 PPM
CHLORIDE ION CONCENTRATION IN SPRAY TOWER RECIRCULATION: 575 PPM
CHLORIDE ION CONCENTRATION IN SCRUBBER MAKEUP WATER (COOLING TOWER BLOWDOWN): 933 PPM
CHLORIDE LEVELS ARE SUFFICIENT TO CAUSE PITTING CORROSION IN LOCALIZE AREAS WHEN TEMPERATURES ARE GREATER THAN 140F AND PH IS LESS THAN 3.0.

11/73	SYSTEM							720			
12/73	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE CONSTRUCTION AND INITIAL TESTING OF THE SYSTEM WERE COMPLETED ON DECEMBER 3. COMMERCIAL OPERATIONS BEGAN ON DECEMBER 14.

BECAUSE OF A DIFFERENCE IN THE SIZE OF THE MAIN DUCT AND REHEATED TRANSITION DUCT, THE GAS FLOW PRODUCES HARMONIC VIBRATIONS IN THE REHEATER. THE VIBRATIONS WERE PARTIALLY DAMPENED BY INSTALLATION OF BAFFLES.

ONE OF THE REHEATER BUNDLES WAS BADLY CORRODED BY ACID THAT CONDENSED IN THE UNINSULATED DUCT UPSTREAM OF THE REHEATERS. THE TUBE BUNDLE WAS REPLACED AND A BAFFLE WAS INSTALLED TO DIVERT CONDENSED ACID FROM REHEATER TUBES.

THE DUCT UPSTREAM OF THE REHEATER WAS INSULATED. THE ACID CONDENSATION OCCURRED ONLY IN THE B-MODULE WHICH CONTAINS NO INTERNAL PACKING AND CONSEQUENTLY HAS A LOWER DEGREE OF SULFUR DIOXIDE REMOVAL (25%).

SOME LINES PLUGGED, PARTICULARLY WHEN THE SYSTEM OPERATED AT LOW FLOW RATES.

SOLIDS SETTLED OUT IN STANDBY PUMPS, AND EXCESSIVE FAN VIBRATIONS OCCURRE BECAUSE OF ACCUMULATION OF SCALE BUILDUP WHEN THE UNIT WAS IDLE. TO SOLVE THESE PROBLEMS THE PACKING GLAND POSITION WAS REVERSED (INSTALLED UPSIDE DOWN). THE FAN WAS SANDBLASTED. THE PIPING WAS MODIFIED TO ELIMINATE STAGNANT POCKETS, AND PUMPS WERE FLUSHED IMMEDIATELY AFTER REMOVAL FROM SERVICE.

THE UTILITY EXPERIENCED SOLIDS BUILDUP IN THE FDS STUFFING GLAND BOX AND ON TOP OF THE SPRAY DOME.

1/74	A			97.0							
	B			90.0							
	SYSTEM			93.5				744			

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/74	A			100.0							
	B			94.0							
	SYSTEM			97.0				672			
3/74	A			100.0							
	B			66.0							
	SYSTEM			83.0				744			
4/74	A			66.0							
	B			57.0							
	SYSTEM			61.5				720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM PERFORMED SATISFACTORILY FROM DECEMBER 15, 1973 TO APRIL 15, 1974. ALTHOUGH SEVERAL UPSETS CAUSED SHUTDOWN OF ONE OR BOTH MODULES FOR SHORT PERIODS SYSTEM AVAILABILITY AVERAGED 92.6% DURING THAT PERIOD.

THE SCRUBBER MODULES WERE SHUTDOWN FOR SHORT PERIODS IN APRIL TO REPLACE CORRODED COR-TEN STEEL EXPANSION JOINTS ON THE REHEATER BUNDLES. MODULE A WAS DOWN APRIL 17 THROUGH 27. MODULE B WAS DOWN APRIL 15 THROUGH 28.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/74	A			98.0							
	B			99.0							
	SYSTEM			98.5				744	744		
6/74	A			100.0							
	B			100.0							
	SYSTEM			100.0				720			
7/74	A		97.5	97.0	97.5						
	B		98.5	92.0	98.5						
	SYSTEM		98.0	94.5	98.0			744	744	729	
8/74	A		94.5	97.0	94.5						
	B	100.0	100.0	100.0	100.0						
	SYSTEM		97.3	98.5	97.3			744	744	724	

** PROBLEMS/SOLUTIONS/COMMENTS

EACH MODULE WAS OUT OF SERVICE ONE DAY OVER THE MONTH FOR THE INSTALLATIO OF BAFFLE PLATES IN THE INLET DUCT OF EACH REHEATER. THE BAFFLE INSTALLA TIONS WERE PARTLY SUCCESSFUL IN STOPPING REHEATER VIBRATION PROBLEMS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/74	A			95.0							
	B			99.0							
	SYSTEM			97.0				720			
10/74	A			83.0							
	B			68.0							
	SYSTEM			75.5				744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS SHUT DOWN IN LATE OCTOBER FOR AN ANNUAL BOILER AND FGD SYSTEM OVERHAUL.

DURING THE OUTAGE SEVERAL INSTANCES OF PITTING CORROSION WERE DISCOVERED IN THE 316L SS FLOODED DICS SCRUBBER WALLS.

REHEATER TUBE LEAKS WERE DISCOVERED IN THE B-SIDE REHEATER DURING THE OUTAGE.

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/74	A			100.0							
	B			98.0							
	SYSTEM			99.0				720			
12/74	A			100.0							
	B			100.0							
	SYSTEM			100.0				744			
1/75	A	97.7	97.7	97.7							
	B	98.7	98.7	98.7							
	SYSTEM	98.2	98.2	98.2				744	744	730	

** PROBLEMS/SOLUTIONS/COMMENTS

OPERATION OF THE SYSTEM THROUGHOUT 1975 AND 1976 WAS ACCOMPANIED BY A NUM BER OF MINOR PROBLEM AREAS INCLUDING: SIGNIFICANT CORROSION ATTACK IN THE VESSEL WALLS OF THE VENTURI FLOODED-DISC PARTICULATE SCRUBBER MODULE; ACI CORROSION IN THE B-SIDE REHEATER HOUSING; SCALE BUILDUP IN THE PIPE OUTLE AT THE SLUDGE/FLYASH EVAPORATION POND; PLUGGING IN THE SCRUBBER TOWER PAC ING AND MIST ELIMINATOR; EROSION IN THE PUMPS; CORROSION IN THE BOILER EX HAUST ELBOW OF THE DUCTWORK LEADING FROM THE SCRUBBERS TO THE STACK.

DURING JANUARY THE BYPASS SYSTEM EXPERIENCED CONTROL PROBLEMS. NO SOLUTION HAS YET BEEN FOUND.

A LEAK IN THE B-SIDE ABSORBER TOWER WAS WELDED IN JANUARY.

SOME LEAKS WERE DISCOVERED OVER THE MOUTH ON THE A-SIDE VENTURI THROATS. THE LEAKS WERE ATTRIBUTED TO NORMAL WEAR.

LEAKS WERE DISCOVERED IN THE B-SIDE REHEATER DUCTS IN JAUNARY.

2/75	A	95.5	95.5	95.5							
	B	91.4	91.4	91.4							
	SYSTEM	93.5	93.5	93.5				672	672	628	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT PROBLEMS WITH VESSEL LEAKS CONTINUED THROUGH FEBRUARY.

SOME OUTAGE TIME WAS REQUIRED FOR RECYCLE PUMP REPAIRS OVER THE MONTH.

THE UTILITY DISCOVERED SOME ADDITIONAL EROSION/CORROSION PROBLEMS IN THE FGD SYSTEM IN FEBRUARY.

3/75	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT BUILDUP OF SEDIMENT HAS OCCURRED SEVERAL TIMES SINCE STARTUP IN DEAD SPACES, IN PIPE LINES, AND VALVES OF IDLE PUMPS AS WELL AS IN PROCESS LINES DURING PERIODS OF REDUCED OPERATING RATE.

SOME PIPE LINERS HAVE EXPERIENCED EROSION SINCE STARTUP. THE EROSION WAS DUE IN SOME CASES TO UNSATISFACTORY LINER MATERIALS AND IN OTHER CASES TO HIGH VELOCITIES THROUGH PIPES AND FITTINGS. PIPING MODIFICATIONS HELPED TO REDUCE THE EROSION PROBLEM. CRACKING OF THE RUBBER LINING IN SOME PIPES WAS DUE TO DEFECTS IN FABRICATION.

SOME FLOODED DISC SCRUBBER PACKING PLUGGING HAS OCCURRED. IT APPEARS THAT THIS IS A RESULT OF THE GRADE OF COAL BURNED. THE "WETTED FILM CONTACTOR" PACKING LIFE HAS BEEN REDUCED.

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/75	A		88.5	88.5	82.4						
	B		65.2	65.2	60.7						
	SYSTEM		76.9	76.9	71.6			720	670	515	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THERE ARE STILL PROBLEMS WITH THE BYPASS SYSTEM CONTROLS.

SOME DOWN TIME WAS REQUIRED TO REPAIR VALVES AND PIPING AND TO UNPLUG SECTIONS OF THE A MODULE TOWER PACKING (MUNTERS).

THE REHEATER SECTION WAS AGAIN PATCHED WITH CEILCOTE DURING APRIL.

5/75	A		47.5	47.5	47.5						
	B		39.9	39.9	39.9						
	SYSTEM		43.7	43.7	43.7			744	744	325	

** PROBLEMS/SOLUTIONS/COMMENTS

BOTH MODULES WERE OUT OF SERVICE FOR MOST OF THE MONTH SO THAT SCHEDULED REPAIRS AND CLEANING COULD BE UNDERTAKEN.

6/75	A	100.0	100.0	100.0	100.0						
	B	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	

** PROBLEMS/SOLUTIONS/COMMENTS

A SUBSTANTIAL AMOUNT OF PLUGGING WAS OBSERVED IN THE MODULE A ABSORBER TOWER PACKING.

PLUGGING OCCURRED IN MIST ELIMINATORS.

NO MAJOR PROBLEMS WERE ENCOUNTERED DURING THE PERIOD.

7/75	A		97.5	97.5	97.5						
	B		98.5	98.5	98.5						
	SYSTEM		98.0	98.0	98.0			744	744	729	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES WERE SHUT DOWN TO CLEAN FLOW RESTRICTIONS IN FLOODED-DISC RECIRCULATION LINES.

8/75	A		94.5	94.5	94.5						
	B	100.0	100.0	100.0	100.0						
	SYSTEM		97.3	97.3	97.3			744	744	724	

** PROBLEMS/SOLUTIONS/COMMENTS

THE A-SIDE WAS SHUT DOWN FOR INSPECTION.

9/75	A		64.5	97.6	64.5						
	B		93.0	97.4	93.0						
	SYSTEM		78.8	97.5	78.8			720	720	567	

** PROBLEMS/SOLUTIONS/COMMENTS

MINOR OUTAGE RESULTED FROM PLUGGED FLOODED DISC SCRUBBER RECIRCULATION LINES.

10/75	A		78.0	84.0	56.4						

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	24.6	54.8	17.8							
	SYSTEM	51.3	69.4	37.1				744	538	276	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		OUTAGES RESULTED FROM SCHEDULED EQUIPMENT OVERHAULS AND RECOATING OF VESSELS.									
11/75	A	100.0	100.0	100.0							
	B	71.4	80.0	71.4							
	SYSTEM	85.7	90.0	85.7				720	720	617	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR OUTAGES OR PROBLEMS OCCURRED DURING THE REPORT PERIOD.									
12/75	A	100.0	100.0	100.0							
	B	100.0	100.0	100.0							
	SYSTEM	100.0	100.0	100.0				744	744	744	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MINOR PROBLEMS ENCOUNTERED REQUIRED RECYCLE PUMP REBUILDING.									
		THE B-SIDE REHEATER COIL MALFUNCTIONED BUT NO OUTAGE TIME WAS REQUIRED.									
1/76	A	96.0	98.9	96.0							
	B	87.9	98.6	89.9							
	SYSTEM	92.0	98.8	92.0				744	744	684	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MINOR VALVE PLUGGING OCCURRED.									
		MINOR RECIRCULATION LINE PLUGGING OCCURRED.									
		MODULE B OPERATING HOURS WERE LOWER BECAUSE OF REDUCED SYSTEM REQUIREMENT									
2/76	SYSTEM							696			
3/76	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE MONTHS OF FEBRUARY AND MARCH.									
4/76	A		99.0								
	B		97.4								
	SYSTEM		98.2					720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM IS CURRENTLY EXPERIENCEING COATING FAILURES IN THE ELBOW O THE SCRUBBER EXHAUST DUCT LEADING TO THE STACK.									
		THE UTILITY PERFORMED SOME MINOR REPAIRS TO THE HOUSING OF THE B-SIDE REHEATER.									
5/76	A		76.4								
	B		99.6								
	SYSTEM		88.0					744			

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
				CORROSION AND PLUGGING PROBLEMS OCCURRED ON THE A-SIDE REHEATER TUBES.							
				THE UTILITY REPORTED THAT PLUGGING OCCURRED IN THE FLOODED DISC SCRUBBER RECIRCULATION LINES.							
				PLUGGING OCCURRED IN THE FLOODED DISC SCRUBBER PACKING.							
				PLUGGING OCCURRED IN THE MIST ELIMINATORS.							
				HEAVY PUMP MAINTENANCE WAS REQUIRED IN MAY. THE UTILITY NOW CONSIDERS HEAVY PUMP MAINTENANCE NORMAL FOR THE CHOLLA 1 SCRUBBER.							
6/76	A			64.1							
	B			39.4							
	SYSTEM			51.8				720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
				LOW RELIABILITY FACTORS FOR THE MONTH OF JUNE RESULTED FROM A SCHEDULED MID-YEAR SCRUBBER SHUTDOWN FOR MAINTENANCE, INSPECTION AND REPAIRS.							
				SOME SCALING AND CORROSION PROBLEMS WERE UNCOVERED IN THE SCRUBBING SYSTE RECYCLE TANKS.							
7/76	A			100.0							
	B			97.5							
	SYSTEM			98.8				744			
8/76	A			100.0							
	B			100.0							
	SYSTEM			100.0				744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
				REPAIRS TO THE COATING IN THE ELBOW OF THE SCRUBBER EXHAUST DUCT WERE COM PLETED OVER THE JULY-AUGUST PERIOD.							
				A MALFUNCTIONING SOLENOID VALVE IN THE B-SIDE MIST ELIMINATOR WASH SYSTEM PREVENTING ADEQUATE WASHING, RESULTED IN A MINOR SCRUBBER OUTAGE DURING THE JULY-AUGUST PERIOD.							
9/76	A	100.0	100.0	100.0	100.0						
	B		93.9	100.0	93.9						
	SYSTEM		97.0	100.0	97.0			720	720	698	
	** PROBLEMS/SOLUTIONS/COMMENTS										
				THE BOILER WAS IN SERVICE THE ENTIRE MONTH. NO SIGNIFICANT SCRUBBER PROBLEMS WERE REPORTED.							
10/76	A		99.5	56.0	55.8						
	B		66.4	56.0	37.2						
	SYSTEM		83.0	56.0	46.5			744	417	346	
11/76	A		94.8	95.8	94.8						
	B		77.2	97.6	77.2						
	SYSTEM		86.1	96.7	86.1			720	720	619	

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TWO MINOR FORCED SCRUBBER OUTAGES OCCURRED DURING THE PERIOD.									
		A REHEATER STEAM LEAK CAUSED A MINOR FORCED OUTAGE.									
		AN INLET GAS DAMPER ADJUSTMENT PROBLEM IN BOTH THE A-SIDE AND B-SIDE SCRUBBING TRAINS CAUSED A MINOR OUTAGE.									
12/76	A	99.8	99.7	99.8							
	B	67.0	100.0	67.0							
	SYSTEM	99.9	99.0	83.4				744	744	620	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ONE OUTAGE WAS REPORTED. THE OUTAGE WAS THE RESULT OF AN ADDITIONAL ADJUSTMENT TO THE A-SIDE GAS INLET DAMPER.									
1/77	A	71.6	72.3	71.6							
	B	91.9	93.4	91.9							
	SYSTEM	81.8	82.9	81.8				744	744	608	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE PERFORMANCE INDEX VALUES CONTAINED IN THESE TABLES ARE BASED UPON THE MODULE ACTUAL SERVICE TIME FOR THE PERIOD VERSUS THE NUMBER OF HOURS THE MODULES ARE CALLED UPON TO OPERATE FOR THE SAME PERIOD. THE MODULES OPERATE ON A DEMAND-ONLY BASIS. FLUE GAS IS BYPASSED AROUND THE MODULES WHEN THEY ARE NOT REQUIRED FOR SERVICE.									
		THE MUNTERS PACKING IN THE A-SIDE TOWER WAS REPLACED IN JANUARY.									
BAD C3471 ****											
		MINOR CORROSION OCCURRED IN THE SYSTEM.									
		MINOR PLUGGING OF SCRUBBER INTERNALS OCCURRED. THE TOWERS WERE CLEANED.									
		SOME PROBLEMS OCCURRED WITH THE LIQUID PIPING.									
		AVERAGE SO2 INLET AND OUTLET CONCENTRATIONS DURING JANUARY WERE 350 PPM AND 175 PPM RESPECTIVELY.									
2/77	A	96.5	98.8	96.5							
	B	88.0	99.6	88.0							
	SYSTEM	92.2	99.2	92.2				672	672	620	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THERE WERE MECHANICAL DIFFICULTIES WITH THE BY-PASS DAMPERS.									
		AVERAGE SO2 INLET AND OUTLET VALUES DURING FEBRUARY WERE 350 PPM AND 175 PPM RESPECTIVELY.									
3/77	A	71.6	72.3	71.6							
	B	91.9	93.4	91.9							
	SYSTEM	81.8	82.9	81.8				744	744	608	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE A-SIDE TOWER PACKING WAS REPLACED DURING MARCH.									
		BOTH MODULES WERE OUT OF SERVICE FOR CLEANING OF AREAS OF PLUGGING IN THE SCRUBBER INTERNALS DURING THE MONTH.									

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/77	A		99.6	100.0	88.2						
	B		98.6	100.0	87.3						
	SYSTEM		99.1	100.0	87.8			720	638	632	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO MAJOR PROBLEMS OCCURRED DURING APRIL.

5/77	A		100.0	87.0	86.7						
	B		100.0	87.0	86.7						
	SYSTEM		100.0	87.0	86.7			744	645	645	

** PROBLEMS/SOLUTIONS/COMMENTS

OUTAGE TIME FOR THE BOILER AND FGD SYSTEM WAS A RESULT OF THE SCHEDULED MID-YEAR SCRUBBER CLEANOUT.

DURING MAY RESEARCH-COTTRELL PERSONNEL CONDUCTED FORCED OXIDATION TESTS B BLOWING AIR INTO THE FLOODED DISC SCRUBBER AND CONVERTING ALL CASO3 TO CASO4 YIELDING SUPERIOR SLUDGE DEWATERING HANDLING AND SCALE-FREE OPERATION.

6/77	A	100.0	100.0	100.0	100.0						
	B	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO MAJOR PROBLEMS FOR THE MONTH OF JUNE.

7/77	A			97.0							
	B			99.0							
	SYSTEM			98.0				744	744		

** PROBLEMS/SOLUTIONS/COMMENTS

A MINOR LEAK OCCURRED IN THE LIMESTONE SLURRY TANK.

A MINOR LEAK OCCURRED IN THE B-SIDE RETURN LINE FROM THE FLOODED DISC SCRUBBER TO THE SCRUBBER TANK.

RESEARCH-COTTRELL PERSONNEL ARE STILL ON THE PLANT SITE CONTINUING FORCED OXIDATION STUDIES.

8/77	A		97.2	97.2	97.2						
	B		98.6	98.6	98.6						
	SYSTEM		97.9	97.9	97.9			744	744	729	

** PROBLEMS/SOLUTIONS/COMMENTS

DOWN TIME WAS REQUIRED TO REPAIR LEAKS IN THE SLURRY DISPOSAL TANK AND TH FLOODED DISC SCRUBBER RETURN LINE BETWEEN THE TOWER AND THE SCRUBBER RECYCLE TANK.

9/77	A	100.0	99.7	100.0	99.7						
	B	100.0	99.7	100.0	99.7						
	SYSTEM	100.0	99.7	100.0	99.7			720	720	718	

** PROBLEMS/SOLUTIONS/COMMENTS

ONLY ROUTINE MAINTENANCE WAS REQUIRED FOR THE SCRUBBING SYSTEM DURING SEPTEMBER.

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
10/77	A	100.0	99.9	100.0	99.9						
	B	100.0	99.9	100.0	99.9						
	SYSTEM	100.0	92.1	98.7	99.9			744	744	743	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO MAJOR PROBLEMS FOR OCTOBER.

11/77	A	100.0	99.7	100.0	23.3						
	B	97.4	84.5	97.4	19.7						
	SYSTEM	98.7	92.0	99.0	21.5			720	169	155	

** PROBLEMS/SOLUTIONS/COMMENTS

THE B-SIDE OUTAGE WAS DUE TO LEAKS IN THE VENTURI SECTION OF THE SCRUBBER AND AN EXPANSION JOINT FAILURE IN A RECYCLE PUMP.

THE BOILER OPERATED ONLY 168.5 HOURS BECAUSE OF A SHUTDOWN FOR OVERHAUL IN THE LAST HALF OF NOVEMBER. THE UNIT IS SCHEDULED TO START UP IN MID-DECEMBER.

12/77	SYSTEM	0.0			0.0			744		0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER AND SCRUBBING SYSTEM WERE OUT OF SERVICE THROUGH DECEMBER AS THE OVERHAUL PERIOD CONTINUED.

OVER THE PAST YEAR EVIDENCE OF CHLORIDE ATTACK WAS NOTED IN THE LIQUID-GAS CENTRIFUGAL SEPARATOR SHELL BELOW THE ABSORBER. THE INTERIOR OF THE VESSEL WAS COATED WITH AN EPOXY MATERIAL BY THE SYSTEM SUPPLIER AS A REMEDY BUT THIS ERODED IN SPOTS AND HAD TO BE REPAIRED. THE EPOXY MATERIAL ALSO ERODED AND DISBONDED BELOW THE SCRUBBER DISC.

DURING 1977 EVIDENCE OF ADDITIONAL CHLORIDE ATTACK WAS NOTED ON THE MODULE B REHEATER TUBES. THE SPRAY DISTRIBUTION DEFLECTOR ABOVE THE FLOODED DISC FAILED BECAUSE OF STRESS-CORROSION CRACKING. THE DEFLECTOR WAS REDESIGNED BY THE SYSTEM SUPPLIER.

EXTENSIVE CORROSION WAS RECENTLY DISCOVERED IN THE DUCTWORK LEADING FROM THE MODULE B ABSORBER TOWER EXHAUST ELBOW TO THE REHEAT TUBE BUNDLE. THE UTILITY HAS RECOATED THE ELBOW SEVERAL TIMES WITH A CEILCOTE LINER. AN APPLICATION PROBLEM CAUSED REPEATED FAILURE OF THE LINER. THIS PROBLEM HAS NOT BEEN FULLY RESOLVED.

1/78	A		97.0	97.0	17.6						
	B		90.9	96.9	16.5						
	SYSTEM		94.0	97.0	17.1			744	135	127	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FLOODED DISC SCRUBBER TANK HEADER FOR THE LIMESTONE SLURRY WAS REPAIR ED AFTER BEING DAMAGED DURING THE OVERHAUL.

THE BOILER AND SCRUBBER WERE OUT OF SERVICE MOST OF JANUARY AS THE SCHEDULED OVERHAUL CONTINUED.

2/78	A		99.1	100.0	94.7						
	B		87.9	100.0	84.0						
	SYSTEM		93.5	100.0	89.4			672	642	600	

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			SOME MINOR LEAK REPAIRS WERE REQUIRED DURING FEBRUARY AFTER THE TWO MONTH OVERHAUL/CLEANING WAS COMPLETED IN JANUARY.								
3/78	A		100.0	74.4	100.0						
	B		98.8	74.4	98.8						
	SYSTEM		99.4	74.4	99.4			744	744	739	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			ONE FORCED SHUTDOWN OCCURRED ON THE A-SIDE SCRUBBING TRAIN.								
4/78	A		92.7	99.9	92.7						
	B	100.0	100.0	100.0	100.0						
	SYSTEM		96.4	100.0	96.4			720	720	694	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			A MINOR LEAK REPAIR WAS NECESSARY AGAIN AFTER THE NOVEMBER-JANUARY OVERHAUL/CLEANING.								
5/78	A		86.7	86.7	86.7						
	B		96.2	98.1	96.2						
	SYSTEM		91.5	92.4	91.5			744	744	680	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THERE WERE NO SIGNIFICANT PROBLEMS REPORTED. ONLY GENERAL MAINTENANCE WA PERFORMED ON THE SYSTEM DURING MAY.								
6/78	A	100.0	100.0	100.0	100.0						
	B		99.2	100.0	99.2						
	SYSTEM		99.6	100.0	99.6			720	720	717	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED NO MAJOR PROBLEMS FOR THE MONTH OF JUNE.								
7/78	A		99.4	99.4	99.4						
	B	100.0	100.0	100.0	100.0						
	SYSTEM		99.7	99.7	99.7			744	744	742	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			ONLY ROUTINE MAINTENANCE WAS REQUIRED ON THE SCRUBBER FOR JULY.								
8/78	A	100.0	100.0	100.0	100.0						
	B		95.1	95.1	95.1						
	SYSTEM		97.6	97.6	97.6			744	744	726	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			REPAIRS WERE NECESSARY TO PLUGGED B-SIDE REHEAT COILS. THE COILS WERE REPLACED.								
9/78	A	100.0	100.0	100.0	100.0						
	B		97.8	100.0	97.8						
	SYSTEM		98.9	100.0	98.9			720	720	712	

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED NO MAJOR PROBLEMS FOR THE MONTH OF SEPTEMBER.								
10/78	A		100.0	100.0	58.4						
	B		95.9	100.0	56.0						
	SYSTEM		98.0	100.0	57.2			744	434	425	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			ONLY ROUTINE MAINTENANCE WAS REQUIRED ON THE SCRUBBER IN OCTOBER.								
11/78	A	100.0	100.0	100.0	100.0						
	B		91.3	100.0	91.3						
	SYSTEM		95.7	100.0	95.7			720	720	688	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED NO MAJOR PROBLEMS FOR THE MONTH OF NOVEMBER.								
12/78	A		88.1	88.1	88.1						
	B		85.6	88.3	85.6						
	SYSTEM		86.9	88.2	86.9			744	744	646	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY HAS REPORTED THAT THE FGD SYSTEM EXPERIENCED CONTROL PROBLEMS DURING DECEMBER.								
1/79	A		99.1	99.1	99.1						
	B	100.0	100.0	100.0	100.0						
	SYSTEM		99.6	99.6	99.6			744	744	741	
2/79	A	100.0	100.0	100.0	100.0						
	B	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			672	672	672	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED NO MAJOR PROBLEMS FOR THE MONTH OF FEBRUARY.								
3/79	A		95.2	95.0	95.2						
	B	100.0	100.0	100.0	100.0						
	SYSTEM		97.6	97.5	97.6			744	744	726	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY HAS EXPERIENCED PLUGGED REHEAT TUBES. THE OLD TUBES, IN UNSECTIONALIZED BUNDLES, WERE REPLACED WITH NEW TUBES OF SPLIT COIL CONSTRUCTION AND MADE OF 316L SS. THE NEW TYPE OF TUBES ALONG WITH BETTER MAINTENANCE PROCEDURES HAS ADDED TO THE REHEAT TUBE LIFE AND REHEATER AVAILABILITY.								
4/79	A	100.0	100.0	100.0	100.0						
	B	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED NO PROBLEMS FOR THE MONTH OF APRIL.								
5/79	A		99.1	99.4	99.1						

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B		44.1	44.1	44.1						
	SYSTEM		71.6	71.8	71.6			744	744	533	

** PROBLEMS/SOLUTIONS/COMMENTS

CORRODED DUCTWORK ON MODULE B FROM THE TOWER TO THE STACK WAS REPLACED DURING MAY.

REPAIRS WERE MADE TO THE MODULE B SCRUBBER LINING.

6/79	A		78.2	78.0	78.2						
	B	100.0	100.0	100.0	100.0						
	SYSTEM		89.1	89.0	89.1			720	720	642	

** PROBLEMS/SOLUTIONS/COMMENTS

THE MODULE A ABSORBER TOWER MUNTERS PACKING WAS REPLACED DURING JUNE.

EMERGENCY MAINTENANCE WAS PERFORMED JUNE 23 ON THE MODULE A COMMON DISCHARGE HEADER.

7/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO INFORMATION WAS AVAILABLE FOR THE MONTH OF JULY.

8/79	A		95.7	95.6	95.7						
	B		95.7	95.7	95.7						
	SYSTEM		95.7	95.7	95.7			744	744	712	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING AUGUST GENERAL MAINTENANCE WAS PERFORMED ON THE FLOODED DISC SCRUBBER.

9/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS NOT AVAILABLE FOR THE MONTH OF SEPTEMBER.

10/79	A		97.8	100.0	45.0						
	B		94.3	98.0	43.3						
	SYSTEM		96.1	99.0	44.2			744	342	328	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER ROUTINE MAINTENANCE WAS PERFORMED ON THE FGD SYSTEM.

11/79	A		77.0		77.0						
	B		98.5		98.5						
	SYSTEM		87.8		87.8			720	720	632	
12/79	A		94.0		94.0						
	B		86.7		86.7						
	SYSTEM		90.4		90.4			744	744	672	
1/80	A		95.5		95.5						
	B		99.1		99.1						
	SYSTEM		97.3		97.3			744	744	724	91.7
2/80	A	100.0	100.0	100.0	100.0						

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B		99.4		99.4						
	SYSTEM		99.7		99.7			696	696	694	92.1
3/80	A		99.1		99.1						
	B		93.1		93.1						
	SYSTEM		96.1		96.1			744	744	715	88.6

** PROBLEMS/SOLUTIONS/COMMENTS

NO FORCED OUTAGES WERE REPORTED BY THE UTILITY FOR THE FIVE MONTH PERIOD OF NOVEMBER 1979 THROUGH MARCH 1980. SOME SCHEDULED OUTAGE TIME WAS REQUIRED FOR REPAIR OF THE REHEATER DUCTWORK.

4/80	A	100.0	100.0	100.0	100.0						
	B	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	82.8

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD-RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF APRIL.

5/80	A	100.0	100.0	100.0	100.0						
	B	99.2	99.2	99.2	99.2						
	SYSTEM	99.6	99.6	99.6	99.6			744	744	741	87.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE B-MODULE OUTAGE TIME IN MAY WAS CAUSED BY PROBLEMS WITH THE BOOSTER FAN.

6/80	A	100.0	80.7	100.0	68.7						
	B	99.3	87.7	99.1	74.6						
	SYSTEM	99.7	84.2	99.6	71.7			720	613	516	67.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE SCHEDULED MAINTENANCE WAS PERFORMED ON THE BOILER. THE SCHEDULED OUTAGE TIME WAS NECESSARY TO ACID WASH THE CONDENSERS.

THE ONLY FGD-RELATED OUTAGE OCCURRED WHEN A BLOCK VALVE MALFUNCTIONED. THE B-MODULE WAS OUT OF SERVICE FOR FIVE HOURS.

7/80	A	100.0	100.0	100.0	100.0						
	B	100.0	98.6	100.0	98.6						
	SYSTEM	100.0	99.3	100.0	99.3			744	744	739	95.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS AVAILABLE 100% OF THE TIME IN JULY. MODULE B WAS NOT UTILIZED FOR PART OF THE MONTH DUE TO LOW BOILER LOAD.

8/80	SYSTEM							744			
9/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DATA FOR THE AUGUST AND SEPTEMBER MONTHS WERE NOT AVAILABLE DUE TO PERSONNEL CHANGES.

10/80	SYSTEM							744			
11/80	SYSTEM							720			
12/80	SYSTEM							744			

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY HAS REPORTED THAT THE AVAILABILITY FIGURES FOR AUGUST THROUGH DECEMBER ARE NOT AVAILABLE AT THIS TIME.

DURING THE FOURTH QUARTER THE DUCTWORK DOWNSTREAM OF THE B TRAIN SCRUBBERS HAD TO BE REPLACED.

1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			
10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			
1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			
4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			
7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JANUARY 1981 TO MARCH 1983.										
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JANUARY 1981 TO JUNE 1983.										
7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE THIRD QUARTER OF 1983.										
10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE FOURTH QUARTER OF 1983.										
1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS NOT AVAILABLE FOR THE FIRST THREE QUARTERS OF 1984.										
10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER OF 1984. THE NEXT UNIT OUTAGE IS SCHEDULED FOR FEBRUARY AND WILL LAST APPROXIMATELY 3 WEEKS.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM OPERATED IN 1985 WITHOUT ANY SCHEDULED OR FORCED OUTAGES. FGD-RELATED PROBLEMS ENCOUNTERED DURING THE YEAR INCLUDED EROSION TO BOOSTER FAN ROTORS AND CORROSION TO THE INLINE REHEAT TUBE BUNDLES.

1/86	SYSTEM							774			
2/86	SYSTEM							672			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT BEGAN OPERATING WITHOUT REHEAT DURING THE MONTH OF FEBRUARY. IT WAS DECIDED TO TRY WET STACK OPERATION DUE TO THE CONTINUED CORROSION-RELATED PROBLEMS WITH THE IN-LINE STEAM REHEAT SYSTEM.

3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN DURING THE MONTH OF MAY FOR A MAJOR TURBINE/BOILER OUTAGE. DURING THIS OUTAGE, THE UTILITY REPLACED THE SCRUBBER OUTLET DUCTWORK BETWEEN THE REHEATER AND STACK WITH HASTELLOY C-22 AT A COST OF $55,000. PRIOR TO THIS, THE UTILITY WAS RELINING ONCE A YEAR AND REPLACING THE CARBON STEEL METAL DUCTWORK COMPLETELY EVERY THIRD YEAR.

6/86	SYSTEM							720			
7/86	SYSTEM							774			

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT CAME BACK ON-LINE IN JUNE AND OPERATED UNTIL AUGUST AT WHICH TIME THE UNIT WAS PLACED ON COLD STANDBY. THE UNIT WAS CAPPED WITH NITROGEN AND IS NOT EXPECTED TO OPERATE UNTIL 1991. THIS WAS LARGELY DUE TO LACK IN POWER DEMAND AND THE RECENT START-UP OF 3000 MW OF NUCLEAR CAPACITY.

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE MONTHS OF JANUARY TO DECEMBER 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA PUBLIC SERVICE	
PLANT NAME	CHOLLA	
UNIT NUMBER	2	
CITY	JOSEPH CITY	
STATE	ARIZONA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	72.	(0.167 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	430.	(1.000 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	344.	(0.800 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	615	
GROSS UNIT GENERATING CAPACITY - MW	250	
NET UNIT GENERATING CAPACITY W/FGD - MW	235	
NET UNIT GENERATING CAPACITY WO/FGD - MW	245	
EQUIVALENT SCRUBBED CAPACITY - MW	250	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	519.09	(1100000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	142.2	(288 F)
STACK HEIGHT - M	168.	(550 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	4.5	(14.7 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	23609.	(10150 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		9650-10600
AVERAGE ASH CONTENT - %	13.50	
RANGE ASH CONTENT - %	9.7-22.5	
AVERAGE MOISTURE CONTENT - %	15.00	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	0.50	
RANGE SULFUR CONTENT - %	0.4-1.0	
AVERAGE CHLORIDE CONTENT - %	0.02	
RANGE CHLORIDE CONTENT - %	0.01-0.04	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	2	
NUMBER OF SPARES	0	
TYPE	CYCLONE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	259.5	(550000 ACFM)
INLET FLUE GAS TEMPERATURE - C	137.8	(280 F)
PARTICLE REMOVAL EFFICENCY -%	70.0	
** ESP		
NUMBER	0	
TYPE	NONE	
** PARTICLE SCRUBBER		
NUMBER	4	
NUMBER OF SPARES	1	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/BOTTOM-ENTRY LIQUID DISTRIBUTION	
TRADE NAME/COMMON NAME	FLOODED DISC SCRUBBER	
SUPPLIER	RESEARCH-COTTRELL	
DIMENSIONS - FT	6.0 DIA X 45.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	MAT-REINFORCED EPOXY	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	617.4	(9800 GPM)

ARIZONA PUBLIC SERVICE: CHOLLA 2 (CONT.)

L/G RATIO - LITER/CU.M	3.3	(25.0 GAL/1000ACF)
PH CONTROL ADDITIVE	ABSORBER SLURRY	
PRESSURE DROP - KPA	5.7	(23.0 IN-H2O)
INLET GAS FLOW RATE - CU.M/S	185.0	(392000 ACFM)
INLET GAS TEMPERATURE - C	137.8	(280 F)
PARTICLE REMOVAL EFFICIENCY - %	99.0	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	RESEARCH-COTTRELL
A-E FIRM	EBASCO
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.70
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	75.00
ENERGY CONSUMPTION - %	4.0
CURRENT STATUS	1
COMMERCIAL START-UP	6/1978
INITIAL START-UP	4/1978
CONTRACT AWARDED	12/1974

** DESIGN AND OPERATING PARAMETERS

DESIGN CHLORIDE CONTENT - %	********
OPER. & MAINT. REQUIREMENT - MANHR/DAY	40.0

** QUENCHER/PRESATURATOR

NUMBER	0

** ABSORBER

NUMBER	4	
NUMBER OF SPARES	1	
GENERIC TYPE	COMBINATION TOWER	
SPECIFIC TYPE	SPRAY/PACKED	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	RESEARCH-COTTRELL	
DIMENSIONS - FT	22.0 DIA X 70.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	MAT-REINFORCED EPOXY; GLASS FLAKE-FILLED POLYEST	
LINER MATERIAL TRADE NAME/COMMON TYPE	COROLINE 505AR; FLAKELINE 103	
GAS CONTACTING DEVICE TYPE	VERTICAL CROSS CHANNEL FIXED GRID PACKING	
NUMBER OF CONTACTING ZONES	2	
LIQUID RECIRCULATION RATE - LITER/S	1210.	(19200 GPM)
L/G RATIO - L/CU.M	6.5	(48.9 GAL/1000 ACF)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	184.98	(392000 ACFM)
INLET GAS TEMPERATURE - C	50.0	(122 F)
SO2 REMOVAL EFFICIENCY - %	98.0	
PARTICLE REMOVAL EFFICENCY - %	99.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
NUMBER PER SYSTEM	4
NUMBER OF SPARES PER SYSTEM	1
NUMBER PER MODULE	1
GENERIC TYPE	CYCLONIC
SPECIFIC TYPE	CYCLONIC SEPARATOR
TRADE NAME/COMMON TYPE	CYCLONIC TOWER
CONFIGURATION	VERTICAL
NUMBER OF STAGES	1
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
WASH WATER SOURCE	NONE
WASH FREQUENCY	N/A

ARIZONA PUBLIC SERVICE: CHOLLA 2 (CONT.)

** REHEATER	
NUMBER	4
NUMBER OF SPARES	1
NUMBER PER MODULE	1
GENERIC TYPE	IN-LINE
SPECIFIC TYPE	STEAM
TRADE NAME/COMMON TYPE	BARE TUBE
LOCATION	TOP OF THE ABSORBER
PERCENT GAS BYPASSED - AVG	0.0
TEMPERATURE INCREASE - C	22.2 (40 F)
INLET FLUE GAS TEMPERATURE - C	49.4 (121 F)
OUTLET FLUE GAS TEMPERATURE - C	71.1 (160 F)
NUMBER OF HEAT EXCHANGER BANKS	3
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM
** FANS	
NUMBER	2
DESIGN	CENTRIFUGAL
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY
FLUE GAS TEMPERATURE - C	137.8 (280 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR
** FANS	
NUMBER	2
DESIGN	CENTRIFUGAL
FUNCTION	BOOSTER
APPLICATION	INDUCED DRAFT
SERVICE	DRY
FLUE GAS TEMPERATURE - C	71.1 (160 F)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC; CARBON STEEL 'HOUSING!; STAINLESS STEEL
** DAMPERS	
NUMBER	4
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
LINER GENERIC MATERIAL TYPE	STAINLESS STEEL
LINER SPECIFIC MATERIAL TYPE	AUSTENITIC
** DAMPERS	
NUMBER	4
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DAMPERS	
NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
MANUFACTURER	MOSSER
** DAMPERS	
NUMBER	4
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
MANUFACTURER	MOSSER
** DAMPERS	
NUMBER	4
FUNCTION	SHUT-OFF

ARIZONA PUBLIC SERVICE: CHOLLA 2 (CONT.)

GENERIC TYPE	LOUVER
MANUFACTURER	MOSSER
** DUCTWORK	
LOCATION	INLET
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	OUTLET
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC; ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER; INERT FLAKE-FILLED
** DUCTWORK	
LOCATION	BYPASS
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	2
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	6.4 (7 TPH)
PRODUCT QUALITY - % SOLIDS	25.0

** TANKS

SERVICE	NUMBER
ABSORBER FEED	2
REAGENT FEED	****
MILL SLURRY SUMP	****
SCRUBBER RECYCLE	4
SLUDGE STORAGE	****

** PUMPS

SERVICE	NUMBER
SCRUBBER RECIRCULATION	12
ABSORBER RECIRCULATION	8
MILL SLURRY SUMP	****
REAGENT FEED	****
MIST ELIMINATOR WASH	****

*** SALEABLE BYPRODUCTS	
NATURE	NONE
DISPOSITION	N/A
*** SLUDGE	
MOISTURE CONTENT - % TOTAL FREE WATER	35.0
** TREATMENT	
METHOD	BLEED
DEVICE	NR
PROPRIETARY PROCESS	NONE
INLET QUALITY - %	15.0
** DISPOSAL	
NATURE	FINAL
TYPE	POND

ARIZONA PUBLIC SERVICE: CHOLLA 2 (CONT.)

LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	NONE
** PROCESS CONTROL AND INSTRUMENTATION	
PROCESS STREAM	SCRUBBER AND ABSORBER HOLD TANK
CHEMICAL PARAMETERS	PH
CONTROL LEVELS	PH 4.8-5.2 IN SCRUBBER HOLD TANK; 5.9-6.2 IN ABS
** WATER BALANCE	
WATER LOOP TYPE	OPEN
MAKEUP WATER ADDITION - LITERS/S	7.6 (120 GPM)
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	LIMESTONE
POINT OF ADDITION	BALL MILL
** FGD SPARE CAPACITY INDICES	
SCRUBBER - %	33.3
ABSORBER - %	33.3
** FGD SPARE COMPONENT INDICES	
SCRUBBER	1.0
ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/78	SYSTEM							720			
5/78	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL SCRUBBING OPERATIONS BEGAN IN APRIL 1978. THE SCRUBBER REPORTEDL OPERATES MOST OF THE TIME, HOWEVER, SOME PROBLEMS HAVE OCCURRED WITH VIBRATIONS THROUGHOUT THE SYSTEM.

THE EPA HAS RECENTLY GRANTED THE UTILITY AN EXTENSION FOR COMPLIANCE. FULL COMMERCIAL OPERATIONS ARE EXPECTED TO BEGIN SOMETIME AFTER MID-AUGUST. THE COMPLIANCE TEST WILL BE COMPLETED BY AUGUST 15. THE UTILITY EXPECTS TO HAVE THE FGD SYSTEM SHAKEDOWN PROBLEMS CLEARED UP BY THEN.

6/78	SYSTEM							720			
7/78	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

SHAKEDOWN/DEBUGGING OPERATIONS ARE CONTINUING.

THE SLURRY RECYCLE PIPING HAS EXPERIENCED CONTINUAL VIBRATION PROBLEMS. THE CONTRACTOR HAS BEEN INJECTING NITROGEN GAS INTO THE LINES TO DAMPEN THE VIBRATIONS (AIR WAS NOT USED BECAUSE THE SULFITE WOULD BE OXIDIZED TO SULFATE AND RESULT IN SCALE FORMATION).

THE CORROSION RESISTANT COATING IN THE DOWNCOMER AREA IN ONE OF THE ABSORBER MODULES HAS BEEN PEELING AWAY.

8/78	SYSTEM							744			
9/78	SYSTEM							720			

ARIZONA PUBLIC SERVICE: CHOLLA 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									

** PROBLEMS/SOLUTIONS/COMMENTS

THE SLURRY RECYCLE SYSTEM COMPONENTS ARE STILL EXPERIENCING RESONANT VIBRATIONS.

THE COMPLIANCE TEST WAS PERFORMED THE WEEK OF AUGUST 7. ALTHOUGH OFFICIA WORD HAS NOT BEEN RECEIVED BY THE UTILITY IT APPEARS THAT THE UNIT IS IN COMPLIANCE WITH RESPECT TO SO2, PARTICULATE MATTER, OPACITY AND NOX.

SHAKEDOWN/DEBUGGING OPERATIONS ARE CONTINUING.

10/78	SYSTEM							744			

11/78	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

SHAKEDOWN DEBUGGING OPERATIONS ARE CONTINUING. SOME SCRUBBER COMPONENTS ARE STILL MANNED BY BECHTEL STAFF, ARIZONA PUBLIC SERVICE PERSONNEL ARE OPERATING MOST OF THE SYSTEM AT THIS TIME.

12/78	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DECEMBER-JANUARY INFORMATION IS UNAVAILABLE AT THIS TIME FOR CHOLLA 2. THE UTILITY REPORTED THAT IT WOULD SOON BE KEEPING PERFORMANCE RECORDS.

1/79	SYSTEM							744			
2/79	SYSTEM							672			
3/79	SYSTEM							744			
4/79	SYSTEM							720			
5/79	SYSTEM							744			
6/79	SYSTEM							720			
7/79	SYSTEM							744			
8/79	SYSTEM							744			
9/79	SYSTEM							720			
10/79	SYSTEM							744			
11/79	SYSTEM							720			
12/79	SYSTEM							744			
1/80	SYSTEM							744			
2/80	SYSTEM							696			
3/80	SYSTEM							744			
4/80	SYSTEM							720			
5/80	SYSTEM							744			
6/80	SYSTEM							720			

ARIZONA PUBLIC SERVICE: CHOLLA 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/80	SYSTEM							744			
8/80	SYSTEM							744			
9/80	SYSTEM							720			
10/80	SYSTEM							744			
11/80	SYSTEM							720			
12/80	SYSTEM							744			
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			
10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			
1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			
4/82	SYSTEM							720			
5/82	SYSTEM							720			
6/82	SYSTEM							720			
7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			

ARIZONA PUBLIC SERVICE: CHOLLA 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
3/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JANUARY 1979 TO MARCH 1983.										
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JANUARY 1979 TO JUNE 1983.										
7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE THIRD QUARTER OF 1983.										
10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE FOURTH QUARTER OF 1983.										
1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS NOT AVAILABLE FOR THE FIRST THREE QUARTERS OF 1984.										
10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

ARIZONA PUBLIC SERVICE: CHOLLA 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER OF 1984. THE NEXT UNIT OUTAGE IS SCHEDULED FOR APRIL AND WILL LAST APPROXIMATELY 4 WEEKS.									
1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO FGD-RELATED FORCED OUTAGES WERE ENCOUNTERED DURING THE YEAR 1985. THE FGD SYSTEM AVAILABILITY FOR THE YEAR WAS APPROXIMATELY 99 %.									
1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

ARIZONA PUBLIC SERVICE: CHOLLA 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING 1986. THE UNIT HAD A SCHEDULED MINOR BOILER/FGD OUTAGE IN SEPTEMBER WHICH LASTED APPROXIMATELY 4 WEEKS. CURRENTLY, THE USUALLY BASE LOADED UNIT IS OPERATING AS A PEAK UNIT AND WILL REMAIN AS SUCH UNTIL APPROXIMATELY 1991.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE MONTHS OF JANUARY TO DECEMBER 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA PUBLIC SERVICE	
PLANT NAME	CHOLLA	
UNIT NUMBER	4	
CITY	JOSEPH CITY	
STATE	ARIZONA	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	965	
GROSS UNIT GENERATING CAPACITY - MW	380	
NET UNIT GENERATING CAPACITY W/FGD - MW	350	
NET UNIT GENERATING CAPACITY WO/FGD - MW	352	
EQUIVALENT SCRUBBED CAPACITY - MW	137	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	********	(******* ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	******	(**** FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	****	
AVERAGE HEAT CONTENT - J/G	23609.	(10150 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		****
AVERAGE ASH CONTENT - %	13.50	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	15.00	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	0.50	
RANGE SULFUR CONTENT - %	0.4-1.0	
AVERAGE CHLORIDE CONTENT - %	0.02	
RANGE CHLORIDE CONTENT - %	0.01-0.04	
*** PARTICLE CONTROL		
** ESP		
NUMBER	1	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	NONE	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	RESEARCH-COTTRELL	
A-E FIRM	EBASCO	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	95.00	
ENERGY CONSUMPTION - %	0.5	
CURRENT STATUS	1	
COMMERCIAL START-UP	6/1981	

ARIZONA PUBLIC SERVICE: CHOLLA 4 (CONT.)

INITIAL START-UP	3/1981
CONTRACT AWARDED	10/1977
** DESIGN AND OPERATING PARAMETERS	
DESIGN CHLORIDE CONTENT - %	********
** QUENCHER/PRESATURATOR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** ABSORBER	
NUMBER	1
GENERIC TYPE	COMBINATION TOWER
SPECIFIC TYPE	SPRAY/PACKED
TRADE NAME/COMMON TYPE	N/A
SHELL GENERIC MATERIAL	NR
SHELL SPECIFIC MATERIAL	NR
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR
LINER GENERIC MATERIAL	NR
LINER SPECIFIC MATERIAL	NR
LINER MATERIAL TRADE NAME/COMMON TYPE	NR
SO2 REMOVAL EFFICIENCY - %	95.0
** MIST ELIMINATOR	
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
GENERIC TYPE	IMPINGEMENT
SPECIFIC TYPE	BAFFLE
TRADE NAME/COMMON TYPE	CLOSED VANE
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** REHEATER	
GENERIC TYPE	BYPASS
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
PERCENT GAS BYPASSED - AVG	64.0
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** FANS	
DESIGN	CENTRIFUGAL
FUNCTION	NR
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
** DAMPERS	
FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR

** TANKS

SERVICE	NUMBER
NR	****

ARIZONA PUBLIC SERVICE: CHOLLA 4 (CONT.)

** PUMPS

SERVICE	NUMBER
NR	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NA

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT

METHOD	BLEED
DEVICE	NA
PROPRIETARY PROCESS	NA

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TREATMENT	NONE

** FGD SPARE CAPACITY INDICES

ABSORBER - %	0.0

** FGD SPARE COMPONENT INDICES

ABSORBER	0.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

IN MARCH 1981 THE FGD SYSTEM COMMENCED OPERATIONS. THE SYSTEM OPERATED FOR APPROXIMATELY ONE WEEK BEFORE BEING TAKEN OFF LINE FOR A BEARING INSPECTION.

4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			
10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			
1/82	SYSTEM							744			
2/82	SYSTEM							672			

ARIZONA PUBLIC SERVICE: CHOLLA 4 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/82	SYSTEM							744			
4/82	SYSTEM							720			
5/82	SYSTEM							720			
6/82	SYSTEM							720			
7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF APRIL 1981 TO MARCH 1983.										
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF APRIL 1981 TO JUNE 1983.										
7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE THIRD QUARTER OF 1983.										
10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE FOURTH QUARTER OF 1983.										
1/84	SYSTEM							744			
2/84	SYSTEM							696			

ARIZONA PUBLIC SERVICE: CHOLLA 4 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS NOT AVAILABLE FOR THE FIRST THREE QUARTERS OF 1984.

10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER OF 1984.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THERE WERE 4 MAJOR OUTAGES DURING 1985 DUE TO TOWER PLUGGING CAUSED BY SCALE BUILDUP. LACK OF PROCESS CONTROL AND INADEQUATE CLEANING WERE BLAMED. FGD SYSTEM AVAILABILITY FOR THE YEAR WAS APPROXIMATELY 87 %.

1/86	SYSTEM							774			
2/86	SYSTEM							672			

ARIZONA PUBLIC SERVICE: CHOLLA 4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR BOILER OR FGD-RELATED OUTAGES WERE REPORTED FOR THE MONTHS OF JANUARY OR FEBRUARY 1986.									
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BEGINNING IN MARCH AND LASTING UNTIL THE END OF MAY, THE BOILER AND FGD SYSTEM WERE DOWN COLLECTIVELY FOR APPROXIMATELY 10 WEEKS FOR SCHEDULED MAINTENANCE. FGD REPAIRS INCLUDED THE RELINING OF THE ABSORBER VESSELS. THE CEILCOTE 505AR WAS REPLACED WITH TROWELON 325SL. THE CEILCOTE HAD DISBONDED AND HAD NUMBEROUS PENETRATIONS.									
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT OPERATED THE LAST HALF OF THE YEAR WITHOUT ANY OTHER MAJOR OUTAGE PERIODS. THIS PLANT IS CURRENTLY STILL BASE LOADED. THE NEW ABSORBER VESSEL LINING MATERIAL IS REPORTED TO BE WORKING SATISFACTORILY.									
1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

UTILITY FGD SURVEY: JANUARY - DECEMBER 1987

ARIZONA PUBLIC SERVICE: CHOLLA 4 (CONT.)

PERIOD	MODULE AVAILABILITY	OPERABILITY RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA						

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE MONTHS OF JANUARY TO DECEMBER 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA PUBLIC SERVICE	
PLANT NAME	FOUR CORNERS	
UNIT NUMBER	1	
CITY	FRUITLAND	
STATE	NEW MEXICO	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	21.	(0.050 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	365.	(0.850 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	2085	
GROSS UNIT GENERATING CAPACITY - MW	186	
NET UNIT GENERATING CAPACITY W/FGD - MW	170	
NET UNIT GENERATING CAPACITY WO/FGD - MW	175	
EQUIVALENT SCRUBBED CAPACITY - MW	186	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	384.13	(814000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	171.1	(340 F)
STACK HEIGHT - M	76.	(250 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	5.3	(17.5 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20004.	(8600 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8500-9100
AVERAGE ASH CONTENT - %	22.00	
RANGE ASH CONTENT - %	19-25	
AVERAGE MOISTURE CONTENT - %	10.80	
RANGE MOISTURE CONTENT - %	8.5-13.4	
AVERAGE SULFUR CONTENT - %	0.75	
RANGE SULFUR CONTENT - %	.5-1.3	
AVERAGE CHLORIDE CONTENT - %	0.03	
RANGE CHLORIDE CONTENT - %	.01-.06	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	0	
TYPE	NONE	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME/ALKALINE FLYASH	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES	
A-E FIRM	IN-HOUSE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	50.00	
ENERGY CONSUMPTION - %	2.7	
CURRENT STATUS	1	
COMMERCIAL START-UP	11/1979	
INITIAL START-UP	11/1979	
CONTRACT AWARDED	0/1978	

ARIZONA PUBLIC SERVICE: FOUR CORNERS 1 (CONT.)

** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	1.30	
DESIGN COAL HEAT CONTENT - J/G	19771.0	(8500 BTU/LB)
DESIGN COAL ASH CONTENT - %	25.00	
DESIGN MOISTURE CONTENT - %	13.40	
DESIGN CHLORIDE CONTENT - %	0.06	
SPACE REQUIREMENTS - SQ M	520.2	(5600 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	200.0	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/TOP-ENTRY PLUMB BOB	
TRADE NAME/COMMON TYPE	N/A	
DIMENSIONS - FT	25 DIA	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER	
LINER MATERIAL TRADE NAME/COMMON TYPE	FLAKELINE 103	
GAS CONTACTING DEVICE TYPE	VENTURI THROAT 'TANGENTIAL NOZZLES AT TOP & AT S	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	630.	(10000 GPM)
L/G RATIO - L/CU.M	3.2	(24.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	2.5	(10.0 IN-H20)
INLET GAS FLOW - CU. M/S	192.06	(407000 ACFM)
INLET GAS TEMPERATURE - C	171.1	(340 F)
SO2 REMOVAL EFFICIENCY - %	67.5	
PARTICLE REMOVAL EFFICENCY - %	99.5	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	2	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	6	
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	FRESH 'FROM LAKE!	
WASH FREQUENCY	ONCE PER SHIFT	
** REHEATER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	N/A	
CONSTRUCTION MATERIAL SPECIFIC TYPE	N/A	
** FANS		
NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	AMERICAN STANDARD	
FUNCTION	UNIT	
APPLICATION	INDUCED DRAFT	
SERVICE	WET	
FLUE GAS FLOW RATE - CU.M/S	259.54	(550000 ACFM)
FLUE GAS TEMPERATURE - C	51.7	(125 F)

ARIZONA PUBLIC SERVICE: FOUR CORNERS 1 (CONT.)

CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY

** DAMPERS

NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	AMERICAN STANDARD
SERVICE CONDITIONS	120-130 F
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	NR
SERVICE CONDITIONS	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	INLET
CONFIGURATION	CIRCULAR
DIMENSIONS	14 DIA X 90 FT
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-283
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	OUTLET 'ME TO STACK!
CONFIGURATION	RECTANGULAR
DIMENSIONS	12 X 12 X 50 FT
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-283
LINER GENERIC MATERIAL TYPE	STAINLESS STEEL
LINER SPECIFIC MATERIAL TYPE	AUSTENITIC

** REAGENT PREPARATION EQUIPMENT

FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	JOY
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	13.6 (15 TPH)
PRODUCT QUALITY - % SOLIDS	30.0

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	1
NUMBER OF SPARES	0

** TANKS

SERVICE	NUMBER
BLEED STREAM	1
RECYCLE	2
MAKEUP WATER	1
RETURN TRANSFER	1
LIME SLURRY	4

ARIZONA PUBLIC SERVICE: FOUR CORNERS 1 (CONT.)

** PUMPS

SERVICE	NUMBER
RECYCLE	2
RECYCLE 'STANDBY!	4
BLEED STREAM TANK	****
THICKENER UNDERFLOW	4
LIME SLURRY TRANSFER	2
RETURN WATER	2
SERVICE WATER	****
ME WATER	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
CONFIGURATION	CIRCULAR
DIMENSIONS - FT	100
CAPACITY	1000000
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER
FEED STREAM SOURCE	ABSORBER BLEED
OUTLET STREAM CHARACTERISTICS	40.0%

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	25.4	(28.0 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	60.0	
% CASO3 - DRY	18.0	
% CASO4 - DRY	5.0	
% CAOH2 - DRY	1.0	
% CACO3 - DRY	1.0	
% ASH - DRY	75.0	
% OTHER COMPOUNDS - DRY	1.0	

** TREATMENT

METHOD	DEWATERED
DEVICE	NR
PROPRIETARY PROCESS	NR

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	NONE
SITE DIMENSIONS	70 ACRES/55 FT
SITE CAPACITY - CU.M	4708550 (3850.0 ACRE-FT)
SITE SERVICE LIFE - YRS	10

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	SLURRY STREAM
CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	% SOLIDS, FLOW, TEMPERATURE
CONTROL LEVELS	PH 6.2-7.2, 12% SOLIDS
MONITOR TYPE	PH- APS FLOW THROUGH; DENSITY- TEXAS NUCLEAR
MONITOR LOCATION	RECYCLE LOOP ON TANGENTIAL NOZZLE HEADER
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

ARIZONA PUBLIC SERVICE: FOUR CORNERS 1 (CONT.)

** WATER BALANCE

WATER LOOP TYPE	OPEN
EVAPORATION WATER LOSS - LITER/S	6.3 (100 GPM)
SOURCE OF MAKEUP WATER	LAKE WATER

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIME
PRINCIPAL CONSTITUENT	CAO
SOURCE/SUPPLIER	CAN AM, PAUL LIME CO.
CONSUMPTION	20 TPD
UTILIZATION - %	83.0
POINT OF ADDITION	SLAKER, ABSORBER BOTTOM

** FGD SPARE CAPACITY INDICES

ABSORBER - %	0.0

** FGD SPARE COMPONENT INDICES

ABSORBER	0.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/79	SYSTEM							720			
12/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATIONS STARTED IN NOVEMBER 1979.

1/80	SYSTEM							744			
2/80	SYSTEM							696			
3/80	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT IS PRESENTLY IN THE SHAKEDOWN/DEBUGGING PHASE OF OPERATION.

4/80	SYSTEM							720			
5/80	SYSTEM							744			
6/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

ALTHOUGH THE FGD SYSTEM PERFORMANCE DATA ARE BEING LOGGED, THE UTILITY REPORTED THAT IT IS UNAVAILABLE FOR RELEASE AT THIS TIME.

7/80	SYSTEM							744			
8/80	SYSTEM							744			
9/80	SYSTEM							720			
10/80	SYSTEM							744			
11/80	SYSTEM							720			
12/80	SYSTEM							744			
1/81	SYSTEM							744			
2/81	SYSTEM							672			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM							744			
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			
10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			
1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			
4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			
7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1980 THROUGH MARCH 1983									
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
					INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1980 THROUGH JUNE 1983.						
7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
					INFORMATION WAS UNAVAILABLE FOR THE THIRD QUARTER OF 1983.						
10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
					INFORMATION WAS UNAVAILABLE FOR THE FOURTH QUARTER OF 1983.						
1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
					INFORMATION WAS NOT AVAILABLE FOR THE FIRST THREE QUARTERS OF 1984.						
10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
					INFORMATION WAS NOT AVAILABLE FOR THE FOURTH QUARTER OF 1984.						
1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE MONTHS OF JANUARY THROUGH DECEMBER 1985.

1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING A 6 WEEK SCHEDULED UNIT OUTAGE IN 1986, LINER REPAIRS AND REWORK OF THE WET FGD BOOSTER FANS WERE CONDUCTED. NO OTHER MAJOR SCHEDULED OR UNSCHEDULED OUTAGES WERE REPORTED FOR 1986 BY THE UTILTIY.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING 1987. THE UNIT WAS REPORTED TO HAVE BEEN OFF-LINE OCTOBER 16 THROUGH NOVEMBER 6 FOR SCHEDULED BOILER/TURBINE MAINTENANCE. DURING THE OUTAGE, THE UTILITY PERFORMED ROUTINE MAINTENANCE ON THE FGD SYSTEM.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA PUBLIC SERVICE	
PLANT NAME	FOUR CORNERS	
UNIT NUMBER	2	
CITY	FRUITLAND	
STATE	NEW MEXICO	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	21.	(0.050 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	365.	(0.850 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	2085	
GROSS UNIT GENERATING CAPACITY - MW	186	
NET UNIT GENERATING CAPACITY W/FGD - MW	170	
NET UNIT GENERATING CAPACITY WO/FGD - MW	175	
EQUIVALENT SCRUBBED CAPACITY - MW	186	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	384.13	(814000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	171.1	(340 F)
STACK HEIGHT - M	76.	(250 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	5.3	(17.5 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20004.	(8600 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8500-9100
AVERAGE ASH CONTENT - %	22.00	
RANGE ASH CONTENT - %	19-25	
AVERAGE MOISTURE CONTENT - %	10.80	
RANGE MOISTURE CONTENT - %	8.5-13.4	
AVERAGE SULFUR CONTENT - %	0.75	
RANGE SULFUR CONTENT - %	.5-1.3	
AVERAGE CHLORIDE CONTENT - %	0.03	
RANGE CHLORIDE CONTENT - %	.01-.06	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	0	
TYPE	NONE	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME/ALKALINE FLYASH	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES	
A-E FIRM	IN-HOUSE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	50.00	
ENERGY CONSUMPTION - %	2.7	
CURRENT STATUS	1	
COMMERCIAL START-UP	11/1979	
INITIAL START-UP	11/1979	
CONTRACT AWARDED	0/1978	

ARIZONA PUBLIC SERVICE: FOUR CORNERS 2 (CONT.)

** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	1.30	
DESIGN COAL HEAT CONTENT - J/G	19771.0	(8500 BTU/LB)
DESIGN COAL ASH CONTENT - %	25.00	
DESIGN MOISTURE CONTENT - %	13.40	
DESIGN CHLORIDE CONTENT - %	0.06	
SPACE REQUIREMENTS - SQ M	520.2	(5600 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	200.0	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/TOP-ENTRY PLUMB BOB	
TRADE NAME/COMMON TYPE	N/A	
DIMENSIONS - FT	25 DIA	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER	
LINER MATERIAL TRADE NAME/COMMON TYPE	FLAKELINE 103	
GAS CONTACTING DEVICE TYPE	VENTURI THROAT 'TANGENTIAL NOZZLES AT TOP & AT S	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	630.	(10000 GPM)
L/G RATIO - L/CU.M	3.2	(24.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	2.5	(10.0 IN-H20)
INLET GAS FLOW - CU. M/S	192.06	(407000 ACFM)
INLET GAS TEMPERATURE - C	171.1	(340 F)
SO2 REMOVAL EFFICIENCY - %	67.5	
PARTICLE REMOVAL EFFICENCY - %	99.5	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	2	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	6	
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	FRESH 'FROM LAKE!	
WASH FREQUENCY	ONCE PER SHIFT	
** REHEATER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	N/A	
CONSTRUCTION MATERIAL SPECIFIC TYPE	N/A	
** FANS		
NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	AMERICAN STANDARD	
FUNCTION	UNIT	
APPLICATION	INDUCED DRAFT	
SERVICE	WET	
FLUE GAS FLOW RATE - CU.M/S	259.54	(550000 ACFM)
FLUE GAS TEMPERATURE - C	51.7	(125 F)

ARIZONA PUBLIC SERVICE: FOUR CORNERS 2 (CONT.)

CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY
** DAMPERS	
NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	AMERICAN STANDARD
SERVICE CONDITIONS	120-130 F
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DAMPERS	
NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	NR
SERVICE CONDITIONS	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	INLET
CONFIGURATION	CIRCULAR
DIMENSIONS	14 DIA X 90 FT
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-283
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	OUTLET 'ME TO STACK!
CONFIGURATION	RECTANGULAR
DIMENSIONS	12 X 12 X 50 FT
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-283
LINER GENERIC MATERIAL TYPE	STAINLESS STEEL
LINER SPECIFIC MATERIAL TYPE	AUSTENITIC
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	JOY
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	13.6 (15 TPH)
PRODUCT QUALITY - % SOLIDS	30.0
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	1
NUMBER OF SPARES	0

** TANKS SERVICE	NUMBER
BLEED STREAM	1
RECYCLE	2
MAKEUP WATER	1
RETURN TRANSFER	1
LIME SLURRY	4

ARIZONA PUBLIC SERVICE: FOUR CORNERS 2 (CONT.)

** PUMPS

SERVICE	NUMBER
RECYCLE	2
RECYCLE 'STANDBY!	4
BLEED STREAM TANK	****
THICKENER UNDERFLOW	4
LIME SLURRY TRANSFER	2
RETURN WATER	2
SERVICE WATER	****
ME WATER	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
CONFIGURATION	CIRCULAR
DIMENSIONS - FT	100
CAPACITY	1000000
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER
FEED STREAM SOURCE	ABSORBER BLEED
OUTLET STREAM CHARACTERISTICS	40.0%

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	25.4	(28.0 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	60.0	
% CASO3 - DRY	18.0	
% CASO4 - DRY	5.0	
% CAOH2 - DRY	1.0	
% CACO3 - DRY	1.0	
% ASH - DRY	75.0	
% OTHER COMPOUNDS - DRY	1.0	

** TREATMENT

METHOD	DEWATERED
DEVICE	NR
PROPRIETARY PROCESS	NR

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	NONE
SITE DIMENSIONS	70 ACRES/55 FT
SITE CAPACITY - CU.M	4708550 (3850.0 ACRE-FT)
SITE SERVICE LIFE - YRS	10

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	SLURRY STREAM
CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	% SOLIDS, FLOW, TEMPERATURE
CONTROL LEVELS	PH 6.2-7.2, 12% SOLIDS
MONITOR TYPE	PH- APS FLOW THROUGH; DENSITY- TEXAS NUCLEAR
MONITOR LOCATION	RECYCLE LOOP ON TANGENTIAL NOZZLE HEADER
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

ARIZONA PUBLIC SERVICE: FOUR CORNERS 2 (CONT.)

** WATER BALANCE	
WATER LOOP TYPE	OPEN
EVAPORATION WATER LOSS - LITER/S	6.3 (100 GPM)
SOURCE OF MAKEUP WATER	LAKE WATER
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	LIME
PRINCIPAL CONSTITUENT	CAO
SOURCE/SUPPLIER	CAN AM, PAUL LIME CO.
CONSUMPTION	20 TPD
UTILIZATION - %	83.0
POINT OF ADDITION	SLAKER, ABSORBER BOTTOM
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	0.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	0.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/79	SYSTEM							720			
12/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATIONS STARTED IN NOVEMBER 1979.

1/80	SYSTEM							744			
2/80	SYSTEM							696			
3/80	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT IS PRESENTLY IN THE SHAKEDOWN/DEBUGGING PHASE OF OPERATION.

4/80	SYSTEM							720			
5/80	SYSTEM							744			
6/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

ALTHOUGH THE FGD SYSTEM PERFORMANCE DATA ARE BEING LOGGED, THE UTILITY REPORTED THAT IT IS UNAVAILABLE FOR RELEASE AT THIS TIME.

7/80	SYSTEM							744			
8/80	SYSTEM							744			
9/80	SYSTEM							720			
10/80	SYSTEM							744			
11/80	SYSTEM							720			
12/80	SYSTEM							744			
1/81	SYSTEM							744			
2/81	SYSTEM							672			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM							744			
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			
10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			
1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			
4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			
7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1980 THROUGH MARCH 1983										
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
					INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1980 THROUGH JUNE 1983.						
7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
					INFORMATION WAS UNAVAILABLE FOR THE THIRD QUARTER OF 1983.						
10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
					INFORMATION WAS UNAVAILABLE FOR THE FOURTH QUARTER OF 1983.						
1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
					INFORMATION WAS NOT AVAILABLE FOR THE FIRST THREE QUARTERS OF 1984.						
10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
					INFORMATION WAS NOT AVAILABLE FOR THE FOURTH QUARTER OF 1984.						
1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE MONTHS OF JANUARY THROUGH DECEMBER 1985.

1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING A 2-3 WEEK SCHEDULED UNIT OUTAGE IN 1986, LINER REPAIRS AND REWORK OF THE WET FGD BOOSTER FANS WERE CONDUCTED. NO OTHER MAJOR SCHEDULED OR UNSCHEDULED OUTAGES WERE REPORTED FOR 1986 BY THE UTILITY.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING 1987. THE UNIT WAS REPORTED TO HAVE BEEN OFF-LINE APPROXIMATELY 3 WEEKS IN NOVEMBER FOR SCHEDULED BOILER/TURBINE MAINTENANCE. DURING THIS OUTAGE, THE UTILITY PERFORMED ROUTINE MAINTENANCE ON THE FGD SYSTEM.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA PUBLIC SERVICE	
PLANT NAME	FOUR CORNERS	
UNIT NUMBER	3	
CITY	FRUITLAND	
STATE	NEW MEXICO	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	21.	(0.050 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	365.	(0.850 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	2085	
GROSS UNIT GENERATING CAPACITY - MW	244	
NET UNIT GENERATING CAPACITY W/FGD - MW	220	
NET UNIT GENERATING CAPACITY WO/FGD - MW	231	
EQUIVALENT SCRUBBED CAPACITY - MW	244	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	486.06	(1030000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	171.1	(340 F)
STACK HEIGHT - M	76.	(250 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20004.	(8600 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8500-9100
AVERAGE ASH CONTENT - %	22.00	
RANGE ASH CONTENT - %	19-25	
AVERAGE MOISTURE CONTENT - %	10.80	
RANGE MOISTURE CONTENT - %	8.5-13.4	
AVERAGE SULFUR CONTENT - %	0.75	
RANGE SULFUR CONTENT - %	.5-1.3	
AVERAGE CHLORIDE CONTENT - %	0.03	
RANGE CHLORIDE CONTENT - %	.01-.06	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	0	
TYPE	NONE	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME/ALKALINE FLYASH	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES	
A-E FIRM	IN-HOUSE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	50.00	
ENERGY CONSUMPTION - %	4.5	
CURRENT STATUS	1	
COMMERCIAL START-UP	11/1979	
INITIAL START-UP	11/1979	
CONTRACT AWARDED	0/1978	

ARIZONA PUBLIC SERVICE: FOUR CORNERS 3 (CONT.)

** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	1.30	
DESIGN COAL HEAT CONTENT - J/G	19771.0	(8500 BTU/LB)
DESIGN COAL ASH CONTENT - %	25.00	
DESIGN MOISTURE CONTENT - %	13.40	
DESIGN CHLORIDE CONTENT - %	0.06	
SPACE REQUIREMENTS - SQ M	520.2	(5600 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	200.0	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/TOP-ENTRY PLUMB BOB	
TRADE NAME/COMMON TYPE	N/A	
DIMENSIONS - FT	25 DIA	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER	
LINER MATERIAL TRADE NAME/COMMON TYPE	FLAKELINE 103	
GAS CONTACTING DEVICE TYPE	VENTURI THROAT 'TANGENTIAL NOZZLES AT TOP & AT S	
NUMBER OF CONTACTING ZONES	1	
L/G RATIO - L/CU.M	3.2	(24.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	2.5	(10.0 IN-H2O)
INLET GAS TEMPERATURE - C	171.1	(340 F)
SO2 REMOVAL EFFICIENCY - %	67.5	
PARTICLE REMOVAL EFFICENCY - %	99.5	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	2	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	6	
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	FRESH 'FROM LAKE!	
WASH FREQUENCY	ONCE PER SHIFT	
** REHEATER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	N/A	
CONSTRUCTION MATERIAL SPECIFIC TYPE	N/A	
** FANS		
NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	AMERICAN STANDARD	
FUNCTION	NR	
APPLICATION	INDUCED DRAFT	
SERVICE	WET	
FLUE GAS TEMPERATURE - C	51.7	(125 F)
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	

ARIZONA PUBLIC SERVICE: FOUR CORNERS 3 (CONT.)

** DAMPERS	
NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	AMERICAN STANDARD
SERVICE CONDITIONS	120-130 F
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DAMPERS	
NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	NR
SERVICE CONDITIONS	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	INLET
CONFIGURATION	CIRCULAR
DIMENSIONS	NR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-283
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	OUTLET 'ME TO STACK!
CONFIGURATION	RECTANGULAR
DIMENSIONS	NR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-283
LINER GENERIC MATERIAL TYPE	STAINLESS STEEL
LINER SPECIFIC MATERIAL TYPE	AUSTENITIC
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	JOY
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	13.6 (15 TPH)
PRODUCT QUALITY - % SOLIDS	30.0
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	1
NUMBER OF SPARES	0

** TANKS	
SERVICE	NUMBER
-------	------
BLEED STREAM	1
RECYCLE	2
MAKEUP WATER	1
RETURN TRANSFER	1
LIME SLURRY	4

ARIZONA PUBLIC SERVICE: FOUR CORNERS 3 (CONT.)

** PUMPS

SERVICE	NUMBER
RECYCLE	2
RECYCLE 'STANDBY!	4
BLEED STREAM TANK	****
THICKENER UNDERFLOW	4
LIME SLURRY TRANSFER	2
RETURN WATER	2
SERVICE WATER	****
ME WATER	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
CONFIGURATION	CIRCULAR
DIMENSIONS - FT	100
CAPACITY	1000000
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER
FEED STREAM SOURCE	ABSORBER BLEED
OUTLET STREAM CHARACTERISTICS	40.0%

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	25.4	(28.0 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	60.0	
% CASO3 - DRY	18.0	
% CASO4 - DRY	5.0	
% CAOH2 - DRY	1.0	
% CACO3 - DRY	1.0	
% ASH - DRY	75.0	
% OTHER COMPOUNDS - DRY	1.0	

** TREATMENT

METHOD	DEWATERED
DEVICE	NR
PROPRIETARY PROCESS	NR

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	NONE
SITE DIMENSIONS	70 ACRES/55 FT
SITE CAPACITY - CU.M	4708550 (3850.0 ACRE-FT)
SITE SERVICE LIFE - YRS	10

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	SLURRY STREAM
CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	% SOLIDS, FLOW, TEMPERATURE
CONTROL LEVELS	PH 6.2-7.2, 12% SOLIDS
MONITOR TYPE	PH- APS FLOW THROUGH; DENSITY- TEXAS NUCLEAR
MONITOR LOCATION	RECYCLE LOOP ON TANGENTIAL NOZZLE HEADER
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

ARIZONA PUBLIC SERVICE: FOUR CORNERS 3 (CONT.)

** WATER BALANCE	
WATER LOOP TYPE	OPEN
EVAPORATION WATER LOSS - LITER/S	6.3 (100 GPM)
SOURCE OF MAKEUP WATER	LAKE WATER
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	LIME
PRINCIPAL CONSTITUENT	CAO
SOURCE/SUPPLIER	CAN AM, PAUL LIME CO.
CONSUMPTION	20 TPD
UTILIZATION - %	83.0
POINT OF ADDITION	SLAKER, ABSORBER BOTTOM
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	0.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	0.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/79	SYSTEM							720			
12/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATIONS STARTED IN NOVEMBER 1979.

1/80	SYSTEM							744			
2/80	SYSTEM							696			
3/80	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT IS PRESENTLY IN THE SHAKEDOWN/DEBUGGING PHASE OF OPERATION.

4/80	SYSTEM							720			
5/80	SYSTEM							744			
6/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

ALTHOUGH THE FGD SYSTEM PERFORMANCE DATA ARE BEING LOGGED, THE UTILITY REPORTED THAT IT IS UNAVAILABLE FOR RELEASE AT THIS TIME.

7/80	SYSTEM							744			
8/80	SYSTEM							744			
9/80	SYSTEM							720			
10/80	SYSTEM							744			
11/80	SYSTEM							720			
12/80	SYSTEM							744			
1/81	SYSTEM							744			
2/81	SYSTEM							672			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 3 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM							744			
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			
10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			
1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			
4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			
7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1980 THROUGH MARCH 1983										
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1980 THROUGH JUNE 1983.									
7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE THIRD QUARTER OF 1983.									
10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE FOURTH QUARTER OF 1983.									
1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS NOT AVAILABLE FOR THE FIRST THREE QUARTERS OF 1984.									
10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS NOT AVAILABLE FOR THE FOURTH QUARTER OF 1984.									
1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE MONTHS OF JANUARY THROUGH DECEMBER 1985.

1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING A 2-3 WEEK SCHEDULED UNIT OUTAGE IN 1986, LINER REPAIRS AND REWORK OF THE WET FGD BOOSTER FANS WERE CONDUCTED. NO OTHER MAJOR SCHEDULED OR UNSCHEDULED OUTAGES WERE REPORTED FOR 1986 BY THE UTILITY.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING 1987. THE UNIT WAS REPORTED TO HAVE BEEN OFF-LINE MARCH 29 THROUGH MAY 1 FOR SCHEDULED BOILER/TURBINE MAINTENANCE. DURING THIS OUTAGE, THE UTILITY PERFORMED ROUTINE MAINTENANCE ON THE FGD SYSTEM.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA PUBLIC SERVICE	
PLANT NAME	FOUR CORNERS	
UNIT NUMBER	4	
CITY	FARMINGTON	
STATE	NEW MEXICO	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	215.	(0.500 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	258.	(0.600 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	2089	
GROSS UNIT GENERATING CAPACITY - MW	786	
NET UNIT GENERATING CAPACITY W/FGD - MW	739	
NET UNIT GENERATING CAPACITY WO/FGD - MW	758	
EQUIVALENT SCRUBBED CAPACITY - MW	668	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	****	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	********	(******* ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	******	(**** FT)
STACK SHELL	NR	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20120.	(8650 BTU/LB)
RANGE HEAT CONTENT - BTU/LB	8300-9000	
AVERAGE ASH CONTENT - %	22.00	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	0.75	
RANGE SULFUR CONTENT - %	0.6-1.0	
AVERAGE CHLORIDE CONTENT - %	0.10	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** FABRIC FILTER		
NUMBER	1	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME	
SYSTEM SUPPLIER	BABCOCK & WILCOX	
A-E FIRM	EBASCO	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	80.00	
ENERGY CONSUMPTION - %	2.4	
CURRENT STATUS	1	
COMMERCIAL START-UP	1/1985	
INITIAL START-UP	10/1984	

ARIZONA PUBLIC SERVICE: FOUR CORNERS 4 (CONT.)

CONTRACT AWARDED	0/1978
** DESIGN AND OPERATING PARAMETERS	
DESIGN CHLORIDE CONTENT - %	********
** QUENCHER/PRESATURATOR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** ABSORBER	
NUMBER	10
GENERIC TYPE	SPRAY TOWER
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY
TRADE NAME/COMMON TYPE	NR
SHELL GENERIC MATERIAL	STAINLESS STEEL
SHELL SPECIFIC MATERIAL	AUSTENITIC
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 317LM
LINER GENERIC MATERIAL	NR
LINER SPECIFIC MATERIAL	NR
LINER MATERIAL TRADE NAME/COMMON TYPE	NR
GAS CONTACTING DEVICE TYPE	NONE
INLET GAS FLOW - CU. M/S	306.73 (650000 ACFM)
SO2 REMOVAL EFFICIENCY - %	67.5
** MIST ELIMINATOR	
PRE-MIST ELIMINATOR/MIST ELIMINATOR	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** REHEATER	
GENERIC TYPE	BYPASS
SPECIFIC TYPE	N/A
TRADE NAME/COMMON TYPE	N/A
PERCENT GAS BYPASSED - AVG	15.0
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** FANS	
DESIGN	NR
FUNCTION	NR
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
** DAMPERS	
FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	DETENTION
DEVICE TYPE	N/A

ARIZONA PUBLIC SERVICE: FOUR CORNERS 4 (CONT.)

** TANKS

SERVICE	NUMBER
NR	****

** PUMPS

SERVICE	NUMBER
NR	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NA

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT

METHOD	FIXATION
DEVICE	NA
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
SITE TREATMENT	NR

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS NOT AVAILABLE FOR THE FOURTH QUARTER OF 1984.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE MONTHS OF JANUARY THROUGH DECEMBER 1985.

1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE BOILER OUTAGE MINOR PATCH WORK WAS CONDUCTED ON THE SCRUBBER OUTLET DUCTWORK.

DUE TO AN EXPLOSION AT A SIMILIARLY DESIGNED BOILER AT ANOTHER UTILITY, APS HAD TO SHUTDOWN TWO OF THEIR BOILERS FOR EMERGENCY REPAIRS TO THE HOT REHEAT PIPING. FOUR CORNERS 4 AND 5 BOTH HAD TO BE SHUT DOWN FOR REPAIRS. UNIT 4 WAS TAKEN OFF-LINE IN MARCH AND REMAINED OFF-LINE UNTIL APRIL.

5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

AFTER STARTUP IN APRIL, NO MAJOR UNIT OR FGD OUTAGES WERE ENCOUNTERED DURING THE REMAINDER OF 1986. FGD ANNUAL SYSTEM AVAILABILITY AND RELIABILITY WERE REPORTED TO BE 99.24 AND 99.03%, RESPECTIVELY.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 4 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING 1987. THE UNIT WAS REPORTED TO HAVE BEEN OFF-LINE JANUARY 31 THROUGH FEBRUARY 26 FOR SCHEDULED BOILER/TURBINE MAINTENANCE. DURING THIS OUTAGE, THE UTILITY PERFORMED ROUTINE MAINTENANCE ON THE FGD SYSTEM.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA PUBLIC SERVICE	
PLANT NAME	FOUR CORNERS	
UNIT NUMBER	5	
CITY	FARMINGTON	
STATE	NEW MEXICO	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	215.	(0.500 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	258.	(0.600 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	2089	
GROSS UNIT GENERATING CAPACITY - MW	786	
NET UNIT GENERATING CAPACITY W/FGD - MW	739	
NET UNIT GENERATING CAPACITY WO/FGD - MW	758	
EQUIVALENT SCRUBBED CAPACITY - MW	668	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	****	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	********	(******* ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	******	(**** FT)
STACK SHELL	NR	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20120.	(8650 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8300-9000
AVERAGE ASH CONTENT - %	22.00	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	0.75	
RANGE SULFUR CONTENT - %	0.6-1.0	
AVERAGE CHLORIDE CONTENT - %	0.10	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** FABRIC FILTER		
NUMBER	1	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME	
SYSTEM SUPPLIER	BABCOCK & WILCOX	
A-E FIRM	EBASCO	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	80.00	
ENERGY CONSUMPTION - %	2.4	
CURRENT STATUS	1	
COMMERCIAL START-UP	1/1985	

ARIZONA PUBLIC SERVICE: FOUR CORNERS 5 (CONT.)

INITIAL START-UP	10/1984
CONTRACT AWARDED	0/1978
** DESIGN AND OPERATING PARAMETERS	
DESIGN CHLORIDE CONTENT - %	********
** QUENCHER/PRESATURATOR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** ABSORBER	
NUMBER	10
GENERIC TYPE	SPRAY TOWER
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY
TRADE NAME/COMMON TYPE	NR
SHELL GENERIC MATERIAL	STAINLESS STEEL
SHELL SPECIFIC MATERIAL	AUSTENITIC
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 317LM
LINER GENERIC MATERIAL	NR
LINER SPECIFIC MATERIAL	NR
LINER MATERIAL TRADE NAME/COMMON TYPE	NR
GAS CONTACTING DEVICE TYPE	NONE
INLET GAS FLOW - CU. M/S	306.73 (650000 ACFM)
SO2 REMOVAL EFFICIENCY - %	90.0
** MIST ELIMINATOR	
PRE-MIST ELIMINATOR/MIST ELIMINATOR	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** REHEATER	
GENERIC TYPE	BYPASS
SPECIFIC TYPE	N/A
TRADE NAME/COMMON TYPE	N/A
PERCENT GAS BYPASSED - AVG	15.0
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** FANS	
DESIGN	NR
FUNCTION	NR
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
** DAMPERS	
FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	DETENTION
DEVICE TYPE	N/A

ARIZONA PUBLIC SERVICE: FOUR CORNERS 5 (CONT.)

** TANKS

SERVICE	NUMBER
NR	****

** PUMPS

SERVICE	NUMBER
NR	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NA

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT

METHOD	FIXATION
DEVICE	NA
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
SITE TREATMENT	NR

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM OPERATED WELL DURING THE FOURTH QUARTER OF 1984 WITH THE EXCEPTON OF MINOR INCIDENTS OF PLUGGING OR NEED TO SWAP OUT ATOMIZERS.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/85	SYSTEM							720			
12/85	SYSTEM							744			
1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DUE TO AN EXPLOSION AT A SIMILARLY DESIGNED BOILER AT ANOTHER UTILITY, APS HAD TO SHUTDOWN TWO OF THEIR BOILERS FOR EMERGENCY REPAIRS TO THE HOT

DURING THE BOILER OUTAGE MINOR PATCH WORK WAS CONDUCTED ON THE SCRUBBER OUTLET DUCTWORK.
REHEAT PIPING. FOUR CORNERS 4 AND 5 BOTH HAD TO BE SHUTDOWN FOR REPAIRS.
UNIT 5 WAS TAKEN OFF-LINE IN MARCH AND REMAINED OFF-LINE UNTIL JUNE.
UNIT 5 WAS DOWN LONGER THAN UNIT 4 BECAUSE THE UTILITY DECIDED TO REPLACE ALL NINE COAL PULVERIZERS IN ADDITION TO THE BOILER REPAIR WORK.

7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

AFTER STARTUP IN JUNE, NO MAJOR UNIT OR FGD OUTAGES WERE ENCOUNTERED DURING THE REMAINDER OF 1986. FGD ANNUAL SYSTEM AVAILABILITY AND RELIABILITY WERE REPORTED TO BE 97.60 AND 97.55 %, RESPECTIVELY.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING 1987. THE UNIT WAS REPORTED TO HAVE BEEN OFF-LINE MARCH 1 THROUGH MARCH 21 FOR SCHEDULED BOILER/TURBINE MAINTENANCE. DURING THIS OUTAGE, THE UTILITY PERFORMED ROUTINE MAINTENANCE ON THE FGD SYSTEM.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ASSOCIATED ELECTRIC	
PLANT NAME	THOMAS HILL	
UNIT NUMBER	3	
CITY	MOBERLY	
STATE	MISSOURI	
REGULATORY CLASSIFICATION	B	
PARTICULATE EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1150	
GROSS UNIT GE		
GROSS UNIT GENERATING CAPACITY - MW	670	
NET UNIT GENERATING CAPACITY W/FGD - MW	628	
NET UNIT GENERATING CAPACITY WO/FGD - MW	643	
EQUIVALENT SCRUBBED CAPACITY - MW	615	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	********	(******* ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	198.	(650 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	****	
AVERAGE HEAT CONTENT - J/G	24423.	(10500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		9600-9800
AVERAGE ASH CONTENT - %	11.20	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	14.00	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	4.80	
RANGE SULFUR CONTENT - %	3.8-4.5	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** ESP		
NUMBER	2	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	PEABODY INTERNATIONAL	
INLET FLUE GAS CAPACITY - CU.M/S	1349.6	(2860000 ACFM)
INLET FLUE GAS TEMPERATURE - C	148.9	(300 F)
PARTICLE REMOVAL EFFICENCY - %	99.7	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	MAGNESIUM OXIDE	
SYSTEM SUPPLIER	M.W. KELLOGG	

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

A-E FIRM	BURNS & MCDONNELL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.00	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	91.50	
ENERGY CONSUMPTION - %	2.2	
CURRENT STATUS	1	
COMMERCIAL START-UP	12/1982	
INITIAL START-UP	10/1982	
CONTRACT AWARDED	2/1978	
** DESIGN AND OPERATING PARAMETERS		
DESIGN CHLORIDE CONTENT - %	********	
SPACE REQUIREMENTS - SQ M	1858.0	(20000 SQ FT)
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	4	
NUMBER OF SPARES	1	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN CROSSCURRENT SPRAY	
TRADE NAME/COMMON TYPE	HORIZONTAL SPRAY CHAMBER	
SUPPLIER	PULLMAN KELLOGG	
DIMENSIONS - FT	26.0 X 18.0 X 80.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	INORGANIC	
LINER SPECIFIC MATERIAL	PREFIRED BRICK/SHAPES	
LINER MATERIAL TRADE NAME/COMMON TYPE	ACID-RESISTANT BRICK 'LOW H2O ABSORPTION!	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	4	
LIQUID RECIRCULATION RATE - LITER/S	2646.	(42000 GPM)
L/G RATIO - L/CU.M	2.3	(17.4 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.4	(1.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	6.7	(22.0 FT/S)
INLET GAS FLOW - CU. M/S	1142.00	(2420000 ACFM)
INLET GAS TEMPERATURE - C	137.8	(280 F)
SO2 REMOVAL EFFICIENCY - %	92.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	4	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	VERTICAL	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
WASH FREQUENCY	INTERMITTENT	
** REHEATER		
GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** FANS		
NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	AXIAL	
SUPPLIER	TLT-BABCOCK	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	1349.63	(2860000 ACFM)
FLUE GAS TEMPERATURE - C	148.9	(300 F)

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** FANS

NUMBER	2
NUMBER OF SPARES	0
DESIGN	AXIAL
SUPPLIER	WESTINGHOUSE
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** DAMPERS

FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	2
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	74.4 (82 TPH)

** REAGENT PREPARATION EQUIPMENT

FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	NR

** TANKS

SERVICE	NUMBER
LIMESTONE-SLURRY STORAGE	2
MIST ELIMINATOR WASH	****
FLOCCULANT	****
THICKENER OVERFLOW	****
ABSORBER RECYCLE	****
FORCED OXIDATION	2
MILL-PRODUCT	2

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	16
WASH WATER	****
FLOCCULANT FEED	****
THICKENER UNDERFLOW	****
THICKENER OVERFLOW	****
LIMESTONE SLURRY TRANSFER	4
MILL-PRODUCT	4

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	CENTRIFUGE
NUMBER	7

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

DIMENSIONS - FT	180.0 DIA
OUTLET STREAM CHARACTERISTICS	30% SOLIDS
*** SALEABLE BYPRODUCTS	
NATURE	NONE
DISPOSITION	N/A
*** SLUDGE	
** TREATMENT	
METHOD	FORCED OXIDATION
DEVICE	N/A
PROPRIETARY PROCESS	N/A
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	NR
** PROCESS CONTROL AND INSTRUMENTATION	
MONITOR TYPE	KVB
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
MAKEUP WATER ADDITION - LITERS/S	48.6 (772 GPM)
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	DOLOMITIC LIME
PRINCIPAL CONSTITUENT	60% CAO, 40% MGO
POINT OF ADDITION	SLAKER
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	33.3
** FGD SPARE COMPONENT INDICES	
ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT INITIAL START-UP OF THE FGD SYSTEM OCCURRED DURING OCTOBER, 1982.

11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED PROBLEMS WITH A CENTRIFUGE IN THE SLUDGE DEWATERING PROCESS SECTION. THE INABILITY TO REDUCE THE SLUDGE SOLIDS CONTENT HAS FORCED THE UTILITY TO OPERATE BELOW THE FULL LOAD DEMAND.									
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF APRIL THROUGH JUNE 1983.									
7/83	3A1	35.6	35.2		32.5						
	3A2	63.8	61.5		56.9						
	3B1	13.8	14.9		13.8						
	3B2	80.8	79.9		73.9						
	SYSTEM	64.7	63.8	63.8	59.0			744	688	439	80.6
8/83	3A1	36.7	36.8		36.7						
	3A2	51.3	51.4		51.3						
	3B1	59.3	59.4		59.3						
	3B2	50.0	50.1		50.0						
	SYSTEM	65.7	65.9	65.9	65.7			744	742	489	93.5
9/83	3A1	23.9	24.0		23.9						
	3A2	60.1	60.4		60.1						
	3B1	40.0	39.5		39.3						
	3B2	72.6	68.9		68.5						
	SYSTEM	65.5	64.2	64.2	63.9			720	717	460	91.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY ENCOUNTERED MAJOR PROBLEMS IN ATTEMPTING TO OPERATE THE DEWATERING PLANT AT REQUIRED CAPACITY FOR FULL FLUE GAS SCRUBBING. THESE PROBLEMS CENTERED AROUND THE CENTRIFUGE AND OXIDATION SYSTEM.

THE UTILITY EXPERIENCED CENTRIFUGE FAILURE WHILE DEWATERING UNDERFLOW TO THE REQUIRED SOLIDS CONCENTRATION. IN ATTEMPTS TO DUPLICATE CONDITIONS PRESENTED AT A TEST CENTRIFUGE, IT WAS DISCOVERED THAT OXIDIZED SLUDGE BELOW THE DESIGN SOLIDS CONCENTRATION TRIPS THE MACHINE ON TORQUE AND UNOXIDIZED SLUDGE BELOW THE DESIGN SOLIDS CONCENTRATION TRIPS THE MACHINE ON VIBRATION. THE UTILITY IS CONTINUING TO ADDRESS THE PROBLEM.

THE OXIDATION SYSTEM IS NOT UP TO REQUIRED CAPACITY. DURING THIS PERIOD WORK ON 2 OF 3 COMPRESSORS HAS BROUGHT UP THEIR CAPACITY, BUT PLUGGING OF THE SPARGER RINGS AND BUILD UP OF SOLIDS IN THE OXIDATION TANK CONTINUE TO ADVERSELY EFFECT THE OXIDATION CAPABILITIES. DESIGN FAILURE OF THE MIXING PADDLES HAS ALSO OCCURRED AND A TEMPORARY FIX WAS MADE. VENTING OF SOLIDS AT FULL OXIDATION RATES WITH SLURRY FLOW NEAR CAPACITY HAS ALSO BECOME A PROBLEM. VARIOUS DESIGN CHANGES ARE PROJECTED FOR THE SYSTEM DURING THE UNIT 3 FALL OUTAGE IN OCTOBER.

THE CONTINUOUS EMISSIONS MONITOR SAMPLE LINE REPLACEMENT IS NEARING COMPLE TION AND SHOULD BE READY FOR TESTING IN MID-OCTOBER.

DURING THIS REPORTING PERIOD, TESTS WERE RUN ON ONE ISOLATED SCRUBBER MODULE RUNNING AT DESIGN FLOW TO DETERMINE OPERATING EFFICIENCY. RESULTS OF THESE TESTS SHOWED SOX REMOVAL RATES WITHIN DESIGN BUT ONLY WHEN LIMESTONE WAS ADDED AT A LEVEL OF OVER TWICE THE THEORETICAL STOICHIOMETRY.

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/83	3A1	22.3	39.8		21.6						
	3A2	25.9	47.5		25.9						
	3B1	53.9	97.8		53.2						
	3B2	13.4	24.6		13.4						
	SYSTEM	38.5	69.9	69.9	38.0			744	405	283	45.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF-LINE FROM OCTOBER 17 THROUGH THE END OF THE MONTH. PROBLEMS WITH THE DEWATERING PLANT DURING THE THIRD QUARTER WERE STILL PRESENT INTO THE FOURTH QUARTER.

CARRYOVER OF SOLIDS THROUGH THE MIST ELIMINATORS CONTINUED TO BE A PROBLEM DURING OCTOBER. SLUDGE WAS BUILDING UP IN THE DUCTS AND ON THE BOTTOM OF THE STACK.

VELOCITY TESTS CONDUCTED DURING THE MONTH INDICATED ABOVE DESIGN VELOCITIES THROUGH THE MODULES. OPERATIONAL PARAMETERS WERE SET TO REDUCE VELOCITY.

DURING THE OCTOBER OUTAGE, WATER NOZZLES AND DRAINS WERE INSTALLED IN THE BREECHING DOWNSTREAM OF THE MIST ELIMINATORS AND IN THE STACK TO REDUCE SOLIDS BUILD UP.

STACK LINER DAMAGE WAS DISCOVERED TO BE THE RESULT OF CARRYOVER FROM THE FGD SYSTEM DURING THIS PERIOD. THE EXTENT OF DAMAGE IS BEING EVALUATED.

11/83	3A1	61.7	85.7		58.4						
	3A2	48.5	66.6		45.4						
	3B1	44.8	61.8		42.2						
	3B2	47.8	65.3		44.5						
	SYSTEM	67.6	93.1	93.1	63.5			720	491	457	56.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT OUTAGE CONTINUED THROUGH NOVEMBER 10, 1983.

FGD SYSTEM OUTAGE TIME DURING NOVEMBER WAS DUE PRIMARILY TO MIST ELIMINATO CLEANING.

12/83	3A1	14.3	11.1		11.1						
	3A2	95.7	85.8		85.4						
	3B1	91.9	75.0		74.6						
	3B2	84.4	67.6		67.3						
	SYSTEM	95.4	79.8	79.8	79.5			744	741	591	81.4

** PROBLEMS/SOLUTIONS/COMMENTS

FGD SYSTEM OUTAGE TIME DURING DECEMBER WAS DUE IN PART TO MIST ELIMINATOR CLEANING.

SEVERE COLD WEATHER CONTRIBUTED TO FGD SYSTEM DOWN TIME DURING DECEMBER.

CENTRIFUGE FAILURE TO DEWATER THE SLUDGE UNDERFLOW AT THE REQUIRED SOLIDS CONCENTRATION IS STILL A PROBLEM. NEGOTIATIONS ARE UNDERWAY WITH THE CENTRIFUGE MANUFACTURER TO PLAN PERFORMANCE GUARANTEE TESTS.

MODIFICATIONS TO THE FORCED OXIDATION SYSTEM WERE MADE DURING THE FOURTH QUARTER AND HAVE IMPROVED THE ABILITY OF THE SYSTEM TO OXIDIZE SCRUBBER SLUDGE. A NUMBER OF DESIGN AND OPERATIONAL PROBLEMS ARE CONTINUOUSLY BEIN ADDRESSED.

1/84	3A1	99.9	57.0		47.4						

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	3A2	97.2	73.9		61.5						
	3B1	77.4	37.6		31.3						
	3B2	74.2	21.2		17.7						
	SYSTEM	100.0	63.3	63.3	52.6			744	619	392	53.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE EXTREME COLD WEATHER ADVERSELY EFFECTED BOTH BOILER AND SCRUBBER OPERATIONS.

2/84	3A1	95.1	48.0		25.5						
	3A2	66.5	53.5		28.4						
	3B1	67.7	60.6		32.2						
	3B2	65.0	62.3		33.1						
	SYSTEM	98.1	74.8	88.4	39.7			696	370	276	35.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS OFF LINE FOR 13 DAYS DURING FEBRUARY.

3/84	3A1	73.5	68.1		65.7						
	3A2	69.2	67.8		65.4						
	3B1	81.0	50.5		48.7						
	3B2	53.4	50.3		48.6						
	SYSTEM	92.3	78.9	78.9	76.2			744	718	567	76.5
4/84	3A1	23.9	64.7		23.3						
	3A2	16.8	36.9		13.3						
	3B1	29.2	77.7		28.0						
	3B2	23.4	65.0		23.4						
	SYSTEM	31.1	81.4	81.4	29.4			720	260	212	28.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS OFF LINE 19 DAYS DURING APRIL.

THE ABSORBER AND DEWATERING FACILITIES UNDERWENT REPAIRS DURING THE MONTH.

THE UTILITY IS CONTINUING TO HAVE PROBLEMS IN THEIR ATTEMPT TO OPERATE THE DEWATERING PLANT AT REQUIRED CAPACITY FOR FULL FLUE GAS SCRUBBING. THESE PROBLEMS ARE PRIMARILY DUE TO CENTRIFUGE FAILURE AND OXIDATION SYSTEM PROBLEMS.

DURING MARCH OF THIS PERIOD, M.W. KELLOGG, THE SYSTEM SUPPLIER, CONDUCTED EXTENSIVE TESTING ON THE FGD SYSTEM. THIS TESTING WAS AN ATTEMPT TO GET THE SYSTEM OPERATING AT DESIGN SO2 REMOVAL EFFICIENCIES. AT THE END OF THE QUARTER, TESTING WAS NOT COMPLETE, BUT IT WAS FOUND THAT OVER FEEDING LIMESTONE BY 2 TO 3 TIMES WOULD RAISE THE SYSTEM PH TO LEVELS THAT WOULD GIVE REMOVAL EFFICIENCIES ABOVE 90%. OPERATION AT THIS LEVEL OF UNREACTED LIMESTONE IN THE WASTE SLURRY ONLY ADDS TO DEWATERING PROBLEMS. THROUGH THE MIDDLE OF APRIL, M.W. KELLOGG CONTINUED ITS TESTING AND WILL ASSIST THE UTILITY IN A SOLUTION TO ITS PROBLEMS WITH REACTOR CHEMISTRY.

5/84	3A1	0.0			0.0						
	3A2	0.0			0.0						
	3B1	0.0			0.0						
	3B2	0.0			0.0						
	SYSTEM	0.0			0.0			744	0	0	0.0

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS OFF LINE ALL MONTH FOR A SCHEDULED OUTAGE.									
		THE MODULES WERE UNAVAILABLE DUE TO REPAIR WORK IN THE ABSORBER AND DEWATERING FACILITIES.									
6/84	3A1	40.0	88.0		36.9						
	3A2	40.0	88.8		37.3						
	3B1	26.3	49.5		20.8						
	3B2	20.3	42.3		17.8						
	SYSTEM	42.2	89.5	89.5	37.6			720	302	271	33.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS OFF LINE UNTIL JUNE 19 FOR A SCHEDULED OUTAGE.									
		THE ABSORBER AND DEWATERING FACILITIES WERE BEING REPAIRED DURING JUNE.									
7/84	3A1	66.3	67.1		66.3						
	3A2	73.4	74.3		73.4						
	3B1	70.4	71.2		70.4						
	3B2	67.2	68.1		67.2						
	SYSTEM	92.4	93.6		92.4			744	735	688	89.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY IS CONTINUING TO EXPERIENCE PROBLEMS IN THEIR ATTEMPT TO OPERATE THE DEWATERING PLANT AT REQUIRED CAPACITY FOR FULL FLUE GAS SCRUBBING. THOSE PROBLEMS ARE PRIMARILY DUE TO CENTRIFUGE FAILURE AND OXIDATION SYSTEM PROBLEMS.									
		WITH THE COMPLETION OF TESTS IN APRIL THE FGD SYSTEM SUPPLIER, M.W. KELLOGG, HAS RECOMMENDED AND WILL MAKE THE FOLLOWING MODIFICATIONS IN ATTEMPTS TO BRING THE SYSTEM UP TO DESIGN PERFORMANCE (1) REPLACEMENT OF REACTOR BAFFLER. (2) REPLACEMENT OF ALL NOZZLES WITH BETE DESIGN. (3) MODIFICATION OF THE RECYCLE PUMPS FOR HIGHER FLOW RATES. (4) INSTALL A ROUGHING DEMISTER. THE DESCRIBED WORK IS SCHEDULED TO BEGIN AUGUST 6TH.									
8/84	3A1	83.4	82.4		79.3						
	3A2	67.4	61.1		58.8						
	3B1	11.0	6.6		6.3						
	3B2	82.2	83.0		79.9						
	SYSTEM	81.3	77.7		74.8			744	716	556	86.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FGD SYSTEM OUTAGE TIME DURING AUGUST WAS DUE IN PART TO MODULE CLEANING.									
		MODULE 3B1 UNDERWENT MAJOR DESIGN MODIFICATIONS DURING AUGUST.									
		THE UNIT WAS DOWN DURING PART OF AUGUST DUE TO BOILER LEAKS.									
		FGD SYSTEM OUTAGE TIME DURING AUGUST WAS DUE IN PART TO MODULE CLEANING.									
		MODULE 3B1 UNDERWENT MAJOR DESIGN MODIFICATIONS DURING AUGUST.									
		THE UNIT WAS DOWN DURING PART OF AUGUST DUE TO BOILER TUBE LEAKS.									

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/84	3A1	45.3	45.5		45.3						
	3A2	71.2	71.4		71.2						
	3B1	52.5	52.7		52.5						
	3B2	27.6	27.7		27.6						
	SYSTEM	65.5	65.8		65.5			720	717	472	84.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT IT WILL BE CONDUCTING THE FOLLOWING MAJOR REPAIRS DURING THE FOURTH QUARTER OF 1984 IN EFFORTS TO INCREASE THE SYSTEMS SO2 REMOVAL EFFICIENCY AND LIMESTONE UTILIZATION:
(1) INSTALLING TWO BAFFLES IN EACH REACTOR TO ESTABLISH A PH PROFILE ACROSS THREE SEPARATE COMPARTMENTS.
(2) INSTALLING NEW DOWNCOMERS BETWEEN THE ABSORBERS AND REACTORS TO HELP RETAIN THE HIGH PH SCRUBBER LIQUOR IN THE FIRST COMPARTMENT.
(3) REPLACING THE EXISTING SPRAY NOZZLES WITH NEW LOWER PRESSURE DROP NOZZLES TO INCREASE THE SYSTEM'S L/G.
(4) INSTALLING NEW BULK ENTRAINMENT MIST ELIMINATORS TO REDUCE THE LIQUID LOADING AND FLATTEN THE FLOW DISTRIBUTION TO THE EXISTING MIST ELIMINATORS.

THE UTILITY ALSO REPORTED EXPERIENCING THE FOLLOWING PROBLEMS:
(1) FAILURE OF CENTRIFUGES TO DEWATER SLUDGE AT MORE THAN 50% DESIGN. UTILITY IS CURRENTLY TESTING A NEW MODIFIED CENTRIFUGE.
(2) OXIDATION TANK SPARGER RING PLUGGING, BLOWER INLET PLUGGING AND TANK PRESSURIZATION. UTILITY IS PRESENTLY ADDRESSING THIS PROBLEM ALSO.

10/84	3A1	44.7	48.6		43.6						
	3A2	26.8	29.9		26.8						
	3B1	39.4	43.9		39.4						
	3B2	41.3	46.0		41.3						
	SYSTEM	50.7	56.1		50.3			744	668	375	76.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS DOWN MOST OF THE MONTH OF OCTOBER DUE TO DEMISTER PLUGGING. THE UNIT WAS ALSO DOWN APPROXIMATELY 3 DAYS DUE TO TUBE LEAKS.

11/84	3A1	58.3	62.6		58.3						
	3A2	76.5	76.2		70.9						
	3B2	58.0	62.3		58.0						
	3B1	69.5	69.7		64.8						
	SYSTEM	87.4	90.3		84.0			720	660	605	83.1

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF NOVEMBE WITH THE EXCEPTION OF HAVING TO CLEAN ABSORBER MIST ELIMINATORS AND REPAIR A SEAL WATER LEAK.

12/84	3A1	63.7	57.7		52.5						
	3A2	65.5	61.9		56.3						
	3B1	67.9	33.1		30.1						
	3B2	82.6	78.7		71.6						
	SYSTEM	93.2	77.1		70.1			744	676	522	76.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE PLANNED WORK REFERENCED TO DURING THE MONTH OF SEPTEMBER IS NOW COMPLETE THE SYSTEM SUPPLIER IS CURRENTLY INSPECTING THE SYSTEM TO DETERMINE THE EFFECT OF THESE MODIFICATIONS. ALL FOUR MODULES WERE ALSO

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
			CLEANED DURING THE MONTH OF DECEMBER.								
1/85	3A1	77.0	70.3	70.3	66.7						
	3A2	77.1	74.9	74.9	71.1						
	3B1	64.3	60.5	60.5	57.4						
	3B2	65.1	58.9	58.9	55.9						
	SYSTEM	94.5	88.2	88.2	83.7			744	706	623	80.1
2/85	3A1	63.2	58.1	58.1	58.1						
	3A2	41.3	21.0	21.0	21.0						
	3B1	63.9	60.8	60.8	60.8						
	3B2	55.0	42.9	42.9	42.9						
	SYSTEM	74.5	60.9	60.9	60.9			672	672	409	78.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN FOR PART OF JANUARY AND FEBRUARY TO PERMIT MIST ELIMINATOR AND DUCTWORK CLEANING.

3/85	3A1	19.9	57.6	57.6	14.9						
	3A2	19.9	62.1	62.1	16.1						
	3B1	19.9	53.5	53.5	13.8						
	3B2	18.7	59.3	59.3	15.3						
	SYSTEM	26.1	77.5	77.5	20.0			744	192	149	16.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY IS INVESTIGATING THE USE OF DIBASIC ACID AND OTHER PROCESS/SYSTEM MODIFICATIONS TO IMPROVE SO2 REMOVAL EFFICIENCY AND SYSTEM RELIABILITY. BY PASS DAMPER OPERATION HAS BEEN IMPROVED SO THAT A SHUTOFF CAN NOW BE INVOKED. CENTRIFUGE MODIFICATIONS HAVE IMPROVED CAPACITY PROBLEMS. HOWEVER, OXIDATION SYSTEM AND THICKENER PROBLEMS CONTINUE TO BE A CONCERN WHEN FULL SCRUBBING CONDITIONS ARE ATTEMPTED UNDER FULL/HIGH BOILER LOADS.

4/85	3A1	0.9	39.6	39.6	0.9						
	3A2	0.9	39.6	39.6	0.9						
	3B1	0.9	39.6	39.6	0.9						
	3B2	0.2	9.1	9.1	0.2						
	SYSTEM	0.0	42.7	42.7	0.0			720	16	7	1.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFFLINE FOR A SCHEDULED OUTAGE FOR ALL BUT 16.4 HOURS OF THE MONTH. NO SPECIFIC FGD SYSTEM PROBLEMS WERE DESCRIBED BY THE UTILITY.

5/85	3A1	56.5	64.4	64.4	56.5						
	3A2	78.1	89.2	89.2	78.1						
	3B1	47.9	54.7	54.7	47.9						
	3B2	72.4	82.6	82.6	72.4						
	SYSTEM	85.0	97.0	97.0	85.0			744	652	632	62.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS REPORTEDLY PERFORMING UNDER COMPLIANCE CONDITIONS FOR ALL BUT 12.3 HOURS DURING THE ENTIRE MONTH. FULL LOAD COMPLIANCE OPERATION WAS ACHIEVED, HOWEVER, NOT ON A FULL TIME BASIS. A CONTRACTOR WAS EMPLOYED TO ASSIST IN DETERMINING OPTIMUM OPERATIONAL PARAMETERS AND ADDITIVE CHEMICALS.

6/85	3A1	64.4	74.9	74.9	64.4						
	3A2	69.6	81.0	81.0	69.6						
	3B1	62.2	72.3	72.3	62.2						

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	3B2	77.3	89.9	89.9	77.3						
	SYSTEM	91.1	100.0	100.0	91.1			720	619	656	64.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT OPERATED WITHIN THE 1.2 LB/MM BTU SO2 LIMITATION FOR ALL BUT 10.6 HOURS DURING THE MONTH. TOTAL SYSTEM DEPENDABILITY WAS VERY HIGH BECAUSE OF 4-MODULE OPERATION DURING THE MONTH (ONLY 3 ARE REQUIRED FOR FULL LOAD SERVICE).

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/85	3A1	50.5	67.1	67.1	50.5						
	3A2	71.8	95.4	95.4	71.8						
	3B1	62.3	82.9	82.9	62.3						
	3B2	70.8	94.1	94.1	70.8						
	SYSTEM	85.1	100.0	100.0	85.1			744	560	633	52.2

** PROBLEMS/SOLUTIONS/COMMENTS

MUCH OF THE SYSTEM UNAVAILABLE TIME DURING THE MONTH WAS ATTRIBUTED TO THE NECESSARY MIST ELIMINATOR CLEANING.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/85	3A1	75.1	85.7	85.7	75.1						
	3A2	78.2	89.2	89.2	78.2						
	3B1	72.0	82.1	82.1	72.0						
	3B2	81.0	92.4	92.4	81.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	652	744	60.1

** PROBLEMS/SOLUTIONS/COMMENTS

MIST ELIMINATOR CLEANING CONTINUED TO BE A MAJOR CAUSE OF MODULE UNAVAILABILITY DURING THE MONTHS OF JUNE THROUGH AUGUST.

THE FGD SYSTEM OPERATED WITH FOUR MODULES IN SERVICE DURING THE PERIOD. THE UNIT MAINTAINED SO2 COMPLIANCE FOR ALL BUT 28.9 HOURS DURING AUGUST.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/85	3A1	94.0	94.5	98.2	88.0						
	3A2	97.1	97.2	99.8	90.5						
	3B1	92.6	90.6	98.5	84.3						
	3B2	93.9	94.0	97.5	87.5						
	SYSTEM	100.0	100.0	100.0	100.0			720	670	720	76.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT MAINTAINED SO2 COMPLIANCE FOR ALL BUT 10 HOURS THROUGH SEPTEMBER. 4-MODULE FGD SYSTEM OPERATION CONTINUED THROUGH THE MONTH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/85	3A1	94.4	93.6	96.8	91.9						
	3A2	91.2	93.7	99.3	92.0						
	3B1	91.7	88.0	96.8	86.4						
	3B2	94.4	93.8	96.8	92.1						
	SYSTEM	100.0	100.0	100.0	100.0			744	731	744	86.5
11/85	3A1	95.5	83.2	100.0	81.8						
	3A2	96.1	88.3	98.8	86.8						
	3B1	92.3	82.9	96.5	81.6						
	3B2	95.8	82.7	100.0	81.3						
	SYSTEM	100.0	100.0	100.0	100.0			720	708	720	68.3
12/85	3A1	97.4	85.2	100.0	77.5						
	3A2	96.0	72.0	99.3	65.5						
	3B1	98.7	86.4	100.0	78.6						
	3B2	98.0	45.7	99.6	41.5						
	SYSTEM	100.0	96.4	100.0	87.7			744	677	653	42.5

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/86	3A1	94.6	88.3	94.5	74.0						
	3A2	94.2	74.9	93.9	62.8						
	3B1	95.4	88.1	95.0	73.8						
	3B2	96.0	91.6	95.1	76.8						
	SYSTEM	100.0	100.0	100.0	95.8			744	624	713	59.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT REMAINED IN COMPLIANCE AT 1.2 LB SO2/MM BTU FOR ALL BUT 13.5 HOURS IN JANUARY.

ABSORBER AND MIST ELIMINATOR CLEANING WAS PERFORMED PERIODICALLY THROUGHOUT THE MONTH.

2/86	3A1	77.8	72.9	94.1	49.5						
	3A2	71.9	81.1	98.3	55.1						
	3B1	73.6	79.0	98.3	53.6						
	3B2	79.3	79.2	96.5	53.8						
	SYSTEM	100.0	100.0	100.0	70.7			672	456	475	42.0

** PROBLEMS/SOLUTIONS/COMMENTS

THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 25.4 HOURS DURING FEBRUARY.

ABSORBER LINER FAILURES WERE REPAIRED DURING THE MONTH.

THE UTILITY REPORTED THAT MIST ELIMINATOR AND NOZZLE CLEANING WAS PERFORMED.

DURING FEBRUARY ABSORBER INTERNALS AND FLOORS WERE CLEANED.

THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 25.4 HOURS DURING FEBRUARY.

3/86	3A1	98.5	96.1	98.5	96.1						
	3A2	98.5	94.3	99.6	94.3						
	3B1	98.4	91.7	98.2	91.7						
	3B2	96.2	85.0	98.4	85.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	76.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY EXPERIENCED RECYCLE PUMP PROBLEMS IN MARCH. MAINTENANCE WAS PERFORMED AND THE PUMPS WERE PLACED BACK IN SERVICE.

MIST ELIMINATOR PLUGGING PROBLEMS WERE REPORTED DURING THE PERIOD. PERIODIC CLEANING WAS PERFORMED.

UNIT 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 6.25 HOURS DURING MARCH.

SOME ABSORBOR CLEANING WAS REPORTED DURING MARCH.

4/86	3A1	49.2	90.8	100.0	40.3						
	3A2	50.0	69.3	100.0	30.8						
	3B1	49.2	83.5	100.0	37.1						
	3B2	49.1	89.1	100.0	39.6						
	SYSTEM	65.8	100.0	100.0	49.3			720	320	355	29.8

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 6.3 HOURS DURING APRIL.									
		THE ANNUAL SPRING OUTAGE BEGAN ON 4/16/86.									
		SOME DOWNTIME DURING THE MONTH WAS ATTRIBUTED TO A BOILER TUBE LEAK.									
		DURING APRIL THE UTILITY REPORTED THAT MIST ELIMINATOR CLEANING WAS REQUIRED SEVERAL TIMES.									
		GENERAL ABSORBER CLEANING AND MAINTENANCE WAS PERFORMED.									
5/86	3A1	40.9	87.0	98.3	23.2						
	3A2	40.0	73.3	100.0	19.6						
	3B1	40.1	75.5	98.0	20.1						
	3B2	39.6	73.9	98.9	19.7						
	SYSTEM	53.5	100.0	100.0	27.5			744	198	205	16.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 9.8 HOURS DURING MAY.									
		THE UTILITY REPORTED THAT RECYCLE PUMP PROBLEMS WERE ENCOUNTERED DURING THE MONTH ON MODULE 3B2.									
		THE SCHEDULED SPRING OUTAGE CONTINUE THROUGH 5/19/86.									
6/86	3A1	100.0	91.7	100.0	88.6						
	3A2	98.4	92.7	99.4	89.6						
	3B1	100.0	88.9	100.0	86.0						
	3B2	100.0	87.9	100.0	85.0						
	SYSTEM	100.0	100.0	100.0	100.0			720	696	720	74.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 8.8 HOURS DURING JUNE.									
		DAMPER PROBLEMS CAUSED BY A COMPUTER MALFUNCTION WERE REPORTED FOR THE 3A2 MODULE IN JUNE.									
		PERIODIC ABSORBER CLEANING WAS PERFORMED DURING THE MONTH.									
7/86	3A1	96.7	76.3	100.0	54.1						
	3A2	98.5	96.3	100.0	68.2						
	3B1	97.3	87.4	100.0	61.9						
	3B2	98.5	95.4	100.0	67.6						
	SYSTEM	100.0	100.0	100.0	84.0			744	527	625	55.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		CLEANING AND WELDING REPAIR ON A LEAK OCCURRED ON MODULE 3B1. GENERAL CLEANING AND MAINTENANCE WORK WAS PERFORMED ON THE OTHER MODULES.									
		THE UTILITY REPORTED THAT RECYCLE PUMP SPRAY NOZZLES WERE CLEANED IN JULY.									
		AN INSPECTION OF THE OUTLET DUCKWORK WAS PERFORMED.									
		THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT									

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
			THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 22.8 HOURS DURING JULY.								
			MIST ELIMINATOR CLEANING WAS PERFORMED ON MODULE 3B2.								
8/86	3A1	94.9	80.0	97.4	69.7						
	3A2	96.8	86.7	98.2	75.6						
	3B1	98.5	87.7	98.5	76.4						
	3B2	96.7	85.9	98.4	74.8						
	SYSTEM	100.0	100.0	100.0	98.8			744	648	735	64.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 31 HOURS DURING AUGUST.								
			SOME MIST ELIMINATOR PLUGGING WAS REPORTED. MIST ELIMINATOR CLEANING WORK WAS PERFORMED DURING TIMES WHEN INDIVIDUAL ABSORBERS WERE NOT REQUIRED FOR SCRUBBING SERVICE.								
			SLURRY SPRAY NOZZLE CLEANING WORK WAS REQUIRED DURING AUGUST.								
			A COMPUTER FUSE BLOW OUT CAUSED A 3A1/3A2 SCRUBBER TRIP BRIEFLY IN AUGUST.								
			GENERAL ABSORBER CLEANING/MAINTENANCE WORK WAS PERFORMED DURING THE MONTH.								
9/86	3A1	99.5	87.1	100.0	79.8						
	3A2	98.4	93.8	100.0	86.0						
	3B1	98.7	96.1	100.0	88.1						
	3B2	97.7	93.7	99.5	85.8						
	SYSTEM	100.0	100.0	100.0	100.0			720	660	720	74.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			ABSORBER CLEANING/MAINTENANCE WAS REQUIRED IN SEPTEMBER. NO FGD SYSTEM DOWNTIME WAS ATTRIBUTED TO SCRUBBER PROBLEMS.								
			THE UTILITY PERFORMED MIST ELIMINATOR CLEANING WORK PERIODICALLY THROUGHOUT THE MONTH.								
			THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 17.3 HOURS DURING SEPTEMBER.								
10/86	3A1	79.4	78.6	98.5	76.0						
	3A2	93.8	94.3	99.2	91.2						
	3B1	89.8	88.6	99.6	85.8						
	3B2	79.3	79.4	99.7	76.8						
	SYSTEM	100.0	100.0	100.0	100.0			744	720	744	79.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
			PRESATURATOR LINER PATCHING WAS PERFORMED ON THE ABSORBER MODULE THROUGHOUT THE PERIOD.								
			THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 18 HOURS DURING OCTOBER.								
			RECYCLE PUMP MAINTENANCE WAS PERFORMED ON MODULE 3B1 IN OCTOBER.								
			MODULE 3A1 MIST ELIMINATOR CLEANING WAS REPORTED DURING THE MONTH.								
			THE UTILITY REPORTED THAT SLURRY SPRAY NOZZLE CLEANING WAS REQUIRED DURING THE MONTH.								

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			ABSORBER CLEANING WAS PERFORMED PERIODICALLY THROUGHOUT THE MONTH.								
11/86	3A1	97.8	96.2	99.8	89.5						
	3A2	78.4	70.4	100.0	65.5						
	3B1	79.2	75.0	100.0	69.8						
	3B2	96.4	96.2	99.7	89.5						
	SYSTEM	100.0	100.0	100.0	100.0			720	670	720	83.6

** PROBLEMS/SOLUTIONS/COMMENTS

MIST ELIMINATOR CLEANING WAS PERFORMED PERIODICALLY THROUGHOUT THE PERIOD.

PRESATURATION PATCHING BEGUN LAST MONTH CONTINUED THROUGH NOVEMBER.

GENERAL ABSORBER CLEANING WAS PERFORMED DURING THE MONTH. SOME CONTRACTOR REBUILDING WORK WAS COMPLETED ON MODULE 3A2.

THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 26 HOURS DURING NOVEMBER.

INSTRUMENTATION PROBLEMS WERE REPORTED FOR NOVEMBER AND A COMPUTER FAILURE TRIPPED THE FGD SYSTEM OFF BRIEFLY.

12/86	3A1	99.6	96.8	100.0	96.4						
	3A2	99.1	94.9	100.0	94.6						
	3B1	98.9	95.2	100.0	94.8						
	3B2	97.8	95.0	100.0	94.6						
	SYSTEM	100.0	100.0	100.0	100.0			744	741	744	87.8

** PROBLEMS/SOLUTIONS/COMMENTS

MIST ELIMINATOR CLEANING WAS REQUIRED ON SEVERAL OCCASSIONS DURING THE MONTH.

PERIODIC CLEANING OF ABSORBER INTERNALS WAS REPORTED DURING DECEMBER.

RECYCLE PUMP HEADER REPAIRS WERE MADE DURING THE PERIOD INVOLVING SEVERAL PUMPS. SOME PLUGGING PROBLEMS WERE ENCOUNTERED LATER.

A COMPUTER CONTROLLER FAILURE TRIPPED THE RECYCLE PUMPS OFF FOR A SHORT TIME. A RELATED DAMPER CONTROLLER PROBLEM ALSO OCCURRED.

THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 14 HOURS DURING DECEMBER.

1/87	3A1	99.7	92.9	100.0	90.8						
	3A2	98.6	87.9	100.0	85.9						
	3B1	99.9	95.7	100.0	93.6						
	3B2	98.9	88.4	99.8	86.4						
	SYSTEM	100.0	100.0	100.0	100.0			744	728	744	73.9

** PROBLEMS/SOLUTIONS/COMMENTS

GENERAL ABSORBER CLEANING/MAINTENANCE WORK WAS PREFORMED DURING THE MONTH.

MODULE 3B2 WAS OUT OF SERVICE FOR DUCT WORK INSPECTION IN JANUARY.

SOME DOWNTIME DURING THE MONTH WAS ATTRIBUTED TO A BOILER TUBE LEAK.

THE UTILITY PERFORMED MIST ELIMINATOR WORK PERIODICALLY THROUGHOUT THE MONTH.

THE UTILITY REPORTED THAT RECYCLE SPRAY NOZZLES WERE REPLACED ON MODULES

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
			3A2 AND 3B2 DURING JANUARY.								
			THE UTILITY REPORTED THAT MAINTENANCE WORK WAS PERFORMED ON PUMPS AND HOSES DURING JANUARY.								
			THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 6.5 HOURS DURING JANUARY.								
2/87	3A1	99.0	88.8	100.0	84.9						
	3A2	99.7	94.4	100.0	90.2						
	3B1	100.0	87.3	100.0	83.4						
	3B2	99.3	85.5	100.0	81.7						
	SYSTEM	100.0	100.0	100.0	100.0			672	642	672	69.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT MAINTENANCE WORK WAS PERFORMED ON RECYCLE PUMPS THROUGHOUT FEBRUARY.								
			GENERAL MAINTENANCE/CLEANING OF MODULES WAS REPORTED THROUGHOUT THE MONTH OF FEBRUARY.								
			THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 7.75 HOURS DURING FEBRUARY.								
			MIST ELIMINATOR CLEANING AND MAINTENANCE WAS PERFORMED THROUGHOUT THE MONTH.								
3/87	3A1	100.0	84.4	100.0	81.7						
	3A2	100.0	95.6	100.0	92.5						
	3B1	99.7	75.6	100.0	73.1						
	3B2	100.0	89.7	100.0	86.8						
	SYSTEM	100.0	100.0	100.0	100.0			744	720	744	67.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
			FGD SYSTEM OUTAGE TIME DURING DECEMBER WAS DUE IN PART TO MIST ELIMINATOR CLEANING.								
			THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 13.25 HOURS DURING MARCH.								
			MODULE 3B1 WAS UNAVAILABLE FOR 2 HOURS IN MARCH DUE TO RECYCLE PUMP MAINTENANCE.								
			FGD SYSTEM OUTAGE TIME DURING MARCH WAS DUE IN PART TO MODULE CLEANING.								
4/87	3A1	60.3	93.9	100.0	56.3						
	3A2	60.2	91.3	100.0	54.8						
	3B1	60.3	87.0	100.0	52.2						
	3B2	60.0	93.7	100.0	56.2						
	SYSTEM	80.3	100.0	100.0	73.1			720	432	527	45.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD DURING APRIL.								
			FGD SYSTEM OUTAGE TIME DURING APRIL WAS DUE IN PART TO MIST ELIMINATOR CLEANING.								
			ABSORBER CLEANING/MAINTENANCE WAS PERFORMED PERIODICALLY DURING APRIL.								
			THE ANNUAL OUTAGE BEGAN ON APRIL 19, 1987.								

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
5/87	3A1	0.0			0.0						
	3A2	0.0			0.0						
	3B1	0.0			0.0						
	3B2	0.0			0.0						
	SYSTEM	0.0			0.0			744	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCHEDULED SPRING OUTAGE CONTINUED THROUGHOUT ALL OF MAY.

6/87	3A1	90.8	96.8	98.4	84.0						
	3A2	95.6	95.2	99.9	82.6						
	3B1	72.8	73.1	93.3	63.4						
	3B2	95.7	96.8	99.9	84.1						
	SYSTEM	100.0	100.0	100.0	100.0			720	625	720	70.8

** PROBLEMS/SOLUTIONS/COMMENTS

THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 25.0 HOURS DURING JUNE.

ABSORBER CLEANING AND MAINTENANCE WERE PERFORMED THROUGHOUT THE MONTH.

THE SCHEDULED SPRING OUTAGE CONTINUED THROUGH JUNE 2.

CONSTRUCTION WORK WAS PERFORMED ON MODULE 3B1 DURING JUNE.

RECYCLE PUMP HEADER REPAIRS WERE PERFORMED ON MODULE 3B1 DURING JUNE.

SOME DOWNTIME DURING THE MONTH WAS ATTRIBUTED TO A BOILER TUBE LEAK.

FGD SYSTEM OUTAGE TIME DURING JUNE WAS DUE IN PART TO MIST ELIMINATOR CLEANING.

7/87	3A1	99.6	95.1	100.0	94.9						
	3A2	100.0	94.6	100.0	94.4						
	3B1	99.9	87.6	100.0	87.5						
	3B2	100.0	90.7	100.0	90.5						
	SYSTEM	100.0	100.0	100.0	100.0			744	743	744	78.5

** PROBLEMS/SOLUTIONS/COMMENTS

FGD OUTAGE TIME DURING JULY WAS DUE IN PART TO MIST ELIMINATOR CLEANING.

THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 12.0 HOURS DURING JULY.

RECYCLE PUMP REPAIRS WERE PERFORMED ON MODULE 3B1 DURING JULY.

ABSORBER CLEANING AND MAINTENANCE WERE PERFORMED THROUGHOUT THE MONTH.

8/87	3A1	99.5	95.6	100.0	95.4						
	3A2	96.1	88.1	98.8	88.0						
	3B1	96.8	84.3	100.0	84.2						
	3B2	100.0	92.1	100.0	92.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	743	744	71.6

** PROBLEMS/SOLUTIONS/COMMENTS

MAINTENANCE WAS REQUIRED ON RECYCLE AND INLET SPRAY NOZZLES DURING AUGUST.

A BOILER TRIP OCCURRED DURING THE MONTH ACCOUNTING FOR PART OF THE DOWNTIME FOR MODULE 3A1 AND 3B1.

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							

ABSORBER CLEANING AND MAINTENANCE WERE PERFORMED THROUGHOUT THE MONTH.

A SPOOL PIECE WAS INSTALLED IN MODULE 3A1.

RECYCLE PUMP MAINTENANCE WAS PERFOMED ON MODULE 3A1 DURING AUGUST.

FGD OUTAGE TIME DURING AUGUST WAS DUE IN PART TO MIST ELIMINATOR CLEANING AND MAINTENANCE. MODULE A1 MIST ELIMINATOR PANELS WERE WASHED. PANELS WERE REPLACED IN MODULES A2 AND B1. WASH HEADERS WERE REPAIRED IN MODULE B1.

THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 25.0 HOURS DURING AUGUST.

THE UTILITY REPORTED THAT A DOOR LEAK WAS REPAIRED ON MODULE 3A2.

9/87	3A1	99.0	91.2	99.8	91.2						
	3A2	100.0	95.7	100.0	95.7						
	3B1	99.2	91.2	100.0	91.2						
	3B2	98.1	90.0	100.0	90.0						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	73.6

** PROBLEMS/SOLUTIONS/COMMENTS

THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 11 HOURS DURING SEPTEMBER.

THE UTILITY REPORTED THAT A LEAK ON A WELD SEAM WAS REPAIRED ON MODULE 3A1 .

FGD OUTAGE TIME DURING SEPTEMBER WAS DUE IN PART TO MIST ELIMINATOR CLEANING.

RECYCLE PUMP MAINTENANCE WAS PERFORMED DURING SEPTEMBER. HOSE LEAKS WERE REPAIRED ON MODULES 3A1 AND 3B2. MAINTENANCE WAS ALSO PERFORMED ON 3B1 AND 3B2 PUMP HEADERS.

10/87	3A1	99.3	83.0	100.0	79.4						
	3A2	99.9	91.9	100.0	87.8						
	3B1	99.7	86.1	99.8	82.4						
	3B2	98.8	90.8	100.0	86.8						
	SYSTEM	100.0	100.0	100.0	100.0			744	712	744	62.4

** PROBLEMS/SOLUTIONS/COMMENTS

THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 17 HOURS DURING OCTOBER.

ABSORBER CLEANING AND MAINTENANCE WERE PERFORMED THROUGHOUT THE MONTH.

SOME DOWNTIME DURING THE MONTH WAS ATTRIBUTED TO A BOILER TUBE LEAK.

RECYCLE PUMP MAINTENANCE WAS PERFORMED DURING OCTOBER.

MODULE 3B1 WAS OUT OF SERVICE FOR 30 MINUTES TO INSTALL A TEST NOZZLE.

11/87	3A1	33.3	85.0	100.0	17.8						
	3A2	56.7	97.1	100.0	20.3						
	3B1	56.7	95.5	100.0	20.0						
	3B2	56.7	96.3	100.0	20.1						
	SYSTEM	67.8	100.0	100.0	26.1			720	151	188	16.6

ASSOCIATED ELECTRIC: THOMAS HILL 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									

** PROBLEMS/SOLUTIONS/COMMENTS

THOMAS HILL 3 OPERATED WITHIN THE 1.2 LB/MM BTU SO2 STANDARD FOR ALL BUT 6.0 HOURS DURING NOVEMBER.

THE UTILITY REPORTED NO MAJOR FGD-RELATED PROBLEMS FOR NOVEMBER. THOMAS HILL 3 WAS PUT ON STANDBY 11/8/87. MODULE 3A1 WAS UNAVAILABLE DUE TO OUTAGE REPAIRS BEGINNING 11/11/87. THE REMAINING MODULES WERE ON PLACED OUTAGE ON 11/18/87. MODULES REMAINED ON OUTAGE THROUGHOUT THE MONTH.

12/87	3A1	52.7			0.0						
	3A2	43.0			0.0						
	3B1	41.9			0.0						
	3B2	43.0			0.0						
	SYSTEM	60.2			0.0			744	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

THOMAS HILL 3 WAS PLACED ON STANDBY OR OFF LINE FOR OUTAGE REPAIRS DURING ALL OF DECEMBER.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	BASIN ELECTRIC POWER	
PLANT NAME	ANTELOPE VALLEY	
UNIT NUMBER	1	
CITY	BEULAH	
STATE	NORTH DAKOTA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	335.	(0.780 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	770	
GROSS UNIT GENERATING CAPACITY - MW	490	
NET UNIT GENERATING CAPACITY W/FGD - MW	450	
NET UNIT GENERATING CAPACITY WO/FGD - MW	467	
EQUIVALENT SCRUBBED CAPACITY - MW	490	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	969.75	(2055000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	154.4	(310 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	7.0	(23.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	15352.	(6600 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		6093-7350
AVERAGE ASH CONTENT - %	7.76	
RANGE ASH CONTENT - %	5.2-13.8	
AVERAGE MOISTURE CONTENT - %	37.00	
RANGE MOISTURE CONTENT - %	30.0-42.4	
AVERAGE SULFUR CONTENT - %	0.68	
RANGE SULFUR CONTENT - %	0.4-1.2	
AVERAGE CHLORIDE CONTENT - %	0.01	
RANGE CHLORIDE CONTENT - %	0.00-0.02	
*** PARTICLE CONTROL		
** FABRIC FILTER		
NUMBER	1	
SUPPLIER	WESTERN PREC. DIVISION, JOY	
INLET FLUE GAS CAPACITY - CU.M/S	969.8	(2055000 ACFM)
INLET FLUE GAS TEMPERATURE - C	85.0	(185 F)
PRESSURE DROP - KPA	1.0	(4.0 IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.8	
TYPICAL GAS/CLOTH RATIO - M/MIN	0.7	(2.2 FT/MIN)
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	SPRAY DRYING	
PROCESS TYPE	LIME/SPRAY DRYING	
SYSTEM SUPPLIER	JOY MFG/NIRO ATOMIZER	
A-E FIRM	STEARNS-ROGER	

BASIN ELECTRIC POWER: ANTELOPE VALLEY 1 (CONT.)

DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	60.00	
ENERGY CONSUMPTION - %	3.5	
CURRENT STATUS	1	
COMMERCIAL START-UP	7/1984	
INITIAL START-UP	5/1983	
CONTRACT AWARDED	8/1978	
** DESIGN AND OPERATING PARAMETERS		
DESIGN CHLORIDE CONTENT - %	********	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	5	
NUMBER OF SPARES	1	
GENERIC TYPE	SPRAY DRYER	
SPECIFIC TYPE	CROSSFLOW	
TRADE NAME/COMMON TYPE	ROTARY ATOMIZER	
SUPPLIER	JOY MFG/NIRO ATOMIZER	
DIMENSIONS - FT	46.0 X 36.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	ASTM A-283	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	2	
LIQUID RECIRCULATION RATE - LITER/S	6.	(100 GPM)
L/G RATIO - L/CU.M	0.0	(0.2 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	3.3	(13.3 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	20.4	(67.0 FT/S)
INLET GAS FLOW - CU. M/S	242.56	(514000 ACFM)
INLET GAS TEMPERATURE - C	152.8	(307 F)
SO2 REMOVAL EFFICIENCY - %	62.0	
PARTICLE REMOVAL EFFICENCY - %	99.8	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	NONE	
GENERIC TYPE	N/A	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** REHEATER		
GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	3.2	
INLET FLUE GAS FLOW RATE - CU. M/S	31.62	(67000 ACFM)
INLET FLUE GAS TEMPERATURE - C	446.1	(835 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** FANS		
NUMBER	4	
DESIGN	CENTRIFUGAL	
SUPPLIER	COMBUSTION ENGINEERING; CEMAX	
FUNCTION	UNIT	
APPLICATION	INDUCED DRAFT	
SERVICE	DRY	
FLUE GAS TEMPERATURE - C	85.0	(185 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

BASIN ELECTRIC POWER: ANTELOPE VALLEY 1 (CONT.)

** DAMPERS		
FUNCTION	NR	
GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	
** DUCTWORK		
SHELL GENERIC MATERIAL TYPE	NR	
SHELL SPECIFIC MATERIAL TYPE	NR	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	
** REAGENT PREPARATION EQUIPMENT		
FUNCTION	SLAKER	
DEVICE	BALL MILL	
DEVICE TYPE	N/A	
NUMBER	1	
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	22.7	(25 TPH)
PRODUCT QUALITY - % SOLIDS	38.0	
** REAGENT PREPARATION EQUIPMENT		
FUNCTION	SLAKER	
DEVICE	NR	
DEVICE TYPE	NR	
NUMBER	1	
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	22.7	(25 TPH)
** TANKS		
SERVICE	NUMBER	
-------	------	
NR	****	
** PUMPS		
SERVICE	NUMBER	
-------	------	
NR	****	
** SOLIDS CONCENTRATING/DEWATERING		
DEVICE	NONE	
*** SALEABLE BYPRODUCTS		
NATURE	NONE	
DISPOSITION	N/A	
*** SLUDGE		
** TREATMENT		
METHOD	UNSTABALIZED	
DEVICE	N/A	
PROPRIETARY PROCESS	N/A	
** DISPOSAL		
NATURE	FINAL	
TYPE	LANDFILL	
LOCATION	OFF-SITE	
SITE TRANSPORTATION METHOD	TRUCKED	
SITE TREATMENT	NONE	
** WATER BALANCE		
WATER LOOP TYPE	OPEN	
EVAPORATION WATER LOSS - LITER/S	23.1	(366 GPM)
MAKEUP WATER ADDITION - LITERS/S	1.4	(22 GPM)

BASIN ELECTRIC POWER: ANTELOPE VALLEY 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT INITIAL OPERATIONS COMMENCED IN MAY 1983. THE UNIT OPERATED IN A STARTUP PHASE DURING THE MONTHS OF MAY AND JUNE.

7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY CONTINUED PERFORMANCE TESTING ON THE FGD SYSTEM DURING THE THIRD QUARTER OF 1983.

10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT ANTELOPE VALLEY 1 WAS STILL IN THE START-UP PHASE OF OPERATION DURING THE FOURTH QUARTER OF 1983.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED TYPICAL PROBLEMS ASSOCIATED WITH START UP DURING THE PERIOD OF JANUARY THROUGH JUNE 1984.

7/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

COMMERCIAL OPERATION OF THE ANTELOPE VALLEY 1 FGD SYSTEM COMMENCED ON JULY 1, 1984.

8/84	SYSTEM							744			
9/84	SYSTEM							720			

BASIN ELECTRIC POWER: ANTELOPE VALLEY 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED FOR AUGUST AND SEPTEMBER.									
10/84	SYSTEM							720			
11/84	SYSTEM							720			
12/84	A	93.3	82.1	87.5	82.1						
	B	98.3	87.8	88.9	87.8						
	C	97.6	91.7	93.9	91.7						
	D	98.1	92.7	93.1	92.7						
	E	98.1	82.3	83.8	82.3						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	90.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE FGD SYSTEM OPERATED WELL DURING THE FOURTH QUARTER 1984 WITH EXCEPTION OF MINOR INCIDENTS OF PLUGGING OR THE NEED TO REPLACE ATOMIZERS.									
1/85	A	88.1	67.9	84.0	62.5						
	B	99.1	86.5	96.6	79.6						
	C	99.3	86.2	98.5	79.4						
	D	96.5	86.2	95.8	79.4						
	D	95.6	90.1	94.9	82.9						
	SYSTEM	100.0	100.0	100.0	96.0			744	685	714	86.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PROBLEMS WERE REPORTED WITH RESPECT TO SPRAY DRYER CHAMBER PLUGGING AND ALOMIZER VIBRATION.									
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT A NUMBER OF MAJOR MODIFICATIONS TO THE REAGENT PREPARATION EQUIPMENT WERE COMPLETED DURING THE SPRING OF 1985. SPRAY DRYER ASH IS NO LONGER RECYCLED BACK TO THE SLURRY MIX TANK. THIS ASH IS NOW SENT DIRECTLY TO AN ASH SILO FOR LATER DISPOSAL. ASH IS NOW ONLY COLLECTED FROM THE BAGHOUSE FOR USE IN THE SLURRY PREPARATION SYSTEM. THE SPRAY DRYER ASH WAS HARD TO CONVEY AND WOULD FORM LARGE CHUNKS MAKING IT									

BASIN ELECTRIC POWER: ANTELOPE VALLEY 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

HARD TO RESLURRY. ADDITIONAL CHANGES TO THE ASH/SLURRY SYSTEM INCLUDED NEW SLURRY FEED PUMPS AND ASH PUMPS. THE UTILITY REPORTED THAT THE FGD SYSTEM OPERATED QUITE WELL DURING THE REMAINDER OF THE YEAR.

1/86	SYSTEM									774	
2/86	SYSTEM									672	
3/86	SYSTEM									774	
4/86	SYSTEM									720	
5/86	SYSTEM									774	
6/86	SYSTEM									720	
7/86	SYSTEM									774	
8/86	SYSTEM									774	
9/86	SYSTEM									720	
10/86	SYSTEM									774	
11/86	SYSTEM									720	
12/86	SYSTEM									774	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO SCHEDULED OR FORCED UNIT OR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING 1986. ONGOING ASH/SLURRY CHANGES WERE COMPLETED DURING THE YEAR.

1/87	SYSTEM									744	
2/87	SYSTEM									672	
3/87	SYSTEM									744	
4/87	SYSTEM									720	
5/87	SYSTEM									744	
6/87	SYSTEM									720	
7/87	SYSTEM									744	
8/87	SYSTEM									744	
9/87	SYSTEM									720	
10/87	SYSTEM									744	
11/87	SYSTEM									720	
12/87	SYSTEM									744	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE YEAR 1987. THE UNIT UNDERWENT A SCHEDULED OUTAGE IN MAY WHICH LASTED APPROXIMATELY 4 WEEKS.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	BASIN ELECTRIC POWER	
PLANT NAME	ANTELOPE VALLEY	
UNIT NUMBER	2	
CITY	BEULAH	
STATE	NORTH DAKOTA	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	168.	(0.390 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	770	
GROSS UNIT GENERATING CAPACITY - MW	490	
NET UNIT GENERATING CAPACITY W/FGD - MW	450	
NET UNIT GENERATING CAPACITY WO/FGD - MW	467	
EQUIVALENT SCRUBBED CAPACITY - MW	490	

** UNIT DATA - BOILER AND STACK

BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	969.75	(2055000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	154.4	(310 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	7.0	(23.0 FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	15352.	(6600 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		6093-7350
AVERAGE ASH CONTENT - %	7.76	
RANGE ASH CONTENT - %	5.2-13.8	
AVERAGE MOISTURE CONTENT - %	37.00	
RANGE MOISTURE CONTENT - %	30.0-42.4	
AVERAGE SULFUR CONTENT - %	0.68	
RANGE SULFUR CONTENT - %	0.4-1.2	
AVERAGE CHLORIDE CONTENT - %	0.01	
RANGE CHLORIDE CONTENT - %	0.00-0.02	

*** PARTICLE CONTROL

** FABRIC FILTER

NUMBER	1	
INLET FLUE GAS CAPACITY - CU.M/S	969.8	(2055000 ACFM)
INLET FLUE GAS TEMPERATURE - C	85.0	(185 F)
PRESSURE DROP - KPA	1.0	(4.0 IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.8	
TYPICAL GAS/CLOTH RATIO - M/MIN	0.7	(2.3 FT/MIN)

** PARTICLE SCRUBBER

NUMBER	0
GENERIC TYPE	NONE
SPECIFIC TYPE	N/A
TRADE NAME/COMMON NAME	N/A
SHELL GENERIC MATERIAL	N/A
SHELL SPECIFIC MATERIAL	N/A
LINER GENERIC MATERIAL	N/A
LINER SPECIFIC MATERIAL	N/A

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	SPRAY DRYING
PROCESS TYPE	LIME/SPRAY DRYING
SYSTEM SUPPLIER	JOY MFG/NIRO ATOMIZER
A-E FIRM	BURNS & MCDONNELL
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW

BASIN ELECTRIC POWER: ANTELOPE VALLEY 2 (CONT.)

UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	78.00	
ENERGY CONSUMPTION - %	3.5	
CURRENT STATUS	1	
COMMERCIAL START-UP	6/1986	
INITIAL START-UP	10/1985	
CONTRACT AWARDED	2/1981	
** DESIGN AND OPERATING PARAMETERS		
DESIGN CHLORIDE CONTENT - %	********	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	5	
NUMBER OF SPARES	1	
GENERIC TYPE	SPRAY DRYER	
SPECIFIC TYPE	CROSSFLOW	
TRADE NAME/COMMON TYPE	ROTARY ATOMIZER	
SUPPLIER	JOY MFG/NIRO ATOMIZER	
DIMENSIONS - FT	46 FT DIAMETER	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	ASTM A-283	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
GAS CONTACTING DEVICE TYPE	NONE	
LIQUID RECIRCULATION RATE - LITER/S	6.	(100 GPM)
L/G RATIO - L/CU.M	0.0	(0.2 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	3.3	(13.3 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	20.4	(67.0 FT/S)
INLET GAS FLOW - CU. M/S	242.56	(514000 ACFM)
INLET GAS TEMPERATURE - C	152.8	(307 F)
SO2 REMOVAL EFFICIENCY - %	78.0	
PARTICLE REMOVAL EFFICENCY - %	99.8	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	NONE	
GENERIC TYPE	N/A	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** REHEATER		
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	0.0	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** FANS		
DESIGN	NR	
FUNCTION	NA	
APPLICATION	NR	
SERVICE	NA	
CONSTRUCTION MATERIAL GENERIC TYPE	NA	
** DAMPERS		
FUNCTION	NR	
GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	

BASIN ELECTRIC POWER: ANTELOPE VALLEY 2 (CONT.)

** DUCTWORK		
SHELL GENERIC MATERIAL TYPE	NR	
SHELL SPECIFIC MATERIAL TYPE	NR	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	
** REAGENT PREPARATION EQUIPMENT		
FUNCTION	SLAKER	
DEVICE	BALL MILL	
DEVICE TYPE	N/A	
NUMBER	1	
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	22.7	(25 TPH)
PRODUCT QUALITY - % SOLIDS	38.0	
** REAGENT PREPARATION EQUIPMENT		
FUNCTION	SLAKER	
DEVICE	NR	
DEVICE TYPE	NR	
NUMBER	1	
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	22.7	(25 TPH)
** TANKS		
SERVICE	NUMBER	
-------	------	
NR	****	
** PUMPS		
SERVICE	NUMBER	
-------	------	
NR	****	
** SOLIDS CONCENTRATING/DEWATERING		
DEVICE	NONE	
*** SALEABLE BYPRODUCTS		
NATURE	NONE	
DISPOSITION	N/A	
*** SLUDGE		
** TREATMENT		
METHOD	UNSTABILIZED	
DEVICE	N/A	
PROPRIETARY PROCESS	N/A	
** DISPOSAL		
NATURE	FINAL	
TYPE	LANDFILL	
LOCATION	OFF-SITE	
SITE TRANSPORTATION METHOD	TRUCKED	
SITE TREATMENT	NONE	
** WATER BALANCE		
WATER LOOP TYPE	OPEN	
EVAPORATION WATER LOSS - LITER/S	23.1	(366 GPM)
MAKEUP WATER ADDITION - LITERS/S	1.4	(22 GPM)

BASIN ELECTRIC POWER: ANTELOPE VALLEY 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM COMMENCED OPERATIONS IN OCTOBER, 1985. THE UNIT IS CURRENTLY UNDERGOING START-UP/SHAKEDOWN OPERATIONS.

1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT SIMILAR REAGENT PREPARATION CHANGES TO UNIT 1 WERE MADE TO UNIT 2. THE SPRAY DRYER ASH IS NO LONGER RECYCLED BACK TO THE SLURRY MIX TANK. THIS ASH IS NOW SENT DIRECTLY TO AN ASH SILO FOR LATER DISPOSAL. ASH IS NOW ONLY COLLECTED FROM THE BAGHOUSE FOR USE IN THE SLURRY PREPARATION SYSTEM. THE SPRAY DRYER ASH WAS HARD TO CONVEY AND WOULD FORM LARGE CHUNKS, MAKING IT HARD TO RESLURRY. MOST OF THESE MODIFICATIONS WERE MADE DURING THE SCHEDULED FALL BOILER OUTAGE.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			

BASIN ELECTRIC POWER: ANTELOPE VALLEY 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE YEAR 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	BASIN ELECTRIC POWER	
PLANT NAME	LARAMIE RIVER	
UNIT NUMBER	1	
CITY	WHEATLAND	
STATE	WYOMING	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	86.	(0.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1500	
GROSS UNIT GENERATING CAPACITY - MW	600	
NET UNIT GENERATING CAPACITY W/FGD - MW	550	
NET UNIT GENERATING CAPACITY WO/FGD - MW	555	
EQUIVALENT SCRUBBED CAPACITY - MW	600	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1085.37	(2300000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	141.1	(286 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	8.7	(28.5 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	19538.	(8400 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8200-8400
AVERAGE ASH CONTENT - %	7.89	
RANGE ASH CONTENT - %	5.5-6.5	
AVERAGE MOISTURE CONTENT - %	28.92	
RANGE MOISTURE CONTENT - %	27.0-30.0	
AVERAGE SULFUR CONTENT - %	0.54	
RANGE SULFUR CONTENT - %	0.30-0.38	
AVERAGE CHLORIDE CONTENT - %	0.04	
RANGE CHLORIDE CONTENT - %	0.01-0.02	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	BABCOCK & WILCOX	
INLET FLUE GAS CAPACITY - CU.M/S	1085.4	(2300000 ACFM)
INLET FLUE GAS TEMPERATURE - C	141.1	(286 F)
PRESSURE DROP - KPA	0.8	(3. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.6	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	RESEARCH-COTTRELL	
A-E FIRM	BURNS & MCDONNELL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.60	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	0.8	
CURRENT STATUS	1	
COMMERCIAL START-UP	7/1980	
INITIAL START-UP	7/1980	
CONTRACT AWARDED	1/1977	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	0.81	
DESIGN COAL HEAT CONTENT - J/G	18931.3	(8139 BTU/LB)
DESIGN COAL ASH CONTENT - %	7.89	
DESIGN MOISTURE CONTENT - %	28.92	
DESIGN CHLORIDE CONTENT - %	0.04	
SPACE REQUIREMENTS - SQ M	2322.5	(25000 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	80.0	
** QUENCHER/PRESATURATOR		
NUMBER	5	
TYPE	SPRAY ZONE	
SUPPLIER	RESEARCH-COTTRELL	
INLET GAS FLOW - CU. M/S	271.34	(575000 ACFM)
INLET GAS TEMPERATURE - C	141.1	(286 F)
LIQUID RECIRCULATION RATE - LITERS/S	616.	(9770 GPM)
L/G RATIO - L/CU. M	2.3	(17.0 GAL/1000 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	IRON BASE/NICKEL-CHROMIUM-COPPER-MOLYBDENUM	
** ABSORBER		
NUMBER	5	
NUMBER OF SPARES	1	
GENERIC TYPE	COMBINATION TOWER	
SPECIFIC TYPE	SPRAY/PACKED	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	RESEARCH-COTTRELL	
DIMENSIONS - FT	30.0 X 30.0 X 88.0	
SHELL GENERIC MATERIAL	STAINLESS STEEL; HIGH ALLOY	
SHELL SPECIFIC MATERIAL	AUSTENITIC; IRON BASE/NICKEL-CHROMIUM-COPPER-MOL	
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 316L; ALLOY 904L	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
GAS CONTACTING DEVICE TYPE	VERTICAL CROSS CHANNEL FIXED GRID PACKING	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1472.	(23372 GPM)
L/G RATIO - L/CU.M	5.3	(40.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.5	(6.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	271.34	(575000 ACFM)
INLET GAS TEMPERATURE - C	141.1	(286 F)
SO2 REMOVAL EFFICIENCY - %	95.0	
PARTICLE REMOVAL EFFICENCY - %	60.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	5	
NUMBER OF SPARES PER SYSTEM	1	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	HORIZONTAL	

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

NUMBER OF STAGES	2	
NUMBER OF PASSES PER STAGE	3	
PRESSURE DROP - KPA	0.6	(2.6 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPROPYLENE	
WASH WATER SOURCE	COOLING TOWER BLOWDOWN	
WASH FREQUENCY	UNDER-ONCE/15 MIN; TOP-ONCE/8 HRS	
WASH RATE - L/S	18.4	(292 GAL/MIN)

** REHEATER

GENERIC TYPE	NONE
SPECIFIC TYPE	N/A
TRADE NAME/COMMON TYPE	N/A

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	AXIAL	
SUPPLIER	BABCOCK & WILCOX	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	542.68	(1150000 ACFM)
FLUE GAS TEMPERATURE - C	141.1	(286 F)
PRESSURE DROP - KPA	7.6	(25.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** FANS

NUMBER	2
NUMBER OF SPARES	0
DESIGN	AXIAL
SUPPLIER	BABCOCK & WILCOX
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** DAMPERS

NUMBER	4
FUNCTION	CONTROL
GENERIC TYPE	LOUVER; LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVRE; OPPOSED BLADE MULTIL
MANUFACTURER	FORNEY ENGINEERING
CONSTRUCTION MATERIAL GENERIC TYPE	DRY SIDE-CARBON STEEL; WET SIDE-STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	1
FUNCTION	CONTROL
GENERIC TYPE	LOUVER; LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVRE; OPPOSED BLADE MULTIL
MANUFACTURER	FORNEY ENGINEERING
CONSTRUCTION MATERIAL GENERIC TYPE	DRY SIDE-CARBON STEEL; WET SIDE-STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	LOUVER; LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVRE; OPPOSED BLADE MULTIL
MANUFACTURER	FORNEY ENGINEERING
CONSTRUCTION MATERIAL GENERIC TYPE	DRY SIDE-CARBON STEEL; WET SIDE-STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

** DAMPERS	
NUMBER	10
FUNCTION	5 CONTROL & 5 SHUT-OFF
GENERIC TYPE	LOUVER; LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVRE; OPPOSED BLADE MULTIL
MANUFACTURER	FORNEY 'LOUVER!; ANDCO 'GUILLOTINE!
CONSTRUCTION MATERIAL GENERIC TYPE	DRY SIDE-CARBON STEEL; WET SIDE-STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DAMPERS	
NUMBER	5
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER; LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVRE; OPPOSED BLADE MULTIL
MANUFACTURER	FORNEY 'LOUVER!; ANDCO 'GUILLOTINE!
CONSTRUCTION MATERIAL GENERIC TYPE	DRY SIDE-CARBON STEEL; WET SIDE-STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	INLET
CONFIGURATION	RECTANGULAR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	OUTLET
CONFIGURATION	RECTANGULAR
SHELL GENERIC MATERIAL TYPE	STAINLESS STEEL
SHELL SPECIFIC MATERIAL TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	BYPASS
CONFIGURATION	RECTANGULAR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	2
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	13.6 (15 TPH)
PRODUCT QUALITY - % SOLIDS	35.0

** TANKS

SERVICE	NUMBER
ABSORBER FEED	5
QUENCHER FEED	5
LIMESTONE SLURRY	1
RECLAIM WATER	1
CENTRATE	1
SEAL WATER	1

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

** PUMPS

SERVICE	NUMBER
ABSORBER FEED	10
QUENCHER FEED	5
MILL PRODUCT	2
LIMESTONE SLURRY TRANSFER	2
MAKEUP WATER SUPPLY	1
RECLAIMED WATER	2
SEAL WATER	2
ABSORBER BLOWDOWN	2
THICKENER UNDERFLOW	9
CENTRATE	2
DEWATERING BUILDING SUMP PUMPS	4

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	3
NUMBER OF SPARES	0
CONFIGURATION	CIRCULAR
DIMENSIONS - FT	110.0 DIA X 10.0
CAPACITY	1000000
SHELL GENERIC MATERIAL TYPE	INORGANIC
SHELL SPECIFIC MATERIAL TYPE	HYDRAULICALLY-BONDED CONCRETE
FEED STREAM SOURCE	QUENCHER BLEED
FEED STREAM CHARACTERISTICS	650 GPM; 10% SOLIDS
OUTLET STREAM CHARACTERISTICS	100 GPM; 30% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	550 GPM; 0.5% SOLIDS
OUTLET STREAM DISPOSITION	TO CENTRIFUGE
OVERFLOW STREAM DISPOSITION	TO RECLAIMED WATER & THEN TO QUENCHER

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	CENTRIFUGE
NUMBER	4
NUMBER OF SPARES	0
DIMENSIONS - FT	8
CAPACITY	110 GPM
SHELL GENERIC MATERIAL TYPE	STAINLESS STEEL
SHELL SPECIFIC MATERIAL TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
BELT GENERIC MATERIAL TYPE	N/A
BELT SPECIFIC MATERIAL TYPE	N/A
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	35% SOLIDS
OUTLET STREAM CHARACTERISTICS	70% SOLIDS
OUTLET STREAM DISPOSITION	TO PUG MILL
OVERFLOW STREAM DISPOSITION	TO CENTRATE TANK & THEN THICKENER

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	0.4	(0.4 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	30.0	
% CASO3 - DRY	8.0	
% CASO4 - DRY	90.0	
% CAOH2 - DRY	0.0	
% CACO3 - DRY	2.0	

** TREATMENT

METHOD	FORCED OXIDATION
DEVICE	SPARGER IN QUENCHER
PROPRIETARY PROCESS	NONE
INLET QUALITY - %	10.0

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	CONVEYED
SITE TREATMENT	PVC LINING
SITE DIMENSIONS	60-90 FT DEEP '160 ACRES TOTAL FOR DISPOSAL!
SITE SERVICE LIFE - YRS	35
** PROCESS CONTROL AND INSTRUMENTATION	
PROCESS STREAM	ABSORBER FEED & QUENCHER FEED
CHEMICAL PARAMETERS	PH, SOLIDS, SO2 INLET, ACFM, SO2 OUTLET
PHYSICAL VARIABLES	PERCENT SOLIDS; GAS FLOW
CONTROL LEVELS	PH 5.8-6.2 IN ABSORBER; PH 4.5-5.0 IN QUENCHER;
MONITOR TYPE	GREAT LAKES 'PH!; DYNASCIENCE FOR CONTROL 'SO2;
MONITOR LOCATION	ABSORBER FEED TANK & QUENCHER; DENSITY ON PUMP
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEED BACK 'PH & DENSITY!
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
EVAPORATION WATER LOSS - LITER/S	23.3 (370 GPM)
POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	0
EFFLUENT WATER LOSS - LITERS/S	0.0 (0 GPM)
RECEIVING WATER STREAM	N/A
MAKEUP WATER ADDITION - LITERS/S	25.2 (400 GPM)
SOURCE OF MAKEUP WATER	COOLING TOWER BLOWDOWN, WELLS & GRAYROCKS RESERV
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	95% CACO3
SOURCE/SUPPLIER	HOLLY SUGAR COMPANY
CONSUMPTION	2000 TONS/MONTH
UTILIZATION - %	90.0
POINT OF ADDITION	BALL MILL
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	25.0
MIST ELIMINATOR - %	25.0
FAN - %	0.0
BALL MILL - %	0.0
EFFLUENT HOLD TANK - %	25.0
RECIRCULATION PUMP - %	25.0
THICKENER - %	33.3
CENTRIFUGE - %	0.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/80	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT BEGAN INITIAL AND COMMERCIAL OPERATIONS ON JULY 1, 1980. NO MAJO PROBLEMS WERE REPORTED DURING STARTUP.

8/80	SYSTEM							744			
9/80	SYSTEM							720			

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT IS STILL IN THE STARTUP PHASE OF OPERATIONS. NO PERFORMANCE DATA ARE CURRENTLY AVAILABLE.									
10/80	A	100.0	99.7	100.0	95.0						
	B	100.0	99.6	100.0	94.9						
	C	100.0	99.7	100.0	95.0						
	D	21.5	22.6	100.0	21.5						
	E	100.0	81.4	100.0	77.5						
	SYSTEM	100.0	100.0	100.0	96.0			744	709	715	85.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER MODULE D WAS DOWN FOR MAINTENANCE ON WELDS IN THE QUENCHER SECTION DUE TO CORROSION OF THE UDDEHOLM 904L. THE OUTAGE LASTED 584 HOURS									
11/80	A	100.0	57.8	100.0	46.4						
	B	100.0	96.2	100.0	77.2						
	C	100.0	72.5	100.0	58.2						
	D	1.9	2.3	100.0	1.9						
	E	100.0	98.3	100.0	78.9						
	SYSTEM	100.0	81.7	100.0	65.6			720	578	568	67.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER THE BOILER WAS OUT OF SERVICE APPROXIMATELY 120 HOURS DUE TO REPAIRS.									
		DURING THE MONTH MODULE D WAS OFF LINE 30 DAYS FOR REPAIRS.									
12/80	A	19.6	21.1	100.0	19.6						
	B	100.0	94.4	100.0	87.9						
	C	100.0	96.7	100.0	90.0						
	D	75.7	81.2	100.0	75.7						
	E	100.0	100.0	100.0	93.0						
	SYSTEM	98.8	98.4	100.0	91.5			744	693	692	87.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER MODULES A AND D WERE OUT OF SERVICE FOR MAINTENANCE ON THE WELDS IN THE QUENCHER SECTION DUE TO CORROSION OF UDDEHOLM 904L.									
1/81	A	0.0	0.0		0.0						
	B	100.0	91.3	100.0	88.6						
	C	100.0	97.4	100.0	94.5						
	D	100.0	95.8	100.0	93.0						
	E	100.0	95.7	100.0	92.8						
	SYSTEM	100.0	95.0	100.0	92.2			744	722	686	97.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY MODULE A WAS UNAVAILABLE DUE TO MAINTENANCE ON WELDS IN THE QUENCHER SECTION THAT FAILED DUE TO CORROSION OF THE UDDEHOLM 904L.									
2/81	A	0.0	0.0		0.0						
	B	100.0	94.0	100.0	84.2						
	C	100.0	97.7	100.0	87.5						
	D	100.0	97.8	100.0	87.6						
	E	100.0	90.7	100.0	81.3						
	SYSTEM	100.0	95.1	100.0	85.1			672	602	572	81.2

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY MODULE A REMAINED OUT OF SERVICE DUE TO THE NECESSARY MAINTENANCE OF THE WELDS IN THE QUENCHER SECTION.									
3/81	A	80.6	81.4	100.0	79.3						
	B	100.0	100.0	100.0	97.4						
	C	25.8	18.2	100.0	17.7						
	D	100.0	99.7	100.0	97.2						
	E	100.0	94.5	100.0	96.0						
	SYSTEM	100.0	99.4	100.0	96.9			744	725	721	96.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH MODULES A AND C EXPERIENCED OUTAGE TIME DUE TO MAINTENANCE ON THE WELDS IN THE QUENCHER SECTION RESULTING FROM CORROSION OF THE UDDEHOLM 904L.									
4/81	A	100.0	91.6	100.0	91.1						
	B	100.0	98.5	100.0	97.9						
	C	0.0	0.0		0.0						
	D	100.0	99.9	100.0	99.3						
	E	100.0	99.4	100.0	98.9						
	SYSTEM	100.0	97.4	100.0	96.8			720	716	697	96.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING APRIL MODULE C WAS OUT OF SERVICE FOR MAINTENANCE ON THE WELDS IN THE QUENCHER SECTION DUE TO CORROSION OF THE UDDEHOLM 904L.									
5/81	A	100.0	86.7	100.0	78.2						
	B	100.0	98.0	100.0	88.4						
	C	0.0	0.0		0.0						
	D	100.0	98.3	100.0	88.7						
	E	100.0	99.3	100.0	89.6						
	SYSTEM	100.0	95.6	100.0	86.3			744	671	642	85.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY MODULE C WAS DOWN FOR MAINTENANCE ON WELDS ON THE QUENCHER SECTION DUE TO CORROSION OF THE UDDEHOLM 904L.									
6/81	A	100.0	51.5	100.0	50.6						
	B	100.0	98.8	100.0	97.1						
	C	100.0	89.8	100.0	88.3						
	D	70.0	67.8	100.0	66.7						
	E	30.0	27.3	100.0	26.8						
	SYSTEM	100.0	83.8	100.0	82.4			720	708	593	63.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		D AND E MODULES WERE TAKEN OUT OF SERVICE FOR MAINTENANCE ON THE WELDS IN THE QUENCHER SECTION. THE UDDEHOLM 904L IS CORRODING.									
7/81	A	100.0	95.5	100.0	95.5						
	B	100.0	99.0	100.0	99.0						
	C	100.0	90.6	100.0	90.6						
	D	100.0	96.6	100.0	96.6						
	E	0.0	0.0		0.0						
	SYSTEM	100.0	95.4	100.0	95.4			744	744	710	86.9

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		E MODULE WAS TAKEN OUT OF SERVICE FOR MAINTENANCE ON WELDS IN THE QUENCHER SECTION. THE UDDEHOLM 904L IS CORRODING.									
8/81	A	100.0	96.8	100.0	92.6						
	B	28.6	29.9	100.0	28.6						
	C	100.0	96.7	100.0	92.5						
	D	100.0	98.9	100.0	94.6						
	E	58.3	61.0	100.0	91.7						
	SYSTEM	96.7	95.8	100.0	91.7			744	711	682	83.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		B AND E MODULES WERE TAKEN OUT OF SERVICE FOR MAINTENANCE ON WELDS IN THE QUENCHER SECTION. THE UDDEHOLM 904L IS CORRODING.									
9/81	A	100.0	96.2	100.0	25.7						
	B	0.0	0.0		0.0						
	C	100.0	91.3	100.0	24.4						
	D	100.0	92.4	100.0	24.7						
	E	100.0	94.0	100.0	25.1						
	SYSTEM	100.0	94.0	100.0	25.1			720	192	181	25.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE B MODULE WAS TAKEN OUT OF SERVICE FOR MAINTENANCE ON WELDS IN THE QUENCHER SECTION. THE UDDEHOLM 904L IS CORRODING.									
		THE UNIT WAS TAKEN OUT OF SERVICE FOR AN ANNUAL OVERHAUL.									
10/81	A	100.0			0.0						
	B	0.0			0.0						
	C	100.0			0.0						
	D	100.0			0.0						
	E	100.0			0.0						
	SYSTEM	100.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER THE UNIT WAS SHUTDOWN FOR SCHEDULED MAINTENANCE.									
11/81	A	100.0	37.8	100.0	36.2						
	B	0.0	0.0		0.0						
	C	100.0	75.7	100.0	72.4						
	D	100.0	59.2	100.0	56.6						
	E	100.0	73.1	100.0	69.9						
	SYSTEM	100.0	63.2	100.0	59.0			720	689	423	40.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER AND NOVEMBER MODULE B WAS DOWN FOR MAINTENANCE IN THE QUENCHER SECTION DUE TO CORROSION OF THE UDDEHOLM 904L.									
12/81	A	46.8	47.1	100.0	46.8						
	B	100.0	46.0	100.0	45.7						
	C	69.1	69.5	100.0	69.1						
	D	100.0	89.7	100.0	89.1						
	E	100.0	61.1	100.0	60.7						
	SYSTEM	100.0	78.3	100.0	77.8			744	739	579	70.4

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER, MODULES A AND C WERE DOWN PART OF THE TIME FOR GENERAL MAINTENANCE.									
		PROBLEMS WERE ENCOUNTERED WITH THE SEAL COATING IN THE ABSORBER FEED TANK.									
1/82	A	100.0	82.1	100.0	82.1						
	B	100.0	99.0	100.0	99.0						
	C	100.0	92.0	100.0	92.0						
	D	74.2	82.5	100.0	82.5						
	E	25.8	9.9	100.0	9.9						
	SYSTEM	100.0	91.4	100.0	91.4			744	744	680	85.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY THE D AND E ABSORBER FEED TANK WAS DOWN FOR SEAL COATING.									
2/82	A	100.0	51.2	100.0	40.4						
	B	100.0	89.0	100.0	70.1						
	C	100.0	95.0	100.0	74.8						
	D	100.0	92.8	100.0	73.1						
	E	53.6	22.9	100.0	18.1						
	SYSTEM	100.0	82.8	100.0	69.1			672	529	465	76.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE E WAS OFF-LINE PART OF FEBRUARY TO MAKE REPAIRS TO THE POTENTIAL PROTECTION.									
3/82	A	74.2	55.6	100.0	55.6						
	B	100.0	61.7	100.0	61.7						
	C	100.0	60.4	100.0	60.4						
	D	100.0	98.0	100.0	98.0						
	E	100.0	99.9	100.0	99.9						
	SYSTEM	100.0	93.9	100.0	93.9			744	744	699	76.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH MODULE A WAS DOWN TO REPAIR A LEAK IN THE QUENCHER SECTION RESULTING FROM CORROSION OF THE UDDEHOLM 904L.									
4/82	A	50.0	65.4	100.0	25.8						
	B	76.7	100.0	100.0	71.8						
	C	76.7	100.0	100.0	74.9						
	D	50.0	65.4	100.0	47.0						
	E	80.0	100.0	100.0	76.1						
	SYSTEM	83.3	100.0	100.0	73.9			720	550	532	59.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING APRIL MODULES B, C, D, AND E WERE DOWN PART OF THE TIME TO PERFORM MAINTENANCE ON THE MIXERS AND TO INSPECT THE MODULES.									
5/82	A	100.0	70.9	100.0	49.6						
	B	96.8	90.3	100.0	63.2						
	C	96.8	93.3	100.0	65.3						
	D	0.0	0.0		0.0						
	E	100.0	72.5	100.0	50.8						
	SYSTEM	98.4	81.7	100.0	57.2			744	521	426	75.7

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE D WAS DOWN DURING MAY FOR GENERAL MAINTENANCE AND REPAIR.									
6/82	A	100.0	56.6	100.0	39.1						
	B	100.0	92.3	100.0	63.8						
	C	100.0	84.2	100.0	58.2						
	D	0.0	0.0		0.0						
	E	100.0	76.3	100.0	52.8						
	SYSTEM	100.0	77.3	100.0	53.5			720	498	385	56.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JUNE MODULE D WAS OUT OF SERVICE FOR NOZZLE REPAIR IN THE QUENCHER SECTION.									
7/82	A	64.5	30.0	100.0	27.1						
	B	71.0	58.4	100.0	52.8						
	C	93.5	86.7	100.0	78.3						
	D	67.7	61.6	100.0	55.7						
	E	100.0	95.9	100.0	86.6						
	SYSTEM	99.2	83.2	100.0	75.1			744	672	559	62.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JULY MODULES A, B AND D WERE DOWN TO REPAIR NOZZLES IN THE QUENCHER SECTION.									
8/82	A	100.0	90.2	100.0	67.3						
	B	100.0	96.3	100.0	71.8						
	C	77.4	80.5	100.0	60.0						
	D	100.0	84.1	100.0	62.8						
	E	12.9	10.3	100.0	7.7						
	SYSTEM	97.6	90.4	100.0	67.4			744	555	501	68.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING AUGUST MODULES C AND E WERE DOWN FOR MAINTENANCE IN THE QUENCHER SECTION RESULTING FROM CORROSION OF THE UDDEHOLM 904L.									
9/82	A	100.0	92.6	100.0	92.6						
	B	100.0	98.0	100.0	98.0						
	C	16.7	16.6	100.0	16.6						
	D	100.0	86.0	100.0	86.0						
	E	86.7	60.0	100.0	60.0						
	SYSTEM	100.0	88.3	100.0	88.3			720	720	636	66.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING SEPTEMBER MODULE C WAS DOWN FOR MAINTENANCE IN THE QUENCHER SECTION RESULTING FROM CORROSION OF THE UDDEHOLM 904L.									
10/82	A	100.0	86.1	100.0	49.9						
	B	16.1	10.2	100.0	5.9						
	C	87.1	70.5	100.0	40.8						
	D	71.0	94.2	100.0	54.6						
	E	100.0	76.3	100.0	44.2						
	SYSTEM	93.5	84.3	100.0	48.8			744	431	363	52.2

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER MODULES B, C AND D WERE DOWN FOR MAINTENANCE IN THE QUENCHER SECTION RESULTING FROM CORROSION OF THE UDDEHOLM 904L.									
11/82	A	63.3	44.3	100.0	44.3						
	B	92.9	73.3	100.0	73.3						
	C	100.0	90.8	100.0	90.8						
	D	46.7	23.8	100.0	23.8						
	E	100.0	82.7	100.0	82.7						
	SYSTEM	100.0	78.7	100.0	78.7			720	720	567	56.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER MODULES A, B AND D WERE DOWN FOR MAINTENANCE ON WELDS IN THE QUENCHER SECTION RESULTING FROM CORROSION OF THE UDDEHOLM 904L.									
12/82	A	93.5	70.0	100.0	57.4						
	B	100.0	79.5	100.0	65.2						
	C	100.0	32.7	100.0	26.8						
	D	100.0	43.9	100.0	36.0						
	E	96.8	57.2	100.0	46.9						
	SYSTEM	100.0	70.8	100.0	58.1			744	610	432	43.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER MODULE A WAS DOWN FOR MAINTENANCE ON THE QUENCHER TOWER MIXERS.									
1/83	A	100.0	46.1	100.0	41.7						
	B	100.0	57.5	100.0	52.0						
	C	74.2	0.0		0.0						
	D	100.0	99.4	100.0	89.9						
	E	100.0	100.0	100.0	90.6						
	SYSTEM	100.0	75.8	100.0	68.5			744	673	510	46.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY MODULE C WAS DOWN FOR MAINTENANCE ON THE ICI ABSORBER FEED PUMP SUCTION VALVE.									
2/83	A	100.0	79.2	100.0	72.9						
	B	100.0	88.6	100.0	81.5						
	C	71.4	47.1	100.0	43.3						
	D	39.3	38.5	100.0	35.4						
	E	100.0	83.5	100.0	76.8						
	SYSTEM	100.0	84.2	100.0	77.5			672	618	521	56.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY MODULE D WAS DOWN DUE TO A LEAK IN THE QUENCHER FLOOR.									
3/83	A	61.3	55.3	100.0	55.3						
	B	71.0	67.0	100.0	67.0						
	C	100.0	100.0	100.0	100.0						
	D	74.2	69.0	100.0	69.0						
	E	100.0	69.7	100.0	69.7						
	SYSTEM	100.0	90.2	100.0	90.2			744	744	671	66.0

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MARCH.									
4/83	A	99.9	78.3	100.0	60.1						
	B	69.9	58.0	100.0	44.5						
	C	99.9	92.5	100.0	71.0						
	D	99.9	81.7	100.0	62.7						
	E	33.3	8.3	100.0	6.4						
	SYSTEM	100.0	79.7	100.0	61.2			720	553	441	57.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE E WAS DOWN DURING APRIL FOR MAINTENANCE, CLEANING AND PACKING OF TH QUENCHER TOWER MIXERS.									
5/83	A	41.9	97.3	100.0	40.6						
	B	41.9	94.6	100.0	39.4						
	C	41.9	92.8	100.0	38.7						
	D	41.9	98.9	100.0	41.2						
	E	0.0	0.0		0.0						
	SYSTEM	41.9	95.9	100.0	40.0			744	310	297	80.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN DURING PART OF MAY FOR AN ANNUAL OUTAGE.									
6/83	A	0.0			0.0						
	B	0.0			0.0						
	C	0.0			0.0						
	E	0.0			0.0						
	D	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ALL MODULES WERE DOWN DURING JUNE FOR MAINTENANCE AND AN ANNUAL OVERHAUL.									
7/83	A	22.6	18.5	100.0	9.8						
	B	58.1	2.8	100.0	1.5						
	C	61.3	96.4	100.0	51.2						
	D	83.9	98.4	100.0	52.3						
	E	47.8	93.6	100.0	49.7						
	SYSTEM	68.4	77.4	100.0	41.1			744	395	306	55.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES A, B, C, D, AND E WERE DOWN FOR MAINTENANCE DURING PART OF JULY.									
8/83	A	100.0	55.1	100.0	50.5						
	B	83.9	50.1	100.0	46.0						
	C	100.0	76.8	100.0	70.5						
	D	87.1	59.8	100.0	54.9						
	E	100.0	84.3	100.0	77.4						
	SYSTEM	100.0	81.5	100.0	74.8			744	683	557	56.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES B AND D WERE DOWN DURING PART OF AUGUST FOR MAINTENANCE.									
9/83	A	100.0	88.1	100.0	88.1						

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	59.5	100.0	59.5						
	C	86.7	81.0	100.0	81.0						
	C	86.7	81.0	100.0	81.0						
	D	10.0	91.0	100.0	91.0						
	E	100.0	63.7	100.0	63.7						
	SYSTEM	96.7	92.9	100.0	92.9			720	720	669	80.7

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE C WAS DOWN DURING PART OF SEPTEMBER FOR MAINTENANCE REQUIRED ON THE QUENCHER SECTION RESULTING FROM TOWER MIXER PROBLEMS.

10/83	A	67.7	45.8	100.0	39.5						
	B	100.0	80.6	100.0	69.5						
	C	55.0	54.0	100.0	46.6						
	D	100.0	66.9	100.0	57.7						
	E	100.0	91.9	100.0	79.3						
	SYSTEM	100.0	84.8	100.0	73.2			744	642	544	70.9

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES A AND C WERE DOWN DURING PART OF OCTOBER FOR MAINTENANCE ON THE ABSORBER RECYCLE TANK MIXERS.

11/83	A	80.0	60.8	100.0	60.8						
	B	100.0	69.6	100.0	69.6						
	C	100.0	97.4	100.0	97.4						
	D	43.3	34.9	100.0	34.9						
	E	100.0	83.9	100.0	83.9						
	SYSTEM	100.0	86.7	100.0	86.7			720	720	624	70.8
12/83	A	100.0	89.0	100.0	82.4						
	B	100.0	85.3	100.0	79.0						
	C	100.0	44.7	100.0	41.4						
	D	64.5	51.6	100.0	47.8						
	E	100.0	55.4	100.0	51.3						
	SYSTEM	100.0	81.5	100.0	75.5			744	689	561	69.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING NOVEMBER AND DECEMBER 1983.

1/84	A	80.6	54.0	100.0	49.6						
	B	100.0	82.7	100.0	76.0						
	C	100.0	42.4	100.0	39.0						
	D	100.0	57.2	100.0	52.6						
	E	100.0	77.7	100.0	71.4						
	SYSTEM	100.0	78.5	100.0	72.2			744	684	537	62.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS DOWN FOR MAINTENANCE OF TANK MIXERS AND REPAIR OF A FEED PUMP.

2/84	A	89.7	71.7	100.0	66.1						
	B	100.0	51.1	100.0	47.1						
	C	13.8	13.6	100.0	12.6						
	D	100.0	80.5	100.0	74.3						
	E	100.0	86.5	100.0	79.8						
	SYSTEM	100.0	75.9	100.0	70.0			696	642	487	59.0

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MODULE C WAS DOWN FOR MAINTENANCE DURING FEBRUARY.									
3/84	A	100.0	89.8	100.0	87.7						
	B	100.0	95.4	100.0	93.1						
	C	93.5	45.2	100.0	44.1						
	D	9.7	3.4	100.0	3.3						
	E	100.0	83.1	100.0	81.1						
	SYSTEM	100.0	79.2	100.0	77.3			744	726	575	60.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MODULE D WAS DOWN FOR MAINTENACE DURING MARCh.									
4/84	A	99.9	97.2	100.0	93.1						
	B	20.0	7.2	100.0	6.9						
	C	99.9	88.6	100.0	84.9						
	D	79.9	74.6	100.0	71.5						
	E	99.9	86.4	100.0	82.8						
	SYSTEM	99.9	88.5	100.0	84.8			720	690	611	76.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE B WAS DOWN FOR MECHANICAL MAINTENANCE DURING APRIL.									
		MODULE D WAS DOWN FOR MECHANICAL REVISIONS OF ABSORBER TANK MIXERS.									
5/84	A	100.0	97.0	100.0	97.0						
	B	71.0	65.2	100.0	65.2						
	C	100.0	84.2	100.0	84.2						
	D	100.0	79.7	100.0	79.7						
	E	32.3	27.0	100.0	27.0						
	SYSTEM	100.0	88.3	100.0	88.3			744	744	657	67.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES B AND E WERE DOWN DURING MAY FOR MAINTENANCE.									
6/84	A	53.3	62.2	100.0	9.9						
	B	53.3	0.0		0.0						
	C	46.7	83.5	100.0	13.3						
	D	100.0	79.0	100.0	12.6						
	E	46.7	92.6	100.0	14.8						
	SYSTEM	75.0	79.3	100.0	12.7			720	115	91	50.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MODULES A, C, D AND E WERE OUT FOR TANK MIXER REPAIRS.									
7/84	A	0.0	0.0		0.0						
	B	100.0	94.8	100.0	90.7						
	C	100.0	51.9	100.0	49.7						
	D	100.0	86.9	100.0	83.2						
	E	100.0	84.6	100.0	81.0						
	SYSTEM	100.0	79.6	100.0	76.1			744	712	566	58.6

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS AROSE DURING JULY.									
8/84	A	71.0	45.5	100.0	45.3						
	B	74.2	71.7	100.0	71.4						
	C	71.0	69.1	100.0	68.8						
	D	100.0	79.4	100.0	79.0						
	E	100.0	75.0	100.0	74.7						
	SYSTEM	100.0	85.1	100.0	84.8			744	741	631	61.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES A,B AND C WERE DOWN DURING PART OF AUGUST FOR TANK MIXER REPAIRS.									
9/84	A	100.0	99.4	100.0	99.4						
	B	63.3	25.6	100.0	25.6						
	C	100.0	87.7	100.0	87.7						
	D	100.0	84.4	100.0	84.4						
	E	100.0	51.0	58.7	51.0						
	SYSTEM	100.0	87.0	100.0	87.0			720	720	626	68.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MODULE B WAS DOWN MOST OF SEPTEMBER FOR MAINTAINENCE ON QUENCHER TOWER MIXERS.									
10/84	A	100.0	97.5	100.0	95.8						
	B	100.0	75.2	100.0	73.9						
	C	100.0	0.0		0.0						
	D	100.0	61.3	100.0	60.2						
	E	100.0	83.7	100.0	82.3						
	SYSTEM	100.0	79.4	100.0	78.1			744	731	581	62.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTE DURING THE MONTH OF OCTOBER.									
11/84	A	70.0	26.7	100.0	22.8						
	B	100.0	77.1	100.0	65.8						
	C	100.0	77.1	100.0	65.8						
	D	100.0	99.2	100.0	84.8						
	E	100.0	99.8	100.0	85.2						
	SYSTEM	100.0	95.0	100.0	81.1			720	615	584	88.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MODULE A WAS DOWN PART OF THE MONTH OF NOVEMBER FOR MAINTAINENCE ON QUENCHER TOWER MIXERS.									
12/84	A	100.0	99.7	100.0	93.2						
	B	100.0	97.1	100.0	90.9						
	C	100.0	99.7	100.0	93.2						
	D	87.1	90.4	100.0	84.6						
	E	12.9	9.0	100.0	8.4						
	SYSTEM	100.0	99.0	100.0	92.6			744	696	689	100.0

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MODULE D AND E WERE REMOVED FROM SERVICE PART OF DECEMBER TO CONDUCT QUENCHER REPAIRS.									
1/85	A	83.9	80.5	100.0	79.2						
	B	100.0	100.0	100.0	98.4						
	C	100.0	98.4	100.0	96.8						
	D	19.4	19.6	100.0	19.3						
	E	100.0	96.7	100.0	95.2						
	SYSTEM	100.0	98.8	100.0	97.2			744	732	723	99.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTH OF JANUARY.									
2/85	A	0.0	0.0		0.0						
	B	100.0	100.0	100.0	100.0						
	C	100.0	99.9	100.0	99.9						
	D	100.0	100.0	100.0	100.0						
	E	100.0	98.6	100.0	98.6						
	SYSTEM	100.0	99.6	100.0	99.6			672	672	669	100.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE A-MODULE WAS DOWN FOR REPAIRS ON TANK AGITATORS AND QUENCHER SECTION HEADERS.									
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS DOWN MOST OF THE MONTH OF OCTOBER DUE TO A SCHEDULED BOILER/TURBINE MAINTENANCE OUTAGE.									
11/85	SYSTEM							720			
12/85	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE REMAINDER OF THE YEAR. ONLY ROUTINE QUENCHER MAINTENANCE SUCH AS SCALE REMOVAL AND PATCH WORK TO THE 904L WERE NECESSARY.									
1/86	SYSTEM							774			
2/86	SYSTEM							672			

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED HAVING NO BOILER/TURBINE OUTAGES IN 1986. CLEANING AND REPLACEMENT OF QUENCHER INTERNALS WERE MADE DURING THE 3RD QUARTER. MATERIALS REPLACED INCLUDED PIPING, NOZZLES, AND SPRAY HEADERS. NO UNIT OUTAGES OCCURRED DURING THIS TIME DUE TO AVAILABLE SPARE CAPACITY.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE YEAR 1987. THE UNIT HAD A SCHEDULED OUTAGE IN THE FALL WHICH LASTED APPROXIMATELY 4 WEEKS.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	BASIN ELECTRIC POWER	
PLANT NAME	LARAMIE RIVER	
UNIT NUMBER	2	
CITY	WHEATLAND	
STATE	WYOMING	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	86.	(0.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1500	
GROSS UNIT GENERATING CAPACITY - MW	600	
NET UNIT GENERATING CAPACITY W/FGD - MW	550	
NET UNIT GENERATING CAPACITY WO/FGD - MW	571	
EQUIVALENT SCRUBBED CAPACITY - MW	600	

** UNIT DATA - BOILER AND STACK

BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1321.32	(2800000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	56.1	(133 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	8.7	(28.6 FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	19538.	(8400 BTU/LB)
RANGE HEAT CONTENT - BTU/LB	****	
AVERAGE ASH CONTENT - %	7.89	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	28.92	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	0.54	
RANGE SULFUR CONTENT - %	0.2-0.8	
AVERAGE CHLORIDE CONTENT - %	0.04	
RANGE CHLORIDE CONTENT - %	****	

*** PARTICLE CONTROL

** ESP

NUMBER	1	
TYPE	COLD SIDE	
SUPPLIER	BABCOCK & WILCOX	
INLET FLUE GAS CAPACITY - CU.M/S	1085.4	(2300000 ACFM)
INLET FLUE GAS TEMPERATURE - C	141.1	(286 F)
PRESSURE DROP - KPA	0.8	(3. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.6	

** PARTICLE SCRUBBER

NUMBER	0
GENERIC TYPE	NONE
SPECIFIC TYPE	N/A
TRADE NAME/COMMON NAME	N/A
SHELL GENERIC MATERIAL	N/A
SHELL SPECIFIC MATERIAL	N/A
LINER GENERIC MATERIAL	N/A
LINER SPECIFIC MATERIAL	N/A
GAS CONTACTING DEVICE TYPE	N/A

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	RESEARCH-COTTRELL
A-E FIRM	BURNS & MCDONNELL

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.60	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	3.5	
CURRENT STATUS	1	
COMMERCIAL START-UP	7/1986	
INITIAL START-UP	7/1981	
CONTRACT AWARDED	1/1977	
** DESIGN AND OPERATING PARAMETERS		
DESIGN CHLORIDE CONTENT - %	********	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	5	
GENERIC TYPE	COMBINATION TOWER	
SPECIFIC TYPE	SPRAY/PACKED	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	RESEARCH-COTTRELL	
DIMENSIONS - FT	30.0 X 30.0 X 88.0	
SHELL GENERIC MATERIAL	STAINLESS STEEL; HIGH ALLOY	
SHELL SPECIFIC MATERIAL	AUSTENITIC; IRON BASE/NICKEL-CHROMIUM-COPPER-MOL	
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 316L; ALLOY 904L	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
GAS CONTACTING DEVICE TYPE	VERTICAL CROSS CHANNEL FIXED GRID PACKING	
NUMBER OF CONTACTING ZONES	2	
DISTANCE BETWEEN GAS CONTACTING ZONES - CM	61.0	(24.0IN)
L/G RATIO - L/CU.M	8.0	(60.0 GAL/1000 ACF)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	1085.37	(2300000 ACFM)
INLET GAS TEMPERATURE - C	141.1	(286 F)
SO2 REMOVAL EFFICIENCY - %	90.0	
PARTICLE REMOVAL EFFICENCY - %	0.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	VERTICAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	1	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** REHEATER		
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	NONE	
CONSTRUCTION MATERIAL SPECIFIC TYPE	N/A	
** FANS		
NUMBER	2	
DESIGN	CENTRIFUGAL	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
** FANS		
NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	AXIAL	
SUPPLIER	BABCOCK & WILCOX	

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
** DAMPERS	
FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
NUMBER	2
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	13.6 (15 TPH)
PRODUCT QUALITY - % SOLIDS	30.0

** TANKS

SERVICE	NUMBER
NR	****

** PUMPS

SERVICE	NUMBER
NR	****

** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER	3
NUMBER OF SPARES	0
DIMENSIONS - FT	110.0 DIA X 10.0
SHELL GENERIC MATERIAL TYPE	INORGANIC
SHELL SPECIFIC MATERIAL TYPE	HYDRAULICALLY-BONDED CONCRETE
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	CENTRIFUGE
NUMBER	1
NUMBER OF SPARES	0
FEED STREAM CHARACTERISTICS	35% SOLIDS
OUTLET STREAM CHARACTERISTICS	60% SOLIDS
*** SALEABLE BYPRODUCTS	
NATURE	NONE
DISPOSITION	N/A
*** SLUDGE	
** TREATMENT	
METHOD	FORCED OXIDATION
DEVICE	OXIDATION TANK
PROPRIETARY PROCESS	N/A
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	CONVEYED
SITE TREATMENT	NONE
SITE SERVICE LIFE - YRS	35

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH, SOLIDS, SO2 INLET, ACFM, SO2 OUTLET
PROCESS CONTROL MANNER	AUTOMATIC

** WATER BALANCE

WATER LOOP TYPE	CLOSED	
MAKEUP WATER ADDITION - LITERS/S	16.9	(269 GPM)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATION OF THE FGD SYSTEM BEGAN DURING JULY 1981.

8/81	A	100.0	78.2	100.0	77.6						
	B	52.4	52.8	100.0	52.4						
	C	100.0	82.3	100.0	81.7						
	D	31.9	32.2	100.0	31.9						
	E	100.0	28.8	100.0	28.6						
	SYSTEM	96.1	68.6	100.0	68.1			744	738	506	46.7

** PROBLEMS/SOLUTIONS/COMMENTS

B AND D MODULES WERE OUT OF SERVICE SO THAT BRACING WORK ON ROUND-OFF CORNERS COULD BE PERFORMED.

9/81	A	100.0	94.0	100.0	77.4						
	B	100.0	99.0	100.0	81.5						
	C	37.7	31.2	100.0	25.7						
	D	100.0	41.7	100.0	34.3						
	E	100.0	60.4	100.0	49.7						
	SYSTEM	100.0	81.6	100.0	67.2			720	593	483	55.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO PROBLEMS WITH THE FGD SYSTEM WERE ENCOUNTERED IN THE MONTH OF SEPTEMBER.

10/81	A	83.9	78.9	100.0	78.1						
	B	100.0	99.1	100.0	98.1						
	C	100.0	99.2	100.0	98.2						
	D	100.0	96.0	100.0	94.9						
	E	38.7	11.7	100.0	11.6						
	SYSTEM	100.0	96.2	100.0	95.0			744	736	708	88.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER MODULES E AND A WERE OFF-LINE PART OF THE TIME FOR THE INSTALLATION OF BRACING.

11/81	A	100.0	99.9	100.0	99.9						
	B	100.0	99.9	100.0	99.9						
	C	100.0	99.9	100.0	99.9						
	D	100.0	94.0	100.0	94.0						
	E	0.0	0.0	.	0.0						
	SYSTEM	100.0	98.4	100.0	98.0			720	720	708	95.3

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER MODULE E WAS DOWN FOR MAINTENANCE ON THE WELDS IN THE QUENCHER SECTION DUE TO CORROSION OF THE UDDEHOLM 904L.									
12/81	A	100.0	90.9	100.0	73.4						
	B	100.0	94.1	100.0	76.0						
	C	100.0	94.4	100.0	76.2						
	D	20.5	25.4	100.0	20.5						
	E	100.0	65.6	100.0	52.9						
	SYSTEM	100.0	92.6	100.0	74.8			744	601	556	69.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		OUTAGE TIME DURING DECEMBER RESULTED FROM PROBLEMS WITH THE SEAL COATING I THE ABSORBER FEED TANK. GENERAL MAINTENANCE WAS PERFORMED ON MODULE D, WHICH ALSO ACCOUNTED FOR PART OF THE OUTAGE TIME.									
1/82	A	100.0	99.3	100.0	96.3						
	B	100.0	99.5	100.0	96.5						
	C	100.0	99.1	100.0	96.1						
	D	0.0	0.0		0.0						
	E	100.0	94.7	100.0	91.8						
	SYSTEM	100.0	98.1	100.0	95.0			744	722	708	93.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY THE MODULE D ABSORBER FEED TANK WAS RESEALED.									
2/82	A	100.0	99.8	100.0	94.7						
	B	100.0	87.6	100.0	83.1						
	C	100.0	75.7	100.0	71.8						
	D	42.9	29.6	100.0	28.1						
	E	100.0	89.2	100.0	84.6						
	SYSTEM	100.0	96.0	100.0	91.0			672	638	609	83.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SEAL COATING OF THE D ABSORBER FEED TANK CONTINUED INTO FEBRUARY.									
		THE D MODULE WAS DOWN PART OF THE TIME TO MAKE REPAIRS TO THE POTENTIAL PROTECTION.									
3/82	A	48.4	33.8	100.0	31.5						
	B	100.0	69.4	100.0	64.8						
	C	100.0	84.2	100.0	78.6						
	D	100.0	93.0	100.0	86.8						
	E	100.0	74.4	100.0	69.4						
	SYSTEM	100.0	89.0	100.0	83.0			744	694	616	70.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH MODULE A WAS OFF-LINE APPROXIMATELY 384 HOURS TO RESEAL THE ABSORBER FEED TANK.									
4/82	A	6.7	0.0		0.0						
	B	26.7	33.3	100.0	1.2						
	C	3.3	48.1	100.0	1.8						
	D	23.3	100.0	100.0	3.8						
	E	26.7	77.8	100.0	2.9						
	SYSTEM	21.7	64.8	100.0	2.4			720	27	18	1.3

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE MODULES WERE DOWN PART OF APRIL TO SEAL COAT THE ABSORBER FEED TANKS.									
		MAINTENANCE WAS PERFORMED ON THE SPRAY NOZZLES IN THE QUENCHER SECTION OF EACH MODULE.									
5/82	A	93.5	53.6	100.0	50.2						
	B	100.0	78.6	100.0	73.7						
	C	0.0	0.0		0.0						
	D	100.0	80.2	100.0	75.2						
	E	100.0	92.6	100.0	86.8						
	SYSTEM	98.4	76.2	100.0	71.5			744	697	532	75.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY MODULE C WAS TAKEN OFF-LINE FOR MAINTENANCE AND REPAIRS.									
6/82	A	100.0	89.3	100.0	89.3						
	B	86.7	69.3	100.0	69.3						
	C	16.7	11.7	100.0	11.7						
	D	100.0	76.1	100.0	76.1						
	E	100.0	96.9	100.0	96.9						
	SYSTEM	100.0	85.8	100.0	85.8			720	720	618	66.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JUNE MODULE C WAS OUT OF SERVICE PART OF THE TIME FOR NOZZLE REPAIR IN THE QUENCHER SECTION.									
7/82	A	67.7	54.7	100.0	43.6						
	B	61.3	55.2	100.0	44.1						
	C	100.0	77.8	100.0	62.1						
	D	100.0	91.0	100.0	72.7						
	E	74.2	45.9	100.0	36.7						
	SYSTEM	100.0	81.2	100.0	64.8			744	594	482	60.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JULY MODULES A, B AND E WERE DOWN TO REPAIR NOZZLES IN THE QUENCHER SECTION.									
8/82	A	80.6	67.0	100.0	63.9						
	B	100.0	93.9	100.0	89.5						
	C	100.0	97.4	100.0	92.8						
	D	22.6	21.7	100.0	20.6						
	E	83.9	58.0	100.0	55.2						
	SYSTEM	96.8	84.5	100.0	80.5			744	709	599	65.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING AUGUST MODULES A AND D WERE DOWN FOR MAINTENANCE IN THE QUENCHER SECTION RESULTING FROM CORROSION OF THE UDDEHOLM 904L.									
9/82	A	100.0	98.7	100.0	94.3						
	B	100.0	99.9	100.0	95.4						
	C	36.7	38.0	100.0	36.4						
	D	63.3	61.3	100.0	58.6						
	E	0.0	0.0		0.0						
	SYSTEM	75.0	74.5	100.0	71.2			720	688	513	46.0

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING SEPTEMBER MODULES C, D AND E WERE DOWN FOR MAINTENANCE IN THE QUENCHER SECTION RESULTING FROM THE CORROSION OF UDDEHOLM 904L.								
10/82	A	25.8	24.5	100.0	24.4						
	B	38.7	34.2	100.0	34.0						
	C	77.4	72.5	100.0	72.2						
	D	74.2	72.7	100.0	72.4						
	E	100.0	98.9	100.0	98.5						
	SYSTEM	79.0	75.7	100.0	75.4			744	741	561	41.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING OCTOBER MODULE A WAS DOWN FOR MAINTENANCE ON WELDS IN THE QUENCHER SECTION RESULTING FROM CORROSION OF THE UDDEHOLM 904L.								
			DURING OCTOBER MODULE D WAS DOWN FOR REPAIRS OF BRACING.								
11/82	A	0.0	0.0		0.0						
	B	63.3	33.1	100.0	22.8						
	C	100.0	97.9	100.0	67.3						
	D	100.0	63.4	100.0	43.6						
	E	100.0	93.6	100.0	64.3						
	SYSTEM	90.8	72.0	100.0	49.5			720	495	356	41.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING NOVEMBER MODULES A AND B WERE DOWN FOR MAINTENANCE ON WELDS IN THE QUENCHER SECTION RESULTING FROM CORROSION OF THE UDDEHOLM 904L.								
12/82	A	32.3	27.1	100.0	26.2						
	B	100.0	90.4	100.0	87.3						
	C	100.0	97.2	100.0	93.9						
	D	100.0	50.2	100.0	48.6						
	E	100.0	100.0	100.0	96.6						
	SYSTEM	100.0	91.2	100.0	88.2			744	719	656	68.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING DECEMBER MODULE A WAS DOWN FOR MAINTENANCE ON THE TOWER MIXERS AND WETTED FILM CONTACT PACKING.								
1/83	A	100.0	92.2	100.0	71.6						
	B	22.6	9.4	100.0	7.3						
	C	100.0	88.1	100.0	68.4						
	D	83.9	74.2	100.0	57.7						
	E	100.0	81.2	100.0	63.1						
	SYSTEM	100.0	86.3	100.0	67.0			744	578	498	61.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING JANUARY MODULE B WAS DOWN TO ROUND OFF WELDS IN THE SCRUBBER.								
2/83	A	25.0	16.5	100.0	15.1						
	B	89.3	72.9	100.0	66.7						
	C	100.0	96.6	100.0	88.4						
	D	100.0	57.8	100.0	52.9						
	E	85.7	72.3	100.0	66.2						
	SYSTEM	100.0	79.0	100.0	72.3			672	615	486	53.1

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY MODULE A WAS DOWN DUE TO PROBLEMS WITH THE INLET ISOLATION GUILLOTINE DAMPER.									
		DURING FEBRUARY MODULE E WAS DOWN TO CLEAN THE TOWER PACKING.									
3/83	A	100.0	95.4	100.0	90.3						
	B	100.0	83.7	100.0	79.2						
	C	100.0	93.9	100.0	88.8						
	D	100.0	46.6	100.0	44.1						
	E	51.6	28.8	100.0	27.2						
	SYSTEM	100.0	87.1	100.0	82.4			744	704	613	82.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH MODULE E WAS DOWN FOR MAINTENANCE IN THE QUENCHER SECTION AND TO CLEAN THE WETTED CONTACT PACKING.									
4/83	A	99.9	98.9	100.0	98.6						
	B	99.9	74.1	100.0	73.9						
	C	46.7	45.1	100.0	45.0						
	D	99.9	31.5	100.0	31.5						
	E	99.9	96.4	100.0	96.1						
	SYSTEM	100.0	86.5	100.0	86.3			720	718	621	64.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE C WAS DOWN DURING APRIL FOR A CLEANING OF THE ABSORBER PACKING AND GENERAL TOWER MAINTENANCE.									
5/83	A	100.0	95.4	100.0	56.5						
	B	100.0	92.1	100.0	54.6						
	C	0.0	0.0		0.0						
	D	100.0	92.3	100.0	54.7						
	E	100.0	75.4	100.0	44.7						
	SYSTEM	100.0	88.8	100.0	52.6			744	441	392	64.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE C WAS DOWN DURING MAY FOR MAINTENANCE IN THE QUENCHER SECTION.									
6/83	A	100.0	100.0	100.0	100.0						
	B	100.0	76.5	100.0	76.5						
	C	13.3	8.0	100.0	8.0						
	D	100.0	85.6	100.0	85.6						
	E	100.0	81.3	100.0	81.3						
	SYSTEM	100.0	87.9	100.0	87.9			720	720	633	65.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE C WAS DOWN DURING JUNE FOR MAINTENANCE.									
7/83	A	48.1	44.0	100.0	41.4						
	B	100.0	84.0	100.0	79.1						
	C	100.0	98.1	100.0	92.4						
	D	100.0	83.2	100.0	78.4						
	E	64.5	33.8	100.0	31.8						
	SYSTEM	100.0	85.8	100.0	80.8			744	701	601	57.6

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES A AND E WERE DOWN DURING PART OF JULY FOR REPAIRS IN THE QUENCHER SECTION.									
8/83	A	35.5	31.4	100.0	30.9						
	B	71.0	66.6	100.0	65.7						
	C	100.0	95.0	100.0	93.6						
	D	100.0	99.1	100.0	97.6						
	E	100.0	60.4	100.0	59.5						
	SYSTEM	100.0	88.1	100.0	86.8			744	733	646	62.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES A AND D WERE DOWN DURING PART OF AUGUST FOR MAINTENANCE.									
9/83	A	100.0	64.0	100.0	3.8						
	B	26.7	0.0		0.0						
	C	100.0	98.8	100.0	5.9						
	D	73.3	100.0	100.0	6.0						
	E	100.0	99.4	100.0	5.9						
	SYSTEM	100.0	90.6	100.0	5.4			720	43	39	59.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES B AND D WERE DOWN DURING PART OF SEPTEMBER FOR MAINTENANCE ON THE QUENCHER TOWER MIXERS.									
10/83	A	100.0	92.7	100.0	16.3						
	B	100.0	93.9	100.0	16.5						
	C	100.0	100.0	100.0	17.8						
	D	0.0	0.0		0.0						
	E	100.0	80.5	100.0	14.2						
	SYSTEM	100.0	91.8	100.0	16.2			744	131	121	72.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE D WAS DOWN DURING PART OF OCTOBER FOR MAINTENANCE ON WELDS IN THE QUENCHER SECTION.									
		ABSORBER RECYCLE TANK MIXERS WERE REPAIRED AT MODULE D DURING THE MONTH.									
11/83	A	100.0			0.0						
	B	100.0			0.0						
	C	100.0			0.0						
	D	43.3			0.0						
	E	46.7			0.0						
	SYSTEM	97.5			0.0			720	0	0	0.0
12/83	A	100.0	93.3	100.0	28.0						
	B	100.0	98.7	100.0	29.6						
	C	100.0	91.0	100.0	27.3						
	D	100.0	0.0		0.0						
	E	41.9	0.0		0.0						
	SYSTEM	100.0	70.7	100.0	21.2			744	223	158	42.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN THE ENTIRE MONTH OF NOVEMBER AND MOST OF DECEMBER DUE TO LOW POWER DEMAND.									
1/84	A	100.0	99.3	100.0	55.2						

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	95.5	100.0	53.1						
	C	100.0	97.7	100.0	54.4						
	D	100.0	0.0		0.0						
	E	100.0	0.0		0.0						
	SYSTEM	100.0	73.1	100.0	40.7			744	414	303	42.9
2/84	A	100.0			0.0						
	B	100.0			0.0						
	C	100.0			0.0						
	D	100.0			0.0						
	E	100.0			0.0						
	SYSTEM	100.0			0.0			696	0	0	0.0
3/84	A	100.0			0.0						
	B	100.0			0.0						
	C	100.0			0.0						
	D	100.0			0.0						
	E	100.0			0.0						
	SYSTEM	100.0			0.0			744	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1984.

4/84	A	0.0			0.0						
	B	0.0			0.0						
	C	0.0			0.0						
	D	0.0			0.0						
	E	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

A UNIT OUTAGE OCCURRED DURING THE MONTH OF APRIL.

5/84	A	6.5			0.0						
	B	9.7			0.0						
	C	0.0			0.0						
	D	3.2			0.0						
	E	9.7			0.0						
	SYSTEM	7.3			0.0			744	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS DOWN FOR MAINTENANCE ON ALL ABSORBER FEED TANKS.

6/84	A	100.0	84.6	100.0	72.6						
	B	100.0	91.6	100.0	78.7						
	C	33.3	35.2	100.0	30.2						
	D	93.3	63.2	100.0	54.2						
	E	100.0	95.4	100.0	81.9						
	SYSTEM	100.0	92.5	100.0	79.4			720	618	572	77.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE C WAS DOWN FOR MECHANICAL REPAIRS DURING JUNE.

7/84	A	100.0	44.2	100.0	44.2						
	B	100.0	85.7	100.0	85.7						
	C	67.7	64.4	100.0	64.4						
	D	90.3	72.8	100.0	72.8						

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	E	100.0	94.2	100.0	94.2						
	SYSTEM	100.0	90.3	100.0	90.3			744	744	672	75.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS AROSE DURING JULY.

8/84	A	100.0	76.8	100.0	76.5						
	B	100.0	89.3	100.0	89.0						
	C	29.0	8.4	100.0	8.3						
	D	100.0	92.0	100.0	91.6						
	E	100.0	98.7	100.0	98.3						
	SYSTEM	100.0	91.3	100.0	90.9			744	741	677	70.8

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE C WAS DOWN DURING PART OF AUGUST FOR ABSORBER MIXER REPAIRS.

WELDING WAS DONE IN THE QUENCHER SECTION DURING AUGUST.

9/84	A	100.0	93.8	100.0	78.5						
	B	100.0	56.4	100.0	47.2						
	C	100.0	59.9	100.0	50.2						
	D	100.0	99.5	100.0	83.4						
	E	40.0	40.0	100.0	33.5						
	SYSTEM	100.0	87.4	100.0	73.2			720	603	527	67.6
10/84	A	100.0	96.5	100.0	74.3						
	B	100.0	81.2	100.0	62.6						
	C	100.0	97.4	100.0	75.0						
	D	100.0	97.9	100.0	75.4						
	E	9.7	10.6	100.0	8.1						
	SYSTEM	100.0	95.9	100.0	73.9			744	573	540	81.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE E WAS DOWN PART OF SEPTEMBER AND OCTOBER FOR QUENCHER TOWER MIXER REPAIRS.

11/84	A	100.0	83.9	100.0	83.3						
	B	100.0	67.5	100.0	67.0						
	C	100.0	92.3	100.0	91.7						
	D	30.0	22.4	100.0	22.2						
	E	100.0	81.8	100.0	81.3						
	SYSTEM	100.0	87.0	100.0	86.4			720	715	622	69.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT MODULE D WAS DOWN MOST OF NOVEMBER FOR TOWER MIXER MAINTAINENCE.

12/84	A	100.0	0.0		0.0						
	B	100.0	0.0		0.0						
	C	100.0	0.0		0.0						
	D	0.0	0.0		0.0						
	E	100.0	0.0		0.0						
	SYSTEM	100.0	0.0		0.0			744	6	0	11.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF LINE MOST OF DECEMBER FOR REPAIRS. MODULE D REMAINED DOWN FOR QUENCHER TOWER REPAIRS.

1/85	A	90.3	33.2	100.0	30.6						

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	65.1	100.0	60.0						
	C	100.0	95.7	100.0	88.3						
	D	16.1	17.5	100.0	16.1						
	E	100.0	74.2	100.0	68.4						
	SYSTEM	100.0	71.4	100.0	65.9			744	686	490	55.0

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM PROBLEMS WERE REPORTED BY THE UTILITY DURING JANUARY.

2/85	A	0.0	0.0		0.0						
	B	100.0	65.4	100.0	60.4						
	C	100.0	90.0	100.0	83.0						
	D	100.0	99.8	100.0	92.0						
	E	100.0	81.3	100.0	75.0						
	SYSTEM	100.0	84.1	100.0	77.6			672	620	522	64.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE A-MODULE WAS OUT OF SERVICE FOR TANK AGITATOR REPAIRS AND REPAIR OF QUENCHER SECTION HEADERS.

3/85	SYSTEM							744			
4/85	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS DOWN MOST OF THE MONTH OF APRIL DUE TO A SCHEDULED BOILER/TURBINE MAINTENANCE OUTAGE.

5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE REMAINDER OF THE YEAR. ONLY ROUTINE QUENCHER MAINTENANCE SUCH AS SCALE REMOVAL AND PATCH WORK TO THE ALLOY 904L WERE NECESSARY.

1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THERE WAS A SCHEDULED 4 WEEK BOILER/TURBINE MAINTENANCE OUTAGE DURING THE SPRING OF 1986. DURING THIS OUTAGE PERIOD, CLEANING AND REPLACEMENT OF QUENCHER INTERNALS WERE MADE. MATERIALS

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
				REPLACED INCLUDED PIPING, NOZZLES, AND SPRAY HEADERS.							
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			
	** PROBLEMS/SOLUTIONS/COMMENTS										
				NO MAJOR UNIT OR FGD-RELATED OUTAGES WERE REPORTED DURING THE REMAINDER OF 1986.							
1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
				THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE YEAR 1987.							

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	BASIN ELECTRIC POWER	
PLANT NAME	LARAMIE RIVER	
UNIT NUMBER	3	
CITY	WHEATLAND	
STATE	WYOMING	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	86.	(0.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1500	
GROSS UNIT GENERATING CAPACITY - MW	600	
NET UNIT GENERATING CAPACITY W/FGD - MW	550	
NET UNIT GENERATING CAPACITY WO/FGD - MW	571	
EQUIVALENT SCRUBBED CAPACITY - MW	600	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1321.32	(2800000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	69.4	(157 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	8.7	(28.6 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	19538.	(8400 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		7906-8244
AVERAGE ASH CONTENT - %	7.89	
RANGE ASH CONTENT - %	4.0-13.0	
AVERAGE MOISTURE CONTENT - %	28.92	
RANGE MOISTURE CONTENT - %	22.2-34.7	
AVERAGE SULFUR CONTENT - %	0.54	
RANGE SULFUR CONTENT - %	0.2-0.5	
AVERAGE CHLORIDE CONTENT - %	0.04	
RANGE CHLORIDE CONTENT - %	0.00-0.04	
*** PARTICLE CONTROL		
** FABRIC FILTER		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
TYPE	COLD SIDE	
SUPPLIER	BABCOCK & WILCOX	
INLET FLUE GAS CAPACITY - CU.M/S	1085.4	(2300000 ACFM)
INLET FLUE GAS TEMPERATURE - C	69.4	(157 F)
PRESSURE DROP - KPA	0.2	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.6	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		

BASIN ELECTRIC POWER: LARAMIE RIVER 3 (CONT.)

** GENERAL DATA			
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT		
SO2 REMOVAL MODE	SPRAY DRYING		
PROCESS TYPE	LIME/SPRAY DRYING		
SYSTEM SUPPLIER	BABCOCK & WILCOX		
A-E FIRM	BURNS & MCDONNELL		
DEVELOPMENT LEVEL	FULL SCALE		
NEW/RETROFIT	NEW		
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.60		
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	82.50		
ENERGY CONSUMPTION - %	3.5		
CURRENT STATUS	1		
COMMERCIAL START-UP	11/1982		
INITIAL START-UP	11/1982		
CONTRACT AWARDED	10/1978		
** DESIGN AND OPERATING PARAMETERS			
DESIGN CHLORIDE CONTENT - %	********		
** QUENCHER/PRESATURATOR			
CONSTRUCTION MATERIAL GENERIC TYPE	NR		
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR		
** ABSORBER			
NUMBER	4		
NUMBER OF SPARES	1		
GENERIC TYPE	SPRAY DRYER		
SPECIFIC TYPE	NR		
TRADE NAME/COMMON TYPE	HYDRAULIC PRESSURE NOZZLE		
SUPPLIER	BABCOCK & WILCOX		
DIMENSIONS - FT	54'8"W X 46'10"H		
SHELL GENERIC MATERIAL	CARBON STEEL		
SHELL SPECIFIC MATERIAL	AISI 1110		
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A		
LINER GENERIC MATERIAL	NONE		
LINER SPECIFIC MATERIAL	N/A		
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A		
GAS CONTACTING DEVICE TYPE	NONE		
NUMBER OF CONTACTING ZONES	2		
LIQUID RECIRCULATION RATE - LITER/S	0.	(0 GPM)	
L/G RATIO - L/CU.M	0.0	(0.3 GAL/1000 ACF)	
GAS-SIDE PRESSURE DROP - KPA	1.6	(6.5 IN-H2O)	
SUPERFICAL GAS VELOCITY - M/SEC	1.5	(5.0 FT/S)	
INLET GAS FLOW - CU. M/S	377.52	(800000 ACFM)	
INLET GAS TEMPERATURE - C	137.2	(279 F)	
SO2 REMOVAL EFFICIENCY - %	85.0		
PARTICLE REMOVAL EFFICENCY - %	99.6		
** MIST ELIMINATOR			
PRE-MIST ELIMINATOR/MIST ELIMINATOR	NONE		
GENERIC TYPE	N/A		
SPECIFIC TYPE	N/A		
TRADE NAME/COMMON TYPE	N/A		
CONSTRUCTION MATERIAL GENERIC TYPE	NR		
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR		
** FANS			
DESIGN	NR		
FUNCTION	NA		
APPLICATION	NR		
SERVICE	DRY		
CONSTRUCTION MATERIAL GENERIC TYPE	NA		
** DAMPERS			
NUMBER	4		
FUNCTION	SHUT-OFF		
GENERIC TYPE	LOUVER		
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER		
CONSTRUCTION MATERIAL GENERIC TYPE	NR		
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR		

BASIN ELECTRIC POWER: LARAMIE RIVER 3 (CONT.)

LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** DAMPERS	
NUMBER	4
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
NUMBER	2
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	5.4 (6 TPH)
PRODUCT QUALITY - % SOLIDS	30.0
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
NUMBER	2
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	5.4 (6 TPH)

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	****
NR	****
REAGENT PREP PRODUCT	****

** PUMPS

SERVICE	NUMBER
NR	****

** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	NONE
*** SALEABLE BYPRODUCTS	
NATURE	NONE
DISPOSITION	N/A
*** SLUDGE	
** TREATMENT	
METHOD	UNSTABILIZED
DEVICE	N/A
PROPRIETARY PROCESS	N/A
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TREATMENT	NONE
** PROCESS CONTROL AND INSTRUMENTATION	
CHEMICAL PARAMETERS	SO2, ACFM, SOLIDS
PROCESS CONTROL MANNER	AUTOMATIC

BASIN ELECTRIC POWER: LARAMIE RIVER 3 (CONT.)

** WATER BALANCE

WATER LOOP TYPE	OPEN	
EVAPORATION WATER LOSS - LITER/S	22.9	(363 GPM)
MAKEUP WATER ADDITION - LITERS/S	4.6	(73 GPM)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIME
CONSUMPTION	3 TPH

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT INITIAL START-UP OCCURRED DURING NOVEMBER 1982.

12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM IS CURRENTLY BEING TESTED AND IS STILL IN THE SHAKEDOWN/DEBUGGING PHASE OF OPERATION.

7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY CONTINUED PERFORMANCE TESTING ON THE FGD SYSTEM DURING THE THIRD QUARTER OF 1983.

10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT LARAMIE RIVER 3 DID NOT OPERATE DURING THE FOURT QUARTER DUE TO MAJOR DESIGN MODIFICATIONS OF THE SPRAY DRYER AND SLURRY PREPARATION SECTIONS.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			

BASIN ELECTRIC POWER: LARAMIE RIVER 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS DOWN DURING THE PERIOD OF JANUARY THROUGH JULY, 1984 DUE TO A CONTINUATION OF MAJOR DESIGN MODIFICATIONS IN THE SPRAY DRYER AND THE SLURRY PREPARATION SYSTEM.

8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR AUGUST AND SEPTEMBER 1984.

10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE FOURTH QUARTER 1984.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE YEAR 1985, THE UTILITY STATED THAT WORK WAS DONE TO UPGRADE THE SO2 REMOVAL EFFICIENCY OF THE SPRAY DRYER. THIS WAS ACCOMPLISHED BY CHANGING THE ATOMIZER SPRAY NOZZLES FROM Y-SHAPED NOZZLES TO I-SHAPED ONES. WORK WAS ALSO DONE TO IMPROVE ASH REMOVAL FROM ESP HOPPERS.

1/86	SYSTEM							774			

BASIN ELECTRIC POWER: LARAMIE RIVER 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED THROUGHOUT 1986 ON UPGRADING THE ASH REMOVAL/SLURRY PREPARATION PROCESS. THE UTILITY PLANS TO REPLACE THE CYCLONE ASH SEPARATORS IN THE SPRING OF 1987 WITH BAGHOUSES. THE ASH TAKEN DIRECTLY FROM THE ESP HOPPERS WILL NOW BE COLLECTED BY BAGHOUSES PRIOR TO REAGENT PREPARATION. NO MAJOR UNIT OR FGD-RELATED OUTAGES WERE REPORTED FOR 1986.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT HAD A SCHEDULED 4 WEEK OUTAGE DURING THE MONTH OF MAY. DURING THIS OUTAGE PERIOD, THE UTILITY CHANGED THE ASH REMOVAL/SLURRY PREPARATION PROCESS. THE ORIGINAL CYCLONE ASH SEPERATORS FOR THE SLURRY PREPARATION SYSTEM WERE REPLACED WITH FABRIC FILTERS. FLY ASH IS NOW TAKEN DIRECTLY FROM THE ESP HOPPERS AND RECOLLECTED BY FABRIC FILTERS FOR USE IN REAGENT PREPARATION. THE ASH CARRYOVER FROM THE CYCLONES DIRECTLY INTO THE SPRAY DRYERS WAS TOO HIGH.

6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

BASIN ELECTRIC POWER: LARAMIE RIVER 3 (CONT.)

PERFORMANCE DATA										
PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED FOR THE REMAINDER OF THE YEAR 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	BIG RIVERS ELECTRIC	
PLANT NAME	D.B. WILSON	
UNIT NUMBER	1	
CITY	CENTERTOWN	
STATE	KENTUCKY	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	880	
GROSS UNIT GENERATING CAPACITY - MW	440	
NET UNIT GENERATING CAPACITY W/FGD - MW	420	
NET UNIT GENERATING CAPACITY WO/FGD - MW	430	
EQUIVALENT SCRUBBED CAPACITY - MW	440	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	FOSTER WHEELER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	********	(******* ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	******	(**** FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	******	(****** BTU/LB)
RANGE HEAT CONTENT - BTU/LB		9600-11600
AVERAGE ASH CONTENT - %	********	
RANGE ASH CONTENT - %	15.0-25.0	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	8.0-14.0	
AVERAGE SULFUR CONTENT - %	3.75	
RANGE SULFUR CONTENT - %	2.5-5.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** ESP		
NUMBER	2	
TYPE	COLD SIDE	
SUPPLIER	BUELL DIVISION, ENVIROTECH	
INLET FLUE GAS CAPACITY - CU.M/S	412.9	(875000 ACFM)
INLET FLUE GAS TEMPERATURE - C	162.8	(325 F)
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	M.W. KELLOGG	
A-E FIRM	BURNS & ROE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	

BIG RIVERS ELECTRIC: D.B. WILSON 1 (CONT.)

ENERGY CONSUMPTION - %	2.3
CURRENT STATUS	1
COMMERCIAL START-UP	9/1984
INITIAL START-UP	9/1984
CONTRACT AWARDED	8/1980
** DESIGN AND OPERATING PARAMETERS	
DESIGN CHLORIDE CONTENT - %	********
** QUENCHER/PRESATURATOR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** ABSORBER	
NUMBER	4
NUMBER OF SPARES	1
GENERIC TYPE	SPRAY TOWER
SPECIFIC TYPE	OPEN CROSSCURRENT SPRAY
TRADE NAME/COMMON TYPE	HORIZONTAL SPRAY CHAMBER
SHELL GENERIC MATERIAL	NR
SHELL SPECIFIC MATERIAL	NR
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR
LINER GENERIC MATERIAL	NR
LINER SPECIFIC MATERIAL	NR
LINER MATERIAL TRADE NAME/COMMON TYPE	NR
GAS CONTACTING DEVICE TYPE	NONE
** MIST ELIMINATOR	
PRE-MIST ELIMINATOR/MIST ELIMINATOR	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** FANS	
DESIGN	NR
FUNCTION	NA
APPLICATION	NR
SERVICE	NA
CONSTRUCTION MATERIAL GENERIC TYPE	NA
** DAMPERS	
FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	NA
DEVICE TYPE	NA

** TANKS

SERVICE	NUMBER
-------	------
NR	****

BIG RIVERS ELECTRIC: D.B. WILSON 1 (CONT.)

** PUMPS

SERVICE	NUMBER
NR	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NA

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION/FIXATION
DEVICE	NA
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
SITE TREATMENT	NA

** WATER BALANCE

WATER LOOP TYPE	CLOSED

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT INITIAL START-UP OF THE FGD SYSTEM COMMENCED IN SEPTEMBER 1984.

10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT COMMERCIAL STATUS HAS BEEN DELAYED TO DATE DUE TO PROBLEMS ASSOCIATED WITH THE HORIZONTAL SPRAY ABSORBERS.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			

BIG RIVERS ELECTRIC: D.B. WILSON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM HAS NOT REACHED COMMERCIAL STATUS. THIS HAS BEEN DUE TO THE SYSTEMS POOR SO2 REMOVAL EFFICIENCY WHICH HAS REQUIRED THE UTILITY TO USE THEIR SPARE MODULE (DESIGN) CAPACITY AT ALL TIMES OR REDUCE BOILER LOAD. AN ADDITIONAL ABSORBER MODULE WILL NOW BE INSTALLED BY THE SYSTEM SUPPLIER. INSTALLATION OF THE FOURTH MODULE BEGAN IN THE EARLY FALL OF 1985 AND WILL TAKE ABOUT A YEAR TO COMPLETE.

1/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR UNIT OR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE FIRST MONTH OF 1986.

2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT LIMESTONE IS THE CURRENT REAGENT IN USE, NOT LIME AS PREVIOUSLY REPORTED. LIMESTONE WAS USED FROM START UP IN SEPTEMBER 1984 UNTIL APPROXIMATELY MAY 1985. AT THAT TIME, THE UTILITY SWITCHED TO LIME DUE TO SCALING AND SO2 REMOVAL PROBLEMS. THE UTILITY USED LIME UNTIL FEBRUARY OF 1986 WHEN IT DECIDED TO SWITCH BACK TO LIMESTONE. THE SUPPLIER WILL INSTALL A FOURTH ABSORBER MODULE AND THE UTILITY WILL TEST BOTH DIBASIC ACID AND MGO PROMOTED LIMESTONE TO AID SO2 REMOVAL AND DECREASE SCALE BUILDUP. THE REAGENT CHANGE OVER WAS MADE DURING A MAJOR TURBINE OUTAGE WHICH BEGAN IN FEBRUARY AND LASTED UNTIL MAY.

6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

INSTALLATION OF THE FOURTH ABSORBER MODULE WAS COMPLETED IN OCTOBER OF 1986. THE UTILITY ALSO REPORTED A 2 WEEK OUTAGE PERIOD IN ORDER TO CLEAN THE MIST ELIMINATORS IN THE EXISTING MODULES. THE UTILITY HAS TO CLEAN THE MIST ELIMINATORS APPROXIMATELY EVERY 6 TO 8 WEEKS TO REMOVE THE SCALE BUILDUP.

BIG RIVERS ELECTRIC: D.B. WILSON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR UNIT OR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE MONTHS OF NOVEMBER AND DECEMBER.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1987. THE UNIT WAS OFF-LINE FOR A SCHEDULED SPRING OUTAGE DURING THE PERIOD FEBRUARY 14 THROUGH MARCH 7.

4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE MONTHS OF APRIL THROUGH JULY 1987. DIBASIC ACID TESTING COMMENCED IN MAY AND WILL LAST UNTIL SPRING OF 1988. DURING THIS SAME PERIOD THE UTILITY WILL BE TESTING DOLOMITE LIME. AS OF APRIL 1987, THE UTILITY ALSO REPORTED THAT THE SYSTEM NOW OPERATES WITHOUT REHEAT EXCEPT ON OCCASIONS OF VERY COLD WEATHER OR FOR COMPLIANCE TESTING.

8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE MONTHS OF AUGUST THROUGH DECEMBER 1987. THE UNIT WAS OFF-LINE FOR A SCHEDULED FALL OUTAGE DURING THE PERIOD AUGUST 29 THROUGH SEPTEMBER 11, 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	BIG RIVERS ELECTRIC	
PLANT NAME	GREEN	
UNIT NUMBER	1	
CITY	SEBREE	
STATE	KENTUCKY	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	444	
GROSS UNIT GENERATING CAPACITY - MW	250	
NET UNIT GENERATING CAPACITY W/FGD - MW	231	
NET UNIT GENERATING CAPACITY WO/FGD - MW	236	
EQUIVALENT SCRUBBED CAPACITY - MW	250	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	471.90	(1000000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	148.9	(300 F)
STACK HEIGHT - M	107.	(350 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	4.6	(15.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	22795.	(9800 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8200-11800
AVERAGE ASH CONTENT - %	15.38	
RANGE ASH CONTENT - %	9.6-27.5	
AVERAGE MOISTURE CONTENT - %	11.40	
RANGE MOISTURE CONTENT - %	5.3-20.1	
AVERAGE SULFUR CONTENT - %	3.91	
RANGE SULFUR CONTENT - %	2.0-6.0	
AVERAGE CHLORIDE CONTENT - %	0.05	
RANGE CHLORIDE CONTENT - %	UNKNOWN	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	2	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	AMERICAN AIR FILTER	
INLET FLUE GAS CAPACITY - CU.M/S	235.9	(500000 ACFM)
INLET FLUE GAS TEMPERATURE - C	148.9	(300 F)
PRESSURE DROP - KPA	0.3	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.6	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME	
PROCESS ADDITIVES	MAGNESIUM OXIDE	
SYSTEM SUPPLIER	AMERICAN AIR FILTER	
A-E FIRM	BURNS & ROE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.00	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	2.0	
CURRENT STATUS	1	
COMMERCIAL START-UP	12/1979	
INITIAL START-UP	12/1979	
CONTRACT AWARDED	10/1976	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	4.00	
DESIGN COAL HEAT CONTENT - J/G	23260.0	(10000 BTU/LB)
DESIGN COAL ASH CONTENT - %	20.00	
DESIGN MOISTURE CONTENT - %	11.25	
DESIGN CHLORIDE CONTENT - %	0.05	
SPACE REQUIREMENTS - SQ M	10869.3	(117000 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	272.0	
** QUENCHER/PRESATURATOR		
NUMBER	0	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	AMERICAN AIR FILTER	
DIMENSIONS - FT	34 X 71.5	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	MASTIC	
LINER MATERIAL TRADE NAME/COMMON TYPE	PENNGUARD ADHESIVE	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1008.	(16000 GPM)
L/G RATIO - L/CU.M	4.3	(32.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.4	(1.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	2.8	(9.2 FT/S)
INLET GAS FLOW - CU. M/S	235.95	(500000 ACFM)
INLET GAS TEMPERATURE - C	148.9	(300 F)
SO2 REMOVAL EFFICIENCY - %	90.0	
** FANS		
NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	WESTINGHOUSE	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	274.80	(582330 ACFM)
FLUE GAS TEMPERATURE - C	148.9	(300 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
** FANS		
NUMBER	2	
NUMBER OF SPARES	0	

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

DESIGN	CENTRIFUGAL
SUPPLIER	WESTINGHOUSE
FUNCTION	UNIT
APPLICATION	INDUCED DRAFT
SERVICE	DRY
FLUE GAS FLOW RATE - CU.M/S	274.80 (582330 ACFM)
FLUE GAS TEMPERATURE - C	148.9 (300 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	TOP-ENTRY GUILLOTINE/SEAL AIR
MANUFACTURER	AMERICAN AIR FILTER
SERVICE CONDITIONS	350 F/INDEFINITE

** DAMPERS

NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	TOP-ENTRY GUILLOTINE/SEAL AIR
MANUFACTURER	AMERICAN AIR FILTER
SERVICE CONDITIONS	350 F/INDEFINITE

** DAMPERS

NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	AMERICAN AIR FILTER
SERVICE CONDITIONS	350 F/INDEFINITE

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	BOTTOM ENTRY GUILLOTINE/SEAL AIR
MANUFACTURER	AMERICAN AIR FILTER
MODULATION	OPEN
SERVICE CONDITIONS	350 F/INDEFINITE
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** DUCTWORK

LOCATION	ABSORBER INLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	11 X 11 X 43.5 LENGTH
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	MASTIC

** DUCTWORK

LOCATION	ABSORBER OUTLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	10 X 10 X 16 LENGTH
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	INORGANIC
LINER SPECIFIC MATERIAL TYPE	HYDRAULICALLY-BONDED MORTAR

** DUCTWORK

LOCATION	BYPASS
CONFIGURATION	RECTANGULAR
DIMENSIONS	11 X 11 X 64 LENGTH
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	HIGH STRENGTH LOW ALLOY 'HSLA'
LINER GENERIC MATERIAL TYPE	ORGANIC/INORGANIC
LINER SPECIFIC MATERIAL TYPE	MASTIC/SYNTHETIC BRICK

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

** REAGENT PREPARATION EQUIPMENT

FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	WALLACE & TIERMAN
NUMBER	4
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	3.6 (4 TPH)
PRODUCT QUALITY - % SOLIDS	22.0

** TANKS

SERVICE	NUMBER
REACTION	2
SCREEN	2
THICKENER RETURN WATER	1
MIST ELIMINATOR WASH	1
ADDITIVE HOLD	2
ADDITIVE SURGE	1

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	3
RECYCLE SLURRY BLEED	4
THICKENER UNDERFLOW	4
ADDITIVE FEED	2
THICKENER RETURN	2
SLUDGE FEED	3
ADDITIVE SUPPLY	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	3
NUMBER OF SPARES	1
DIMENSIONS - FT	12 DIA X 20 LONG
CAPACITY	20 TPH '291 GPM AT 25-30% SOLIDS!
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER SPECIFIC MATERIAL TYPE	NYLON
BELT GENERIC MATERIAL TYPE	ORGANIC
BELT SPECIFIC MATERIAL TYPE	POLYPROPYLENE
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	25% SOLIDS
OUTLET STREAM CHARACTERISTICS	45% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	1% SOLIDS, 360 GPM
OUTLET STREAM DISPOSITION	PUG MILL
OVERFLOW STREAM DISPOSITION	THICKENER

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	2
NUMBER OF SPARES	0
CONFIGURATION	CIRCULAR
DIMENSIONS - FT	125 DIA X 15.5 DEPTH
CAPACITY	900000 GAL
SHELL GENERIC MATERIAL TYPE	INORGANIC
SHELL SPECIFIC MATERIAL TYPE	HYDRAULICALLY-BONDED CONCRETE
LINER GENERIC MATERIAL TYPE	CARBON STEEL
LINER SPECIFIC MATERIAL TYPE	ASTM A-36 '1/4"!
FEED STREAM SOURCE	BLEED PUMP DISCHARGE
FEED STREAM CHARACTERISTICS	774 GPM, 6% SOLIDS
OUTLET STREAM CHARACTERISTICS	136 GPM, 25% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	638 GPM, 1% SOLIDS
OUTLET STREAM DISPOSITION	TO VACUUM FILTERS
OVERFLOW STREAM DISPOSITION	THICKENER RETURN WATER TANK

*** SALEABLE BYPRODUCTS

NATURE	NONE

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

QUALITY - %	25.0	
DISPOSITION	N/A	
*** SLUDGE		
FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	18.2	(20.0 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	75.0	
% CASO3 - DRY	82.4	
% CASO4 - DRY	11.8	
% ASH - DRY	5.8	
** TREATMENT		
METHOD	FIXATION	
DEVICE	PUG MILL	
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!	
INLET FLOW RATE - LITER/S	17.1	(272 GPM)
INLET QUALITY - %	25.0	
** DISPOSAL		
NATURE	FINAL	
TYPE	LANDFILL	
LOCATION	ON-SITE	
SITE TRANSPORTATION METHOD	TRUCK	
SITE TREATMENT	NONE	
SITE DIMENSIONS	200 ACRES	
** PROCESS CONTROL AND INSTRUMENTATION		
PROCESS STREAM	ABSORBER RECYCLE	
CHEMICAL PARAMETERS	PH	
PHYSICAL VARIABLES	% SOLIDS	
CONTROL LEVELS	PH 9, 6% SOLIDS	
MONITOR TYPE	LEEDS & NORTHRUP/TEXAS NUCLEAR	
MONITOR LOCATION	SCREEN TANKS	
PROCESS CONTROL MANNER	AUTOMATIC	
PROCESS CHEMISTRY MODE	FEEDBACK	
** WATER BALANCE		
WATER LOOP TYPE	CLOSED	
EVAPORATION WATER LOSS - LITER/S	0.8	(12 GPM)
SLUDGE HYDRATION WATER LOSS - LITER/S	0.3	(4 GPM)
SLUDGE INTERSTITIAL WATER LOSS - LITERS/S	0.3	(4 GPM)
POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	0	
RECEIVING WATER STREAM	N/A	
MAKEUP WATER ADDITION - LITERS/S	23.1	(366 GPM)
SOURCE OF MAKEUP WATER	COOLING TOWER BLOWDOWN '290 GPM!/RIVER WATER '76	
** CHEMICALS AND CONSUMPTION		
FUNCTION	ABSORBENT	
NAME	LIME 'THIOSORBIC!	
PRINCIPAL CONSTITUENT	92% CAO, 2-6% INERTS, 2-6% MGO	
SOURCE/SUPPLIER	DRAVO LIME	
CONSUMPTION	230 TPD	
UTILIZATION - %	93.2	
POINT OF ADDITION	SLAKER	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	30.0	
MIST ELIMINATOR - %	0.0	
REHEATER - %	0.0	
FAN - %	0.0	
THICKENER - %	0.0	
VACUUM FILTER - %	33.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	0.4	
MIST ELIMINATOR	0.0	
REHEATER	0.0	
FAN	0.0	
THICKENER	0.0	
VACUUM FILTER	0.1	

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD OPERATION COMMENCED IN MID-DECEMBER 1979. THE UNIT OPERATED IN A STARTUP PHASE DURING THIS PERIOD.

1/80	SYSTEM							744			
2/80	SYSTEM							696			
3/80	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO INFORMATION WAS AVAILABLE FOR THE FIRST QUARTER, 1980.

4/80	A	65.0	56.0	78.8	45.0						
	B	65.0	56.0	79.0	45.0						
	SYSTEM	65.0	56.0	79.0	45.0			720	576	324	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FOLLOWING FIVE OUTAGES OCCURRED IN APRIL AND ACCOUNTED FOR THE LOW AVAILABILITY OF THE FGD SYSTEM.

1. LOW ADDITIVE IN TANK
2. INSTRUMENT TROUBLE
3. WATER IN THE PANEL
4. LOW ON LIME IN THE HOLDING TANKS
5. THE ESPS TRIPPED

5/80	A	73.7	76.1	79.0	73.7						
	B	73.7	76.0	78.9	73.5						
	SYSTEM	73.7	76.1	79.0	73.7			744	720	548	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE FGD SYSTEM WAS OFF LINE FOR APPROXIMATELY 548 HOURS DUE TO THE FOLLOWING PROBLEMS.

1. SULFUR OXIDES TOO HIGH
2. LOW LEVEL IN ADDITIVE TANK
3. INSTRUMENT TROUBLE
4. SCHEDULED MAINTENANCE OUTAGE
5. SOLIDS ON CARRY OVER
6. SOLID WASTE PROBLEM
7. UNIT TRIPPED
8. CONSTRUCTION WORK

6/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS NOT AVAILABLE FOR THE MONTH OF JUNE.

7/80	SYSTEM							744			
8/80	SYSTEM							744			
9/80	SYSTEM					40.7		720		293	

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING SEPTEMBER THE VENDOR INSTALLED NEW SWITCHES ON BOTH MODULES' TRAVELING SCREENS.									
10/80	SYSTEM	80.4			40.9			744		304	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ON SEPTEMBER 12 THE FGD SYSTEM WAS TAKEN OFF-LINE FOR A SCHEDULED OUTAGE. THE SYSTEM WAS PLACED BACK IN SERVICE ON OCTOBER 13.									
		DURING OCTOBER A CONTROL SYSTEM MALFUNCTION CAUSED APPROXIMATELY 2 1/2 DAYS OF OUTAGE TIME.									
		DUE TO LOST LEVEL IN ADDITIVE HOLD TANK THE SCREW CONVEYOR TRIPPED OUT.									
		THE THICKENER WAS CLEANED OUT AND THE LEAKS REPAIRED DURING THE MONTH.									
		LEAKS WERE ENCOUNTERED ON THE EXPANSION JOINTS LOCATED ON THE ABSORBER OUTLET DUCT. THESE EXPANSION JOINTS WERE REPLACED DURING THE MONTH.									
11/80	SYSTEM	97.5			96.0			720		691	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A LEAK IN MODULE A BLEED LINE DURING NOVEMBER CAUSED APPROXIMATELY 10 HOURS OF OUTAGE TIME.									
12/80	SYSTEM	97.9			93.5			744		695	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER SEVEN HOURS OF DOWN TIME WAS DUE TO PROBLEMS AT THE SOLID WASTE FACILITY.									
		LEAKS WERE ENCOUNTERED WITH THE MIST ELIMINATOR WASH LINES.									
		PROBLEMS WERE ENCOUNTERED WITH THE CLARIFIERS AT THE COOLING TOWER CAUSING THE FGD SYSTEM TO BE TAKEN OUT OF SERVICE FOR APPROXIMATELY 23 HOURS.									
1/81	SYSTEM	88.4			82.9			744		617	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE FIRST PART OF JANUARY THE UTILITY EXPERIENCED PROBLEMS WITH HAULING THE WASTE PRODUCT. THIS CAUSED THE SYSTEM TO BE TAKEN OFF LINE APPROXIMATELY THREE DAYS.									
		DURING THE MONTH IT WAS NECESSARY TO WASH THE ID FAN.									
		PROBLEMS WERE ENCOUNTERED WITH THE RECYCLE PUMP PACKING.									
2/81	SYSTEM	90.9			84.9			696		591	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY HAS EXPERIENCED BYPASS DAMPER PROBLEMS AND IN FEBRUARY INSTALLED A SOLENOID ON THE DAMPER TO RESOLVE THE PROBLEM.									
		REPAIR WORK ON THE MIST ELIMINATOR LEAKS WAS PERFORMED DURING THE MONTH.									
		THICKENER MAINTENANCE CAUSED AN OUTAGE WHICH LASTED 22 HOURS.									

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
				THE ADDITIVE FEED LINE TO MODULE A REACTION TANK PLUGGED.							
3/81	SYSTEM	100.0			51.4			744		382	
	** PROBLEMS/SOLUTIONS/COMMENTS										
				THE SYSTEM WAS SHUT DOWN DURING THE FIRST TWO WEEKS OF MARCH FOR SCHEDULED MAINTENANCE.							
4/81	SYSTEM	100.0			60.7			720		437	
	** PROBLEMS/SOLUTIONS/COMMENTS										
				NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING APRIL.							
5/81	SYSTEM	84.7			79.3			744		590	
	** PROBLEMS/SOLUTIONS/COMMENTS										
				AT THE FIRST OF MAY GENERAL MAINTENANCE WAS PERFORMED ON THE SYSTEM.							
				PLUGGING WAS EXPERIENCED IN THE LINES ASSOCIATED WITH THE SLAKER.							
				THICKENER MAINTENANCE CAUSED THE SYSTEM TO BE OFF-LINE APPROXIMATELY 15 HOURS.							
				TWO OUTAGES WERE CAUSED BY THE THICKENER RAKE.							
				A LINE LEAK IN THE MIST ELIMINATOR WASH TANK WAS ENCOUNTERED. FIVE HOURS OF OUTAGE TIME WAS NEEDED TO MAKE THE NECESSARY REPAIRS.							
				PLUGGED ADDITIVE LINES CAUSED TWO OUTAGES DURING THE MONTH.							
6/81	SYSTEM	95.1			95.1			720		684	
	** PROBLEMS/SOLUTIONS/COMMENTS										
				DURING JUNE THE ADDITIVE LINES TO BOTH MODULES PLUGGED CAUSING THE SYSTEM TO SHUT DOWN THREE SEPARATE TIMES.							
				THE BYPASS DAMPER SOLENOID MALFUNCTIONED AND HAD TO BE REPLACED.							
				PROBLEMS HAVE BEEN ENCOUNTERED WITH THE MODULE B INLET DAMPER.							
7/81	A	98.3	96.2	96.2	96.2						
	B	98.3	96.2	96.2	96.2						
	SYSTEM	98.3	96.2	96.2	96.2			744	744	716	93.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
				THE MAJORITY OF THE OUTAGE TIME DURING THE MONTH RESULTED FROM PLUGGING OF THE ADDITIVE FEED LINES AND CONTROL VALVES, AS WELL AS MECHANICAL PROBLEMS WITH THE LIMIT SWITCHES ON THE DAMPERS.							
8/81	A	95.2	92.6	92.6	85.3						
	B	95.2	92.6	92.6	85.3						
	SYSTEM	95.2	92.6	92.6	85.3			744	686	635	88.9
9/81	A	84.5	96.4	96.4	79.9						
	B	84.5	96.4	96.4	79.9						
	SYSTEM	84.5	96.4	96.4	79.9			720	597	575	71.0

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING SEPTEMBER, THE FGD SYSTEM AVAILABILITY WAS SLIGHTLY LIMITED DUE TO THE REPLACEMENT OF THE CHEVRON MIST ELIMINATORS ON BOTH MODULES. THE MIST ELIMINATORS WERE REPLACED DUE TO THEIR NORYL MATERIAL OF CONSTRUCTION WHICH MELTED AT TEMPERATURES GREATER THAN 180 F. THE REPLACEMENT MIST ELIMINATORS ARE CONSTRUCTED OF FIBERGLASS 'FIRST STAGE! AND RYTON 'SECOND STAGE! RATED FOR TEMPERATURES GREATER THAN 300 F.									
10/81	A	75.3	98.3	98.3	74.8						
	B	75.3	98.3	98.3	74.8						
	SYSTEM	75.3	98.3	98.3	74.8			744	566	557	69.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER A PROBLEM WAS ENCOUNTERED WITH THE BY-PASS SOLENOID CAUSING DOWN TIME.									
		OUTAGE TIME WAS NECESSARY TO REPAIR LEAKS ON THE INLET DAMPERS AND TO INSPECT THE CHEVRONS.									
		A LOW PH CAUSED THE ADDITIVE LINE TO MODULE A TO PLUG RESULTING IN AN OUTAGE.									
		THE BLEED LINE TO MODULE A RUPTURED ACCOUNTING FOR ADDITIONAL DOWN TIME.									
11/81	A	96.2	94.9	94.9	94.9						
	B	94.9	94.9	94.9	94.9						
	SYSTEM	95.6	94.9	94.9	94.9			720	720	683	97.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS OCCURRED.									
12/81	A	98.9	97.6	97.6	97.6						
	B	98.9	97.6	97.6	97.6						
	SYSTEM	98.9	97.6	97.4	97.6			744	744	726	91.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER NO MAJOR FGD-RELATED PROBLEMS WERE EXPERIENCED.									
1/82	A	92.9	90.6	90.6	90.6						
	B	94.8	91.3	91.3	91.3						
	SYSTEM	93.8	91.0	91.0	91.0			744	744	677	88.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JANUARY.									
2/82	A	95.4	93.1	93.1	93.1						
	B	97.0	93.1	93.1	93.1						
	SYSTEM	96.2	93.1	93.1	93.1			672	672	626	87.6
3/82	A	98.4	94.4	94.4	93.8						
	B	98.4	94.4	94.4	93.8						
	SYSTEM	98.4	94.4	94.4	93.8			744	739	698	89.6

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY AND MARCH NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED.									
4/82	A	86.9	96.4	96.4	58.8						
	B	86.9	96.4	96.4	58.8						
	SYSTEM	86.9	96.4	96.4	58.8			720	439	423	56.4
5/82	A	99.1	98.1	98.1	98.1						
	B	98.1	98.1	98.1	98.1						
	SYSTEM	98.6	98.1	98.1	98.1			744	744	730	88.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING APRIL AND MAY.									
6/82	G1-A	98.5	98.5	98.5	98.5						
	G1-B	98.5	98.5	98.5	98.5						
	SYSTEM	98.5	98.5	98.5	98.5			720	720	709	79.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.									
7/82	G1-A	98.2	96.2	96.2	96.2						
	G1-B	98.2	96.2	96.2	96.2						
	SYSTEM	98.2	96.2	96.2	96.2			744	744	716	93.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PLUGGING OF ADDITIVE FEED LINES AND CONTROL VALVES CONTRIBUTED TO THE OUTAGE TIME DURING JULY.									
		MECHANICAL PROBLEMS WITH LIMIT SWITCHES ON THE DAMPERS ALSO CONTRIBUTED TO OUTAGE TIME DURING THE MONTH.									
8/82	G1-A	100.0	99.2	99.2	91.8						
	G1-B	100.0	99.2	99.2	91.8						
	SYSTEM	100.0	99.2	99.2	91.8			744	689	683	70.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST.									
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PERFORMANCE DATA PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF SEPTEMBER 1982 THROUGH MARCH 1983.									
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE MONTHS OF APRIL AND MAY THE FOLLOWING REPAIRS WERE MADE: BOTH DOUBLE-LOUVRE SEAL AIR DAMPERS LOCATED AT THE INLET OF THE ABSORBER VESSELS WERE REPLACED WITH BOTTOM-ENTRY GUILLOTINE SEAL AIR DAMPERS. THE DOUBLE-LOUVRE DAMPERS DID NOT PROVIDE ADEQUATE ISOLATION TO ALLOW MAINTENANCE DURING BOILER OPERATION. THE UTILITY ALSO REPORTED THAT THE DOUBLE-LOUVRE DAMPERS CLOSED TOO SLOWLY DURING BYPASS (REASON WHY ORIGINAL NORYL MIST ELIMINATORS WERE MELTED). THE FAULTY PRE-KRETE G-8 LINER MATERIAL IN THE ABSORBER VESSELS WAS REPLACED WITH PENNGUARD MASTIC. THE PENN GUARD MASTIC WAS APPLIED TO THE ABSORBER AND DUCTWORK FROM THE MIST ELIMINATORS TO THE OUTLET ABSORBER GUILLOTINE DAMPERS. PENNGUARD MASTIC AND PENNGUARD BLOCK WERE BOTH APPLIED TO THE DUCTWORK LOCATED BETWEEN THE OUTLET ABSORBER GUILLOTINE DAMPERS AND THE STACK INLET. THE UTILITY ALSO REPORTED REDUCING THE L/G RATIO ON BOTH ABSORBER VESSELS (PUMP SPEEDS WERE REDUCED). THE UTILITY REPORTS STILL MEETING COMPLIANCE LIMITS BUT HAVING A 14 PERCENT DECREASE IN LIME USAGE OVER LAST YEAR.									
7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER. THE NEXT SCHEDULED UNIT OUTAGE IS SET TO BEGIN THE FIRST WEEK OF NOVEMBER AND WILL LAST TWO WEEKS. ABSORBER LIQUID RECIRCULATION WAS DECREASED IN CONJUNCTION WITH CHANGES TO NOZZLE HEADER DESIGN IN ORDER TO SAVE ON LIME CONSUMPTION. THE UTILITY REPORTED THAT THE FGD SYSTEM WAS REMOVING MORE SO2 THAN REQUIRED BY LAW. THE LIQUID RECIRCULATION RATE FOR EACH OF THE TWO ABSORBERS WAS DECREASED FROM A DESIGN FLOW RATE OF 20,280 GPM (L/G OF 40.6) TO 16,00 GPM (L/G OF 32.0). THREE OF THE SIX SPRAY HEADERS ON HALF OF THE PIG TAIL NOZZLES WERE CHANGED TO FULL-FLOW TYPE (BASICALLY A 1-7/8 INCH OPEN HOLE) NOZZLES. DURING NORMAL OPERATIONS 1 PIG TAIL HEADER IS USED IN CONJUNCTION WITH 2 COMBINATION HEADERS. WHEN THESE BECOME PLUGGED, AN ADDITIONAL COMBINATION HEADER IS VALVED IN. WHEN ALL SIX HEADERS ARE USED THE LIQUID RECIRCULATION RATE IS 16,000 GPM. HOWEVER, ONLY THREE OF THE FOUR HEADERS ARE USED FOR NORMAL OPERATING CONDITIONS HAVING A LIQUID RECIRCULATION RATE OF APPROXIMATELY 11,000 TO 13,000 GPM. BECAUSE OF THIS CHANGE THE UTILITY REPORTED SAVING 11,200 TONS OF LIMESTONE AT A SAVINGS OF $392,000 (COMPARED TO 1982 BASED ON A 9-MONTH PERIOD) WHILE STILL MEETING ITS SO2 LIMITATIONS.									
10/83	SYSTEM							744			
11/83	SYSTEM							720			

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE PERIOD. THE UNIT WAS DOWN FOR THE FIRST AND SECOND WEEKS OF NOVEMBER FOR SCHEDULED MAINTENANCE.

DURING 1983, THE UNIT AND FGD SYSTEM OPERATED A TOTAL OF 7854.5 AND 7592.7 HOURS, RESPECTIVELY. TOTAL FGD SYSTEM AVAILABILITY FOR THE YEA WAS 96.7 PERCENT.

THE AVERAGE COAL SULFUR CONTENT FOR THE YEAR WAS 3.58 PERCENT AND THE LIME TO COAL USAGE RATIO FOR THE YEAR WAS 16:1.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE PENNGUARD BLOCKS INSTALLED IN THE OUTLET DUC DURING THE SPRING OF 1983 HAVE WORKED FAVORABLY TO DATE.

THE UTILITY REPORTED THAT THE NEW DAMPERS, WHICH HAVE BEEN IN USE 18 MONTH TO DATE, HAVE OPERATED FAVORABLY.

MIST ELIMINATOR WASH PIPE PLUGGAGE WAS REPORTED. A HIGH PRESSURE WASH (5000 PSI) WAS REQUIRED TO CLEAR THE PLUGGED LINES.

OVERALL FGD SYSTEM AVAILABILITY DURING THE FIRST THREE QUARTERS OF 1984 WA ESTIMATED AT 90%. NO MAJOR OUTAGES OCCURRED DURING THIS TIME.

10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER OF 1984. THE FGD SYSTEM AVAILABILITY FOR THE PERIOD WAS ESTIMATED AT 90% TO 95%.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1985.

4/85	SYSTEM							720			
5/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE BOILER AND FGD SYSTEM WAS OFF-LINE APRIL 20 - MAY 5 FOR A SCHEDULED MAINTENANCE OUTAGE.

THE UTILITY REPORTED THAT AN UNPLANNED OUTAGE OCCURRED MAY 25-29 FOR BYPASS DUCT REPAIR. THE SAUEREISEN REFRACTORY MATERIAL REQUIRED PATCH WORK REPAIR.

6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED FOR THE PERIOD OF JUNE THROUGH DECEMBER 1985. A SCHEDULED BOILER/TURBINE OUTAGE FOR GENERAL MAINTENANCE TOOK PLACE BETWEEN OCTOBER 19 THROUGH NOVEMBER 27. DURING THIS OUTAGE, GENERAL CLEANING WAS CONDUCTED ON THE FGD SYSTEM.

1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS DOWN APPROXIMATELY 318 HOURS BEGINNING MAY 11 FOR A SCHEDULED BOILER/TURBINE OUTAGE. DURING THIS PERIOD, REPLACEMENT WORK WAS BEGUN ON THE FLOOR OF THE BYPASS OUTLET DUCTWORK. THE FLOOR OF THE DUCT WILL BE COMPLETELY REPLACED WITH 1/8 INCH HASTELLOY G AND FERRALIUM 255. THE REMAINDER OF THE WORK WILL BE COMPLETED DURING THE FALL OUTAGE. THE SIDE WALL AND CEILING OF THE DUCTWORK WILL NOT BE REPLACED. THE CONSTRUCTION OF THAT PART OF THE DUCTWORK WILL REMAIN COR-TEN CARBON STEEL LINED WITH SAUEREISEN REFRACTORY.

6/86	SYSTEM							720			

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTLITY REPORTED THAT THE UNIT WAS DOWN APPROXIMATELY 278 HOURS BEGINNING OCTOBER 25 FOR A SCHEDULED BOILER/TURBINE OUTAGE. DURING THIS PERIOD, THE BYPASS OUTLET DUCTWORK REPAIRS WERE COMPLETED.

11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE YEAR 1986, THE FGD SYSTEM HAD A TOTAL OF 171.8 UNPLANNED OUTAGE HOURS AND WAS IN SERVICE FOR A TOTAL OF 8214.7 HOURS.

THE UTILITY REPORTED THAT THEY HAVE BEEN OPERATING WITHOUT REHEAT SINCE MARCH OF 1985. THE IN-DIRECT HOT AIR STEAM REHEAT SYSTEM WAS REMOVED DUE TO HIGH MAINTENANCE COSTS AND ITS INABILITY TO KEEP FLUE GAS EXIT TEMPERATURES ABOVE THE DESIGNED TEMPERATURE OF 145 F. THE CURRENT EXIT GAS TEMPERATURE OUT OF THE STACK WITHOUT REHEAT IS 130 F. NO ILL EFFECTS TO THE STACK REFRACTORY LINING HAS BEEN NOTICED TO DATE. THE UTILITY HAD TO MOVE THEIR OPACITY METERS TO JUST AFTER THE ID FAN DISCHARGE SINCE THE WATER DROPLETS IN THE STACK PRODUCED FALSE READINGS. SINCE EPA CONSIDERED THIS TO BE A MAJOR MODIFICATION TO THE SYSTEM, THE UTILITY WAS ALSO REQUIRED TO LOWER THEIR SO2 LIMITATIONS FROM 1.2 LB/MMBTU TO 0.816 LB/MMBTU.

THE UNIT CAME BACK ON-LINE NEAR THE MIDDLE OF NOVEMBER AND OPERATED THE REMAINDER OF THE YEAR WITHOUT ANY MAJOR UNIT OR FGD-RELATED OUTAGES. THERE WAS A MINOR UNIT OUTAGE ON DECEMBER 24 WHICH LASTED ONLY 38 HOURS DUE TO A AIR PREHEATER PROBLEM.

1/87	SYSTEM							744			
2/87	SYSTEM							672			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE MONTHS OF JANUARY AND FEBRUARY 1987.

3/87	SYSTEM							744			
4/87	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT UNDERWENT A SCHEDULED SPRING OUTAGE WHICH LASTED FROM MARCH 23 TO APRIL 10.

5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			

BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT UNDERWENT A SCHEDULED FALL OUTAGE WHICH BEGAN LATE IN NOVEMBER AND LASTED APPROXIMATELY 3 WEEKS. DURING THIS OUTAGE, THE UTILITY RELINED THE SCRUBBER OUTLET DUCTWORK (APPROXIMATELY 15-20 FEET) AND STACK WITH 1/8 INCH TITANIUM SHEET. THE METAL SURROUNDING THE ANCHORS HOLDING THE PENNWALT BLOCK TO THE FERRALIUM 255 LINED FLOOR OF THE DUCTWORK FAILED. THE PENNWALT BLOCK HAD ALSO BEEN COATED WITH SAUEREISEN 72. INSTALLATION AND FABRICATION WAS PERFORMED BY RDM COMPANY. THE ORIGINAL STACK CONSISTED OF A CONCRETE SHELL WITH A REFRACTORY FLUE LINING.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	BIG RIVERS ELECTRIC	
PLANT NAME	GREEN	
UNIT NUMBER	2	
CITY	SEBREE	
STATE	KENTUCKY	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	444	
GROSS UNIT GENERATING CAPACITY - MW	242	
NET UNIT GENERATING CAPACITY W/FGD - MW	223	
NET UNIT GENERATING CAPACITY WO/FGD - MW	228	
EQUIVALENT SCRUBBED CAPACITY - MW	242	

** UNIT DATA - BOILER AND STACK

BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	471.90	(1000000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	148.9	(300 F)
STACK HEIGHT - M	107.	(350 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	4.6	(15.0 FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	22795.	(9800 BTU/LB)
RANGE HEAT CONTENT - BTU/LB	8200-11800	
AVERAGE ASH CONTENT - %	15.38	
RANGE ASH CONTENT - %	9.6-27.5	
AVERAGE MOISTURE CONTENT - %	11.40	
RANGE MOISTURE CONTENT - %	5.3-20.1	
AVERAGE SULFUR CONTENT - %	3.91	
RANGE SULFUR CONTENT - %	2.0-6.0	
AVERAGE CHLORIDE CONTENT - %	0.05	
RANGE CHLORIDE CONTENT - %	UNKNOWN	

*** PARTICLE CONTROL

** MECHANICAL COLLECTOR

NUMBER	0	
TYPE	NONE	

** ESP

NUMBER	2	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	AMERICAN AIR FILTER	
INLET FLUE GAS CAPACITY - CU.M/S	235.9	(500000 ACFM)
INLET FLUE GAS TEMPERATURE - C	148.9	(300 F)
PRESSURE DROP - KPA	0.3	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.6	

** PARTICLE SCRUBBER

NUMBER	0
GENERIC TYPE	NONE
SPECIFIC TYPE	N/A
TRADE NAME/COMMON NAME	N/A
SHELL GENERIC MATERIAL	N/A
SHELL SPECIFIC MATERIAL	N/A
LINER GENERIC MATERIAL	N/A
LINER SPECIFIC MATERIAL	N/A
GAS CONTACTING DEVICE TYPE	N/A

*** FGD SYSTEM

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME	
PROCESS ADDITIVES	MAGNESIUM OXIDE; DIBASIC	
SYSTEM SUPPLIER	AMERICAN AIR FILTER	
A-E FIRM	BURNS & ROE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.00	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	2.1	
CURRENT STATUS	1	
COMMERCIAL START-UP	12/1980	
INITIAL START-UP	11/1980	
CONTRACT AWARDED	5/1977	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	4.00	
DESIGN COAL HEAT CONTENT - J/G	23260.0	(10000 BTU/LB)
DESIGN COAL ASH CONTENT - %	20.00	
DESIGN MOISTURE CONTENT - %	11.25	
DESIGN CHLORIDE CONTENT - %	0.05	
SPACE REQUIREMENTS - SQ M	10869.3	(117000 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	272.0	
** QUENCHER/PRESATURATOR		
NUMBER	0	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	AMERICAN AIR FILTER	
DIMENSIONS - FT	34 X 71.5	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	MASTIC	
LINER MATERIAL TRADE NAME/COMMON TYPE	PENNGUARD ADHESIVE	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1008.	(16000 GPM)
L/G RATIO - L/CU.M	4.3	(32.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.4	(1.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	2.8	(9.2 FT/S)
INLET GAS FLOW - CU. M/S	235.95	(500000 ACFM)
INLET GAS TEMPERATURE - C	148.9	(300 F)
SO2 REMOVAL EFFICIENCY - %	90.0	
** FANS		
NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	WESTINGHOUSE	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	274.80	(582330 ACFM)
FLUE GAS TEMPERATURE - C	148.9	(300 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
** FANS		
NUMBER	2	
NUMBER OF SPARES	0	

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

DESIGN	CENTRIFUGAL
SUPPLIER	WESTINGHOUSE
FUNCTION	UNIT
APPLICATION	INDUCED DRAFT
SERVICE	DRY
FLUE GAS FLOW RATE - CU.M/S	274.80 (582330 ACFM)
FLUE GAS TEMPERATURE - C	148.9 (300 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	TOP-ENTRY GUILLOTINE/SEAL AIR
MANUFACTURER	AMERICAN AIR FILTER
SERVICE CONDITIONS	350 F/INDEFINITE

** DAMPERS

NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	TOP-ENTRY GUILLOTINE/SEAL AIR
MANUFACTURER	AMERICAN AIR FILTER
SERVICE CONDITIONS	350 F/INDEFINITE

** DAMPERS

NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	AMERICAN AIR FILTER
SERVICE CONDITIONS	350 F/INDEFINITE

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	BOTTOM ENTRY GUILLOTINE/SEAL AIR
MANUFACTURER	AMERICAN AIR FILTER
MODULATION	OPEN
SERVICE CONDITIONS	350 F/INDEFINITE
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** DUCTWORK

LOCATION	ABSORBER INLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	11 X 11 X 43.5 LENGTH
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	MASTIC

** DUCTWORK

LOCATION	ABSORBER OUTLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	10 X 10 X 16 LENGTH
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	INORGANIC
LINER SPECIFIC MATERIAL TYPE	HYDRAULICALLY-BONDED MORTAR

** DUCTWORK

LOCATION	BYPASS
CONFIGURATION	RECTANGULAR
DIMENSIONS	11 X 11 X 64 LENGTH
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	HIGH STRENGTH LOW ALLOY 'HSLA'
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	MASTIC

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

** REAGENT PREPARATION EQUIPMENT

FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	WALLACE & TIERMAN
NUMBER	4
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	3.6 (4 TPH)
PRODUCT QUALITY - % SOLIDS	22.0

** TANKS

SERVICE	NUMBER
REACTION	2
SCREEN	2
THICKENER RETURN WATER	1
MIST ELIMINATOR WASH	1
ADDITIVE HOLD	2
ADDITIVE SURGE	1

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	3
RECYCLE SLURRY BLEED	4
THICKENER UNDERFLOW	4
ADDITIVE FEED	2
THICKENER RETURN	2
SLUDGE FEED	3
ADDITIVE SUPPLY	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	3
NUMBER OF SPARES	1
DIMENSIONS - FT	12 DIA X 20 LONG
CAPACITY	20 TPH '291 GPM AT 25-30% SOLIDS!
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER SPECIFIC MATERIAL TYPE	NYLON
BELT GENERIC MATERIAL TYPE	ORGANIC
BELT SPECIFIC MATERIAL TYPE	POLYPROPYLENE
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	25% SOLIDS
OUTLET STREAM CHARACTERISTICS	45% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	1% SOLIDS, 360 GPM
OUTLET STREAM DISPOSITION	PUG MILL
OVERFLOW STREAM DISPOSITION	THICKENER

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	2
CONFIGURATION	CIRCULAR
DIMENSIONS - FT	125 DIA X 15.5 DEPTH
CAPACITY	900000 GAL
SHELL GENERIC MATERIAL TYPE	INORGANIC
SHELL SPECIFIC MATERIAL TYPE	HYDRAULICALLY-BONDED CONCRETE
LINER GENERIC MATERIAL TYPE	CARBON STEEL
LINER SPECIFIC MATERIAL TYPE	ASTM A-36 '1/4"!
FEED STREAM SOURCE	BLEED PUMP DISCHARGE
FEED STREAM CHARACTERISTICS	774 GPM, 6% SOLIDS
OUTLET STREAM CHARACTERISTICS	136 GPM, 25% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	638 GPM, 1% SOLIDS
OUTLET STREAM DISPOSITION	TO VACUUM FILTERS
OVERFLOW STREAM DISPOSITION	THICKENER RETURN WATER TANK

*** SALEABLE BYPRODUCTS

NATURE	NONE
QUALITY - %	25.0

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

DISPOSITION	N/A	
*** SLUDGE		
FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	18.2	(20.0 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	75.0	
% CASO3 - DRY	82.4	
% CASO4 - DRY	11.8	
% ASH - DRY	5.8	
** TREATMENT		
METHOD	FIXATION	
DEVICE	PUG MILL	
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!	
INLET FLOW RATE - LITER/S	17.1	(272 GPM)
INLET QUALITY - %	25.0	
** DISPOSAL		
NATURE	FINAL	
TYPE	LANDFILL	
LOCATION	ON-SITE	
SITE TRANSPORTATION METHOD	TRUCK	
SITE TREATMENT	NONE	
SITE DIMENSIONS	200 ACRES	
** PROCESS CONTROL AND INSTRUMENTATION		
PROCESS STREAM	ABSORBER RECYCLE	
CHEMICAL PARAMETERS	PH	
PHYSICAL VARIABLES	% SOLIDS	
CONTROL LEVELS	PH 9, 6% SOLIDS	
MONITOR TYPE	LEEDS & NORTHRUP/TEXAS NUCLEAR	
MONITOR LOCATION	SCREEN TANKS	
PROCESS CONTROL MANNER	AUTOMATIC	
PROCESS CHEMISTRY MODE	FEEDBACK	
** WATER BALANCE		
WATER LOOP TYPE	CLOSED	
EVAPORATION WATER LOSS - LITER/S	0.8	(12 GPM)
SLUDGE HYDRATION WATER LOSS - LITER/S	0.3	(4 GPM)
SLUDGE INTERSTITIAL WATER LOSS - LITERS/S	0.3	(4 GPM)
POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	0	
RECEIVING WATER STREAM	N/A	
MAKEUP WATER ADDITION - LITERS/S	23.1	(366 GPM)
SOURCE OF MAKEUP WATER	COOLING TOWER BLOWDOWN '290 GPM!/RIVER WATER '76	
** CHEMICALS AND CONSUMPTION		
FUNCTION	ABSORBENT	
NAME	LIME 'THIOSORBIC!	
PRINCIPAL CONSTITUENT	92% CAO, 2-6% INERTS, 2-6% MGO	
SOURCE/SUPPLIER	DRAVO LIME	
CONSUMPTION	230 TPD	
UTILIZATION - %	93.2	
POINT OF ADDITION	SLAKER	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	30.0	
MIST ELIMINATOR - %	0.0	
REHEATER - %	0.0	
FAN - %	0.0	
THICKENER - %	0.0	
VACUUM FILTER - %	33.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	0.4	
MIST ELIMINATOR	0.0	
REHEATER	0.0	
FAN	0.0	
THICKENER	0.0	
VACUUM FILTER	0.1	

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/80	SYSTEM	94.2			91.8			720		661	

** PROBLEMS/SOLUTIONS/COMMENTS

ON NOVEMBER 14, 1980 OPERATION OF UNIT 2 COMMENCED.

DURING THE MONTH TWO OUTAGES WERE CAUSED BY THICKENER RAKE PROBLEMS.

THE ADDITIVE FEED LINE PLUGGED CAUSING ABOUT EIGHT HOURS OF DOWN TIME.

DURING OPERATION ON LOW RECYCLE FLOW, A WELD ON THE BYPASS DAMPER ADJUSTMENT ARM ROD FAILED.

12/80	SYSTEM	96.2			26.1			744		194	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS DOWN FOR 18 DAYS AT THE BEGINNING OF DECEMBER.

PROBLEMS WITH THE BYPASS DAMPER WAS ENCOUNTERED DURING THE MONTH.

1/81	SYSTEM	94.3			68.1			744		506	

** PROBLEMS/SOLUTIONS/COMMENTS

THE DAMPERS MALFUNCTIONED ON MODULE B, WHEN THE RECYCLE PUMP TRIPPED, CAUSING ABOUT SEVEN HOURS OF OUTAGE TIME.

THE UTILITY IS EXPERIENCING PROBLEMS WITH HAULING THE WASTE PRODUCT.

THE MODULE B REACTION TANK HAS EXPERIENCED PLUGGING DUE TO THE INABILITY TO MAINTAIN THE PH.

2/81	SYSTEM	94.5			94.0			696		654	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THICKENER MAINTENANCE WAS PERFORMED.

3/81	SYSTEM	97.9			97.9			744		728	
4/81	SYSTEM	99.9			99.5			720		716	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MARCH AND APRIL.

5/81	SYSTEM	92.7			92.0			744		684	

** PROBLEMS/SOLUTIONS/COMMENTS

THE ADDITIVE LINE TO THE REACTION TANK PLUGGED CAUSING OUTAGE TIME DURING MAY.

6/81	SYSTEM	96.2			95.6			720		688	

** PROBLEMS/SOLUTIONS/COMMENTS

THE MODULE A DISCHARGE LINE SEPARATED DURING THE MONTH CAUSING A 10 HOUR OUTAGE.

PROBLEMS WERE ENCOUNTERED WITH THE INLET PRESSURE SWITCH ON BOTH MODULES. THE SWITCHES FOULED APPROXIMATELY SIX TIMES DURING JUNE CAUSING A TOTAL OF

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			14 HOURS OF OUTAGE TIME.								
7/81	A	94.0	89.1	89.1	77.2						
	B	94.0	89.1	89.1	77.2						
	SYSTEM	94.0	89.1	89.1	77.2			744	645	574	77.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JULY, PLUGGING OF THE ADDITIVE FEED LINES AND CONTROL VALVES, AS WELL AS MECHANICAL PROBLEMS WITH THE LIMIT SWITCHES ON THE DAMPERS CONTRIBUTED TO THE MAJORITY OF THE OUTAGE TIME.									
8/81	A	96.4	94.0	94.0	86.0						
	B	97.8	94.0	94.0	86.0						
	SYSTEM	97.1	94.0	94.0	86.0			744	681	640	85.1
9/81	A	99.7	98.5	98.5	98.4						
	B	99.7	98.5	98.5	98.4						
	SYSTEM	99.7	98.5	98.5	98.4			720	719	708	84.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF AUGUST AND SEPTEMBER.									
10/81	A	76.3	96.2	96.2	72.9						
	B	76.1	96.2	96.2	72.9						
	SYSTEM	76.2	96.2	96.2	72.9			744	564	542	66.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER THE UTILITY REPORTED THAT PROBLEMS WERE ENCOUNTERED WITH A RECYCLE PUMP VALVE.									
		THE BELT ON THE C MODULE RECYCLE PUMP WAS ADJUSTED ACCOUNTING FOR SOME DOWN TIME.									
		DURING THE MONTH THE FALL SCHEDULED MAINTENANCE OUTAGE COMMENCED.									
11/81	A	62.6	87.4	87.4	44.5						
	B	62.6	87.4	87.4	44.5						
	SYSTEM	62.6	87.4	87.4	44.5			720	367	320	45.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FALL SCHEDULED MAINTENANCE OUTAGE CONTINUED THROUGH THE BEGINNING OF NOVEMBER.									
		THE ADDITIVE MASS VALVE ON THE A MODULE REACTION TANK WAS REPAIRED.									
		ADDITIONAL OUTAGE TIME WAS CAUSED BY A BROKEN REHEAT ISOLATION DAMPER DRIVE AND A LEAK IN THE MIST ELIMINATOR MAKE UP.									
		THE B MODULE ADDITIVE MASS LINE PLUGGED CAUSING A PH DROP.									
		THE MIST ELIMINATORS WERE REPLACED DUE TO THEIR NORYL MATERIAL OF CONSTRUCTION WHICH MELTED AT TEMPERATURES GREATER THAN 180 F. THE REPLACEMENT MIST ELIMINATORS ARE CONSTRUCTED OF FIBERGLASS 'FIRST STAGE! AND RYTON 'SECOND STAGE! RATED FOR TEMPERATURES GREATER THAN 300 F.									
12/81	A	99.9	98.1	98.1	87.0						
	B	99.9	98.1	98.1	87.0						
	SYSTEM	99.9	98.1	98.1	87.0			744	660	647	78.5

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER.									
1/82	A	96.5	95.1	95.1	95.1						
	B	96.8	94.4	94.4	94.4						
	SYSTEM	96.6	94.8	94.8	94.8			744	744	705	86.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JANUARY.									
2/82	A	99.7	97.8	97.8	97.8						
	B	99.7	97.8	97.8	97.8						
	SYSTEM	99.7	97.8	97.8	97.8			672	672	657	88.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED EXPERIENCING NO MAJOR FGD-RELATED PROBLEMS DURING FEBRUARY.									
3/82	A	39.9	91.9	91.9	39.9						
	B	39.9	91.9	91.9	39.9						
	SYSTEM	39.9	91.9	91.9	39.9			744	323	297	40.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH THE SYSTEM WAS TAKEN OFF-LINE PART OF THE TIME FOR A SCHEDULED OUTAGE.									
4/82	A	61.8	92.6	92.6	55.6						
	B	61.8	92.6	92.6	55.6						
	SYSTEM	61.8	92.6	92.6	55.6			720	432	401	50.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT AND SYSTEM WERE DOWN PART OF APRIL FOR A SPRING OUTAGE.									
5/82	A	99.6	97.8	97.8	90.1						
	B	99.6	97.8	97.8	90.1						
	SYSTEM	99.6	97.8	97.8	90.1			744	685	671	77.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF MAY.									
6/82	G2-A	99.3	97.7	97.7	95.9						
	G2-B	99.3	97.7	97.7	95.9						
	SYSTEM	99.3	97.7	97.7	95.9			720	707	690	80.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.									
7/82	G2-A	94.0	89.1	89.1	77.2						
	G2-B	94.0	89.1	89.1	77.2						
	SYSTEM	94.0	89.1	89.1	77.2			744	645	574	77.5

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PLUGGING OF ADDITIVE FEED LINES AND CONTROL VALVES CONTRIBUTED TO THE OUTAGE TIME DURING JULY.									
		MECHANICAL PROBLEMS WITH LIMIT SWITCHES ON THE DAMPERS ALSO CONTRIBUTED TO OUTAGE TIME DURING THE MONTH.									
8/82	G2-A	98.5	98.5	98.5	98.5						
	G2-B	98.5	98.5		98.5						
	SYSTEM	98.5	98.5	98.5	98.5			744	744	733	78.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST.									
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF SEPTEMBER 1982 THROUGH MARCH 1983.									
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE MONTHS OF APRIL AND MAY THE FOLLOWING REPAIRS WERE MADE:									
		BOTH DOUBLE-LOUVRE SEAL AIR DAMPERS LOCATED AT THE INLET OF THE ABSORBER VESSELS WERE REPLACED WITH BOTTOM-ENTRY GUILLOTINE SEAL AIR DAMPERS. THE DOUBLE-LOUVRE DAMPERS DID NOT PROVIDE ADEQUATE ISOLATION TO ALLOW MAINTENANCE DURING BOILER OPERATION. THE UTILITY ALSO REPORTED THAT THE DOUBLE-LOUVRE DAMPERS CLOSED TOO SLOWLY DURING BYPASS (REASON WHY ORIGINAL NORYL MIST ELIMINATORS WERE MELTED). THE FAULTY PRE-KRETE G-8 LINER MATERIAL IN THE ABSORBER VESSELS WAS REPLACED WITH PENNGUARD MASTIC. THE PENN GUARD MASTIC WAS APPLIED TO THE ABSORBER AND DUCTWORK FROM THE MIST ELIMINATORS TO THE ABSORBER OUTLET GUILLOTINE DAMPERS. PENNGUARD MASTIC AND PENNGUARD BLOCK WILL BE APPLIED DURING THE NEXT MAJOR OUTAGE PERIOD TO THE DUCTWORK LOCATED BETWEEN THE ABSORBER OUTLET GUILLOTINE DAMPERS AND THE STACK INLET.									
		THE UTILITY ALSO REPORTED REDUCING THE L/G RATIO ON BOTH ABSORBER VESSELS (PUMP SPEEDS WERE REDUCED). THE UTILITY REPORTS STILL MEETING COMPLIANCE LIMITS BUT HAVING A 14 PERCENT DECREASE IN LIME USAGE OVER LAST YEAR.									
7/83	SYSTEM							744			

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILITIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/83	SYSTEM							744			
9/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

ABSORBER LIQUID RECIRCULATION WAS DECREASED IN CONJUNCTION WITH CHANGES TO NOZZLE HEADER DESIGN IN ORDER TO SAVE ON LIME CONSUMPTION. THE UTILITY REPORTED THAT THE FGD SYSTEM WAS REMOVING MORE SO2 THAN REQUIRED BY LAW. THE LIQUID RECIRCULATION RATE FOR EACH OF THE TWO ABSORBERS WAS DECREASED FROM A DESIGN FLOW RATE OF 20,280 GPM (L/G OF 40.6) TO 16,00 GPM (L/G OF 32.0). THREE OF THE SIX SPRAY HEADERS ON HALF OF THE PIG TAIL NOZZLES WERE CHANGED TO A FULL-FLOW TYPE (BASICALLY A 1-7/8 INCH OPEN HOLE) NOZZLES. DURING NORMAL OPERATIONS 1 PIG TAIL HEADER IS USED IN CONJUNCTION WITH 2 COMBINATION HEADERS. WHEN THESE BECOME PLUGGED, AN ADDITIONAL COMBINATION HEADER IS VALVED IN. WHEN ALL SIX HEADERS ARE USED THE LIQUID RECIRCULATION RATE IS 16,000 GPM. HOWEVER, ONLY THREE OF THE FOUR HEADERS ARE USED FOR NORMAL OPERATING CONDITIONS HAVING A LIQUID RECIRCULATION RATE OF APPROXIMATELY 11,000 TO 13,000 GPM. BECAUSE OF THIS CHANGE THE UTILITY REPORTED SAVING 11,200 TONS OF LIMESTONE AT A SAVINGS OF $392,000 (COMPARED TO 1982 BASED ON A 9-MONTH PERIOD) WHILE STILL MEETING ITS SO2 LIMITATIONS.

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER. THE NEXT SCHEDULED UNIT OUTAGE IS SET TO BEGIN THE FIRST WEEK OF NOVEMBER AND WILL LAST TWO WEEKS.

10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE PERIOD. THE UNIT WAS DOWN FORTHE THIRD AND FOURTH WEEKS OF NOVEMBER FOR SCHEDULED MAINTENANCE.

DURING 1983, THE UNIT AND FGD SYSTEM OPERATED A TOTAL OF 7966.7 AND 7742.7 HOURS, RESPECTIVELY. TOTAL FGD SYSTEM AVAILABILITY FOR THE YEA WAS 97.2 PERCENT.

THE AVERAGE COAL SULFUR CONTENT FOR THE YEAR WAS 3.58 PERCENT AND THE LIME TO COAL RATIO FOR THE YEAR WAS 16:1.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT A NEW OUTLET DUCT LINING (STEBBINS TILE) WAS INSTALLED AT THE OUTLET DUCT MIXING ZONE DURING THE FIRST THREE QUARTERS O 1984.

THE UTILITY REPORTED THAT THE NEW DAMPERS, WHICH HAVE BEEN IN USE 18 MONTH TO DATE, HAVE OPERATED FAVORABLY.

MIST ELIMINATOR WASH PIPE PLUGGAGE WAS REPORTED. A HIGH PRESSURE WASH (5000 PSI) WAS REQUIRED TO CLEAR THE PLUGGED LINES.

OVERALL FGD SYSTEM AVAILABILITY DURING THE FIRST THREE QUARTERS OF 1984 WA ESTIMATED AT 90%. NO MAJOR OUTAGES OCCORRED DURING THIS TIME.

10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE NEW TILE INSTALLED IN THE ABSORBER OUTLET DUCT WAS WORKING SATISFACTORILY ON DUCT WALLS BUT NOT ON FLOOR AREAS OF THE DUCTING. THESE TILES WERE REPORTED TO HAVE EXPANDED AND BUCKLED. THE UTILITY DECIDED TO CUT HALF INCH LINES IN THESE TILES AND GROUT THEM WITH PENNGUARD MASTIC.

OVERALL FGD SYSTEM AVAILABILITY WAS ESTIMATED AT 90% TO 95%. NO MAJOR FGD-RELATED OUTAGES CR PROBLEMS WERE REPORTED FOR THE PERIOD.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE YEAR 1985. BOILER/TURBINE SCHEDULED OUTAGES OCCURRED ON MAY 6 - MAY 24 AND SEPTEMBER 27 - OCTOBER 6. THE UTILITY ALSO REPORTED THAT THE GUNNITE STACK LINING WAS WEARING MORE RAPIDLY THAN ANTICIPATED AND WOULD POSSIBLY NEED REPLACEMENT IN FOUR YEARS.

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS DOWN APPROXIMATELY 326 HOURS BEGINNING APRIL 13 FOR A SCHEDULED BOILER/TURBINE OUTAGE. DURING THIS PERIOD REPLACEMENT WORK WAS BEGUN ON THE FLOOR OF THE BYPASS OUTLET DUCTWORK. THE FLOOR OF THE DUCT WILL BE COMPLETELY REPLACED WITH 1/8 INCH HASTELLOY G AND FERRALIUM 255. THE REMAINDER OF THE WORK WILL BE COMPLETED DURING THE FALL OUTAGE. THE SIDE WALL AND CEILING OF THE DUCTWORK WILL NOT BE REPLACED. THE CONSTRUCTION OF THAT PART OF THE DUCTWORK WILL REMAIN COR-TEN CARBON STEEL LINED WITH SAUEREISEN REFRACTORY.

5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE BOILER WAS FORCED OFF-LINE FOR 92 HOURS IN AUGUST DUE TO BOILER TUBE FAILURES AND FGD REPAIRS.

9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS DOWN APPROXIMATELY 323 HOURS BEGINNING NOVEMBER 22 FOR A SCHEDULED BOILER/TURBINE OUTAGE. DURING THIS PERIOD, THE BYPASS OUTLET DUCTWORK REPAIRS WERE COMPLETED.

12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT CAME BACK ON-LINE NEAR THE BEGINNING OF DECEMBER AND OPERATED THE REMAINDER OF THE YEAR WITHOUT ANY MAJOR UNIT OR FGD-RELATED OUTAGES. THERE WAS A MINOR UNIT OUTAGE ON DECEMBER 7 WHICH LASTED ONLY 47 HOURS DUE TO A SECONDARY TUBE FAILURE.

DURING THE YEAR 1986, THE FGD SYSTEM HAD A TOTAL OF 125.3 UNPLANNED OUTAGE HOURS AND WAS IN SERVICE FOR A TOTAL OF 8343.7 HOURS.

THE UTILITY REPORTED THAT THEY HAVE BEEN OPERATING WITHOUT REHEAT SINCE MARCH OF 1985. THE IN-DIRECT HOT AIR STEAM REHEAT SYSTEM WAS REMOVED DUE TO HIGH MAINTENANCE COSTS AND ITS INABILITY TO KEEP FLUE GAS EXIT TEMPERATURES ABOVE THE DESIGNED TEMPERATURE OF 145 F. THE CURRENT EXIT GAS TEMPERATURE OUT OF THE STACK WITHOUT REHEAT IS 130 F. NO ILL EFFECTS TO THE STACK REFRACTORY LINING HAS BEEN NOTICED TO DATE. THE

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

UTILITY HAD TO MOVE THEIR OPACITY METERS TO JUST AFTER THE ID FAN DISCHARGE SINCE THE WATER DROPLETS IN THE STACK PRODUCED FALSE READINGS. SINCE EPA CONSIDERED THIS TO BE A MAJOR MODIFICATION TO THE SYSTEM, THE UTILITY WAS ALSO REQUIRED TO LOWER THEIR SO2 LIMITATIONS FROM 1.2 LB/MMBTU TO 0.816 LB/MMBTU.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE PERIOD JANUARY THROUGH MARCH 1987.

4/87	SYSTEM							720			
5/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT UNDERWENT A SCHEDULED SPRING OUTAGE WHICH LASTED FROM APRIL 24 TO MAY 10.

6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED REPLACING FAILED STEBBINS TILE IN THE SCRUBBER OUTLET DUCTWORK (USUALLY THE WALLS AND CEILING) WITH PENNWALT BLOCK WHICH HAS BECOME A COMMON MAINTENANCE PRACTICE.

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE PERIOD JUNE THROUGH DECEMBER 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	CENTRAL ILLINOIS LIGHT	
PLANT NAME	DUCK CREEK	
UNIT NUMBER	1	
CITY	CANTON	
STATE	ILLINOIS	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	378	
GROSS UNIT GENERATING CAPACITY - MW	396	
NET UNIT GENERATING CAPACITY W/FGD - MW	366	
NET UNIT GENERATING CAPACITY WO/FGD - MW	377	
EQUIVALENT SCRUBBED CAPACITY - MW	396	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	717.29	(1520000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	135.0	(275 F)
STACK HEIGHT - M	152.	(500 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	5.8	(19.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	24181.	(10396 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		9800-11000
AVERAGE ASH CONTENT - %	9.12	
RANGE ASH CONTENT - %	6-18	
AVERAGE MOISTURE CONTENT - %	15.43	
RANGE MOISTURE CONTENT - %	13-23	
AVERAGE SULFUR CONTENT - %	3.40	
RANGE SULFUR CONTENT - %	2.4-4.0	
AVERAGE CHLORIDE CONTENT - %	0.06	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	2	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	POLLUTION CONTROL-WALTHER	
INLET FLUE GAS CAPACITY - CU.M/S	358.6	(760000 ACFM)
INLET FLUE GAS TEMPERATURE - C	135.0	(275 F)
PRESSURE DROP - KPA	0.1	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.8	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	DIBASIC ACID	
SYSTEM SUPPLIER	ENVIRONEERING, RILEY STOKER	
A-E FIRM	GILBERT/COMMONWEALTH ASSOCIATES	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	85.30	
ENERGY CONSUMPTION - %	2.8	
CURRENT STATUS	1	
COMMERCIAL START-UP	8/1978	
INITIAL START-UP	7/1976	
CONTRACT AWARDED	8/1973	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	4.00	
DESIGN COAL HEAT CONTENT - J/G	22794.8	(9800 BTU/LB)
DESIGN COAL ASH CONTENT - %	18.00	
DESIGN MOISTURE CONTENT - %	23.00	
DESIGN CHLORIDE CONTENT - %	0.05	
OPER. & MAINT. REQUIREMENT - MANHR/DAY	144.0	
** QUENCHER/PRESATURATOR		
NUMBER	0	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	4	
NUMBER OF SPARES	0	
GENERIC TYPE	PACKED TOWER	
SPECIFIC TYPE	ROD DECK	
TRADE NAME/COMMON TYPE	VENTRI-SORBER	
SUPPLIER	ENVIRONEERING, RILEY STOKER	
DIMENSIONS - FT	40.0 X 5.0 X 40.0	
SHELL GENERIC MATERIAL	STAINLESS STEEL; HIGH ALLOY 'ATOP ABSORBER'	
SHELL SPECIFIC MATERIAL	AUSTENITIC; NICKEL BASE/CHROMIUM-IRON-COPPER-MOL	
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 316L; HASTELLOY G	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
GAS CONTACTING DEVICE TYPE	ROD DECKS	
NUMBER OF CONTACTING ZONES	8	
LIQUID RECIRCULATION RATE - LITER/S	992.	(15750 GPM)
L/G RATIO - L/CU.M	5.9	(44.5 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	3.0	(12.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.7	(12.0 FT/S)
INLET GAS FLOW - CU. M/S	167.05	(354000 ACFM)
INLET GAS TEMPERATURE - C	135.0	(275 F)
SO2 REMOVAL EFFICIENCY - %	85.3	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	4	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	VERTICAL	
NUMBER OF STAGES	2	
NUMBER OF PASSES PER STAGE	3	
FREEBOARD DISTANCE - M	3.66	(12.0 FT)
DISTANCE BETWEEN STAGES - CM	121.92	(48.0 IN)
DISTANCE BETWEEN VANES - CM	6.3	(2.50 IN)
VANE ANGLES - DEGREES	90	
PRESSURE DROP - KPA	0.2	(1.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	4.0	(13.0 FT/S)

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM	
WASH WATER SOURCE	SUPERNATANT	
WASH FREQUENCY	EVERY 20 MINUTES	
WASH RATE - L/S	102.8	(1630 GAL/MIN)
** REHEATER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	N/A	
CONSTRUCTION MATERIAL SPECIFIC TYPE	N/A	
** FANS		
NUMBER	4	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	BUFFALO FORGE	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	167.05	(354000 ACFM)
FLUE GAS TEMPERATURE - C	135.0	(275 F)
PRESSURE DROP - KPA	11.6	(38.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
** DAMPERS		
NUMBER	4	
FUNCTION	SHUT-OFF	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER	
MANUFACTURER	AMERICAN STANDARD	
SEAL AIR FLOW - CU. M/S	1.96	(4150 ACFM)
SERVICE CONDITIONS	450	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	
** DAMPERS		
NUMBER	8	
FUNCTION	SHUT-OFF	
GENERIC TYPE	GUILLOTINE	
SPECIFIC TYPE	NR	
MANUFACTURER	ENVIRONMENTAL ELEMENTS	
SEAL AIR FLOW - CU. M/S	0.57	(1200 ACFM)
SERVICE CONDITIONS	450	
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	
** DAMPERS		
NUMBER	1	
FUNCTION	SHUT-OFF	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER	
MANUFACTURER	AMERICAN STANDARD	
SEAL AIR FLOW - CU. M/S	0.00	(0 ACFM)
SERVICE CONDITIONS	450	
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	
** DAMPERS		
NUMBER	1	
FUNCTION	CONTROL	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER	

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

MANUFACTURER	AMERICAN STANDARD
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
SERVICE CONDITIONS	NR
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	8
FUNCTION	CONTROL
GENERIC TYPE	NR
SPECIFIC TYPE	NR
MANUFACTURER	BUFFALO FORGE
SERVICE CONDITIONS	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	4
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	AMERICAN STANDARD
SEAL AIR FLOW - CU. M/S	1.96 (4150 ACFM)
SERVICE CONDITIONS	700
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	INLET
CONFIGURATION	RECTANGULAR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	OUTLET & BYPASS
CONFIGURATION	CIRCULAR
SHELL GENERIC MATERIAL TYPE	HIGH ALLOY
SHELL SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	TRANSITION DUCT-AT BASE OF STACK
CONFIGURATION	CIRCULAR TO SQUARE
SHELL GENERIC MATERIAL TYPE	HIGH ALLOY
SHELL SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	36.3 (40 TPH)
PRODUCT QUALITY - % SOLIDS	35.0

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	4
WASTE SLURRY BLEED	1
REAGENT PREP PRODUCT	1
MIST ELIMINATOR WASH	4
MILL SLURRY	1

** PUMPS

SERVICE	NUMBER
POND RETURN	2
MIST ELIMINATOR WASH	8
ABSORBER RECIRCULATION	12
SLURRY TRANSFER	2
MILL SLURRY	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT

METHOD	BLEED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	CLAY LINING
SITE DIMENSIONS	57 ACRES
SITE CAPACITY - CU.M	125969 (103.0 ACRE-FT)
SITE SERVICE LIFE - YRS	5

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	ABSORBER RECYCLE
CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	PERCENT SOLIDS, LIQUID LEVEL
CONTROL LEVELS	PH 6.0 AT INLET, 5.5 AT OUTLET
MONITOR LOCATION	RECYCLE TANK
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	CLOSED
RECEIVING WATER STREAM	NONE
MAKEUP WATER ADDITION - LITERS/S	37.8 (600 GPM)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	95% CACO3
CONSUMPTION	40 TPH
UTILIZATION - %	67.0
POINT OF ADDITION	RECYCLE TANK

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

** FGD SPARE CAPACITY INDICES

ABSORBER - %	0.0
MIST ELIMINATOR - %	0.0
FAN - %	0.0
BALL MILL - %	0.0
EFFLUENT HOLD TANK - %	0.0
RECIRCULATION PUMP - %	33.0

** FGD SPARE COMPONENT INDICES

ABSORBER	0.0
MIST ELIMINATOR	0.0
FAN	0.0
BALL MILL	0.0
EFFLUENT HOLD TANK	0.0
RECIRCULATION PUMP	4.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/76	SYSTEM				1.1	91.60		744		8	

** PROBLEMS/SOLUTIONS/COMMENTS

CONSTRUCTION OF DUCK CREEK 1 BEGAN IN EARLY 1972 AND WAS VIRTUALLY COMPLETED BY SPRING 1976. COMMERCIAL OPERATION WAS INITIATED IN JUNE 1976 WITH THE ESP MODULES IN THE GAS PATH. THE FIRST MODULE OF THE 4-MODULE SCRUBBING SYSTEM WAS INSTALLED BY JUNE 1976 AND START-UP FOR SHAKEDOWN/DE-BUGGING PURPOSES OCCURRED IN JULY 1976. THE REMAINING THREE MODULES WILL BE INSTALLED LATER WITH A 4-MODULE START-UP SCHEDULED FOR THE SUMMER OF 1978.

INITIAL OPERATION OF THE FIRST SCRUBBER MODULE FOR SHAKEDOWN AND DEBUGGING PURPOSES OCCURRED DURING THE MONTH. LIMITED SERVICE TIME RESULTED FROM PROBLEMS WITH BAD WELDS, FAULTY PIPE HANGERS, AND ABSORBER LEAKS.

8/76	SYSTEM				2.4			744		18	

** PROBLEMS/SOLUTIONS/COMMENTS

LIMITED OPERATIONS CONTINUED THROUGHOUT AUGUST BECAUSE OF THE START-UP AND CONSTRUCTION PROBLEMS MENTIONED FOR JULY, 1976. THE MODULE WAS TAKEN OUT OF THE GAS PATH AT THIS POINT TO CONCENTRATE ON RESOLVING THESE PROBLEM AREAS.

9/76	SYSTEM				50.0			744		360	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE RESTART OCCURRED ON SEPTEMBER 9. OPERATION CONTINUED THROUGHOUT TH REMAINDER OF THE MONTH ON AN INTERMITTANT BASIS. MAJOR PROBLEMS INCLUDED PIPE BREAKING, PUMP LINER FAILURES, PLUGGING AND SCALING OF MIST ELIMINATORS, AND SOME BOILER-RELATED PROBLEMS. THE MODULE REMAINED IN SER VICE FOR APPROXIMATELY 15 DAYS OF NON-CONTINUOUS OPERATION. THE ESP MODULES HAVE REMAINED IN SERVICE WITHOUT THE OCCURRENCE OF ANY MAJOR PROBLEMS.

10/76	SYSTEM				51.8			744		385	

** PROBLEMS/SOLUTIONS/COMMENTS

TOTAL OPERATION TIME DURING THE MONTH WAS APPROXIMATELY 16 DAYS (NON-CONTINUOUS). THE MAJOR PROBLEM AREA WAS THE CONTINUATION OF MASSIVE SCALE DEVELOPMENT ON THE MIST ELIMINATORS, RESULTING IN PLUGGING OF THE PIPING AND NOZZLES TO THE COMPONENTS SPRAY SYSTEM.

11/76	SYSTEM				3.3			720		24	

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SPORADIC OPERATION RESULTED FROM CONTINUED SCALING PROBLEMS IN THE MIST ELIMINATOR SECTION. RILEY AND CILCO INITIATED MODIFICATIONS TO THE DESIGN OF THE MODULE. SPECIFICALLY, A ROD DECK WAS CHANGED IN THE ABSORBER, PRESSURE DROP ACROSS THE ABSORBER WAS INCREASED, PIPING AND PUMP LINER MATERIALS WERE MODIFIED/REPLACED, AND A FRESH WATER WASH SYSTEM WAS INSTALLED FOR THE MIST ELIMINATOR.									
12/76	SYSTEM				0.0			744		0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE MODULE REMAINED OUT OF SERVICE THE ENTIRE MONTH. DURING THIS TIME, THE BOILER FIRED LOW SULFUR (0.6%) KENTUCKY COAL.									
1/77	SYSTEM				0.0			744	0	0	0.0
2/77	SYSTEM				0.0			672	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE NO. 1 UNIT WAS DOWN THROUGHOUT THE ENTIRE JANUARY-FEBRUARY PERIOD FOR TURBINE/BOILER OVERHAUL. DURING THE UNIT OUTAGE, A NUMBER OF MODIFICATIONS WERE MADE TO THE SCRUBBER.									
3/77	SYSTEM				47.0			744		350	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE NO. 1 UNIT WAS RETURNED TO SERVICE IN MID-MARCH. THE SCRUBBER WAS PLACED IN SERVICE TO TEST THE MODIFICATIONS MADE DURING THE PRECEDING OUTAGE. THESE MODIFICATIONS INCLUDED: THE MIST ELIMINATOR SPRAY WASH SYSTEM PIPING WAS CHANGED FROM PVC TO FRP MATERIALS. ALSO, AN ADDITIONAL SPRAY HEADER WAS ADDED. THE SLURRY CIRCULATION SYSTEM WAS REVAMPED. NEOPRENE PUMP LINERS HAVE REPLACED THE ORIGINAL RUBBER LINERS. FLUSH/DRAIN SYSTEMS HAVE BEEN INCLUDED TO MINIMIZE SOLIDS BUILD UP. PIPING VALVES MOVED CLOSER TO THE RECYCLE TANK. SLURRY STORAGE TANKS EQUIPPED WITH FLUSH/DRAIN SYSTEMS. ADDITIONAL MIXERS ADDED FOR GREATER AGITATION TO PROMOTE PROCESS CHEMISTRY. DURING THE LAST PART OF MARCH THE MODULE REMAINED IN SERVICE ON A CONTINUA BASIS WITH THE EXCEPTION OF A FEW MINOR BOILER OUTAGES. CILCO INTENDS TO CONTINUE EXPERIMENTAL OPERATIONS THROUGHOUT THE APRIL-MAY PERIOD, TESTING THE MECHANICAL MODIFICATIONS AND THE AUTOMATIC CONTROL LOOPS (SYSTEM CHEMISTRY WILL BE CONTROLLED BY INLET/OUTLET SO2 LOADING, SOLUTION PH, SOLUTION SOLIDS. OPERATION UP TO THIS POINT HAS PROCEEDED IN A MANUAL CONTROL MODE). CONTINUED OPERATION BEYOND THIS TIME FRAME WILL DEPEND UPON THE SUCCESS OF EXPERIMENTAL OPERATIONS. CILCO HAS THE OPTION OF FIRING LOW SULFUR COAL UNTIL THE ENTIRE 4-MODULE SCRUBBER PLANT IS READY FOR SERVICE IN AUGUST 1978.									
4/77	SYSTEM				0.0			720		0	
5/77	SYSTEM				0.0			744		0	
6/77	SYSTEM				0.0			720		0	
7/77	SYSTEM				0.0			744		0	
8/77	SYSTEM				0.0			744		0	
9/77	SYSTEM				0.0			720		0	

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
10/77	SYSTEM				0.0			744		0	
11/77	SYSTEM				0.0			720		0	
12/77	SYSTEM				0.0			744		0	
1/78	SYSTEM				0.0			744		0	
2/78	SYSTEM				0.0			672		0	
3/78	SYSTEM				0.0			744		0	
4/78	SYSTEM				0.0			720		0	
5/78	SYSTEM				0.0			744		0	
6/78	SYSTEM				0.0			720	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT CONTINUED TO FIRE LOW-SULFUR COLORADO COAL DURING THE REPORT PERIOD. THE RESTART OF SCRUBBER OPERATIONS CONTINUES TO BE SCHEDULED FOR AUGUST 1978.									
7/78	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ALL FOUR MODULES BECAME OPERATIONAL ON JULY 24.									
		MODIFICATIONS WERE MADE TO THE UNDER DESIGNED SLURRY TRANSFER TANK.									
		A PLUGGING PROBLEM CAUSED BY COAL FINES IN THE SLURRY WAS EXPERIENCED. THE FINES RESULTED FROM A COMMON COAL AND LIMESTONE HANDLING SYSTEM.									
8/78	SYSTEM	45.0	46.0	46.0	42.0			744	691	315	62.5
9/78	SYSTEM	46.0	46.0	46.0	44.0			720	691	317	62.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SCREEN BASKETS WERE USED TO KEEP COAL PARTICLES FROM THE LIMESTONE. THE COAL PARTICLES RESULT FROM THE COMMON COAL-LIMESTONE HANDLING SYSTEM.									
		THE SLURRY TRANSFER SYSTEM PREVENTED PROPER SLURRY FLOW DUE TO UNDER DESIGN. THE OLD SYSTEM WAS REPLACED WITH A NEW PIPING SYSTEM.									
		PLUGGING OF THE RECYCLE PUMP SHUT-OFF VALVES OCCURED. THE VALVES ARE BEING REPLACED WITH PINCH VALVES.									
		THE SCRUBBER WASTE WATER SUMP PUMPS HAVE BEEN PLUGGING. NEW PUMPS ARE BEING INVESTIGATED.									
10/78	A	19.1	31.6	31.6	19.1						
	B	22.5	37.2	37.2	22.5						
	C	0.8	1.3	1.3	0.8						
	D	20.5	33.9	33.9	20.5						
	SYSTEM	15.7	26.0	26.0	15.7			744	449	117	32.9

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									

** PROBLEMS/SOLUTIONS/COMMENTS

THE MAJOR CAUSES FOR DOWNTIME OCCURRING IN OCTOBER WERE VALVE LEAKS AND SUBSEQUENT RECYCLE GLAND SEAL CONTAMINATION AND THE INSTALLATION OF A LIQUID/SOLID SEPARATOR.

A LEAKING VALVE RESULTED IN CONTAMINATION OF THE RECYCLE PUMP GLAND SEAL WATER SYSTEM WITH POND RETURN WATER CAUSING SCALING AND PLUGGING FORCING SHUTDOWN OF THE RECYCLE PUMPS. A NEW VALVE SYSTEM WAS INSTALLED AND THE OPERATING PRESSURES WERE CHANGED TO PREVENT RECURRANCE OF THE CONTAMINATION.

THE RECYCLE PUMPS WERE SHUT DOWN WHEN CONTAMINATION OF THE GLAND SEAL WATER SYSTEM CAUSED BY A FAULTY VALVE OCCURRED.

A FLOW CONTROL VALVE ON THE D-MODULE WAS REMOVED BECAUSE IT CAUSED ABRASION AND FAILURE OF THE RECYCLE HEADER. NONE OF THE MODULES NOW UTILIZE FLOW CONTROL VALVES.

THE MIST ELIMINATOR SPRAY NOZZLES PLUGGED BY COAL PARTICLES WERE CLEANED THE COAL PARTICLES RESULT FROM A COMMON COAL/LIMESTONE HANDLING SYSTEM. A LIQUID/SOLID SEPARATOR HAS BEEN INSTALLED IN THE SLURRY SYSTEM TO PREVENT RECURRENCE.

EXCESSIVE LIMESTONE CARRYOVER TO THE MIST ELIMINATOR WAS NOTED. THE TOP ROD DECK WAS REMOVED TO IMPROVE GAS FLOW AND ELIMINATE THE CARRYOVER PROBLEM.

BLANK OFF PLATES WERE ADDED TO THE LOWER SEVEN ROD DECKS TO MAINTAIN PRESSURE DROP REQUIREMENTS. THIS HAS BEEN FOUND TO BE AN ACCEPTABLE SOLUTION AT OTHER ENVIRONEERING FGD SYSTEM INSTALLATIONS.

11/78	A	8.1	8.8	8.8	8.1						
	B	8.1	8.8	8.8	8.1						
	C	8.1	8.8	8.8	8.1						
	D	8.1	8.8	8.8	8.1						
	SYSTEM	8.1	8.8	8.8	8.1			720	661	59	63.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE 1B SLURRY TANK PUMP LINER EXPERIENCED A FAILURE RESULTING IN SCRUBBIN SYSTEM SHUTDOWN FOR 84 HOURS. THE LINER FAILED AFTER ONLY THREE MONTHS. THE SPARE PUMP WAS ALREADY OUT OF SERVICE FOR A MOTOR REPLACEMENT.

A SPARE SLURRY TANK PUMP WAS OUT OF SERVICE TO REPLACE THE ORIGINAL 50-HP MOTOR WITH A 75-HP MOTOR.

THE PINION BEARING ON THE BALL MILL DRIVE FAILED. THE FAILURE IS BEING INVESTIGATED. FGD SYSTEM OPERATION WAS HALTED DUE TO THE FAILURE. THIS ACCOUNTED FOR MOST OF THE NOVEMBER OUTAGE TIME.

THE LEVEL AND DENSITY INSTRUMENTS ON RECYCLE TANKS ARE BEING MODIFIED.

THE LEEDS & NORTHRUP LEVEL AND DENSITY TRANSMITTERS ARE BEING REPLACED WITH ROSEMOUNT TRANSMITTERS.

12/78	A	23.3	24.5	24.5	23.3						
	B	26.2	27.6	27.6	26.2						
	C	21.3	22.5	22.5	21.3						
	D	10.2	10.8	10.8	10.2						
	SYSTEM	20.3	21.4	21.4	20.3			744	706	151	70.3

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ISOLATION DAMPER FAILURES AND SLURRY RECYCLE DISCHARGE VALVE FAILURES OCCURRED DURING DECEMBER.									
		LIMESTONE MILL PROBLEMS AND A PLUGGED LIMESTONE FEEDER HAMPERED SCRUBBER OPERATIONS DURING DECEMBER.									
		THE SYSTEM EXPERIENCED FROZEN INSTRUMENT CONTROL LINES IN DECEMBER. THIS WAS THE MAJOR CAUSE OF THE DECEMBER SCRUBBER UNAVAILABILITY.									
1/79	SYSTEM	0.0	0.0	0.0	0.0			744	738	0	77.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FROZEN INSTRUMENT CONTROL LINES, RECYCLE TANK SUCTION LINES, MAIN MODULE DRAIN LINES AND MIST ELIMINATOR DRAIN LINES WERE MAJOR PROBLEM AREAS DURING JANUARY.									
		SLURRY RECYCLE VALVE PLUGGING AND SLURRY TRANSFER PUMP FAILURE CONTRIBUTED TO THE SYSTEM OUTAGE TIME.									
2/79	SYSTEM	0.0	0.0	0.0	0.0			672	533	0	63.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		RECYCLE PUMP SUCTION VALVE FAILURES AND A SLURRY TRANSFER PUMP FAILURE CONTRIBUTED TO THE NON-OPERATION OF THE FGD SYSTEM.									
		FROZEN MIST ELIMINATOR DRAINS, ABSORBER DRAINS AND INSTRUMENT LINES WERE A MAJOR PROBLEM DURING FEBRUARY.									
3/79	A	33.7	31.1	31.1	31.1						
	B	6.7	6.7	6.7	6.7						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	10.1	9.5	9.5	9.5			744	744	70	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FREEZING PROBLEMS CONTINUED TO HAMPER FGD OPERATIONS DURING MARCH. THE C AND D MODULE WERE STILL NOT BACK IN SERVICE DUE TO MAJOR CLEAN-UP FROM THE FREEZING PROBLEMS.									
		BROKEN MIST ELIMINATOR SPRAY LINES AND PLUGGED MIST ELIMINATOR NOZZLES WERE PROBLEM AREAS DURING MARCH.									
		RECYCLE PUMP FAILURES AND WASTE WATER PUMP FAILURES WERE EXPERIENCED DURING MARCH.									
		PLUGGED SLURRY NOZZLES AND GENERAL INSTRUMENTATION PROBLEMS WERE REPORTED BY THE UTILITY.									
4/79	A	100.0	71.9	100.0	67.3						
	B	84.3	50.5	75.0	47.3						
	C	86.5	81.2	84.9	76.0						
	D	21.3	22.7	21.3	21.3						
	SYSTEM	73.0	56.6	70.3	53.0			720	674	380	55.9

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INLET DAMPER MALFUNCTIONS HINDERED FGD OPERATION DURING APRIL.									
		PLUGGED MIST ELIMINATOR SPRAY NOZZLES DURING APRIL HINDERED FGD OPERATION.									
		SLURRY CONTROL VALVE MALFUNCTIONS WERE REPORTED BY THE UTILITY.									
		RECYCLE TANK MIXER FAILURES WERE EXPERIENCED DURING APRIL.									
		RECYCLE PUMP BELT AND BEARING FAILURES AND SLURRY SUPPLY LINE FAILURES WERE REPORTED BY THE UTILITY.									
5/79	A	95.7	37.4	69.7	9.9						
	B	95.7	44.2	73.2	11.7						
	C	94.7	41.8	71.1	11.1						
	D	1.3	5.0	1.3	1.3						
	SYSTEM	71.9	32.1	53.8	8.5			744	197	63	14.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MIST ELIMINATOR PUMP MALFUNCTIONS WERE REPORTED DURING MAY. MODULE D WAS UNAVAILABLE DUE TO A MIST ELIMINATOR WASH LINE FAILURE.									
		MILL SHAKER BASKET DRIVE MOTOR FAILURES WERE ENCOUNTERED.									
		SLURRY SUPPLY LINE FAILURES OCCURRED DURING THE MONTH.									
		STACK LINER BLISTERING WAS DISCOVERED DURING A SPRING INSPECTION. REPAIRS WERE MADE. THE STACK WILL BE INSPECTED AGAIN IN MARCH 1980.									
6/79	A	81.9	76.9	79.6	70.6						
	B	89.2	86.9	88.1	79.8						
	C	86.6	83.0	85.1	76.2						
	D	92.0	90.0	91.1	82.7						
	SYSTEM	87.4	84.2	86.0	77.3			720	661	557	70.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JUNE SOME PROBLEMS WITH THE MIST ELIMINATOR WERE ENCOUNTERED. THES PROBLEMS INCLUDED PLUGGING IN THE MIST ELIMINATOR AND THE MIST ELIMINATOR LINES AND A BROKEN MIST ELIMINATOR RETURN LINE.									
		THE UTILITY REPORTED STORAGE PUMP LEAKS, RECYCLE PUMP FAILURES, SLURRY SUPPLY LINE PLUGGING AND DAMPER AND MILL SHAKER BASKET FAILURES.									
7/79	A	93.1	85.6	89.7	59.9						
	B	94.9	88.3	92.3	61.7						
	C	95.8	87.9	93.6	61.5						
	D	96.1	86.4	93.9	60.4						
	SYSTEM	95.0	87.1	92.4	60.9			744	520	453	48.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		IN JULY THE MIST ELIMINATOR PLUGGED CAUSING OPERATIONAL PROBLEMS.									
		RECYCLE PUMP FAILURES WERE ENCOUNTERED DURING THE PERIOD.									
8/79	A	3.0	4.0	3.0	3.0						
	B	26.1	31.4	24.0	23.4						
	C	13.6	18.3	13.6	13.6						
	D	9.5	12.7	9.5	9.5						
	SYSTEM	13.1	16.6	12.5	12.4			744	555	92	53.8

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		IN AUGUST THE MIST ELIMINATOR AND THE MIST ELIMINATOR DRAIN LINES PLUGGED CAUSING EXTENSIVE DOWNTIME FOR MODULE CLEANING.									
		FAILURES WITH THE LIMESTONE SLURRY FORWARDING PUMP AND THE RECYCLE PUMP WERE ENCOUNTERED.									
		DAMPER MALFUNCTIONS WERE REPORTED BY THE UTILITY.									
9/79	A	63.9	53.9	58.0	49.8						
	B	61.2	48.4	53.5	44.7						
	C	49.0	38.9	41.4	35.9						
	D	88.8	86.2	87.6	79.6						
	SYSTEM	65.7	56.9	60.1	52.5			720	665	378	69.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PLUGGING IN THE MIST ELIMINATOR, MIST ELIMINATOR HEADER AND NOZZLES WERE ENCOUNTERED IN AUGUST CONTINUED IN SEPTEMBER.									
		THE DAMPER FAILED CAUSING A PROBLEM DURING SEPTEMBER.									
		THE UTILITY REPORTED MIST ELIMINATOR PUMP CAVITATION PROBLEMS RELATED TO MIST ELIMINATOR PROBLEMS ENCOUNTERED IN AUGUST.									
		PLUGGED SLURRY NOZZLES AND LIMESTONE CONVEYOR FAILURES CONTRIBUTED TO THE OUTAGES EXPERIENCED.									
		SCRUBBER UNAVAILABILITY WAS PRIMARILY A RESULT OF CARRY-OVER PLUGGING PROBLEMS FROM AUGUST AND SUBSEQUENT CLEAN-UP.									
10/79	A	84.8	82.3	89.2	82.3						
	B	93.7	86.2	92.4	86.2						
	C	91.7	75.8	90.5	75.8						
	D	93.5	91.9	93.4	91.9						
	SYSTEM	90.9	84.1	91.4	84.1			744	744	625	72.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE MONTH OF OCTOBER PROBLEMS WERE ENCOUNTERED WITH THE MIST ELIMINATOR SECTIONS. THE MIST ELIMINATOR PUMP MALFUNCTIONED, THE LINES PLUGGED AND A HEADER FLANGE GASKET FAILED.									
		OUTAGE TIME RESULTED FROM THE MODULE ISOLATION DAMPER FAILURE INCLUDING DAMPER MOTOR MALFUNCTION.									
		THE SLURRY SUPPLY LINE NEEDED REPAIRS.									
11/79	A	43.1	52.1	52.1	42.2						
	B	12.4	15.3	18.8	12.4						
	C	22.4	22.6	24.9	18.3						
	D	51.0	61.9	62.0	50.1						
	SYSTEM	32.2	38.0	39.5	30.8			720	583	221	61.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE ISOLATION DAMPER PROBLEMS CONTINUED DURING NOVEMBER.									
		THE MIST ELIMINATOR AND THE MIST ELIMINATOR DRAIN PLUGGED CAUSING DOWN TIME.									
		ALL RECYCLE PUMP SUCTION VALVES WERE REPLACED DURING THE MONTH. THIS									

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

WAS THE PRIMARY CAUSE FOR THE LOW SYSTEM AVAILABILITY.

SLURRY SUPPLY LINES FAILED AGAIN, DURING NOVEMBER.

12/79	A	54.5	72.6	77.6	53.5						
	B	35.1	47.6	51.0	35.1						
	C	43.0	58.4	61.9	43.0						
	D	25.5	34.6	40.9	25.5						
	SYSTEM	39.5	53.3	57.9	39.3			744	548	292	60.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE ISOLATION DAMPER FAILURES CONTINUED.

THE MIST ELIMINATOR PROBLEMS WITH PLUGGING AND HEADER RUPTURES OCCURRED DURING DECEMBER.

THE MODULE B AND D RECYCLE TANK LINERS WERE REPAIRED AND TANK COVERS WERE INSTALLED.

MIST ELIMINATOR PLUGGING AND RECYCLE TANK REPAIRS ACCOUNTED FOR MOST OF THE DECEMBER SCRUBBER OUTAGE TIME.

1/80	A	24.8	27.0	29.8	24.8						
	B	58.5	63.6	65.9	58.5						
	C	17.1	18.6	20.3	17.1						
	D	29.2	31.8	35.3	29.3						
	SYSTEM	32.4	35.3	37.8	32.4			744	684	241	81.6

** PROBLEMS/SOLUTIONS/COMMENTS

MOST OF THE JANUARY OUTAGE TIME WAS REQUIRED FOR RECYCLE TANK COVERING WORK.

THE MIST ELIMINATOR SECTION PLUGGED ALONG WITH THE NOZZLES HINDERING SYSTEM OPERATIONS. THE MIST ELIMINATOR DRAIN LINE WAS MODIFIED ALSO CAUSING OUTAGE TIME.

OTHER PROBLEMS ENCOUNTERED DURING THE MONTH INCLUDED A PLUGGED LIMESTONE FEEDER, INLET DAMPER PROBLEMS, SLURRY SUPPLY HEADER LEAKS AND STORAGE PUMP DISCHARGE VALVE REPAIRS.

2/80	A	11.8	11.8	12.5	11.8						
	B	72.7	72.7	73.5	72.7						
	C	70.7	70.7	71.5	70.7						
	D	41.3	41.3	47.9	41.3						
	SYSTEM	49.1	49.1	51.4	49.1			696	696	342	73.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY SOME OUTAGE TIME WAS DUE TO MODULE D CLEANING AND THE CLEANING OF THE MODULE D MIST ELIMINATOR SECTION.

THE INLET DAMPER DRIVE WAS REPLACED DURING THE MONTH.

REPAIR OF THE FIBERGLASS ON THE SLURRY RECYCLE LINE HINDERED OPERATIONS DURING THIS MONTH.

THE MODULES A AND D RECYCLE DISCHARGE VALVE WERE REPLACED CAUSING EXTENSIV DOWN TIME.

3/80	A	52.9	62.5	64.7	52.9						
	B	73.2	86.6	86.9	73.2						

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	C	51.0	60.3	60.5	51.0						
	D	34.0	40.2	45.9	34.0						
	SYSTEM	52.8	62.4	65.1	52.8			744	629	393	68.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH NEW RECYCLE PUMP DISCHARGE VALVES WERE INSTALLED IN ORDER TO ELIMINATE RESTRICTED FLOW OF THE OLD VALVES.

CARRIER BEARINGS ON THE INLET DAMPER WERE REPLACED IN ORDER TO MAINTAIN MODULE ISOLATION CAPABILITY.

THE MIST ELIMINATOR WASH SYSTEM WAS CONVERTED TO RETURN WATER IN ORDER TO ACHIEVE A HIGHER QUALITY ELIMINATION WASH WATER.

FIBERGLASS LINES ON THE RECYCLE PUMP DISCHARGE WERE ALSO REPAIRED DURING EXTENSIVE

4/80	A	53.0	81.7	95.9	52.9						
	B	54.2	83.6	87.5	54.2						
	C	57.2	88.3	95.3	57.2						
	D	26.0	40.1	71.9	26.0						
	SYSTEM	47.6	73.4	89.2	47.6			720	466	342	35.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE MAJOR PROBLEM HINDERING SYSTEM OPERATIONS DURING APRIL WAS THE REBUILD OF THE RECYCLE TANK MIXER.

MINOR PROBLEMS DURING THE MONTH WERE CAUSED BY THE INOPERABILITY OF THE LIMESTONE HANDLING SYSTEM.

5/80	A	44.6	68.6	72.0	44.6						
	B	45.7	70.3	73.5	45.7						
	C	34.7	53.3	59.1	34.7						
	D	43.6	67.0	73.9	43.6						
	SYSTEM	42.1	64.8	69.7	42.1			744	484	314	49.4

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY REPAIRS WERE MADE TO THE RECYCLE TANK RUBBER LINER.

EXPANSION JOINT LEAKS WERE ALSO REPAIRED DURING THE MONTH.

OTHER OPERATIONAL PROBLEMS INCLUDED THE REPLACEMENT OF THE LIMESTONE STORAGE TANK MIXER MOTOR, MODIFICATION OF ROD DECKS TO REDUCE SYSTEM DIFFERENTIAL PRESSURE AND REPAIR OF THE LIMESTONE FEEDER SYSTEM.

6/80	A	87.6	82.3	87.1	82.1						
	B	86.8	82.6	86.0	82.3						
	C	84.5	81.4	84.3	81.1						
	D	80.0	73.1	75.8	72.9						
	SYSTEM	84.8	79.9	84.3	79.6			720	718	573	78.5

** PROBLEMS/SOLUTIONS/COMMENTS

A LEAK WAS REPAIRED IN THE SLURRY SUPPLY HEADER DURING JUNE.

WORK CONTINUED ON THE MODIFICATIONS BEING DONE ON THE ROD DECKS IN THE ABSORBER MODULES.

7/80	A	91.2	81.0	87.6	70.1						
	B	83.5	70.0	80.0	60.6						

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PERFORMANCE DATA PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	C	90.5	78.8	86.4	68.2						
	D	87.5	74.9	85.4	64.8						
	SYSTEM	88.2	76.2	84.9	65.9			744	644	490	67.4

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY FGD SYSTEM OUTAGE TIME RESULTED FROM THE NECESSARY REPAIR OF THE SLURRY SUPPLY LINE AND REPAIR OF THE MALFUNCTIONING CLUTCH IN THE MILL SYSTEM.

ADDITIONAL OUTAGE TIME OCCURRED SO REPAIRS TO THE 1B STORAGE TANK PUMP DISCHARGE VALVES AND THE STORAGE TANK MIXER MOTOR COULD BE COMPLETED.

8/80	A	88.6	85.4	92.7	81.9						
	B	91.4	86.3	90.8	82.7						
	C	91.3	84.6	88.9	81.0						
	D	90.6	85.1	90.1	81.6						
	SYSTEM	90.5	85.4	90.7	81.9			744	713	609	76.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE SLURRY SUPPLY ISOLATION VALVE WAS REPAIRED IN AUGUST.

THE POND WATER RETURN LINE WAS ALSO REPAIRED DURING THE MONTH.

REPAIRS WERE MADE TO THE ELECTRICAL SYSTEM AFTER A POWER FAILURE IN THE WASTEWATER BUILDING.

9/80	A	43.1	39.2	41.5	39.2						
	B	47.8	47.2	48.2	47.2						
	C	45.6	43.2	45.9	43.2						
	D	46.3	46.0	47.6	46.0						
	SYSTEM	45.6	43.9	45.9	43.9			720	720	316	81.3

** PROBLEMS/SOLUTIONS/COMMENTS

MAJOR PROBLEMS DURING SEPTEMBER INCLUDED REPAIR OF THE LIMESTONE BALL MILL AFTER IT WAS REPAIRED, THE BALL MILL MOTOR BURNED OUT AND HAD TO BE RE-PLACED.

SLURRY CONTAMINATION OF THE MILL BEARING OIL AND REPAIR OF THE RECYCLE PUM SUCTION SCREEN CAUSED THE FGD SYSTEM TO BE DOWN FOR SEVERAL HOURS DURING THE MONTH.

10/80	A	73.0	73.0	75.9	73.0						
	B	73.3	65.9	71.8	65.9						
	C	74.2	74.1	75.8	74.1						
	D	73.4	73.2	76.6	73.2						
	SYSTEM	72.8	71.5	75.1	71.6			744	744	532	64.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER THE FGD SYSTEM WAS DOWN APPROXIMATELY 168 HOURS DUE TO PROBLEMS WITH THE LIMESTONE BALL MILL MOTOR.

SOME OUTAGE TIME DURING THE MONTH WAS DUE TO NECESSARY REPAIRS TO THE RECYCLE TANK PUMP AND PROBLEMS WITH THE DISCHARGE VALVE ON THE STORAGE TANK PUMP.

11/80	A	98.9	92.3	100.0	70.3						
	B	96.2	88.1	97.2	67.1						
	C	99.2	91.8	99.6	69.9						
	D	95.4	82.7	100.0	62.9						
	SYSTEM	97.4	88.7	99.2	67.5			720	548	486	50.1

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER THE FGD SYSTEM WAS OFF LINE FOR APPROXIMATELY 192 HOURS DUE TO A PLANT OUTAGE (BOILER RELATED).									
		THE FRESH WATER FLUSH VALVE IN THE MIST ELIMINATOR FAILED ADDING TO THE OUTAGE TIME DURING NOVEMBER.									
		REPAIRS WERE MADE TO THE RECYCLE TANK SUCTION SCREEN CAUSING SOME OUTAGE TIME.									
12/80	A	93.5	92.6	94.1	92.2						
	B	94.9	93.9	95.9	93.5						
	C	87.2	86.0	90.7	85.6						
	D	94.0	93.0	96.0	92.6						
	SYSTEM	92.4	91.4	94.2	91.0			744	741	677	79.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MINOR PROBLEMS WERE REPORTED FOR DECEMBER, INCLUDING PLUGGING OF RECYCLE TANK PUMP SUCTION SCREENS. REPAIRS WERE MADE DURING THE MONTH TO THE "B" MODULE OUTLET DAMPER AND THE "C" MODULE INLET DAMPER.									
1/81	A	92.2	92.1	94.9	92.1						
	B	94.9	94.9	97.8	94.8						
	C	94.2	94.1	98.0	94.1						
	D	88.6	88.6	94.4	88.6						
	SYSTEM	92.5	92.4	96.3	92.4			744	744	687	77.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY SOME OUTAGE TIME WAS DUE TO THE PLUGGING OF THE RECYCLE TANK PUMP SUCTION SCREENS.									
		REPAIRS WERE MADE TO THE INLET DAMPER OF MODULE C AND THE RECYCLE TANK PUMP OF MODULE D DURING THE MONTH.									
2/81	A	95.2	95.8	100.0	94.2						
	B	80.2	81.5	96.9	80.2						
	C	95.1	95.6	100.0	94.0						
	D	94.0	94.6	99.8	93.0						
	SYSTEM	91.1	91.8	99.2	90.3			672	661	607	59.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY PROBLEMS WERE ENCOUNTERED THAT NECESSITATED REPAIRS TO THE LIMESTONE CONVEYOR BELT AND THE SLURRY SUPPLY TANK AND LINES.									
3/81	A	93.8	88.5	91.6	85.1						
	B	82.5	79.9	84.7	76.9						
	C	84.7	81.5	85.5	78.4						
	D	86.8	84.1	90.8	80.8						
	SYSTEM	86.9	83.5	88.2	80.2			744	715	597	68.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH OUTAGE TIME WAS DUE TO THE REPLACEMENT OF THE LIMESTONE MILL HIGH LIFT PUMP AND THE SLURRY STORAGE TANK PUMP, BOTH LIMITING THE LIMESTONE SLURRY SUPPLY. THE RECYCLE TANK PUMP ON MODULE C WAS ALSO REPLACED.									
		ADDITIONAL OUTAGE TIME WAS CAUSED BY PLUGGING IN THE MIST ELIMINATOR SECTION OF ALL THE MODULES.									

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	A	26.2	27.1	28.1	23.3						
	B	27.1	28.1	29.5	24.2						
	C	44.8	29.1	30.2	25.0						
	D	52.1	28.4	29.5	24.4						
	SYSTEM	37.5	28.1	29.2	24.2			720	619	174	58.6

** PROBLEMS/SOLUTIONS/COMMENTS

EXTENSIVE PLUGGING THROUGHOUT EACH MODULE WAS OBSERVED AT THE BEGINNING OF APRIL, RESULTING IN THE NEED FOR EXTENSIVE MAINTENANCE CLEANING, REPAIRS, AND UPGRADING OF EACH MODULE. THE MODULES WERE TAKEN OUT OF SERVICE TWO AT A TIME SO THAT THE WORK COULD BE PERFORMED.

THE ISOLATION DAMPERS ON ALL FOUR MODULES HAVE BEEN A CONTINUAL PROBLEM. THE DAMPERS STICK AND FAIL TO SEAL TIGHTLY RESULTING IN GASEOUS CONDITIONS FOR MAINTENANCE CREWS. THE UTILITY IS PRESENTLY INVESTIGATING THE SITUATION.

5/81	A	68.7	67.0	69.1	65.9						
	B	68.1	66.4	69.2	65.3						
	C	76.4	69.9	71.4	68.7						
	D	71.4	69.8	73.4	68.5						
	SYSTEM	69.9	68.3	70.8	67.1			744	731	499	64.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY MAJOR REPAIR TO THE MODULE C FAN RESULTED IN LOW SYSTEM AVAILABILITY DUE TO THE NEED FOR BYPASSING AROUND THE MODULE. PROBLEMS WITH OPERATION OF THE MODULE C ISOLATION DAMPER AS WELL AS EXPANSION JOINT LEAKAGE, RESULTED IN GASEOUS WORKING CONDITIONS SUCH THAT REPAIR WORK COULD NO BE PERFORMED WITH THE SCRUBBER IN SERVICE.

PROBLEMS PERSIST WITH ALL THE ISOLATION DAMPERS.

6/81	1	69.9	60.0	67.4	51.5						
	B	71.3	63.9	71.2	54.8						
	C	72.4	65.2	70.5	55.9						
	D	70.3	61.6	69.5	52.9						
	SYSTEM	71.0	62.7	69.6	53.8			720	618	387	52.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE WORK ON THE MODULE C ID FAN CONTINUED. DUE TO THE CONTINUAL DAMPER PROBLEMS THE MODULE WAS TAKEN OUT OF SERVICE SO THAT THE REPAIRS COULD BE COMPLETED.

7/81	A	78.2	62.4	73.0	53.4						
	B	75.8	62.3	75.7	53.2						
	C	80.5	64.2	75.1	54.8						
	D	53.6	62.7	75.1	53.6						
	SYSTEM	72.0	62.9	74.7	53.8			744	636	400	56.4

** PROBLEMS/SOLUTIONS/COMMENTS

PROBLEMS WITH OPERATION OF THE ISOLATION DAMPERS AND EXPANSION JOINT LEAKAGE DURING THE MONTH RESULTED IN LOW SYSTEM AVAILABILITY DUE TO THE NEED FOR BYPASSING FLUE GAS TO ELIMINATE GASEOUS WORKING CONDITIONS DURING MAINTENANCE OPERATIONS.

SIGNIFICANT REPAIR WORK WAS REQUIRED DURING THE MONTH ON THE MODULE A,B, AND D RECYCLE PUMPS.

8/81	A	79.4	78.6	80.0	78.6						

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	79.7	78.9	79.6	78.9						
	C	79.6	78.9	80.3	78.9						
	D	60.3	60.3	62.6	60.3						
	SYSTEM	74.8	74.2	75.6	74.2			744	744	552	75.0

** PROBLEMS/SOLUTIONS/COMMENTS

ISOLATION DAMPER AND EXPANSION JOINT PROBLEMS CONTINUED TO LOWER THE OVERALL FGD SYSTEM AVAILABILITY.

MIXER REPAIR ON THE MODULE D RECYCLE TANK RESULTED IN LOW MODULE AVAILABILITY.

10/81	SYSTEM	0.0			0.0			744	0	0	0.0
11/81	A	32.9	82.6	93.7	26.9						
	B	32.9	82.6	93.7	26.9						
	C	32.6	82.1	93.4	26.8						
	D	24.5	67.9	81.9	22.2						
	SYSTEM	30.7	78.8	90.8	25.7			720	235	185	20.7

** PROBLEMS/SOLUTIONS/COMMENTS

A MAJOR UNIT OUTAGE STARTED ON SEPTEMBER 18 AND CONTINUED THROUGH OCTOBER AND ENDED ON NOVEMBER 21. DURING THIS TIME THE SCRUBBER WAS DRAINED OF SLURRY AND CLEANED. ISOLATION DAMPER SEAL AIR PROBLEMS RESULTED IN LOW AVAILABILITY DURING OPERATING PERIODS. IT WAS NECESSARY TO BYPASS THE SYSTEM TO ELIMINATE HAZARDOUS WORKING CONDITIONS DURING MAINTENANCE OPERATIONS.

12/81	A	80.3	81.2	81.5	68.1						
	B	81.0	81.6	83.6	68.4						
	C	76.9	81.0	82.5	67.9						
	D	82.1	83.8	84.1	70.3						
	SYSTEM	80.1	81.9	82.9	68.7			744	624	511	63.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER ISOLATION DAMPER SEAL AIR PROBLEMS RESULTED IN LOW AVAILABILITY DURING OPERATING PERIODS. IT WAS NECESSARY TO BYPASS THE SYSTEM TO ELIMINATE HAZARDOUS WORKING CONDITIONS DURING MAINTENANCE OPERATIONS.

1/82	A	79.1	74.4	76.7	72.4						
	B	73.4	68.6	71.5	66.7						
	C	73.8	69.0	71.0	67.1						
	D	67.3	69.1	71.9	67.3						
	SYSTEM	73.4	70.3	72.8	68.4			744	724	509	70.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCHEDULED BOILER OUTAGE THAT STARTED AT THE END OF DECEMBER ENDED ON JANUARY 4.

THE LOW SYSTEM AVAILABILITY DURING JANUARY WAS PARTIALLY DUE TO THE LIMESTONE IN THE STORAGE PILE BEING FROZEN LIMITING ITS DELIVERY TO THE FGD SYSTEM.

LOW AVAILABILITY WAS ALSO DUE TO ISOLATION DAMPER SEAL AIR PROBLEMS REQUIRING THE NEED FOR BY-PASSING FLUE GAS TO ELIMINATE HAZARDOUS WORKING CONDITIONS DURING MAINTENANCE OPERATIONS.

2/82	A	53.6	53.6	53.6	53.6						

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	54.5	54.5	54.5	54.5						
	C	49.3	49.3	49.3	49.3						
	D	55.5	55.5	55.5	55.5						
	SYSTEM	53.2	53.2	53.2	53.2			672	672	358	76.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE LOW AVAILABILITY DURING THE MONTH OF FEBRUARY WAS PRIMARILY DUE TO SEVERE PLUGGING OF THE MODULES.

THE ISOLATION DAMPER SEAL AIR PROBLEMS CONTINUED THROUGHOUT FEBRUARY.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/82	A	32.9	46.6	46.8	32.9						
	B	35.5	50.2	50.4	35.5						
	C	35.7	50.5	50.7	35.7						
	D	34.4	48.7	48.8	34.4						
	SYSTEM	34.6	49.0	49.2	34.6			744	526	258	53.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE LOW AVAILABILITY IN MARCH WAS DUE TO SEVERE PLUGGING OF THE ABSORBER MODULES.

MODULE ISOLATION DAMPER SEAL AIR PROBLEMS CONTINUED THROUGH MARCH.

ON MARCH 23 THE UNIT WAS TAKEN OUT OF SERVICE FOR A SCHEDULED OUTAGE. THE UNIT REMAINED OFF-LINE THROUGH THE END OF THE MONTH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/82	A	12.2	37.7	46.1	11.0						
	B	19.0	58.9	65.3	15.6						
	C	21.3	66.0	65.6	15.7						
	D	21.3	66.2	65.8	15.8						
	SYSTEM	18.4	57.2	60.7	14.5			720	232	105	17.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCHEDULED OUTAGE STARTED IN MARCH CONTINUED THROUGH TO APRIL 26. DURING THE OUTAGE THE MODULES WERE CLEANED EXTENSIVELY. THIS HAS SHOWN MUCH IMPROVEMENT IN THE SYSTEM'S RELIABILITY.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/82	A	91.1	91.1	91.1	91.1						
	B	92.2	92.2	92.2	92.2						
	C	91.9	91.9	91.9	91.9						
	D	91.7	91.7	91.7	91.7						
	SYSTEM	91.7	91.7	91.7	91.7			744	744	682	66.9

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE ISOLATION DAMPER SEAL AIR PROBLEMS CONTINUE TO REDUCE THE AVAILABIL ITY DUE TO THE NEED FOR BY-PASSING FLUE GAS TO ELIMINATE GASEOUS WORKING CONDITIONS DURING MAINTENANCE OPERATIONS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/82	A	83.6	83.6	83.6	83.6						
	B	91.6	91.6	91.6	91.6						
	C	91.7	91.7	91.7	91.7						
	D	92.5	92.5	92.5	92.5						
	SYSTEM	89.9	89.9	89.9	89.9			720	720	647	68.2

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE DOWN TIME DURING JUNE WAS TO REMOVE ANY SCALE ACCUMULATION AND TO CLEAN THE MODULES.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION
7/82	A	85.5	87.3	89.9	78.3

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	88.8	90.6	93.2	81.2						
	C	98.0	79.8	89.6	71.6						
	D	87.3	78.4	89.4	70.3						
	SYSTEM	89.9	84.0	90.5	75.3			744	667	560	57.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JULY.

8/82	A	95.0	95.0	98.5	95.0						
	B	97.4	97.4	98.3	97.4						
	C	91.6	91.1	96.9	91.1						
	D	96.5	93.5	97.6	93.5						
	SYSTEM	95.1	94.3	97.8	94.3			744	744	702	69.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST.

9/82	A	83.3	81.5	95.3	76.6						
	B	88.3	86.5	96.0	81.3						
	C	87.5	86.5	95.9	81.3						
	D	84.7	82.4	99.4	77.5						
	SYSTEM	85.9	84.2	96.6	79.2			720	677	570	65.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING SEPTEMBER. SYSTEM AVAILABILITY WAS REDUCED ONLY BY BOILER OUTAGE TIME. RELIABILITY MORE ACCURATELY REFLECTS THE OPERATION OF THE SCRUBBER DURING SEPTEMBER.

10/82	A	93.6	93.4	96.0	93.4						
	B	95.9	95.9	96.3	95.9						
	C	95.5	91.5	96.0	91.5						
	D	92.7	92.7	94.6	92.7						
	SYSTEM	94.4	93.4	95.7	93.4			744	744	695	72.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMSS WERE ENCOUNTERED DURING OCTOBER.

11/82	A	64.7	85.0	97.4	56.7						
	B	65.5	90.1	97.7	60.1						
	C	65.6	89.5	97.6	59.7						
	D	66.7	90.8	97.8	60.5						
	SYSTEM	65.6	88.9	97.6	59.2			720	480	426	43.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER THE UNIT WAS DOWN FOR CLEANING AND INSPECTION OF THE MODULES.

12/82	A	83.0	76.3	88.4	76.3						
	B	87.0	85.7	89.3	85.7						
	C	87.1	87.1	89.8	87.1						
	D	83.8	83.2	89.2	83.2						
	SYSTEM	85.2	83.1	89.2	83.1			744	744	618	63.0

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A MAJOR PROBLEM OCCURRED WITH THE LIMESTONE PREPARATION EQUIPMENT FROM DECEMBER 16 TO 23, 1982. THE LIMESTONE BALL MILL MOTOR FAILED AND HAD TO BE EXTENSIVELY REPAIRED. DURING THIS TIME AN EMERGENCY SYSTEM WAS SET UP SO THAT LIMESTONE IN A POWDERED FORM COULD BE CONVEYED TO THE SCRUBBER.									
1/83	A	93.1	96.9	99.9	89.0						
	B	91.9	95.6	99.9	87.9						
	C	93.3	96.1	99.9	88.3						
	D	88.8	92.2	99.9	84.8						
	SYSTEM	91.7	95.2	99.9	87.5			744	684	651	63.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JANUARY.									
2/83	A	61.9	97.2	100.0	61.9						
	B	61.4	96.3	100.0	61.4						
	C	62.3	97.8	100.0	62.3						
	D	57.4	90.1	100.0	57.4						
	SYSTEM	60.7	95.3	100.0	60.7			672	428	408	45.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OFF LINE FROM FEBRUARY 18 TO 28, 1983 TO REPAIR THE EXHAUST STACK.									
3/83	SYSTEM	0.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OFF LINE FOR THE ENTIRE MONTH OF MARCH TO CONTINUE REPAIRING THE EXHAUST STACK.									
4/83	A	0.0			0.0						
	B	0.0			0.0						
	C	0.0			0.0						
	D	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OFF LINE DURING APRIL TO CONTINUE STACK LINER REPAIRS.									
5/83	A	60.8	85.2	99.1	53.5						
	B	60.1	94.0	99.2	59.0						
	C	60.2	87.1	99.1	54.7						
	D	59.7	92.0	96.9	57.8						
	SYSTEM	60.2	89.6	98.6	56.2			744	467	418	40.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OUT OF SERVICE UNTIL MAY 13, 1983 DUE TO CONTINUED MAINTENANCE ON THE STACK LINER.									
6/83	A	97.3	95.1	99.3	95.1						
	B	99.3	96.3	99.4	96.3						
	C	98.5	95.2	99.3	95.2						
	D	98.1	96.6	98.6	96.6						
	SYSTEM	98.3	95.8	99.1	95.8			720	720	690	71.0

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.									
7/83	A	100.0	98.7	100.0	98.7						
	B	100.0	97.7	100.0	97.7						
	C	100.0	98.0	100.0	98.0						
	D	100.0	97.8	100.0	97.8						
	SYSTEM	100.0	98.1	100.0	98.1			744	744	730	71.7
8/83	A	100.0	96.4	100.0	96.4						
	B	100.0	94.4	100.0	94.4						
	C	97.8	94.7	100.0	94.7						
	D	100.0	95.3	100.0	95.3						
	SYSTEM	99.5	95.2	100.0	95.2			744	744	708	70.3
9/83	A	93.3	89.4	100.0	89.1						
	B	100.0	95.0	100.0	94.7						
	C	97.2	92.5	100.0	92.3						
	D	99.7	95.3	100.0	95.0						
	SYSTEM	97.6	93.0	100.0	92.8			720	718	668	62.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF JULY THROUGH SEPTEMBER, 1983.									
10/83	A	99.9	95.7	100.0	76.8						
	B	100.0	98.3	100.0	78.9						
	C	100.0	98.2	100.0	78.8						
	D	100.0	97.5	100.0	78.3						
	SYSTEM	100.0	97.4	100.0	78.2			744	597	582	54.6
11/83	A	97.5	91.0	100.0	81.9						
	B	100.0	91.9	100.0	82.7						
	C	100.0	94.0	100.0	84.6						
	C	100.0	94.0	100.0	84.6						
	D	98.6	91.6	100.0	82.5						
	SYSTEM	99.2	92.5	100.0	83.3			720	648	600	55.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS OFF LINE FROM OCTOBER 25 TO NOVEMBE 4, 1983.									
12/83	A	88.5	85.2	88.2	85.2						
	B	88.5	85.2	88.2	85.2						
	C	88.5	85.6	88.2	85.6						
	D	88.5	86.7	88.3	86.7						
	SYSTEM	88.5	85.7	88.2	85.7			744	744	638	69.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT SEVERE COLD WEATHER BETWEEN DECEMBER 24 AND 28 DISABLED THE COAL AND LIMESTONE HANDLING EQUIPMENT. LIMESTONE COULD NOT B LOADED INTO THE FACILITY RESULTING IN THE LOSS OF THE LIMESTONE SLURRY SUPPLY. ALL FOUR MODULES WERE CONSIDERED UNAVAILABLE DURING THIS PERIOD.									
1/84	A	94.1	89.0	93.5	81.9						
	B	94.3	86.4	93.6	79.4						
	C	94.0	89.2	93.2	82.0						

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	D	93.7	87.6	92.7	80.5						
	SYSTEM	94.0	88.0	93.2	80.9			744	684	602	60.2
2/84	A	100.0	96.0	100.0	96.0						
	B	100.0	96.9	100.0	96.9						
	C	100.0	98.2	100.0	98.2						
	D	100.0	95.8	100.0	95.8						
	SYSTEM	100.0	96.7	100.0	96.7			696	696	673	70.3
3/84	A	100.0	96.1	100.0	91.3						
	B	100.0	95.1	100.0	90.4						
	C	97.8	94.2	99.5	89.5						
	D	100.0	93.7	100.0	89.1						
	SYSTEM	99.5	94.8	99.9	90.1			744	707	670	69.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE EXPERIENCED DURING THE FIRST QUARTER OF 1984.

4/84	A	88.9	97.4	100.0	86.6						
	B	88.9	90.6	100.0	80.5						
	C	88.9	96.4	100.0	85.7						
	D	86.9	89.2	100.0	79.3						
	SYSTEM	88.4	93.4	100.0	83.0			720	640	598	58.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS TAKEN OFF LINE ON APRIL 27 FOR INSPECTIONS AND MAINTENANCE.

5/84	A	35.1	84.6	100.0	27.8						
	B	32.1	80.2	100.0	26.3						
	C	35.1	84.8	100.0	27.8						
	D	34.1	81.7	100.0	26.8						
	SYSTEM	34.1	82.8	100.0	27.2			744	244	202	14.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF LINE UNTIL MAY 20 DUE TO INSPECTION AND MAINTENANCE.

6/84	A	99.6	95.4	99.5	89.5						
	B	99.4	95.3	99.4	89.4						
	C	99.6	94.1	99.5	88.3						
	D	99.1	94.6	99.5	88.8						
	SYSTEM	99.4	94.8	99.5	89.0			720	676	641	64.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS OFF LINE FROM JUNE 15 UNTIL JUNE 18 FOR UNSPECIFIED REASONS.

7/84	A	99.5	98.2	99.9	97.8						
	B	99.5	97.9	99.9	97.5						
	C	99.5	98.4	99.9	98.0						
	D	99.5	92.7	99.9	92.3						
	SYSTEM	99.5	96.8	99.9	96.4			744	741	717	67.2

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JULY.

8/84	A	100.0	92.5	100.0	86.5						
	B	100.0	92.4	100.0	86.3						

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	C	100.0	91.7	100.0	85.7						
	D	100.0	92.1	100.0	86.1						
	SYSTEM	100.0	92.2	100.0	86.1			744	695	641	65.0
9/84	A	100.0	93.7	100.0	85.4						
	B	100.0	91.8	100.0	83.6						
	C	100.0	96.1	100.0	87.5						
	D	100.0	93.6	100.0	85.3						
	SYSTEM	100.0	93.8	100.0	85.5			720	656	615	59.1
10/84	A	100.0	95.5	100.0	95.6						
	B	100.0	98.3	100.0	98.5						
	C	100.0	94.7	100.0	94.9						
	D	99.0	96.0	100.0	96.1						
	SYSTEM	99.9	96.1	100.0	96.3			744	745	716	71.1
11/84	A	100.0	93.7	100.0	87.6						
	B	100.0	95.0	100.0	88.8						
	C	100.0	95.3	100.0	89.1						
	D	100.0	95.1	100.0	88.9						
	SYSTEM	100.0	94.8	100.0	88.6			720	673	638	63.4
12/84	A	100.0	91.4	100.0	60.9						
	B	99.7	94.0	100.0	62.6						
	C	82.8	69.7	100.0	46.4						
	D	100.0	89.2	100.0	59.4						
	SYSTEM	95.6	86.0	100.0	57.4			744	496	427	33.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED FOR THE MONTHS OF AUGUST THROUGH DECEMBER 1984.

1/85	A	89.7	88.1	100.0	88.1						
	B	83.4	82.1	100.0	82.1						
	C	74.8	73.1	100.0	73.1						
	D	91.9	90.2	100.0	90.2						
	SYSTEM	84.9	83.4	100.0	83.4			744	744	620	62.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT EACH OF THE MODULES WAS REMOVED FROM SERVICE FOR APPROXIMATELY A WEEK ON A ROTATING BASIS FOR SLURRY TANK SCALE REMOVAL.

2/85	A	100.0	98.4	100.0	98.4						
	B	100.0	97.8	100.0	97.8						
	C	100.0	98.0	100.0	98.0						
	D	100.0	98.7	100.0	98.7						
	SYSTEM	100.0	98.2	100.0	98.2			672	672	660	73.4
3/85	A	100.0	93.9	100.0	89.5						
	B	100.0	96.1	100.0	91.6						
	C	100.0	96.3	100.0	91.7						
	D	100.0	95.4	100.0	91.0						
	SYSTEM	100.0	95.4	100.0	91.0			744	709	677	70.2
4/85	A	100.0	96.0	100.0	82.8						
	B	99.7	95.9	99.7	82.7						
	C	100.0	94.1	100.0	81.2						
	D	100.0	90.8	100.0	78.3						
	SYSTEM	99.9	94.2	99.9	81.2			720	621	585	56.6

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTHS OF FEBRUARY THROUGH APRIL.									
5/85	A	100.0	90.1	100.0	38.0						
	B	100.0	92.6	100.0	39.1						
	C	100.0	91.0	100.0	38.4						
	D	100.0	86.3	100.0	36.4						
	SYSTEM	100.0	90.0	100.0	38.0			744	314	283	25.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A SCHEDULED UNIT OUTAGE BEGAN ON MAY 1ST AND EXITENDED THROUGH MAY 19TH. NO FGD SYSTEM PROBLEMS WERE REPORTED BY THE UTILITY.									
6/85	A	99.5	95.6	100.0	91.8						
	B	99.0	94.1	100.0	90.5						
	C	96.9	94.6	100.0	91.0						
	D	94.2	90.7	100.0	87.2						
	SYSTEM	97.4	93.8	100.0	90.1			720	692	649	62.6
7/85	A	100.0	96.5	100.0	89.7						
	B	98.8	93.5	100.0	86.9						
	C	100.0	96.1	100.0	89.4						
	D	100.0	95.3	100.0	88.7						
	SYSTEM	99.7	95.4	100.0	88.7			744	692	660	60.8
8/85	A	99.7	98.0	99.7	98.0						
	B	99.7	96.9	99.7	96.9						
	C	99.7	98.1	99.7	98.1						
	D	99.7	98.0	99.7	98.0						
	SYSTEM	99.7	97.7	99.7	97.7			744	744	727	68.0
9/85	A	94.1	93.3	100.0	93.3						
	B	100.0	98.9	100.0	98.9						
	C	100.0	98.2	100.0	98.2						
	D	94.4	93.4	100.0	93.4						
	SYSTEM	97.1	95.9	100.0	95.9			720	720	691	69.8
10/85	A	98.1	95.9	99.7	96.1						
	B	98.7	95.2	100.0	95.3						
	C	81.6	80.4	99.3	80.6						
	D	97.3	92.9	100.0	93.0						
	SYSTEM	93.9	91.1	99.8	91.2			744	745	679	65.1
11/85	A	96.7	84.7	100.0	53.7						
	B	93.1	90.2	100.0	57.1						
	C	100.0	91.7	100.0	58.1						
	D	100.0	91.7	100.0	58.1						
	SYSTEM	97.4	89.6	100.0	56.7			720	456	408	39.3
12/85	A	97.8	94.7	100.0	89.7						
	B	97.2	91.4	100.0	86.6						
	C	96.3	88.8	100.0	84.2						
	D	95.7	90.9	100.0	86.2						
	SYSTEM	96.7	91.4	100.0	86.7			744	705	645	68.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTH OF JUNE THROUGH DECEMBER.									

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/86	A	92.8	87.5	100.0	59.1						
	B	98.9	97.5	100.0	65.8						
	C	96.7	93.4	100.0	63.0						
	D	100.0	96.0	100.0	64.8						
	SYSTEM	97.1	93.6	100.0	63.2			744	502	470	47.6

** PROBLEMS/SOLUTIONS/COMMENTS

A FORCED UNIT OUTAGE OCCURRED ON JANUARY 22 THROUGH 31. NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED.

2/86	A	100.0	91.2	100.0	57.7						
	B	100.0	91.4	100.0	57.8						
	C	100.0	92.6	100.0	58.6						
	D	99.7	90.8	100.0	57.4						
	SYSTEM	99.9	91.5	100.0	57.9			672	425	389	44.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE FORCED UNIT OUTAGE REPORTED LAST MONTH CONTINUED THROUGH FEBRUARY 9 AS REPAIRS WERE MADE IN RESPONSE TO A MAIN STEAM HEADER CRACK.

3/86	A	100.0	92.0	100.0	78.5						
	B	99.7	92.0	100.0	78.5						
	C	100.0	93.2	100.0	79.5						
	D	100.0	92.4	100.0	78.9						
	SYSTEM	99.9	92.4	100.0	78.8			744	635	587	62.0

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE FIRST QUARTER OF 1986.

4/86	A	96.3	92.0	99.4	66.7						
	B	99.5	88.3	99.3	64.0						
	C	99.6	88.4	99.4	64.1						
	D	99.6	84.8	99.3	61.5						
	SYSTEM	98.7	88.4	99.3	64.1			720	522	461	49.7
5/86	A	99.7	96.5	99.7	87.0						
	B	99.3	93.2	99.5	84.1						
	C	99.7	95.2	99.7	85.9						
	D	99.7	97.3	99.7	87.8						
	SYSTEM	99.6	95.6	99.6	86.2			744	671	641	67.6
6/86	A	99.7	96.2	99.7	91.6						
	B	99.7	95.7	99.8	91.1						
	C	99.7	95.6	99.7	91.1						
	D	99.7	97.2	99.7	92.6						
	SYSTEM	99.7	96.2	99.7	91.6			720	686	660	68.6

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE SECOND QUARTER OF 1986.

7/86	A	100.0	98.0	100.0	98.0						
	B	100.0	96.5	100.0	96.5						
	C	100.0	96.6	100.0	96.6						
	D	100.0	98.2	100.0	98.2						
	SYSTEM	100.0	97.3	100.0	97.3			744	744	724	77.2
8/86	A	100.0	97.5	100.0	89.2						

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	96.4	100.0	88.2						
	C	98.8	93.4	99.9	85.5						
	D	100.0	97.6	100.0	89.4						
	SYSTEM	99.7	96.2	100.0	88.1			744	681	655	65.2
9/86	A	100.0	93.9	100.0	87.3						
	B	100.0	96.6	100.0	89.8						
	C	100.0	94.5	100.0	87.8						
	D	100.0	97.2	100.0	90.4						
	SYSTEM	100.0	95.6	100.0	88.8			720	669	639	69.7

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE THIRD QUARTER OF 1986.

10/86	A	100.0	84.0	100.0	7.6						
	B	100.0	60.1	100.0	5.4						
	C	100.0	84.0	100.0	7.6						
	D	92.9	29.1	90.7	2.6						
	SYSTEM	98.2	64.3	97.7	5.8			744	67	43	5.5

** PROBLEMS/SOLUTIONS/COMMENTS

ON OCTOBER 3, 1986, THE DUCKCREEK 1 UNIT WAS TAKEN OUT OF SERVICE TO PERFORM A SCHEDULED OVERHAUL OF THE TURBINE-GENERATOR EQUIPMENT. THE OUTAGE WAS SCHEDULED THROUGH THE END OF NOVEMBER.

11/86	A	100.0			0.0						
	B	100.0			0.0						
	C	100.0			0.0						
	D	100.0			0.0						
	SYSTEM	100.0			0.0			720	0	0	0.0
12/86	A	99.5	83.6	99.1	56.8						
	B	99.5	82.6	99.1	56.2						
	C	96.2	81.8	97.9	55.6						
	D	99.5	82.2	99.0	55.9						
	SYSTEM	98.7	82.5	98.8	56.1			744	506	418	39.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT OUTAGE THAT BEGAN ON OCTOBER 3, 1986 CONTINUED THROUGH DECEMBER 5, 1986. NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE FOURTH QUARTER OF 1986.

1/87	A	100.0	97.1	100.0	93.0						
	B	99.9	96.1	99.9	92.1						
	C	95.0	92.7	100.0	88.8						
	D	100.0	91.7	100.0	87.8						
	SYSTEM	98.7	94.4	100.0	90.4			744	713	673	62.1
2/87	A	94.1	91.6	100.0	85.7						
	B	94.0	91.6	100.0	85.7						
	C	83.8	76.9	99.6	72.0						
	D	96.2	95.1	100.0	89.0						
	SYSTEM	92.0	88.8	99.9	83.1			672	629	559	62.8
3/87	A	100.0	96.8	100.0	93.3						
	B	96.8	94.6	100.0	91.1						
	C	100.0	96.1	100.0	92.6						
	D	94.8	91.9	100.0	88.6						
	SYSTEM	97.9	94.9	100.0	91.4			744	717	680	74.8

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE PERIOD JANUARY THROUGH MARCH,1987.									
4/87	A	100.0	85.3	100.0	27.8						
	B	100.0	93.6	100.0	30.6						
	C	100.0	84.9	100.0	27.7						
	D	100.0	91.8	100.0	30.0						
	SYSTEM	100.0	88.9	100.0	29.0			720	235	209	22.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 1 WAS OUT OF SERVICE FROM APRIL 10-30 FOR A SCHEDULED MAINTENANCE OUTAGE.									
5/87	A	96.3	88.4	99.6	76.0						
	B	99.7	90.0	100.0	77.4						
	C	99.7	90.2	99.7	77.6						
	D	96.7	88.8	100.0	76.3						
	SYSTEM	98.1	89.3	99.8	76.8			744	640	572	62.3
6/87	A	100.0	93.4	100.0	83.9						
	B	100.0	94.8	100.0	85.2						
	C	100.0	91.4	100.0	82.2						
	D	100.0	94.6	100.0	85.0						
	SYSTEM	100.0	93.6	100.0	84.1			720	647	605	69.4
7/87	A	100.0	99.2	100.0	99.2						
	B	100.0	96.7	100.0	96.7						
	C	99.1	99.1	100.0	99.1						
	D	100.0	100.0	100.0	100.0						
	SYSTEM	99.8	98.7	100.0	98.7			744	744	735	77.2
8/87	A	100.0	95.6	100.0	88.7						
	B	99.2	97.1	100.0	90.0						
	C	100.0	98.7	100.0	91.5						
	D	100.0	98.0	99.3	90.9						
	SYSTEM	99.8	97.3	99.8	90.3			744	690	672	71.3
9/87	A	100.0	100.0	100.0	100.0						
	B	100.0	99.0	100.0	99.0						
	C	100.0	99.8	100.0	99.8						
	D	95.1	94.2	100.0	94.2						
	SYSTEM	98.8	98.3	100.0	98.3			720	720	707	75.0
10/87	A	98.6	93.3	98.3	84.8						
	B	99.3	95.6	99.2	86.8						
	C	99.3	95.6	99.2	86.9						
	D	99.3	95.5	99.2	86.7						
	SYSTEM	99.1	95.0	99.0	86.3			744	676	642	63.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE PERIOD MAY THROUGH OCTOBER 1987.									
11/87	A	100.0	92.2	100.0	55.7						
	B	100.0	92.6	100.0	55.9						
	C	100.0	92.6	100.0	55.9						
	D	83.5	66.1	100.0	39.9						
	SYSTEM	95.9	85.9	100.0	51.9			720	435	374	38.3

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 1 WAS OUT OF SERVICE FROM NOVEMBER 13-24 FOR A SCHEDULED MAINTENANCE OUTAGE.									
12/87	A	100.0	98.3	100.0	98.3						
	B	99.9	97.2	100.0	97.2						
	C	100.0	98.9	100.0	98.9						
	D	100.0	98.1	100.0	98.1						
	SYSTEM	100.0	98.1	100.0	98.1			744	744	730	72.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF DECEMBER 1987.									
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR 1987.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	CENTRAL ILLINOIS PUBLIC SERV	
PLANT NAME	NEWTON	
UNIT NUMBER	1	
CITY	NEWTON	
STATE	ILLINOIS	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	575	
GROSS UNIT GENERATING CAPACITY - MW	590	
NET UNIT GENERATING CAPACITY W/FGD - MW	555	
NET UNIT GENERATING CAPACITY WO/FGD - MW	570	
EQUIVALENT SCRUBBED CAPACITY - MW	590	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1020.95	(2163480 ACFM)
BOILER FLUE GAS TEMPERATURE - C	163.9	(327 F)
STACK HEIGHT - M	162.	(530 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25353.	(10900 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		****
AVERAGE ASH CONTENT - %	12.70	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	9.50	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	3.00	
RANGE SULFUR CONTENT - %	2.8-3.2	
AVERAGE CHLORIDE CONTENT - %	0.20	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** FABRIC FILTER		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
TYPE	COLD SIDE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	1080.7	(2290000 ACFM)
INLET FLUE GAS TEMPERATURE - C	162.8	(325 F)
PRESSURE DROP - KPA	0.0	(0. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.5	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	DUAL ALKALI
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
A-E FIRM	BUELL DIVISION, ENVIROTECH
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	2.5
CURRENT STATUS	1
COMMERCIAL START-UP	12/1979
INITIAL START-UP	9/1979
CONTRACT AWARDED	8/1975

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	4.00
DESIGN CHLORIDE CONTENT - %	********

** QUENCHER/PRESATURATOR

NUMBER	4
TYPE	PRECOOLER
CONSTRUCTION MATERIAL GENERIC TYPE	NR

** ABSORBER

NUMBER	4	
NUMBER OF SPARES	0	
GENERIC TYPE	PACKED TOWER	
SPECIFIC TYPE	MOBILE BED PACKING	
TRADE NAME/COMMON TYPE	POLYSPHERE SCRUBBER	
SUPPLIER	BUELL DIVISION, ENVIROTECH	
DIMENSIONS - FT	18.0 X 48.0 X 72.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR	
GAS CONTACTING DEVICE TYPE	PLASTIC/RUBBER MOBILE BALLS	
NUMBER OF CONTACTING ZONES	1	
DISTANCE BETWEEN GAS CONTACTING ZONES - CM	45.7	(18.0IN)
LIQUID RECIRCULATION RATE - LITER/S	148.	(2351 GPM)
L/G RATIO - L/CU.M	1.3	(10.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.5	(6.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	2.5	(8.3 FT/S)
SO2 REMOVAL EFFICIENCY - %	90.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
NUMBER PER SYSTEM	8
GENERIC TYPE	IMPINGEMENT
SPECIFIC TYPE	BAFFLE
TRADE NAME/COMMON TYPE	CLOSED VANE
CONFIGURATION	VERTICAL
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

NUMBER	4
DESIGN	CENTRIFUGAL
FUNCTION	BOOSTER
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

** DAMPERS	
FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK
** TANKS	
SERVICE	NUMBER
-------	------
NR	****
** PUMPS	
SERVICE	NUMBER
-------	------
NR	****
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	VACUUM FILTER
NUMBER	1
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER	2
DIMENSIONS - FT	100.0 DIA
SHELL GENERIC MATERIAL TYPE	INORGANIC
SHELL SPECIFIC MATERIAL TYPE	HYDRAULICALLY-BONDED CONCRETE
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER	1
DIMENSIONS - FT	100.0 DIA
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
*** SALEABLE BYPRODUCTS	
NATURE	NONE
DISPOSITION	N/A
*** SLUDGE	
** TREATMENT	
METHOD	FIXATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

SITE TREATMENT	NR
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	33.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATIONS BEGAN AT THIS UNIT ON SEPTEMBER 1 WHEN FLUE GAS WAS PASSED THROUGH THE INDIVIDUAL FGD MODULES FOR TESTING PURPOSES. TESTING OF THE SYSTEM IN AN INTEGRATED MODE IS EXPECTED TO BEGIN IN DECEMBER.

10/79	SYSTEM							744			
11/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

TESTING OPERATIONS CONTINUED THROUGH OCTOBER AND NOVEMBER.

12/79	SYSTEM	75.3	60.1	74.1	59.0			744	730	439	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT BEGAN BURNING HIGH SULFUR COAL ON NOVEMBER 18-19 AT WHICH TIME THE FGD SYSTEM BEGAN OPERATIONS IN AN INTEGRATED MODE FOR THE FIRST TIME.

INITIAL START UP PROBLEMS HAVE INCLUDED MIST ELIMINATOR PLUGGING.

LINING FAILURES HAVE ALSO BEEN ENCOUNTERED DURING START UP PHASE.

THE UNIT PASSED A COMPLIANCE TEST ON DECEMBER 5, 1979. IT WAS DETERMINED THAT THE FGD SYSTEM CONTROLLED SO2 EMISSIONS TO WELL BELOW THE ALLOWABLE 1.2 LB/MM BTU STANDARD.

1/80	A	68.3	57.1	63.5	55.5						
	B	66.4	60.6	64.9	58.9						
	C	52.2	48.8	60.5	47.4						
	D	21.0	19.1	26.3	18.5						
	SYSTEM	52.0	46.4	53.8	45.1			744	723	336	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY TESTS WERE CONDUCTED TO CERTIFY THE GAS EMISSIONS MONITOR AT NEWTON.

PRESATURATOR CORROSION AND EXPANSION JOINT REPAIRS AND A DEPLETION OF THE FLYASH USED FOR SLUDGE STABILIZATION ACCOUNTED FOR THE LOW JANUARY DEPENDABILITY FIGURES.

2/80	A	61.1	42.4	45.0	42.4						
	B	74.4	55.7	57.7	55.7						
	C	78.2	58.5	59.1	58.5						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	53.4	39.2	40.4	39.2			696	696	273	

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY THE D-MODULE WAS UNAVAILABLE DUE TO THE COLLAPSE OF THE PRECOOLER MIST ELIMINATORS CAUSED BY A TEMPERATURE EXCURSION.									
		REPAIR WORK ON THE PRESATURATOR CORROSION AND EXPANSION JOINTS AS WELL AS THE FLYASH DEPLETION PROBLEM CONTINUED TO YIELD LOW DEPENDABILITY FIGURES FOR FEBRUARY.									
3/80	A	53.4	52.6	53.1	52.3						
	B	47.0	42.3	48.0	42.1						
	C	44.5	41.1	46.5	41.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	36.2	34.0	36.9	33.9			744	740	252	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE FIRST QUARTER, 1980, THE FOLLOWING PROBLEMS WERE ENCOUNTERED: THE VALVES AND PIPING IN THE PRECOOLER LOOP EXPERIENCED CORROSION. THE MIST ELIMINATOR ON THE D MODULE FAILED. THE FLY ASH SUPPLIES DEPLETED. RUBBER LINING AND DUCTWORK LINING FAILURES OCCURRED. BOOSTER FAN EXPANSION JOINT FAILURE OCCURRED. THE THICKENER EXPERIENCED PLUGGING. THESE COMBINED PROBLEMS ACCOUNTED FOR THE LOW MARCH PERFORMANCE FIGURES. FOR THE QUARTER, THE TOTAL SYSTEM WAS AVAILABLE 47.2% AND WAS UTILIZED 39.4% OF THE TIME.									
4/80	A	33.8	31.3	31.4	31.3						
	B	35.4	25.8	25.8	25.8						
	C	37.4	35.6	35.6	35.6						
	D	26.1	21.8	21.8	21.8						
	SYSTEM	33.2	28.6	28.6	28.6			720	720	206	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE NEWTON 1 FGD SYSTEM WAS OUT OF SERVICE DURING THE FIRST 12 DAYS OF APRIL FOR NECESSARY REPAIRS ON THE OUTLET DUCT LININGS. THE UTILITY INDICATED THAT THE LINING FAILURES MAY HAVE RESULTED FROM IMPROPER APPLICATION									
		DURING THE LAST 18 DAYS OF APRIL MINOR PROBLEMS WERE EXPERIENCED WITH THE OCCURANCE OF PLUGGING IN THE SODIUM CARBONATE THICKENER AND CORROSION OF THE VALVES IN THE PRESATURATOR CIRCUIT.									
5/80	A	0.0	0.0	0.0	0.0						
	B	9.7	9.6	9.6	6.2						
	C	9.7	9.6	9.6	6.2						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	4.8	4.8	4.8	3.1			744	477	23	45.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY, THE FGD SYSTEM WAS DOWN BECAUSE THE FLUIDIZING STONES WERE CAKED WITH FLY ASH. THIS WAS CAUSED BY IMPROPER WIRING OF THE HEATER WHIC BLOWS OVER THE STONES. THE HEATER WAS REWIRED AND THE FLUIDIZING STONES REPLACED. FLUIDIZING STONES ARE LOCATED IN THE FLYASH SILO. HEATED AIR PASSES THROUGH THESE POROUS STONES TO AERATE OR "FLUIDIZE" THE FLYASH SO THAT IT CAN BE CONVEYED TO THE FLYASH/SLUDGE MIXER. WHEN THE FLYASH SUPPLY IS DEPLETED OR THE MATERIAL CANNOT BE DELIVERED TO THE MIXER THE SCRUBBING SYSTEM IS SHUT DOWN. THE SLUDGE MUST BE TREATED WITH FLYASH BEFORE DISPOSAL.									
6/80	A	0.0	0.0	0.0	0.0						

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	40.3	40.3	40.3	40.3						
	C	40.4	40.4	40.4	40.4						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	20.2	20.2	20.2	20.2			720	720	145	63.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE THE A AND D MODULES WERE UNAVAILABLE FOR OPERATION BECAUSE THE MIST ELIMINATORS COLLAPSED.

THE SYSTEM WAS SHUTDOWN DURING THE FIRST HALF OF THE MONTH TO REPAIR THE DRY FLYASH COLLECTION SYSTEM WHICH ACCOUNTED FOR THE LOW B AND C MODULE FIGURES.

7/80	A	3.5	3.7	3.7	3.5						
	B	3.6	3.9	3.9	3.6						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	1.8	1.9	1.9	1.8			744	698	13	67.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY PROBLEMS WERE ENCOUNTERED WITH THE MIST ELIMINATORS.

SOME OF THE SYSTEM OUTAGE TIME RESULTED FROM REPAIRS MADE NECESSARY BY THE OCCURRENCE OF CORROSION IN THE PRESATURATOR.

SCRUBBER PLUGGING DURING JULY CONTRIBUTED TO THE LOW FGD SYSTEM AVAILABILITY.

8/80	A	0.0	0.0	0.0	0.0						
	B	64.7	50.2	50.2	49.3						
	C	51.2	34.1	36.9	33.5						
	D	37.6	21.9	24.0	21.5						
	SYSTEM	53.8	36.4	39.9	35.8			744	731	266	68.2

** PROBLEMS/SOLUTIONS/COMMENTS

PLUGGING PROBLEMS WITHIN THE FGD SYSTEM WERE THE CAUSE OF DOWN TIME IN AUGUST.

BECAUSE OF CHANGES IN SYSTEM OPERATIONS, ONLY 3 MODULES ARE NEEDED TO MEET CURRENT SO2 REGULATIONS.

9/80	A	69.0	20.3	48.6	10.0						
	B	99.6	74.6	80.3	36.8						
	C	96.9	35.8	66.8	17.6						
	D	99.6	80.8	80.8	39.9						
	SYSTEM	99.1	67.8	82.5	33.4			720	355	241	33.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS TAKEN OUT OF SERVICE ON SEPTEMBER 16, 1980 FOR A SCHEDULED MAINTENANCE OUTAGE.

10/80	A	75.9	38.5	46.3	16.9						
	B	83.7	47.9	56.5	21.1						
	C	81.0	51.6	54.5	22.7						
	D	62.4	7.0	13.7	3.1						
	SYSTEM	81.5	48.4	46.3	21.3			744	328	119	30.4

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER THE FGD SYSTEM AVAILABILITY WAS LOW AS A RESULT OF LOW LIQUOR TEMPERATURES IN THE SCRUBBER FOLLOWING THE FOUR WEEK BOILER OUTAGE. THE LIQUOR WAS PREHEATED WITH STEAM TO PREVENT PLUGGING DUE TO THE "SALTING OUT" OF REAGENTS AT LOW TEMPERATURES.									
11/80	A	93.6	69.9	98.2	69.9						
	B	79.6	59.9	100.0	59.9						
	C	89.4	58.8	97.2	58.8						
	D	79.6	70.1	99.0	70.0						
	SYSTEM	99.3	84.9	100.0	84.8			720	719	465	69.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR OUTAGES OCCURRED DURING NOVEMBER.									
12/80	A	64.5	45.9	63.8	45.7						
	B	71.5	68.7	72.2	68.4						
	C	72.7	42.1	63.4	41.9						
	D	71.5	52.8	66.7	52.6						
	SYSTEM	74.1	69.5	84.8	69.3			744	741		70.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FGD SYSTEM AVAILABILITY WAS LOWERED DURING DECEMBER AS A RESULT OF THICKENER PLUGGING PROBLEMS.									
1/81	A	90.5	75.0	99.1	75.0						
	B	73.9	58.1	99.5	58.1						
	C	96.2	79.8	100.0	79.8						
	D	88.3	57.1	100.0	57.1						
	SYSTEM	99.1	89.5	100.0	89.5			744	744	425	71.4
2/81	A	93.2	49.8	100.0	49.7						
	B	96.0	81.1	100.0	81.0						
	C	92.3	72.3	100.0	72.2						
	D	100.0	82.4	100.0	82.3						
	SYSTEM	100.0	95.1	100.0	94.9			672	671	639	66.6
3/81	A	94.1	56.9	100.0	52.7						
	B	87.1	80.6	100.0	75.0						
	C	86.4	65.9	100.0	61.0						
	D	94.1	65.5	100.0	60.6						
	SYSTEM	90.4	67.2	100.0	62.2			744	689	463	63.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER 1981.									
4/81	A	96.1	73.3	100.0	73.3						
	B	98.2	82.8	100.0	82.8						
	C	96.1	60.6	100.0	60.6						
	D	98.6	85.1	100.0	85.1						
	SYSTEM	99.9	94.5	100.0	94.5			720	720	680	73.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING APRIL.									
5/81	A	93.3	66.9	98.3	61.4						

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	85.3	78.0	98.5	71.6						
	C	91.9	76.6	98.5	70.3						
	D	93.4	43.2	97.4	39.7						
	SYSTEM	100.0	88.3	98.4	81.0			744	683	603	60.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MAY.

6/81	A	96.5	64.9	100.0	64.6						
	B	92.2	72.1	100.0	71.7						
	C	88.3	46.4	100.0	46.1						
	D	96.7	92.2	100.0	91.7						
	SYSTEM	100.0	91.9	100.0	91.3			720	716	658	64.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

7/81	A	79.6	44.5	79.2	42.9						
	B	85.3	64.6	84.8	62.2						
	C	84.5	35.0	74.3	33.7						
	D	82.5	68.2	84.9	65.7						
	SYSTEM	89.2	70.2	98.9	67.6			744	717	503	55.4
8/81	A	92.7	55.6	100.0	55.6						
	B	90.5	64.5	100.0	64.5						
	C	100.0	67.1	100.0	67.1						
	D	81.3	57.0	100.0	57.0						
	SYSTEM	100.0	81.6	100.0	81.6			744	744	607	57.9
9/81	A	88.8	45.3	100.0	38.9						
	B	99.0	78.4	100.0	67.4						
	C	100.0	79.5	100.0	68.3						
	D	97.9	38.8	100.0	33.3						
	SYSTEM	100.0	80.7	100.0	69.3			720	619	499	47.2

** PROBLEMS/SOLUTIONS/COMMENTS

A SCHEDULED MAINTENANCE OUTAGE (BOTH BOILER AND FGD SYSTEM) BEGAN ON SEPTEMBER 26.

10/81	SYSTEM	100.0	0.0	0.0	0.0			744	7	0	0.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER A SCHEDULED MAINTENANCE OUTAGE OF THE GENERATING UNIT OCCURRED.

11/81	A	98.6	63.9	76.2	63.5						
	B	85.8	27.8	63.0	27.6						
	C	97.5	55.5	73.0	55.1						
	D	85.7	61.3	73.1	60.8						
	SYSTEM	100.0	69.5	95.1	68.7			720	715	497	61.1
12/81	A	94.8	55.8	99.8	53.8						
	B	84.8	42.2	100.0	40.7						
	C	100.0	82.0	100.0	79.0						
	D	100.0	73.5	100.0	70.8						
	SYSTEM	100.0	84.5	100.0	81.4			744	717	612	52.6

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER AND DECEMBER THE UTILITY REPORTED THAT NO MAJOR FGD-RELATE PROBLEMS WERE ENCOUNTERED.									
1/82	A	100.0	58.5	100.0	58.2						
	B	100.0	97.9	100.0	97.4						
	C	50.5	42.3	100.0	42.1						
	D	93.4	79.6	100.0	79.3						
	SYSTEM	100.0	92.7	100.0	92.3			744	740	687	63.5
2/82	A	90.0	37.2	100.0	37.2						
	B	93.8	79.6	100.0	79.6						
	C	100.0	92.1	100.0	92.1						
	D	91.1	82.0	100.0	82.0						
	SYSTEM	100.0	97.0	100.0	97.0			672	672	652	70.1
3/82	A	90.9	40.1	84.2	40.1						
	B	93.1	91.4	92.4	91.4						
	C	80.8	61.7	90.0	61.7						
	D	90.5	61.7	89.1	61.7						
	SYSTEM	100.0	85.2	100.0	85.2			744	744	634	66.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER 1982.									
4/82	A	100.0	60.9	100.0	46.5						
	B	98.2	78.9	100.0	60.3						
	C	94.9	91.7	100.0	70.0						
	D	95.0	23.5	100.0	17.9						
	SYSTEM	100.0	85.0	100.0	64.9			720	550	467	43.3
5/82	A	71.0	0.0		0.0						
	B	100.0	94.3	100.0	26.5						
	C	100.0	40.7	100.0	11.4						
	D	99.3	95.7	100.0	26.9						
	SYSTEM	100.0	76.9	100.0	21.6			744	209	161	13.1
6/82	A	0.0	0.0		0.0						
	B	99.7	97.7	100.0	97.5						
	C	100.0	62.7	100.0	62.6						
	D	98.3	52.6	100.0	52.5						
	SYSTEM	99.4	71.0	100.0	70.9			720	719	510	38.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER.									
7/82	A	22.3	14.0	92.8	13.8						
	B	86.6	79.8	98.8	79.0						
	C	94.1	50.0	97.4	49.5						
	D	98.9	81.1	98.7	80.2						
	SYSTEM	97.8	75.2	100.0	74.4			744	737	553	45.5
8/82	A	98.5	97.8	99.5	97.8						
	B	0.0	0.0		0.0						
	C	98.9	76.2	100.0	76.2						
	D	100.0	48.4	100.0	48.4						
	SYSTEM	99.1	74.2	99.8	74.2			744	744	522	43.7

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/82	A	100.0	78.7	100.0	76.4						
	B	0.0	0.0		0.0						
	C	100.0	70.8	100.0	68.8						
	D	100.0	71.2	100.0	69.2						
	SYSTEM	100.0	73.6	100.0	71.4			720	699	514	41.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1982.

10/82	A	48.3	45.7	90.8	45.2						
	B	48.4	35.5	96.0	35.1						
	C	96.5	58.8	94.3	58.2						
	D	93.3	87.8	96.1	86.8						
	SYSTEM	95.5	75.9	100.0	75.1			744	736	559	50.6
11/82	A	0.0	0.0		0.0						
	B	92.4	88.0	97.9	76.3						
	C	95.4	42.1	95.3	36.5						
	D	97.1	89.9	97.7	77.9						
	SYSTEM	96.8	73.3	97.4	63.6			720	624	458	38.9
12/82	A	51.1	35.1	91.7	23.8						
	B	94.6	70.8	96.0	48.0						
	C	91.1	45.4	94.2	30.8						
	D	74.6	63.1	96.4	42.7						
	SYSTEM	93.3	73.4	100.0	49.7			744	504	370	30.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER OF 1982.

1/83	A	77.3	28.0	100.0	19.0						
	B	100.0	100.0	100.0	91.3						
	C	99.3	39.3	88.8	26.6						
	D	88.3	100.0	100.0	82.4						
	SYSTEM	100.0	77.5	100.0	73.1			744	504	544	48.0
2/83	A	99.6	70.5	100.0	70.5						
	B	41.8	36.0	99.2	36.0						
	C	100.0	18.2	100.0	18.2						
	D	100.0	100.0	100.0	100.0						
	SYSTEM	99.9	74.3	100.0	74.3			672	672	500	54.4
3/83	A	81.7	56.9	100.0	56.9						
	B	94.4	94.1	99.7	94.1						
	C	19.4	3.0	100.0	3.0						
	D	94.1	94.1	100.0	94.1						
	SYSTEM	97.6	81.5	99.7	81.5			744	744	606	64.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1983.

4/83	A	99.4	95.6	100.0	95.6						
	B	97.8	89.3	100.0	89.3						
	C	0.0	0.0		0.0						
	D	93.3	88.9	100.0	88.9						
	SYSTEM	96.8	91.3	100.0	100.0			720	720	720	76.8

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE C WAS OUT OF SERVICE DURING THE ENTIRE MONTH OF APRIL FOR LINING REPAIRS.									
5/83	A	100.0	100.0	100.0	1.3						
	B	100.0	50.0	100.0	0.7						
	C	0.0	0.0		0.0						
	D	100.0	100.0	100.0	1.3						
	SYSTEM	100.0	83.5	100.0	1.1			744	10	8	0.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS REMOVED FROM SERVICE ON MAY 1 FOR AN ANNUAL MAINTENANCE OUTAGE.									
		MODULE C REMAINED OUT OF SERVICE DURING MAY FOR REPAIR OF THE FLAKEGLASS LINING.									
6/83	A	99.9	77.9	99.7	45.0						
	B	100.0	71.2	100.0	41.1						
	C	100.0	73.6	100.0	42.5						
	D	0.0	0.0		0.0						
	SYSTEM	99.9	76.2	100.0	44.0			720	416	317	43.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT REMAINED OUT OF SERVICE UNTIL JUNE 15 FOR THE ANNUAL MAINTENANCE OUTAGE.									
		MODULE D WAS OUT OF SERVICE ALL MONTH FOR REPAIR OF THE FLAKEGLASS LINING.									
7/83	A	100.0	93.3	100.0	93.3						
	B	98.9	98.9	100.0	98.9						
	C	100.0	100.0	100.0	100.0						
	D	0.0	0.0		0.0						
	SYSTEM	99.6	97.4	100.0	97.4			744	744	725	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE D WAS OUT OF SERVICE DURING THE ENTIRE MONTH OF JULY FOR ABSORBER LINING REPAIRS.									
8/83	A	100.0	87.0	100.0	87.0						
	B	94.6	82.9	100.0	82.9						
	C	100.0	99.6	100.0	99.6						
	D	16.8	15.1	100.0	15.1						
	SYSTEM	100.0	94.8	100.0	94.8			744	744	706	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ABSORBER LINER REPAIRS AT MODULE D CONTINUED IN AUGUST.									
9/83	A	65.9	56.7	99.3	56.7						
	B	71.3	32.8	100.0	32.8						
	C	100.0	94.9	100.0	94.9						
	D	100.0	96.7	100.0	96.7						
	SYSTEM	100.0	93.7	100.0	93.7			720	720	674	85.2

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS UNAVAILABLE DURING PART OF SEPTEMBER DUE TO REPAIR OF THE ABSORBER'S FLAKEGLASS LINING.									
		MODULE B WAS UNAVAILABLE DURING PART OF SEPTEMBER DUE TO SCALE AND TRASH BUILD UP IN THE RECIRCULATION PUMP SUCTION STRAINERS CAUSING PLUGGING PROBLEMS.									
10/83	A	82.3	57.8	100.0	57.8						
	B	61.3	31.9	100.0	31.9						
	C	100.0	68.8	100.0	68.8						
	D	84.7	57.8	100.0	57.8						
	SYSTEM	100.0	72.1	100.0	72.1			744	744	536	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES A AND D WERE DOWN DURING PART OF OCTOBER DUE TO DUCTWORK LINING REPAIRS.									
		MODULE B WAS OUT OF SERVICE DURING PART OF THE MONTH DUE TO PUMP PACKING SLEEVE FAILURE.									
11/83	A	100.0	99.8	100.0	85.0						
	B	10.6	0.0		0.0						
	C	98.9	98.4	100.0	83.8						
	D	100.0	96.7	100.0	82.4						
	SYSTEM	100.0	98.3	100.0	83.7			720	613	603	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE B WAS DOWN DURING NOVEMBER DUE TO RECIRCULATING PUMP FAILURE.									
12/83	A	80.6	67.3	100.0	57.9						
	B	93.5	88.4	99.1	76.1						
	C	91.9	57.3	95.1	49.3						
	D	98.1	89.5	99.5	77.0						
	SYSTEM	100.0	100.0	100.0	86.8			744	640	646	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A UNIT OUTAGE OCCURRED FROM DECEMBER 1 TO DECEMBER 5, 1983.									
1/84	A	98.1	93.1	99.9	93.1						
	B	61.3	41.0	99.7	41.0						
	C	93.1	49.7	99.7	49.7						
	D	99.9	89.9	99.9	89.9						
	SYSTEM	100.0	91.3	100.0	91.3			744	744	679	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JANUARY.									
2/84	A	59.5	12.0	100.0	10.2						
	B	92.8	97.6	100.0	83.2						
	C	92.7	84.5	100.0	72.0						
	D	88.8	52.4	100.0	44.7						
	SYSTEM	100.0	82.2	100.0	70.0			696	593	487	

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS UNAVAILABLE DURING PART OF FEBRUARY DUE TO A PLUGGED SPRAY NOZZLE.									
3/84	A	89.0	9.9	100.0	9.5						
	B	100.0	98.5	100.0	95.0						
	C	100.0	99.2	100.0	95.7						
	D	89.7	51.6	100.0	49.7						
	SYSTEM	100.0	86.4	100.0	83.3			744	718	620	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MARCH.									
4/84	A	81.1	55.6	100.0	50.1						
	B	94.7	88.2	100.0	79.6						
	C	100.0	90.5	100.0	81.7						
	D	38.5	28.0	100.0	25.3						
	SYSTEM	100.0	87.5	100.0	78.9			720	650	568	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS REMOVED FROM SERVICE APRIL 28 FOR MAINTENANCE.									
5/84	A	100.0			0.0						
	B	100.0			0.0						
	B	100.0			0.0						
	C	100.0			0.0						
	D	100.0			0.0						
	SYSTEM	100.0			0.0			744	0	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT REMAINED OUT OF SERVICE THROUGHOUT MAY DUE TO THE ANNUAL MAINTENANCE OUTAGE.									
6/84	A	0.0	0.0		0.0						
	B	57.2	96.8	99.7	51.0						
	C	56.9	61.2	98.7	32.2						
	D	56.1	74.4	98.6	39.2						
	SYSTEM	56.8	77.5	99.0	40.8			720	379	294	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MODULE A WAS BEING RELINED DURING JUNE.									
7/84	A	62.5	53.5	100.0	53.5						
	B	100.0	50.3	100.0	50.3						
	C	100.0	34.4	100.0	34.4						
	D	100.0	82.1	100.0	82.1						
	SYSTEM	100.0	73.4	100.0	73.4			744	744	546	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		RELINING CONTINUED AT MODULE A DURING JULY.									
8/84	A	94.0	40.5	100.0	40.1						
	B	100.0	65.2	100.0	64.5						
	C	85.6	21.7	100.0	21.5						

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	D	88.3	72.6	100.0	71.9						
	SYSTEM	100.0	66.7	100.0	66.0			744	737	491	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD RELATED PROBLEMS AROSE IN AUGUST.									
9/84	A	85.3	7.8	38.7	7.4						
	B	88.3	57.0	81.9	53.5						
	C	88.3	39.6	75.9	37.2						
	D	87.6	20.1	61.8	18.9						
	SYSTEM	100.0	41.5	86.1	39.0			720	676	281	
10/84	A	94.4	69.1	92.4	69.1						
	B	39.7	39.7	87.5	39.7						
	C	94.4	90.1	94.1	90.1						
	D	88.2	27.2	100.0	27.2						
	SYSTEM	100.0	75.3	100.0	75.3			744	744	560	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF SEPTEMBER AND OCTOBER.									
11/84	A	70.8	75.0	100.0	52.9						
	B	30.0	16.1	100.0	11.4						
	C	100.0	92.3	100.0	65.1						
	D	100.0	50.8	100.0	35.8						
	SYSTEM	100.0	78.1	100.0	55.1			720	508	397	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MODULES A AND B WERE UNAVAILABLE MOST OF THE MONTH OF NOVEMBER FOR RELINING.									
12/84	A	29.8	28.0	100.0	28.0						
	B	63.2	42.5	100.0	42.5						
	C	48.7	18.8	100.0	18.8						
	D	66.0	59.1	100.0	59.1						
	SYSTEM	69.2	49.5	100.0	49.5			744	744	368	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD WAS NOT AVAILABLE TO OPERATE MOST OF DECEMBER DUE TO INSUFFICIENT FLY ASH FOR WASTE STABILIZATION.									
1/85	A	87.9	68.4	99.0	68.4						
	B	100.0	74.1	100.0	74.1						
	C	89.7	24.9	100.0	24.9						
	D	92.7	81.9	100.0	81.9						
	SYSTEM	100.0	83.1	100.0	83.1			744	744	618	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTH OF JANUARY.									
2/85	A	100.0	99.1	100.0	95.7						
	B	100.0	87.7	100.0	84.7						
	C	98.7	44.5	99.7	43.0						
	D	65.6	55.2	100.0	53.3						
	SYSTEM	100.0	95.5	100.0	92.2			672	649	620	

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE D-MODULE PRESATURATOR WAS OUT OF SERVICE DURING PART OF THE MONTH FOR RUBBER LINING REPAIR.									
3/85	A	100.0	73.1	100.0	70.3						
	B	100.0	95.9	100.0	92.2						
	C	100.0	40.5	100.0	39.0						
	D	72.3	62.1	100.0	59.7						
	SYSTEM	100.0	90.6	100.0	87.1			744	715	648	
4/85	A	100.0	61.5	100.0	61.5						
	B	100.0	98.8	100.0	98.8						
	C	100.0	25.4	100.0	25.4						
	D	76.0	75.6	100.0	75.6						
	SYSTEM	100.0	87.1	100.0	87.1			720	720	627	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED NO FGD-RELATED PROBLEMS FOR THE MONTHS OF MARCH AND APRIL.									
5/85	A	100.0	58.7	100.0	3.0						
	B	100.0	100.0	100.0	5.0						
	C	100.0	0.0		0.0						
	D	100.0	100.0	100.0	5.0						
	SYSTEM	100.0	86.2	100.0	4.3			744	38	32	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE GENERATING UNIT WAS OUT OF SERVICE FOR A SCHEDULED ANNUAL MAINTENANCE OUTAGE THROUGH MOST OF MAY.									
6/85	A	99.9	95.9	99.7	48.3						
	B	53.3	0.0		0.0						
	C	99.9	26.7	99.0	13.5						
	D	99.9	91.2	99.7	46.0						
	SYSTEM	100.0	71.3	99.5	35.9			720	363	259	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE ANNUAL UNIT OUTAGE CONTINUED INTO JUNE.									
7/85	A	98.1	42.2	100.0	37.5						
	B	100.0	65.4	100.0	58.1						
	C	29.0	6.1	100.0	5.4						
	D	100.0	98.0	100.0	87.1						
	SYSTEM	100.0	70.5	100.0	62.7			744	661	466	
8/85	A	97.8	19.5	100.0	19.1						
	B	100.0	94.3	100.0	92.2						
	C	100.0	57.2	100.0	55.9						
	D	100.0	60.1	100.0	58.7						
	SYSTEM	100.0	77.0	100.0	75.3			744	728	560	
9/85	A	99.0	57.4	100.0	55.4						
	B	91.1	66.9	100.0	64.6						
	C	96.4	86.8	100.0	83.8						
	D	100.0	69.4	100.0	66.9						
	SYSTEM	100.0	93.5	100.0	90.2			720	695	650	
10/85	A	96.1	56.2	100.0	54.4						

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	99.2	98.5	100.0	95.4						
	C	99.9	50.9	100.0	49.3						
	D	99.2	82.0	100.0	79.4						
	SYSTEM	100.0	95.9	100.0	92.9			744	721	691	

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTHS OF JULY THROUGH OCTOBER.

11/85	A	83.5	63.1	99.5	53.6						
	B	86.4	97.0	99.7	82.4						
	C	23.9	21.9	95.7	18.6						
	D	85.6	97.8	98.7	83.1						
	SYSTEM	93.1	93.3	100.0	79.2			720	612	570	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE C WAS OUT OF SERVICE FOR PART OF THE MONTH. THE UTILITY DID NOT SPECIFY THE REPAIR DETAILS.

12/85	A	100.0	98.4	100.0	91.8						
	B	63.7	20.9	100.0	19.5						
	C	79.6	81.1	100.0	75.7						
	D	100.0	98.5	100.0	91.9						
	SYSTEM	100.0	99.6	100.0	93.0			744	694	692	

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTH OF DECEMBER.

1/86	A	83.2	78.1	94.5	72.2						
	B	83.2	71.4	95.3	66.0						
	C	83.2	79.7	94.6	73.7						
	D	8.7	5.8	100.0	5.4						
	SYSTEM	86.1	78.4	100.0	72.4			744	687	539	

** PROBLEMS/SOLUTIONS/COMMENTS

THE LOWER THAN EXPECTED FGD SYSTEM AVAILABILITY DURING JANUARY RESULTED FROM A THICKENER RAKE DRIVE FAILURE.

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF JANUARY.

2/86	A	99.1	93.0	99.5	91.2						
	B	34.2	19.3	100.0	18.9						
	C	99.6	94.8	99.5	93.0						
	D	69.9	61.6	99.3	60.4						
	SYSTEM	100.0	89.5	100.0	87.8			672	659	590	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBING SYSTEM WAS REMOVED FROM SERVICE FOR PART OF THE MONTH TO ALLOW INSPECTION OF THE MAIN STACK.

3/86	A	100.0	50.9	100.0	39.2						
	B	30.5	28.2	100.0	21.8						
	C	100.0	44.1	100.0	34.0						
	D	77.8	21.6	100.0	16.7						
	SYSTEM	100.0	48.3	100.0	37.2			744	574	277	
4/86	A	98.3	68.6	100.0	68.5						

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	72.0	100.0	71.9						
	C	98.5	59.8	100.0	59.7						
	D	96.3	18.8	100.0	18.8						
	SYSTEM	100.0	73.1	100.0	73.0			720	719	525	
5/86	A	84.9	71.4	100.0	64.8						
	B	89.4	37.5	100.0	34.0						
	C	77.0	17.8	100.0	16.1						
	D	89.1	60.3	100.0	54.7						
	SYSTEM	100.0	62.3	100.0	56.5			744	675	421	
6/86	A	71.0	66.7	100.0	66.7						
	B	100.0	52.5	100.0	52.5						
	C	79.0	66.8	100.0	66.8						
	D	90.0	38.9	100.0	38.9						
	SYSTEM	100.0	75.0	100.0	75.0			720	720	540	
7/86	A	95.7	94.4	100.0	94.4						
	B	88.0	28.5	100.0	28.5						
	C	100.0	96.5	100.0	96.5						
	D	98.9	14.7	100.0	14.7						
	SYSTEM	100.0	78.0	100.0	78.0			744	744	580	
8/86	A	100.0	78.8	100.0	73.8						
	B	69.0	0.4	100.0	0.4						
	C	100.0	78.8	100.0	73.8						
	D	100.0	8.5	100.0	7.9						
	SYSTEM	100.0	55.5	100.0	52.0			744	697	387	
9/86	A	100.0			0.0						
	B	100.0			0.0						
	C	100.0			0.0						
	D	100.0			0.0						
	SYSTEM	100.0			0.0			720	0	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT AND FGD SYSTEM WERE OFF-LINE FOR THE ENTIRE MONTH OF SEPTEMBER FOR A SCHEDULED UNIT OUTAGE.

10/86	A	100.0	79.7	100.0	51.9						
	B	20.2	12.8	100.0	8.3						
	C	58.1	85.7	100.0	55.8						
	D	0.0	0.0		0.0						
	SYSTEM	59.4	59.4	100.0	38.7			744	485	288	
11/86	A	100.0	72.2	100.0	72.2						
	B	99.2	44.0	100.0	44.0						
	C	100.0	89.0	100.0	89.0						
	D	18.1	14.9	100.0	14.9						
	SYSTEM	100.0	73.4	100.0	73.4			720	720	528	
12/86	A	100.0	98.9	100.0	89.5						
	B	67.3	6.1	100.0	5.5						
	C	49.5	33.1	100.0	30.0						
	D	99.1	78.3	100.0	70.8						
	SYSTEM	100.0	72.1	100.0	65.3			744	673	486	

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF APRIL THROUGH DECEMBER 1986.

1/87	A	49.5	14.4	100.0	13.4						

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	99.2	100.0	92.3						
	C	66.0	50.4	100.0	46.9						
	D	99.3	81.4	100.0	75.8						
	SYSTEM	100.0	81.8	100.0	76.2			744	693	567	
2/87	A	64.4	55.4	98.4	53.5						
	B	95.7	78.6	98.5	75.9						
	C	98.8	69.7	98.3	67.3						
	D	67.1	53.0	100.0	51.1						
	SYSTEM	100.0	85.6	100.0	82.6			672	649	555	
3/87	A	95.3	84.1	100.0	66.9						
	B	94.2	86.9	100.0	69.2						
	C	61.4	55.0	100.0	43.8						
	D	100.0	64.6	100.0	51.5						
	SYSTEM	100.0	96.9	100.0	77.2			744	593	574	
4/87	A	41.5	17.3	100.0	16.1						
	B	100.0	98.4	100.0	91.5						
	C	93.3	80.4	100.0	74.9						
	D	100.0	89.6	100.0	83.3						
	SYSTEM	100.0	95.2	100.0	88.6			720	670	638	
5/87	A	78.5	36.9	100.0	32.5						
	B	83.5	74.0	100.0	65.2						
	C	96.4	82.7	100.0	72.8						
	D	100.0	91.2	100.0	80.4						
	SYSTEM	100.0	94.9	100.0	83.6			744	656	622	
6/87	A	98.3	97.1	100.0	82.6						
	B	58.6	50.0	100.0	42.5						
	C	89.7	80.7	100.0	68.6						
	D	82.9	53.2	100.0	45.3						
	SYSTEM	100.0	93.7	100.0	79.7			720	613	574	
7/87	A	100.0	41.9	100.0	34.9						
	B	100.0	83.1	100.0	69.2						
	C	100.0	86.6	100.0	72.2						
	D	90.9	55.5	100.0	46.2						
	SYSTEM	100.0	89.0	100.0	74.2			744	620	552	
8/87	A	98.9	90.9	100.0	66.5						
	B	99.6	70.7	100.0	51.7						
	C	88.0	56.2	100.0	41.1						
	D	80.5	48.7	100.0	35.6						
	SYSTEM	100.0	88.8	100.0	65.0			744	545	484	
9/87	A	100.0	70.2	100.0	32.1						
	B	100.0	58.4	100.0	26.7						
	C	100.0	82.4	100.0	37.6						
	D	100.0	26.7	100.0	12.2						
	SYSTEM	100.0	79.2	100.0	36.2			720	329	261	
10/87	A	100.0	95.0	100.0	95.0						
	B	97.6	37.0	100.0	37.0						
	C	99.6	54.2	100.0	54.2						
	D	92.5	89.8	100.0	89.8						
	SYSTEM	100.0	92.0	100.0	92.0			744	744	684	
11/87	A	70.0	48.8	100.0	43.8						
	B	84.3	65.6	100.0	58.7						
	C	87.6	60.4	100.0	54.2						
	D	100.0	79.3	100.0	71.1						
	SYSTEM	100.0	84.7	100.0	75.9			720	645	547	

UTILITY FGD SURVEY: JANUARY - DECEMBER 1987

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
12/87	A	100.0	81.3	100.0	81.3						
	B	84.9	38.8	100.0	38.8						
	C	100.0	80.9	100.0	80.9						
	D	87.1	35.2	100.0	35.2						
	SYSTEM	100.0	78.8	100.0	78.8			744	744	586	
12/87	SYSTEM							744	9999		999.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO MAJOR FGD-RELATED PROBLEMS FOR THE YEAR 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	CINCINNATI GAS & ELECTRIC	
PLANT NAME	EAST BEND	
UNIT NUMBER	2	
CITY	RABBIT HASH	
STATE	KENTUCKY	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	650	
GROSS UNIT GENERATING CAPACITY - MW	643	
NET UNIT GENERATING CAPACITY W/FGD - MW	600	
NET UNIT GENERATING CAPACITY WO/FGD - MW	619	
EQUIVALENT SCRUBBED CAPACITY - MW	643	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1763.96	(3738000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	357.2	(675 F)
STACK HEIGHT - M	198.	(650 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	7.2	(23.5 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25586.	(11000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10800-13000
AVERAGE ASH CONTENT - %	11.90	
RANGE ASH CONTENT - %	9.0-14.0	
AVERAGE MOISTURE CONTENT - %	10.00	
RANGE MOISTURE CONTENT - %	9.0-11.0	
AVERAGE SULFUR CONTENT - %	2.60	
RANGE SULFUR CONTENT - %	1.0-4.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** FABRIC FILTER		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	HOT SIDE	
SUPPLIER	WESTERN PREC. DIVISION, JOY	
INLET FLUE GAS CAPACITY - CU.M/S	1764.0	(3738000 ACFM)
INLET FLUE GAS TEMPERATURE - C	357.2	(675 F)
PRESSURE DROP - KPA	0.1	(1. IN-H20)
PARTICLE REMOVAL EFFICENCY - %	99.6	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	

CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	BABCOCK & WILCOX	
A-E FIRM	SARGENT & LUNDY	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.00	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	87.00	
ENERGY CONSUMPTION - %	3.0	
CURRENT STATUS	1	
COMMERCIAL START-UP	3/1981	
INITIAL START-UP	3/1981	
CONTRACT AWARDED	3/1978	

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	5.10	
DESIGN COAL HEAT CONTENT - J/G	25586.0	(11000 BTU/LB)
DESIGN COAL ASH CONTENT - %	11.90	
DESIGN MOISTURE CONTENT - %	10.00	
DESIGN CHLORIDE CONTENT - %	********	
SPACE REQUIREMENTS - SQ M	13461.2	(144900 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	144.0	

** QUENCHER/PRESATURATOR

NUMBER	3	
TYPE	VENTURI	
SUPPLIER	BABCOCK & WILCOX	
INLET GAS FLOW - CU. M/S	398.49	(844433 ACFM)
INLET GAS TEMPERATURE - C	136.7	(278 F)
PRESSURE DROP - KPA	0.2	(1.0 IN-H2O)
LIQUID RECIRCULATION RATE - LITERS/S	552.	(8760 GPM)
L/G RATIO - L/CU. M	1.3	(10.0 GAL/1000 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** ABSORBER

NUMBER	3	
NUMBER OF SPARES	0	
GENERIC TYPE	COUNTER CURRENT TRAY TOWER	
SPECIFIC TYPE	SIEVE TRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	BABCOCK & WILCOX	
DIMENSIONS - FT	43.0 DIA X 95.0	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 316	
LINER GENERIC MATERIAL	NA	
LINER SPECIFIC MATERIAL	NA	
LINER MATERIAL TRADE NAME/COMMON TYPE	NA	
GAS CONTACTING DEVICE TYPE	PERFORATED TRAYS	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	2205.	(35000 GPM)
L/G RATIO - L/CU.M	6.7	(50.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.6	(2.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	2.4	(8.0 FT/S)
INLET GAS FLOW - CU. M/S	329.66	(698585 ACFM)
INLET GAS TEMPERATURE - C	50.6	(123 F)
SO2 REMOVAL EFFICIENCY - %	87.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	6	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	2	
GENERIC TYPE	IMPINGEMENT	

CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
MANUFACTURER	BABCOCK & WILCOX	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	2	
NUMBER OF PASSES PER STAGE	1	
FREEBOARD DISTANCE - M	2.13	(7.0 FT)
DISTANCE BETWEEN STAGES - CM	182.88	(72.0 IN)
DISTANCE BETWEEN VANES - CM	7.6	(3.00 IN)
VANE ANGLES - DEGREES	90	
PRESSURE DROP - KPA	0.1	(0.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	2.4	(8.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	BLENDED	
WASH FREQUENCY	INTERMITTENT	
WASH RATE - L/S	58.4	(926 GAL/MIN)

** REHEATER

NUMBER	1	
NUMBER OF SPARES	0	
NUMBER PER MODULE	0	
GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	STEAM	
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE	
LOCATION	PLENUM COMBINING GAS FLOW FROM INDIVIDUAL ABSORB	
TEMPERATURE INCREASE - C	13.9	(25 F)
INLET FLUE GAS TEMPERATURE - C	51.7	(125 F)
NUMBER OF HEAT EXCHANGER BANKS	2	
CONSTRUCTION MATERIAL GENERIC TYPE	NA	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NA	

** FANS

NUMBER	4	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	WESTINGHOUSE	
FUNCTION	UNIT	
APPLICATION	INDUCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	1175.12	(2490185 ACFM)
FLUE GAS TEMPERATURE - C	136.7	(278 F)
PRESSURE DROP - KPA	7.3	(23.8 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	WESTINGHOUSE	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	639.25	(1354635 ACFM)
FLUE GAS TEMPERATURE - C	37.8	(100 F)
PRESSURE DROP - KPA	5.3	(17.5 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** FANS

NUMBER	3	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	WESTINGHOUSE	
FUNCTION	BOOSTER	
APPLICATION	INDUCED DRAFT	
SERVICE	DRY	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	3	
FUNCTION	SHUT-OFF	

CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

GENERIC TYPE	LOUVER
SPECIFIC TYPE	OPPOSED BLADE
MANUFACTURER	BABCOCK & WILCOX
MODULATION	OPEN
SERVICE CONDITIONS	278
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DAMPERS

FUNCTION	CONTROL
MODULATION	OPEN

** DUCTWORK

LOCATION	AFTER SCRUBBER
CONFIGURATION	CIRCULAR
DIMENSIONS	17 FT. DIAMETER
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	40 MILS PLASITE 4005/2 INCHES KAOCRETE HS

** REAGENT PREPARATION EQUIPMENT

FUNCTION	SLAKER
DEVICE	COMPARTMENTED
DEVICE TYPE	PASTE
MANUFACTURER	WALLACE & TIERNAN
NUMBER	8
NUMBER OF SPARES	2
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	3.6 (4 TPH)
PRODUCT QUALITY - % SOLIDS	15.8

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	3
REAGENT PREP PRODUCT	1
THICKENER OVERFLOW	1
THICKENER UNDERFLOW	1

** PUMPS

SERVICE	NUMBER
FEED SLURRY	2
ABSORBER RECIRCULATION	12
QUENCHER RECIRCULATION	6
THICKENER UNDERFLOW	4
CLARIFIED RECYCLE	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	4
NUMBER OF SPARES	0
CONFIGURATION	HORIZONTAL-PARALLEL
DIMENSIONS - FT	12 FT. DIAMETER X 20 FT.
CAPACITY	22 TONS/HR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	POLYPROPYLENE
BELT GENERIC MATERIAL TYPE	RUBBER
BELT SPECIFIC MATERIAL TYPE	USBM 28
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	668 GPM, 30% SOLIDS
OUTLET STREAM CHARACTERISTICS	47.5% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	200 GPM, 30% SOLIDS
OUTLET STREAM DISPOSITION	MIXED WITH FLYASH & LIME
OVERFLOW STREAM DISPOSITION	THICKENERS

CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

** SOLIDS CONCENTRATING/DEWATERING		
DEVICE	THICKENER	
NUMBER	2	
NUMBER OF SPARES	0	
CONFIGURATION	CYLINDRICAL	
DIMENSIONS - FT	190.0 DIA X 25.0	
CAPACITY	5000000 GALLONS	
SHELL GENERIC MATERIAL TYPE	CARBON STEEL	
SHELL SPECIFIC MATERIAL TYPE	N/A	
LINER GENERIC MATERIAL TYPE	POLYESTER RESIN	
LINER SPECIFIC MATERIAL TYPE	FLAKE GLASS	
BELT GENERIC MATERIAL TYPE	N/A	
BELT SPECIFIC MATERIAL TYPE	N/A	
FEED STREAM SOURCE	ABSORBER BLEED	
FEED STREAM CHARACTERISTICS	1458 GPM, 7% SOLIDS	
OUTLET STREAM CHARACTERISTICS	655 GPM, 30% SOLIDS	
OVERFLOW STREAM CHARACTERISTICS	1129 GPM, 0% SOLIDS	
OUTLET STREAM DISPOSITION	PUMPED TO WASTE STABILIZATION SYSTEM	
OVERFLOW STREAM DISPOSITION	RECYCLED	
*** SALEABLE BYPRODUCTS		
NATURE	NONE	
DISPOSITION	N/A	
*** SLUDGE		
FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	16.6	(18.3 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	75.0	
% CASO3 - DRY	77.0	
% CASO4 - DRY	17.0	
% CAOH2 - DRY	3.0	
% CACO3 - DRY	1.0	
% ASH - DRY	0.0	
% SODIUM COMPOUNDS - DRY	0.0	
% OTHER COMPOUNDS - DRY	2.0	
** TREATMENT		
METHOD	FIXATION	
DEVICE	PUG MILL	
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!	
INLET FLOW RATE - LITER/S	42.1	(668 GPM)
INLET QUALITY - %	30.0	
** DISPOSAL		
NATURE	FINAL	
TYPE	LANDFILL	
LOCATION	ON-SITE	
SITE TRANSPORTATION METHOD	TRUCK	
SITE TREATMENT	UNLINED	
SITE DIMENSIONS	160 ACRES/120 FEET	
SITE CAPACITY - CU.M	23481600	(19200.0 ACRE-FT)
SITE SERVICE LIFE - YRS	35	
** WATER BALANCE		
WATER LOOP TYPE	CLOSED	
EVAPORATION WATER LOSS - LITER/S	21.9	(348 GPM)
SLUDGE HYDRATION WATER LOSS - LITER/S	0.4	(7 GPM)
SLUDGE INTERSTITIAL WATER LOSS - LITERS/S	6.9	(109 GPM)
POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	0	
EFFLUENT WATER LOSS - LITERS/S	0.0	(0 GPM)
RECEIVING WATER STREAM	NONE	
MAKEUP WATER ADDITION - LITERS/S	29.2	(464 GPM)
SOURCE OF MAKEUP WATER	OHIO RIVER	
** CHEMICALS AND CONSUMPTION		
FUNCTION	ABSORBENT	
NAME	THIOSORBIC LIME	

CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

PRINCIPAL CONSTITUENT	90% CAO, 5% MGO, 5% INERT
SOURCE/SUPPLIER	DRAVO LIME
CONSUMPTION	250 TONS/DAY
UTILIZATION - %	96.6
POINT OF ADDITION	RECIRCULATION TANK

** FGD SPARE CAPACITY INDICES

SCRUBBER - %	0.0
ABSORBER - %	0.0
MIST ELIMINATOR - %	0.0
REHEATER - %	0.0
FAN - %	0.0
SLAKER - %	25.0
EFFLUENT HOLD TANK - %	0.0
RECIRCULATION PUMP - %	25.0
THICKENER - %	0.0
VACUUM FILTER - %	0.0

** FGD SPARE COMPONENT INDICES

SCRUBBER	0.0
ABSORBER	0.0
MIST ELIMINATOR	0.0
REHEATER	0.0
FAN	0.0
SLAKER	2.0
EFFLUENT HOLD TANK	0.0
RECIRCULATION PUMP	3.0
THICKENER	0.0
VACUUM FILTER	0.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	A	98.3	55.3	100.0	14.1						
	B	97.6	48.4	100.0	12.4						
	C	74.4	0.0		0.0						
	SYSTEM	100.0	51.8	100.0	13.2	47.70		744	190	99	12.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM BEGAN INITIAL AND COMMERCIAL OPERATIONS IN MARCH 1981. NO MAJOR PROBLEMS WERE ENCOUNTERED DURING THIS TIME.									
4/81	A	96.3	69.2	100.0	59.0						
	B	89.7	50.6	100.0	43.2						
	C	86.3	47.9	100.0	40.8						
	SYSTEM	100.0	83.8	100.0	71.5	78.70		720	614	515	60.4
5/81	A	84.5	76.6	100.0	60.3						
	B	71.5	35.9	100.0	28.2						
	C	41.2	10.3	100.0	8.1						
	SYSTEM	98.6	61.5	100.0	48.3	96.10		744	586	360	41.4
6/81	A	100.0	82.4	100.0	70.5						
	B	67.8	44.8	100.0	38.3						
	C	94.9	72.0	100.0	61.6						
	SYSTEM	100.0	99.6	100.0	85.2	84.60		720	616	614	62.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE FGD SYSTEM HAS OPERATED SINCE MID-MARCH WITH NO MAJOR PROBLEMS.									
7/81	A	89.3	56.4	100.0	56.3						
	B	91.7	72.0	100.0	71.9						
	C	97.4	57.2	100.0	57.1						
	SYSTEM	100.0	92.7	100.0	92.6	92.40		744	743	689	79.6

CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
8/81	A	45.9	15.8	100.0	15.3						
	B	96.0	92.5	100.0	89.7						
	C	97.5	81.8	100.0	79.3						
	SYSTEM	100.0	95.0	100.0	92.1	82.30		744	721	685	76.2
9/81	A	85.7	67.5	100.0	62.9						
	B	96.6	84.6	100.0	78.8						
	C	33.5	10.4	100.0	9.7						
	SYSTEM	100.0	81.3	100.0	75.7	77.40		720	671	545	65.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE ONLY PROBLEM ENCOUNTERED DURING THE THIRD QUARTER INVOLVED ONE OF THE TWO THICKENERS. THE PROBLEM NECESSITATED USE OF THE EMERGENCY ASH POND FOR A SHORT PERIOD OF TIME TO HANDLE THE SLUDGE BEING GENERATED.

THE UTILITY REPORTED THAT TESTING WITH STRAIGHT LIME WILL TAKE PLACE FOR A TWO TO THREE MONTH PERIOD BEGINNING IN NOVEMBER. CURRENTLY, THIOSORBIC LIME IS BEING USED. THE FGD SYSTEM WAS DESIGNED TO OPERATE WITH STRAIGHT LIME AS THE REAGENT AND, AS SUCH, THE TESTING WILL BE PERFORMED TO SEE IF THE SYSTEM CAN MEET DESIGN GUARANTEES.

10/81	A	92.4	31.4	100.0	29.3						
	B	97.6	89.3	100.0	83.3						
	C	91.7	75.0	100.0	85.1						
	SYSTEM	100.0	97.8	100.0	91.3	81.60		744	695	679	68.2
11/81	A	96.4	61.2	100.0	22.6						
	B	96.4	75.8	100.0	28.0						
	C	96.4	12.6	100.0	4.6						
	SYSTEM	100.0	74.5	100.0	27.6	86.70		720	266	198	30.0
12/81	A	93.4	53.7	100.0	49.7						
	B	93.4	56.4	100.0	52.2						
	C	81.0	63.1	100.0	58.4						
	SYSTEM	100.0	86.6	100.0	80.1	85.70		744	689	596	68.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FOURTH QUARTER THE BOILER AND THE FGD SYSTEM WERE TAKEN OFF-LIN FOR AN INSPECTION. THE UTILITY REPORTED THAT THERE WERE NO SIGNS OF ANY CORROSION OR EROSION. THE SYSTEM HAS PERFORMED WELL WITH NO PROBLEMS.

1/82	A	64.1	57.6	100.0	50.5						
	B	97.0	94.5	100.0	82.8						
	C	48.7	34.4	100.0	30.1						
	SYSTEM	100.0	93.2	100.0	81.8	80.60		744	653	608	75.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY PROBLEMS WERE ENCOUNTERED WITH ICE BUILDUP ON THE FANS.

2/82	SYSTEM	672
3/82	SYSTEM	744
4/82	SYSTEM	720
5/82	SYSTEM	744
6/82	SYSTEM	720

CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF MARCH 1982 TO JUNE 1982.									
7/82	SYSTEM	100.0	99.0	100.0	98.1			744	733	730	68.7
8/82	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	77.9
9/82	SYSTEM	100.0	99.7	100.0	98.9			720	714	712	61.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF JULY THROUGH SEPTEMBER, 1982.									
10/82	SYSTEM	100.0	100.0	100.0	2.5			744	19	19	1.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS REMOVED FROM SERVICE DURING OCTOBER FOR A MAINTENANCE OUTAGE.									
11/82	SYSTEM	100.0		100.0				720	0		
	** PROBLEMS/SOLUTIONS/COMMENTS										
		OUTAGE TIME DURING NOVEMBER WAS DUE TO THE RETURN OF SERVICE ON UNIT 2 FRO THE MAINTENANCE OUTAGE IN OCTOBER. BOILER OUTLET TEMPERATURE WAS INSUFFICIENT FOR OPERATION OF THE PRECIPITATORS OR FGD SYSTEM.									
12/82	SYSTEM	100.0	99.4	100.0	95.6			744	715	711	52.2
1/83	SYSTEM	100.0	99.7	100.0	98.4			744	734	732	67.1
2/83	SYSTEM	100.0	100.0	100.0	100.0			672	672	672	74.5
3/83	SYSTEM	100.0	98.9	100.0	89.9			744	677	669	69.2
4/83	SYSTEM	100.0	98.6	100.0	75.1			720	547	541	71.2
5/83	SYSTEM	100.0	99.2	100.0	99.2			744	741	738	91.8
6/83	SYSTEM	100.0	99.4	100.0	90.4			720	655	651	81.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF DECEMBER 1982 THROUGH JUNE 1983.									
7/83	SYSTEM	100.0	99.5	100.0	92.9			744	694	691	80.1
8/83	SYSTEM	100.0	99.7	100.0	99.5			744	742	740	85.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JULY AND AUGUST.									
9/83	SYSTEM							720			

CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE MONTH OF SEPTEMBER.									
10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE FOURTH QUARTER OF 1983. AVAILABILITY WAS REPORTED AS 100%.									
1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE FGD SYSTEM WAS 100% AVAILABLE DURING THE FIRST THREE QUARTERS OF 1984.									
10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE FGD SYSTEM WAS DOWN FROM SEPTEMBER 29 THRU OCTOBER 27, FOR A SCHEDULED BOILER/TURBINE OUTAGE. NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE QUARTER.									
1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			

CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT DURING THE YEAR 1985 THERE WERE NO BOILER OR FGD SYSTEM OUTAGES. THE UNIT EXPERIENCED ONLY 5 MINOR TRIPS ALL YEAR DUE TO MINOR DAMPER DRIVE PROBLEMS AND AIR PREHEATER ALIGNMENT. DUE TO LOWERING SULFUR COAL CONTENTS, THE UTILITY OPERATED 1 MODULE 25% OF THE TIME AND 2 MODULES 75% OF THE TIME. THE UTILITY VERY RARELY HAD TO USE ALL 3 MODULES. THE SYSTEM WAS ORIGINALLY DESIGNED TO HANDLE 3.5% SULFUR COAL AND THE UTILITY IS CURRENTLY BURNING 2.5 - 3.0% SULFUR COAL.

THE UTILITY STATED THEY ARE CURRENTLY EXPERIMENTING WITH OPERATING WITHOUT SPRAY NOZZLES TO LOWER PUMPING COSTS AND REDUCE THE MAINTENANCE REQUIRED FOR CLEANING NOZZLES. THE UTILITY FEELS THEY WILL BE ABLE TO MAINTAIN LIQUID/GAS CONTACT WELL ENOUGH WITHOUT THE USE OF THE NOZZLES.

1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE YEAR 1986, NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED. DURING VARIOUS MINOR BOILER/TURBINE OUTAGES, NOZZLE REPLACEMENT WORK AND THE REDESIGNING OF THE SPRAY HEADER FEED SYSTEM WERE CONDUCTED. TO DATE, THE NEW NOZZLES REPORTEDLY HAVE LOWERED THE SO2 REMOVAL EFFICIENCY BY ONLY A FEW PERCENT.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			

CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE PERIOD JANUARY THROUGH SEPTEMBER 1987.

10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS TAKEN OUT OF SERVICE FOR A MAJOR SCHEDULED OUTAGE ON OCTOBER 3, 1987. THE BOILER/TURBINE MAINTENANCE OUTAGE LASTED APPROXIMATELY 2 MONTHS WITH THE UNIT COMING BACK ON-LINE THE FIRST WEEK OF DECEMBER. DURING THIS OUTAGE PERIOD, THE UTILITY REPLACED THE MIST ELIMINATOR IN ONE OF THE THREE ABSORBER MODULES. THE REMAINING TWO WILL BE REPLACED IN THE FALL OF 1988 WHILE THE UNIT IS ON-LINE. THE MIST ELIMINATORS ARE CONSTRUCTED OF A DIFFERENT MATERIAL BUT HAVE THE SAME DESIGN AND ARE SUPPLIED BY THE SAME CONTRACTOR AS THE ORIGINALS.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	CITY UTILITIES OF SPRINGFIELD	
PLANT NAME	SOUTHWEST	
UNIT NUMBER	1	
CITY	SPRINGFIELD	
STATE	MISSOURI	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	173	
GROSS UNIT GENERATING CAPACITY - MW	195	
NET UNIT GENERATING CAPACITY W/FGD - MW	173	
NET UNIT GENERATING CAPACITY WO/FGD - MW	182	
EQUIVALENT SCRUBBED CAPACITY - MW	195	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	375.16	(795000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	165.6	(330 F)
STACK HEIGHT - M	117.	(385 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	3.7	(12.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25586.	(11000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB	10500-12500	
AVERAGE ASH CONTENT - %	12.00	
RANGE ASH CONTENT - %	10.0-22.0	
AVERAGE MOISTURE CONTENT - %	9.00	
RANGE MOISTURE CONTENT - %	6.0-12.0	
AVERAGE SULFUR CONTENT - %	3.50	
RANGE SULFUR CONTENT - %	2.5-4.5	
AVERAGE CHLORIDE CONTENT - %	0.30	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	AIR CORRECTION DIVISION, UOP	
INLET FLUE GAS CAPACITY - CU.M/S	375.2	(795000 ACFM)
INLET FLUE GAS TEMPERATURE - C	148.9	(300 F)
PRESSURE DROP - KPA	0.1	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.7	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	

*** FGD SYSTEM

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	ADIPIC ACID	
SYSTEM SUPPLIER	AIR CORRECTION DIVISION, UOP	
A-E FIRM	BURNS & MCDONNELL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.70	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	80.00	
ENERGY CONSUMPTION - %	4.6	
CURRENT STATUS	1	
COMMERCIAL START-UP	9/1977	
INITIAL START-UP	4/1977	
CONTRACT AWARDED	8/1973	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	2.95	
DESIGN COAL HEAT CONTENT - J/G	25697.6	(11048 BTU/LB)
DESIGN COAL ASH CONTENT - %	11.01	
DESIGN MOISTURE CONTENT - %	14.00	
DESIGN CHLORIDE CONTENT - %	0.30	
SPACE REQUIREMENTS - SQ M	1393.5	(15000 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	105.0	
** QUENCHER/PRESATURATOR		
NUMBER	2	
TYPE	QUENCH DUCT	
SUPPLIER	AIR CORRECTION DIVISION, UOP	
INLET GAS FLOW - CU. M/S	165.16	(350000 ACFM)
INLET GAS TEMPERATURE - C	165.6	(330 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-36	
** ABSORBER		
NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	NR	
SUPPLIER	AIR CORRECTION DIVISION, UOP	
DIMENSIONS - FT	16 X 30 X 54.5 'QUENCHER!; 13 X 30 X 12 'ABSORBE	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	ASTM A-36	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	SYNTHETIC RUBBER	
LINER MATERIAL TRADE NAME/COMMON TYPE	NEOPRENE LS-576	
GAS CONTACTING DEVICE TYPE	TRAYS	
NUMBER OF CONTACTING ZONES	3	
DISTANCE BETWEEN GAS CONTACTING ZONES - CM	121.9	(48.0IN)
LIQUID RECIRCULATION RATE - LITER/S	819.	(13000 GPM)
L/G RATIO - L/CU.M	5.2	(39.1 GAL/1000 ACF)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	156.91	(332500 ACFM)
INLET GAS TEMPERATURE - C	57.2	(135 F)
SO2 REMOVAL EFFICIENCY - %	85.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	2	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
MANUFACTURER	UOP	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	2	

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

NUMBER OF PASSES PER STAGE	3	
DISTANCE BETWEEN STAGES - CM	1.52	(0.6 IN)
DISTANCE BETWEEN VANES - CM	2.5	(1.00 IN)
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	FRESH	
WASH FREQUENCY	CONTINUOUS	
WASH RATE - L/S	6.9	(110 GAL/MIN)

** REHEATER

GENERIC TYPE	NONE
SPECIFIC TYPE	N/A
TRADE NAME/COMMON TYPE	N/A
CONSTRUCTION MATERIAL GENERIC TYPE	N/A
CONSTRUCTION MATERIAL SPECIFIC TYPE	N/A

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FAN	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	192.06	(407000 ACFM)
FLUE GAS TEMPERATURE - C	168.3	(335 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	2	
FUNCTION	SHUT-OFF	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER	
MANUFACTURER	AMERICAN WARMING & VENTILATING	
SEAL AIR FLOW - CU. M/S	0.00	(0 ACFM)
SERVICE CONDITIONS	335	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** DAMPERS

NUMBER	2	
FUNCTION	SHUT-OFF	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER	
MANUFACTURER	AMERICAN WARMING & VENTILATING	
SEAL AIR FLOW - CU. M/S	0.00	(0 ACFM)
SERVICE CONDITIONS	335	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** DAMPERS

NUMBER	2	
FUNCTION	SHUT-OFF	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER	
MANUFACTURER	AMERICAN WARMING & VENTILATING	
SEAL AIR FLOW - CU. M/S	0.00	(0 ACFM)
SERVICE CONDITIONS	161	
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	IRON BASE/NICKEL-CHROMIUM-COPPER-MOLYBDENUM	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** DUCTWORK

LOCATION	INLET
CONFIGURATION	RECTANGULAR

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

DIMENSIONS	153 IN. HEIGHT X 93.5 IN. WIDTH
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-36
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	BYPASS
CONFIGURATION	RECTANGULAR
DIMENSIONS	135 IN. HEIGHT X 96 IN. WIDTH
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-36
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	OUTLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	109 IN. HEIGHT X 101.5 IN. WIDTH
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-36
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	TUBE MILL
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	2
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	7.3 (8 TPH)
PRODUCT QUALITY - % SOLIDS	65.0

** TANKS

SERVICE	NUMBER
REAGENT PREP PRODUCT	1
ABSORBER RECYCLE	2
MIST ELIMINATOR WASH	1
PRESATURATOR	1
BALL MILL SUMP	1
SLURRY DRAW-OFF SUMP	1
SUPERNATANT	1
WASH WATER RETURN	1

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	4
MIST ELIMINATOR WASH	2
THICKENER FEED	2
SLURRY FEED	4
SLURRY TRANSFER	2
PRESATURATOR WATER-TRAP OUT TRAY WAS	2
SLUDGE TRANSFER	2
WASH WATER RETURN	2
SUPERNATANT	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	1
NUMBER OF SPARES	0
DIMENSIONS - FT	38.6 X 13.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
BELT GENERIC MATERIAL TYPE	CLOTH
BELT SPECIFIC MATERIAL TYPE	N/A
FEED STREAM SOURCE	THICKENER UNDERFLOW

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

FEED STREAM CHARACTERISTICS	40-55% SOLIDS
OUTLET STREAM CHARACTERISTICS	70% SOLIDS
OUTLET STREAM DISPOSITION	TO PUG MILL
OVERFLOW STREAM DISPOSITION	TO THICKENER

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
CONFIGURATION	CIRCULAR
DIMENSIONS - FT	110 DIAMETER X 8.5 SIDEWALL, 15.7 CENTER DEPTH
CAPACITY	860000
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	BITUMASTIC
FEED STREAM SOURCE	ABSORBER BLEED
FEED STREAM CHARACTERISTICS	15% SOLIDS
OUTLET STREAM CHARACTERISTICS	40-55% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	1200 GPM
OUTLET STREAM DISPOSITION	TO VACUUM FILTER
OVERFLOW STREAM DISPOSITION	TO QUENCHER AND ME WASH

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	N/A
INLET QUALITY - %	70.0

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	CLAY LINING

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	PH
CHEMICAL PARAMETERS	PH, SLURRY DENSITY
PHYSICAL VARIABLES	SLURRY DENSITY
CONTROL LEVELS	PH 5.4-5.5
MONITOR TYPE	BECKMAN IN-LINE PROBE
MONITOR LOCATION	RECYCLE SLURRY LINE
PROCESS CONTROL MANNER	MANUAL
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	CLOSED

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	CACO3 'MAXIMUM OF 2% INERTS!
SOURCE/SUPPLIER	CONCO, GRIESEMER
CONSUMPTION	7 TPH
UTILIZATION - %	89.0
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	20.0
MIST ELIMINATOR - %	0.0

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

FAN - %	0.0
BALL MILL - %	0.0
THICKENER - %	0.0
VACUUM FILTER - %	0.0

** FGD SPARE COMPONENT INDICES

ABSORBER	0.3
MIST ELIMINATOR	0.3
FAN	0.0
BALL MILL	0.0
THICKENER	0.0
VACUUM FILTER	0.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
0/77	SYSTEM										

** PROBLEMS/SOLUTIONS/COMMENTS

INSTALLATION OF THE LIMESTONE FGD SYSTEM WAS COMPLETED DURING THE FIRST QUARTER OF 1977 (BEHIND SCHEDULE, PRIMARILY BECAUSE OF DELAYS IN ELECTRIC AL WORK). FOLLOWING AIR/WATER TESTS AND CHECKOUT OF LIMESTONE PREPARATIO FACILITIES, THE FGD PLANT WAS STARTED UP IN EARLY APRIL 1977 FOR MECHANIC AL SHAKEDOWN/DEBUGGING OPERATIONS WHICH CONTINUED THROUGHOUT THE SUMMER. COMPLIANCE TESTING AND CERTIFICATION OF COMMERCIAL AVAILABILITY WERE SUC-CESSFULLY COMPLETED IN SEPTEMBER, JUST BEFORE A SCHEDULED 3-MONTH FALL SHUTDOWN. OPERATION OF THE SYSTEM HAS BEEN HAMPERED BY A NUMBER OF PROB-LEMS: MIST ELIMINATOR PLUGGING (PIPING TO M.E. SPRAY SYSTEM HAS BEEN MOD-IFIED), CORROSION IN THE PRESATURATOR (WAS RELINED WITH PRECRETE), CORROSION OF THE INLET/OUTLET GAS DAMPERS (REPLACED WITH 316 SS DAMPERS), AND FAILURE OF PRECRETE LINING IN THE SCRUBBER AND CEILCOTE IN THE STACK (BOTH FAILURES IDENTIFIED AS APPLICATION PROBLEMS). THE UTILITY ALSO FOUND IT NECESSARY TO CHANGE THE SYSTEM PH CONTROL FROM 5.9 TO 5.6 TO INCREASE LIMESTONE UTILIZATION AND DECREASE PLUGGING WITHIN THE SYSTEM.

4/77	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

FGD OPERATIONS BEGAN IN EARLY APRIL. THE SYSTEM IS CURRENTLY EXPER-IENCING MIST ELIMINATOR PLUGGING AND INSTRUMENTATION PROBLEMS.

5/77	SYSTEM							744			
6/77	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER EXPERIENCED CORROSION IN THE PRESATURATOR AREAS THAT WILL WILL REQUIRE RELINING.

7/77	SYSTEM							744			
8/77	SYSTEM							744			
9/77	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OPERATED ROUGHLY 60% OF THE AUGUST-SEPTEMBER PERIOD. A NEW SOURCE PERFORMANCE TEST WAS RUN DURING THE SECOND WEEK OF SEPTEMBER. LATER, THE UNIT WAS SHUT DOWN FOR THE FIRST TURBINE IN-SPECTION.

10/77	SYSTEM							744			

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A SCHEDULED OCTOBER-NOVEMBER OUTAGE WAS INITIATED. THE UNIT IS SCHEDULED TO START UP AGAIN IN JANUARY.									
		DURING OCTOBER THE OUTLET DAMPERS WERE MODIFIED. THE 316 SS DAMPERS WERE REPLACED WITH 316L SS DAMPERS.									
		THE PRESATURATOR WAS RELINED WITH HIGH MOLYBDENUM STEEL AS A RESULT OF THE PRECRETE FAILURE NOTED EARLIER (JUNE).									
		OUTLET DUCTWORK WAS RELINED WITH CEILCOTE DURING THE OUTAGE.									
		HOLLOW PACKING BALLS WERE REPLACED WITH HEAVIER WALLED PLASTIC BALLS. THE BALLS WERE RUPTURING AND FILLING WITH SLURRY MAKING THEM INEFFECTIVE.									
		LEAKING AROUND OUTLET DAMPERS WAS MINIMIZED BY SEAL-AIR FANS.									
11/77	SYSTEM							720			
12/77	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE PLANT SHUTDOWN CONTINUED UNTIL JANUARY 28 WHEN THE BOILER RESTARTED. THE FGD SYSTEM WAS EXPECTED TO BE PUT BACK ON LINE IN FEBRUARY 1978. DURING THE OUTAGE ALL REMAINING MODIFICATIONS TO THE FGD SYSTEM WERE COMPLETED.									
1/78	SYSTEM							744			
2/78	SYSTEM							672			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE ABSORBERS DID NOT OPERATE DUE TO AN EXPANSION JOINT FAILURE BETWEEN THE ID FAN AND THE ABSORBERS.									
		THE ABSORBERS ARE CURRENTLY BEING BY-PASSED. THE FGD SYSTEM IS EXPECTED TO BE BACK ON LINE BY THE END OF APRIL.									
3/78	SYSTEM							744			
4/78	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ONLY ONE ABSORBER MODULE IS CURRENTLY OPERATING. THE EXPANSION JOINT FAILURE MENTIONED PREVIOUSLY WAS DIRECTLY RELATED TO THE DAMPER FAILURE WHICH DIRECTED THE BOILER FLUE GAS TO THE SEALED OFF FGD SYSTEM.									
		THE DAMPER LOUVERS HAVE BEEN STICKING. THERE ARE NO MANUAL CONTROLS FOR THE DOUBLE LOUVER DAMPERS SO THAT WHEN INSTRUMENTATION FAILURES OCCUR THE UNIT MUST BE SHUT DOWN. OF THE 12 DAMPERS (6 PAIRS) ON THIS SYSTEM 6 HAVE BEEN REBUILT.									
		AN FRP LINER FAILURE OCCURRED DURING THIS PERIOD.									
		A PUMP FAILURE OCCURRED DURING THE PERIOD. THE PROBLEM DOES NOT APPEAR TO BE SEVERE.									
5/78	SYSTEM							744			

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/78	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE S-1 MODULE RAN STEADILY FOR OVER 11 DAYS. THE S-2 MODULE WAS STILL DOWN WITH EXPANSION JOINT PROBLEMS.

DURING THE MONTH THE MIST ELIMINATOR WASH SYSTEM WAS ALTERED FROM A SEPAR ATE CLOSED LOOP FOR EACH MODULE TO A COMMON SYSTEM FOR BOTH MODULES. THE NEW SYSTEM TAKES SUPERNATANT FROM THE TOP OF THE THICKENER FOR MIST ELIM- INATOR SPRAY.

INSTRUMENTATION PROBLEMS WERE ENCOUNTERED DURING THE MONTH. PH PROBES WERE LOST, THE MAG-FLOW METER FOR LIMESTONE SLURRY FAILED, AND THE AUTO- MATIC GAS ANALYZERS DID NOT OPERATE PROPERLY.

SOME PIPES EXPERIENCED PLUGGING DUE TO NEOPRENE PEELING FROM VALVES. IT IS EXPECTED THAT VALVE REPAIR OR REPLACEMENT SHOULD STOP THE PLUGGING.

THE SLUDGE SYSTEM EXPERIENCED SOME FILTER BELT PROBLEMS DURING THE MONTH. REPAIRS WERE MADE BUT INSUFFICIENT SLUDGE HAS BEEN GENERATED TO DETERMINE IF THE PROBLEMS HAVE BEEN SOLVED.

7/78	S-1	16.7	16.7	16.7	16.7						
	S-2	0.0	0.0	0.0	0.0						
	SYSTEM	8.3	8.3	8.3	8.3			744	744	62	70.1

** PROBLEMS/SOLUTIONS/COMMENTS

PROBLEMS WERE ENCOUNTERED WITH THE S-1 MODULE TRANSFER PUMPS. NINE DAYS WERE REQUIRED TO TRACE THE ELECTRICAL-RELATED PROBLEM.

A 17-DAY OUTAGE WAS CAUSED BY PROBLEMS WITH THE BALL MILL AIR SUPPLY WHIC RESULTED IN THE UNAVAILABILITY OF SLURRY.

THE S-2 MODULE WAS STILL DOWN IN JULY WHILE THE UTILITY WAITED FOR THE REPLACEMENT EXPANSION JOINT.

WORK WAS DONE DURING THE MONTH TO IMPROVE THE INSTRUMENTATION. IT WAS DISCOVERED THAT MANY OF THE PROBLEMS WERE DUE TO SCALE ACCUMULATION ON TH PROBES.

8/78	S-1	59.0	59.0	59.0	59.0						
	S-2	0.0	0.0	0.0	0.0						
	SYSTEM	29.5	29.5	29.5	29.5			744	744	220	56.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE S-2 MODULE REMAINED DOWN THROUGHOUT AUGUST BECAUSE THE REPLACEMENT EXPANSION JOINT HAD NOT YET ARRIVED.

EXPANSION JOINT REPAIRS ON THE S-1 MODULE SCRUBBER FORCED THE MODULE OUT OF SERVICE FOR 84 HOURS.

PROBLEMS WITH THE THICKENER AND PLUGGED LINES FORCED THE S-1 MODULE OUT OF SERVICE FOR 211 HOURS.

9/78	S-1	22.1	28.6	28.6	22.1						
	S-2	0.0	0.0	0.0	0.0						
	SYSTEM	11.1	14.3	14.3	11.1			720	557	80	49.1

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									

** PROBLEMS/SOLUTIONS/COMMENTS

CONTINUATION OF THE EXPANSION JOINT PROBLEM RESULTED IN THE S-2 MODULE REMAINING DOWN THROUGHOUT THE MONTH.

S-1 MODULE DOWN TIME WAS DUE TO PLUGGING OF THE THICKENER SLURRY MAKEUP LINES AND FAILURE OF THE BALLS WITHIN THE MODULE.

THE HEAVIER-WALLED PING PONG BALLS THAT WERE INSTALLED DURING THE DECEMBER 1977-JANUARY 1978 PERIOD WERE REPLACED WITH 1.25 INCH DIAMETER SOLID RUBBER BALLS DURING SEPTEMBER 1978.

10/78	SYSTEM	0.0	0.0	0.0	0.0			744	26	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS DOWN FOR A SCHEDULED OUTAGE DURING THE MONTH

CONSIDERABLE CLEANING OF THE S-1 MODULE WAS DONE AS THE LOWER TWO LEVELS OF THE MODULE HAD BEGUN TO PLUG WHEN THE BALLS FAILED (SEE SEPTEMBER 1978).

A THOROUGH CLEANING OF THE ENTIRE FGD SYSTEM OCCURRED DURING THIS PERIOD.

A BEARING WAS REPLACED ON THE SLURRY DRAW OFF PUMP. WORK WAS ALSO REQUIRED ON A WASTE DRAW OFF PUMP.

THE OUTLET DUCT WAS CLEANED AND A PLASITE LINER WAS INSTALLED. REPAIR WAS MADE TO THE BYPASS DUCT TOGGLE (A PAIR OF EXPANSION JOINTS WITH TWO TO THREE FT. OF DUCT BETWEEN THEM) DUE TO METAL DETERIORATION.

THE RUBBER COATING ON HOLD TANK AGITATORS AND SLURRY STORAGE TANK AGITATORS WERE REPAIRED.

MAINTENANCE WAS PERFORMED ON FANS, DAMPERS AND VALVES.

MAINTENANCE AND MODIFICATIONS TO THE INSTRUMENTATION HAVE YIELDED SOME IMPROVEMENT IN OPERATIONS. SOME INSTRUMENTATION PROBLEMS RESULTED FROM SCALE ACCUMULATION ON PROBES. MODIFICATIONS TO THE PRESATURATOR TEMPERATURE PROBES WHICH WERE COMPLETELY COATED WITH MATERIAL ARE EXPECTED TO PERMANENTLY RECTIFY THE PROBLEM IN THIS AREA.

THE FILTER BELTS HAVE STILL BEEN TEARING AS MENTIONED EARLIER (JUNE, 1978). THERE HAVE BEEN PROBLEMS BOTH UPSTREAM AND DOWNSTREAM OF THE FILTER BELTS IN THE SLUDGE DISPOSAL SYSTEM.

THE UTILITY REPORTED THAT THERE HAS BEEN NO SIGN OF SCALE ACCUMULATION ON THE MIST ELIMINATORS SINCE THE WASH SYSTEM WAS MODIFIED AS REPORTED IN JUNE, 1978.

11/78	S-1	68.1	64.7	64.7	64.3						
	S-2	34.9	22.4	22.4	22.3						
	SYSTEM	51.5	43.6	43.6	43.3			720	716	312	52.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER OUTAGE LASTED INTO THE FIRST PART OF NOVEMBER DURING WHICH TIME SCRUBBER REPAIR WORK CONTINUED.

AN FGD OUTAGE WAS CAUSED BY A FAN BEARING FAILURE ON THE S-2 MODULE DURING NOVEMBER.

ALL DAMPERS WERE SERVICED, REPAIRED AND EXERCISED.

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/78	S-1	45.2	32.9	32.9	29.7						
	S-2	81.7	76.2	76.2	68.7						
	SYSTEM	63.4	54.6	54.6	49.2			744	671	366	58.9

** PROBLEMS/SOLUTIONS/COMMENTS

PRESATURATOR NOZZLE PLUGGING OCCURRED IN THE S-1 MODULE DURING DECEMBER. AFTER THE SPRAY NOZZLES WERE REPLACED FROZEN LINES PREVENTED MODULE STARTUP.

SEVERAL LINES BROKE OR DEVELOPED LEAKS AS A RESULT OF FREEZE UPS.

ALL THE MAJOR OUTAGES CAN BE ATTRIBUTED TO THE COLD WEATHER. THE SYSTEM WAS NOT DESIGNED WITH DUE REGARD TO WEATHER CONDITIONS.

ONE OR TWO MINOR SCRUBBER SHUTDOWNS RESULTED FROM FROZEN INSTRUMENTATION.

1/79	S-1	0.0	0.0	0.0	0.0						
	S-2	42.6	47.3	47.3	29.0						
	SYSTEM	21.3	24.9	24.9	14.5			744	457	108	43.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE S-2 MODULE WAS UNAVAILABLE FOR 117 HOURS BECAUSE OF VALVE FREEZE-UPS.

FROZEN VALVES AND EQUIPMENT CONTRIBUTED TO THE OUTAGES OF THE S-1 MODULE.

DURING THE FIRST 15 DAYS OF JANUARY THE SECOND BALL MILL WAS UNUSEABLE BECAUSE OF A COMPRESSED AIR SYSTEM FAILURE. THIS RESULTED IN AN INSUFFICIENT LIMESTONE SLURRY SUPPLY TO THE S-1 MODULE.

2/79	S-1	28.7	0.0	0.0	0.0						
	S-2	24.2	32.0	32.0	24.2						
	SYSTEM	26.5	16.0	16.0	12.1			672	508	81	48.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE S-1 MODULE EXPERIENCED PLUGGING PROBLEMS IN THE FIRST AND SECOND STAGES DURING FEBRUARY AND DID NOT OPERATE. DUE TO FLUE GAS LEAKING INTO THE MODULE, ACCESS COULD NOT BE OBTAINED TO CLEAN THE MODULE.

EXPANSION JOINT PROBLEMS AND BROKEN LINES THROUGHOUT THE SYSTEM WERE REPORTED.

SCRUBBING OPERATIONS WERE HAMPERED DURING THE LATTER PART OF FEBRUARY BECAUSE OF INSUFFICIENT LIMESTONE SLURRY.

THE S-2 MODULE PROBLEMS INCLUDED FROZEN VALVES AND LINES.

3/79	S-1	62.0	39.5	39.5	38.8						
	S-2	55.1	14.0	14.0	13.7						
	SYSTEM	58.6	26.8	26.8	26.3			744	730	195	46.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE MAJORITY OF MODULE S-1 DOWNTIME WAS DUE TO A BROKEN SUPERNATE LINE AND MAKEUP CROSS TIE.

THE UTILITY REPORTED THAT THE MODULE WAS UNABLE TO RUN FOR A TIME DUE TO A DESIGN PROBLEM WITH THE WESTINGHOUSE 500 HP MOTORS.

4/79	S-1	42.6	30.9	30.9	18.5						

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	S-2	51.6	45.0	45.0	27.0						
	SYSTEM	47.1	38.0	38.0	22.8			720	432	164	28.4

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE S-1 EXPERIENCED AN EXPANSION JOINT FAILURE ON THE ID FAN DISCHARGE.

LOW DENSITY AT THE SLURRY HOLD TANK WAS A MAJOR PROBLEM.

SOME PLUGGING OF THE FIRST STAGE OF THE S-2 MODULE WAS REPORTED BY THE UTILITY.

5/79	S-1	84.1	77.5	77.5	67.0						
	S-2	0.0	0.0	0.0	0.0						
	SYSTEM	42.1	38.8	38.8	33.5			744	644	249	37.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE S-2 MODULE WAS NOT OPERATED DURING MAY DUE TO A BROKEN RECYCLE TANK AGITATOR SHAFT. A NEW ONE HAS BEEN ORDERED. RUBBER LINING OF THE SHAFT AND REPAIR OF DAMAGED LINING ON THE IMPELLER WILL BE DONE ON SITE.

6/79	S-1	55.0	53.0	53.0	52.9						
	S-2	0.0	0.0	0.0	0.0						
	SYSTEM	27.5	26.5	26.5	26.5			720	719	191	53.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE BROKEN AGITATOR SHAFT ON THE S-2 MODULE WAS REPLACED AND LINED DURING JUNE.

THE S-1 MODULE WAS OUT OF SERVICE ON THREE OCCASIONS DUE TO PLUGGING OF THE FIRST AND SECOND STAGES. THE UTILITY REPORTED THAT WITH THE EXCEPTION OF THE PLUGGING PROBLEM ONLY A FEW MINOR SHORT DURATION TRIPS WERE NOTED.

7/79	S-1	59.2	34.1	34.1	34.1						
	S-2	55.3	47.4	47.4	47.3						
	SYSTEM	57.3	40.8	40.8	40.7			744	743	303	52.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE S-1 MODULE WAS NOT OPERATED DURING THE FIRST PART OF THE PERIOD DUE TO PLUGGING IN THE FIRST AND SECOND STAGES. TWO OTHER OUTAGES OCCURRED. ONE RESULTED FROM A BROKEN SLURRY LINE AND THE OTHER FROM PROCESS CONTROL TROUBLE ATTRIBUTED TO A MINI COMPUTER MALFUNCTION.

THE S-2 MODULE WAS NOT OPERATED FOR TWO PERIODS. ONCE WHEN THE TANK WAS BEING REFILLED AFTER AN AGITATOR WAS INSTALLED AND ONCE TO CLEAN THE FIRST AND SECOND STAGES.

8/79	S-1	74.6	53.8	53.8	50.7						
	S-2	94.8	70.9	70.9	66.8						
	SYSTEM	84.7	62.4	62.4	58.8			744	701	437	58.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE S-1 MODULE WAS DOWN FOR TWO PERIODS DUE TO PLUGGING IN THE ABSORBER SECTION. THE MODULE ALSO TRIPPED OFF AS A RESULT OF SUPERNATE PUMP FAILURES.

9/79	S-1	55.3	58.3	58.3	45.8						
	S-2	87.3	60.2	78.8	47.4						
	SYSTEM	71.3	59.3	65.7	46.6			720	566	336	45.6

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE S-1 MODULE WAS OFF LINE DUE TO PLUGGING IN THE ABSORBER SECTION FOR TWO PERIODS AND IT ALSO TRIPPED AS A RESULT OF SUPERNATE PUMP FAILURES.									
		THE S-2 MODULE WAS OFF LINE ONCE DUE TO BROKEN SUPERNATE LINE, AND ONCE DUE TO FAULTY PH PROBES IN SEPTEMBER. THE SCRUBBING SYSTEM WAS OFF LINE FOR SEVERAL SHORT PERIODS DUE TO MINOR PROBLEMS.									
10/79	SYSTEM	0.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A SCHEDULED BOILER/SCRUBBER OVERHAUL BEGAN ON SEPTEMBER 29 AND CONTINUED THROUGH OCTOBER 31.									
		BOTH SCRUBBER TOWERS WERE COMPLETELY CLEANED DURING THE OUTAGE.									
		THE SLURRY TANKS AND RELATED PIPING WERE CLEANED DURING OCTOBER.									
		THE SCRUBBER OUTLET DUCTWORK WAS RELINED WITH PLASITE.									
		ON AREAS OF THE SCRUBBING SYSTEM WHERE FIBERGLASS PIPING WAS BEING USED, REPLACEMENTS WERE MADE WITH LINED CARBON STEEL PIPING.									
		THE PH PROBES WERE REPAIRED.									
		REPAIRS WERE MADE TO THE LIMESTONE FEED BELT ON THE CONVEYOR SYSTEM.									
		REPAIRS WERE MADE TO THE S-2 MODULE HOLD TANK AGITATOR SHAFT DURING THE OUTAGE.									
		A PRESATURATOR SPRAY NOZZLE WAS REPLACED.									
		THE SCRUBBER DAMPERS WERE REPAIRED AND ADJUSTED.									
		THE SLUDGE DISPOSAL CONVEYOR SYSTEM WAS REPAIRED AND MODIFIED.									
		PUMP REPAIRS WERE MADE ON THE SUPERNATE PUMPS AND NEW STANDBY PUMPS WERE INSTALLED AT THE SCRUBBING SYSTEM FACILITY.									
11/79	S-1	0.0	0.0	0.0	0.0						
	S-2	41.9	41.3	41.3	40.6						
	SYSTEM	20.9	20.6	20.6	20.3			720	708	146	58.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FOR THE FIRST WEEK OF NOVEMBER NEITHER MODULE WAS AVAILABLE DUE TO AN OVERRUN ON SCHEDULED OUTAGE CAUSED BY A LACK OF MANPOWER.									
		THE S-1 MODULE WAS UNAVAILABLE FOR THE LAST THREE WEEKS OF THE MONTH BECAUSE OF THE LACK OF MANPOWER TO FINISH THE ABSORBER SECTION AND HOLD TANK CLEANOUT.									
		PROBLEMS WITH THE S-2 MODULE RECYCLE PUMPS WERE ENCOUNTERED. THE MODULE WAS REMOVED FROM SERVICE SO THAT THE REPAIRS COULD BE MADE.									
		SEVERAL ATTEMPTS TO RETURN THE S-1 MODULE TO SERVICE WERE ABORTED DUE TO VARIOUS PIPING PROBLEMS.									
12/79	S-1	53.7	23.7	23.7	21.2						

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	S-2	64.8	40.6	40.6	36.2						
	SYSTEM	59.3	32.2	32.2	28.7			744	664	213	53.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE S-1 ABSORBER SECTION AND HOLD TANK CLEANOUT WAS COMPLETED DURING DECEMBER. THE MODULE WAS RETURNED TO SERVICE.

THE PRESATURATION NOZZLES CAUSED SOME PROBLEMS AND HAD TO BE REMOVED AND CLEANED.

AT THE END OF THE MONTH THE ID FAN EXPANSION JOINT BROKE AND HAD TO BE REPLACED.

THE DENSITY METER ON THE RECYCLE LINE WAS REMOVED AND REPAIRED.

THE DRAINS ON THE MIST ELIMINATOR PUMPS HAD TO BE REPLACED.

THE WEIGH FEEDER WEIGH BELT AND CALIBRATED FEEDER WERE REPLACED AND THE CALIBRATION FEEDER WAS CHECKED DURING DECEMBER.

1/80	S-1	54.5	38.7	47.9	36.3						
	S-2	68.7	72.6	73.1	68.1						
	SYSTEM	61.6	55.7	60.5	52.2			744	698	388	65.4

** PROBLEMS/SOLUTIONS/COMMENTS

AT THE BEGINNING OF JANUARY AN S-1 ID FAN EXPANSION JOINT FAILED. THE BOILER WAS SHUTDOWN SOON AFTER FOR BOILER-RELATED PROBLEMS.

DURING THE LATTER PART OF THIS PERIOD THE S-1 MIST ELIMINATOR AND TRAP OUT TRAY HEADER FROZE. AFTER REPAIRS WERE MADE BOTH MODULES WERE PUT ON LINE. BOTH WERE KEPT RUNNING UNTIL JANUARY 20 WHEN A FLANGE BROKE LOOSE ON THE MIST ELIMINATOR HEADER.

AFTER MIST ELIMINATOR REPAIRS WERE COMPLETED THE S-1 MODULE OPERATED UNTIL JANUARY 27 WHEN FREEZING AIR LINES TO THE BALL MILLS PREVENTED THE USE OF BOTH MODULES DUE TO THE LACK OF SLURRY.

THE S-2 MODULE WAS ON LINE AT THE BEGINNING OF THE MONTH BUT DEVELOPED PRESATURATOR SPRAY NOZZLE PROBLEMS. WHILE THIS WAS BEING REPAIRED THE UNIT WAS TAKEN OFF LINE. APART FROM THIS TIME THE MODULE WAS ON LINE.

2/80	S-1	36.7	29.1	31.5	29.1						
	S-2	73.8	71.7	73.2	71.6						
	SYSTEM	55.3	50.4	52.4	50.4			696	695	350	59.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE S-1 MODULE WAS OUT OF SERVICE IN THE FIRST PART OF FEBRUARY DUE TO FROZEN AND BROKEN LINES. THE SUPERNATE LINE BROKE IN SEVERAL PLACES TAKIN BOTH MODULES OUT OF SERVICE FOR SEVERAL DAYS. ONCE THIS WAS REPAIRED BOTH MODULES WERE IN SERVICE AS REQUIRED BY LOAD EXCEPT FOR A FEW MINOR TRIPS.

THE S-2 MODULE WAS EITHER IN SERVICE OR AVAILABLE FOR MOST OF THE MONTH.

3/80	S-1	64.5	64.1	64.4	64.1						
	S-2	22.0	5.8	6.9	5.8						
	SYSTEM	43.3	35.0	35.7	35.0			744	744	260	57.7

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING MARCH THE S-1 MODULE WAS OUT FOR 11 DAYS TO CLEAN THE ABSORBER SECTION.								
			THE S-2 MODULE WAS OUT OF SERVICE FOR CLEANING THE ABSORBER SECTIONS AND MIST ELIMINATORS FOR NEARLY ALL THE PERIOD BUT WAS AVAILABLE ON MARCH 25. IT WAS NOT OPERATED, HOWEVER, BECAUSE OF LOW UNIT LOAD DEMANDS.								
4/80	S-1	78.2	69.1		59.6						
	S-2	15.1	6.9		6.0						
	SYSTEM	46.7	37.9	37.9	32.8			720	621	236	42.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE S-1 MODULE EXPERIENCED SHORT OUTAGES DURING APRIL CAUSED BY SLURRY DRAW-OFF PUMP FAILURES AND MIST ELIMINATOR AND PRESATURATOR SPRAY SYSTEM PROBLEMS.								
			THE S-2 MODULE EXPERIENCED RECURRING HIGH FLUE GAS TEMPERATURE-RELATED PROBLEMS DURING THE MONTH. THIS WAS CORRECTED BY REPAIRING THE SCRUBBER INLET SCREEN.								
5/80	S-1	72.9	60.7	69.1	60.6						
	S-2	43.6	30.7	35.2	30.7						
	SYSTEM	58.3	45.7	52.2	45.7			744	744	340	56.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING MAY THE S-1 SCRUBBER REQUIRED CLEANING.								
			PUMP AND PUMP CONTROL PROBLEMS ON THE S-1 SCRUBBING TRAIN OCCURRED DURING THE PERIOD.								
			THE S-2 MODULE WAS OFF LINE SEVERAL DAYS BECAUSE OF RECYCLE PUMP AND RECYCLE SYSTEM REPAIRS.								
			FLUE GAS OUTLET DUCT REPAIRS WERE REQUIRED ON THE S-2 MODULE IN MAY.								
6/80	S-1	85.6	85.6	85.5	84.9						
	S-2	12.8	6.8	7.2	6.8						
	SYSTEM	49.2	45.8	47.4	45.8			720	720	330	66.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE S-1 MODULE WAS IN CONTINUOUS SERVICE DURING JUNE WITH SHORT DURATION OUTAGES FOR CLEANING, CONTROL SYSTEM DAMAGE CAUSED BY LIGHTNING, AND OTHER MINOR MISCELLANEOUS PROBLEMS.								
			THE S-2 MODULE WAS OUT OF SERVICE FOR APPROXIMATELY 23 DAYS IN JUNE BECAUS OF A BROKEN SLURRY HOLD TANK AGITATOR SHAFT.								
			IN ADDITION TO THE OUTAGE CAUSED BY THE BROKEN SHAFT, THE S-2 MODULE HAD SHORT DURATION OUTAGES CAUSED BY RECYCLE PUMP AGITATOR PROBLEMS, CONTROL SYSTEM PROGRAMMING, AND OTHER MINOR MISCELLANEOUS PROBLEMS.								
7/80	S-1	80.5	69.6		69.5						
	S-2	57.0	39.0		39.0						
	SYSTEM	68.7	54.3	72.4	54.3			744	743	404	80.6

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY THE S-1 MODULE WAS CLEANED AND THE SPHERES WERE REPLACED.

THE S-1 MODULE DUCTWORK NEEDED REPAIR DURING JULY CAUSING SOME OUTAGE TIME

THE SLUDGE DEWATERING FILTER BELT AND THE HOLD TANK BEARING FAILED ACCOUNTING FOR SOME OF THE S-1 MODULE DOWNTIME.

THE S-1 MODULE SPRAY CONTROL VALVE FAILED ADDING TO THE OUTAGE TIME.

HIGH FLUE GAS TEMPERATURE CONDITIONS RESULTED IN A SHUTDOWN OF BOTH THE FGD MODULES.

THE S-2 MODULE AGITATOR SHAFT IN THE HOLD TANK FAILED CAUSING THE MODULE TO COME OFF LINE.

PROBLEMS WERE ENCOUNTERED WITH THE SLURRY DRAW OFF PUMP, SUPERNATANT PUMP AND THE RECYCLE PUMP CAUSING THE S-2 MODULE TO SHUTDOWN.

A POWER SUPPLY EQUIPMENT FAILURE RESULTED IN A S-2 MODULE OUTAGE.

AN EXPANSION JOINT FAILURE OCCURRED ON THE S-2 MODULE SEAL AIR FAN.

A HIGH LEVEL CONDITION IN THE DRAW OFF SUMP WAS ALSO A CAUSE OF THE S-2 MODULE LOW AVAILABILITY. THE PROBLEMS EXPERIENCED WITH THE CONTROL SYSTEM CONTRIBUTED ALSO.

8/80	S-1	73.7	67.4		67.4						
	S-2	71.9	55.4		55.4						
	SYSTEM	72.8	61.4	62.4	61.4			744	744	457	86.2

** PROBLEMS/SOLUTIONS/COMMENTS

THICKENER PROBLEMS ENCOUNTERED DURING AUGUST CAUSED BOTH MODULES TO SHUT DOWN FOR PART OF THE MONTH.

THE OUTLET DUCT EXPERIENCED LEAKAGE CAUSING SOME SYSTEM DOWN TIME.

THE S-1 MODULE DAMPER DRIVE FAILED CAUSED ADDITIONAL OUTAGE TIME.

THE LIMESTONE FEEDER FOR MODULE S-2 FAILED CAUSING THE S-2 MODULE TO SHUT DOWN FOR PART OF THE MONTH.

THE FGD SYSTEM WAS SHUT DOWN DURING PART OF THE MONTH SO THAT VALVE REPAIR COULD BE MADE.

PROBLEMS WERE ENCOUNTERED WITH THE S-2 MODULE RECYCLE PUMP.

9/80	S-1	78.5	85.8	87.4	78.5						
	S-2	57.5	0.6	0.2	0.2						
	SYSTEM	68.0	43.2	43.8	39.4			720	658	283	80.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER, THE SCRUBBER OUTLET DUCTS EXPERIENCED LEAKING CAUSING THE SYSTEM TO SHUTDOWN FOR PART OF THE MONTH.

THE S-1 MODULE EXPERIENCED INLET DAMPER PROBLEMS.

THE RECYCLE SPRAY NOZZLES ON THE S-2 MODULE PLUGGED CAUSING ADDITIONAL OUTAGE TIME.

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

THE RADIAN CORP. BEGAN PREPARING THE SYSTEM FOR TESTING IN THE FORCED OXIDATION MODE. THIS IS IN CONJUNCTION WITH THE ADIPIC ACID TEST PROGRAM.

10/80	S-1										
	S-2										
	SYSTEM	0.0	0.0	0.0	0.0			744	572	0	67.3

** PROBLEMS/SOLUTIONS/COMMENTS

BOTH SCRUBBER MODULES WERE OUT OF SERVICE FOR THE ENTIRE PERIOD DUE TO MAINTENANCE REQUIREMENTS THAT COULD NO LONGER BE DEFERRED.

THE BOILER WAS BROUGHT OFF LINE ON OCTOBER 24 FOR AN ANNUAL MAINTENANCE OUTAGE. THIS OUTAGE HAD BEEN DELAYED FOR APPROXIMATELY ONE MONTH BECAUSE OF SYSTEM ELECTRICAL DEMAND AND THE UNAVAILABILITY OF ALTERNATE POWER PRODUCTION FACILITIES.

11/80	S-1										
	S-2										
	SYSTEM	0.0	0.0	0.0	0.0			720	147	0	11.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER MODULES WERE NOT RETURNED TO SERVICE AT THE CONCLUSION OF THE ANNUAL MAINTENANCE OUTAGE DURING NOVEMBER. WORK WAS IN PROGRESS TO PREPARE THE MODULES FOR TESTING IN THE FORCED OXIDATION MODE OF OPERATION IN CONJUNCTION WITH THE EPA ADIPIC ACID TEST PROGRAM.

12/80	S-1	37.4	0.0	0.0	0.0						
	S-2	48.4	12.5	16.9	8.7						
	SYSTEM	42.9	6.3	7.7	4.4			744	520	65	49.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER, DOWN TIME RESULTED DUE TO PIPING SYSTEM MODIFICATIONS, AN INLET DAMPER DRIVE FAILURE, FROZEN AND BROKEN PIPING, AND PROGRAMMABLE CONTROLLER PROBLEMS.

1/81	S-1	41.9	41.2		41.1						
	S-2	73.1	66.3		66.1						
	SYSTEM	57.5	53.7	71.4	53.6			744	742	399	67.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY MODULES S-1 AND S-2 ENCOUNTERED ELECTRICAL PROBLEMS IN THE DEWATERING AREA AND PROGRAMMABLE CONTROLLER MALFUNCTIONS.

THE RECYCLE SPRAY NOZZLES ON THE S-1 MODULE PLUGGED CAUSING SOME OUTAGE TIME.

ADDITIONAL FGD SYSTEM PROBLEMS DURING THE MONTH INCLUDED SLURRY MAKE-UP LINE PLUGGING, A BROKEN SUPERNATANT LINE, AND AN I.D. FAN EXPANSION JOINT FAILURE.

2/81	S-1	55.3	53.6	54.4	53.0						
	S-2	36.9	32.7	37.1	32.3						
	SYSTEM	46.1	43.1	45.8	42.6			672	664	287	71.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY MODULE S-1 WAS OFF LINE PART OF THE MONTH DUE TO FAILURE OF THE EXPANSION JOINT IN THE RECYCLE PUMP DISCHARGE LINE.

MODULE S-2 EXPERIENCED PROBLEMS DUE TO PLUGGING IN THE BALL CAGE, PRESATU-

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
		RATOR AREA, AND THE RECYCLE NOZZLE.									
3/81	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION FOR THE MONTH OF MARCH IS NOT AVAILABLE AT THIS TIME.									
4/81	S-1	47.5	62.1	64.8	46.3						
	S-2	73.5	97.2	97.2	72.4						
	SYSTEM	60.5	79.6	81.3	59.3			720	536	427	59.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING APRIL A SUPERNATANT PIPE FAILURE CAUSED SOME OUTAGE TIME FOR BOTH MODULES.									
		A BOILER TRIP ON APRIL 23 CAUSED A HIGH TEMPERATURE CONDITION ON BOTH MODULES. THE MODULES WERE INSPECTED AND S-2 WAS RETURNED TO SERVICE AND S-1 REMAINED OFF LINE DUE TO DAMAGE TO THE SCRUBBER SPHERES.									
		SOME DOWN TIME RESULTED DUE TO PROGRAMMABLE CONTROLLER PROBLEMS. THE S-1 MODULE'S INTERNALS WERE INSPECTED BY RADIAN CORP.									
		MODULE S-2 TRIPPED DUE TO AN EQUIPMENT FAILURE WHILE SWITCHING RECYCLE PUMPS AND WENT OFF LINE TWICE DUE TO THE LOSS OF ELECTRICAL POWER IN THE DEWATERING AND SUPERNATANT PUMPS AREA.									
5/81	S-1	44.9	86.9	99.3	36.6						
	S-2	42.6	61.3	82.1	25.8						
	SYSTEM	43.7	74.3	91.4	31.2			744	313	232	27.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY THE BOILER REMAINED OUT OF SERVICE THROUGH MAY 18, FOR A SCHEDULED MAINTENANCE OUTAGE.									
		MODULE S-1 WAS OUT OF SERVICE APPROXIMATELY 410 HOURS DUE TO PROGRAMMABLE CONTROLLER POWER PROBLEMS.									
		MODULE S-2 EXPERIENCED 427 HOURS OF OUTAGE TIME DUE TO DEWATERING PROBLEMS									
6/81	S-1	76.3	77.9	82.3	62.6						
	S-2	79.2	72.9	84.9	58.5						
	SYSTEM	77.8	75.4	83.5	60.6			720	579	436	58.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JUNE THE SYSTEM WAS DOWN PART OF THE TIME DUE TO LIMESTONE CONVEYOR PROBLEMS.									
		THE UNIT WAS OUT OF SERVICE FOR ABOUT SIX DAYS IN JUNE FOR MAINTENANCE.									
		BOTH MODULES EXPERIENCED OUTAGES DUE TO ELECTRICAL PROBLEMS CAUSED BY LIGHTNING.									
7/81	S-1	94.9	90.9	98.1	90.9						
	S-2	98.3	94.5	94.5	94.5						
	SYSTEM	96.6	92.7	96.3	92.7			744	744	690	78.1

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE ONLY SIGNIFICANT FGD SYSTEM OUTAGE DURING JULY WAS NECESSARY FOR MOD-IFICATION OF THE S-1 TRAYS. BOTH MODULES WERE REMOVED FROM SERVICE TO PERMIT ENTRY INTO THE MODULE.									
		MINOR PUMP AND PIPING PROBLEMS WERE ENCOUNTERED DURING THE MONTH.									
8/81	S-1	100.0	100.0	100.0	100.0						
	S-2	96.2	74.7	80.5	74.7						
	SYSTEM	98.1	87.4	90.3	87.4			744	744	650	82.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE MONTH, ONE OF THE CONVEYOR BELTS USED FOR SLUDGE REMOVAL WAS STRUCK BY A TRUCK AND DAMAGED. SOME MINOR PROBLEMS RESULTED.									
9/81	S-1	89.4	79.9	88.6	79.9						
	S-2	87.6	75.6	81.1	75.6						
	SYSTEM	88.5	77.8	84.9	75.6			720	720	544	67.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SLUDGE CONVEYOR REMAINED OUT OF SERVICE DURING THE MONTH AS A RESULT OF DAMAGE FROM A TRUCK ACCIDENT. THIS CAUSED THE MAJORITY OF THE FGD SYSTE OUTAGE TIME DURING THE MONTH.									
		SLURRY CARRYOVER IN THE RECYCLED SUPERNATANT WATER CAUSED NOZZLE PLUGGING AND OUTAGE TIME ON BOTH MODULES DURING THE MONTH.									
10/81	S-1	50.9	95.5	99.4	49.3						
	S-2	43.0	78.0	96.7	40.2						
	SYSTEM	47.0	86.8	98.1	44.8			744	384	333	32.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ON OCTOBER 16 A UNIT MAINTENANCE OUTAGE OCCURRED AND LASTED THROUGH THE EN OF THE MONTH.									
		DURING THE OUTAGE THE MOBILE SPHERES WERE REMOVED FROM S-2 AND REPLACED WITH TRAYS SIMILAR TO THOSE PREVIOUSLY INSTALLED IN S-1.									
11/81	SYSTEM	0.0			0.0			720	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT MAINTENANCE OUTAGE LASTED THROUGH NOVEMBER.									
12/81	S-1	80.5	82.6	97.8	65.9						
	S-2	76.2	82.2	93.3	65.7						
	SYSTEM	78.4	82.3	95.5	65.8			744	594	489	49.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT MAINTENANCE OUTAGE ENDED DECEMBER 7 WITH THE BOILER FIRED WITH FUEL OIL AND NATURAL GAS ON DECEMBER 6. A SHORT OUTAGE FOR CONDENSER TUBE LEAK REPAIR OCCURRED ON DECEMBER 30.									
		THE MODULE OUTAGES OCCURRED DURING THE PERIOD FOR THE FOLLOWING REASONS: HIGH TEMPERATURE TRIPS, LOSS OF D.C. POWER, RECYCLE PUMP PROBLEMS, AND FLUE GAS DAMPER PROBLEMS.									
1/82	S-1	98.6	98.2	98.2	97.9						

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	S-2	88.6	88.5	99.0	88.2						
	SYSTEM	93.6	93.4	98.6	93.0			744	742	692	71.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY MODULE S-2 WAS REMOVED FROM SERVICE FOR MAINTENANCE APPROXMATELY THREE DAYS DURING A LOW LOAD PERIOD.

2/82	S-1	42.2	43.8	99.8	42.2						
	S-2	84.2	83.3	99.7	80.2						
	SYSTEM	63.2	63.6	99.8	61.2			672	647	411	43.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY BOTH MODULES WERE OUT OF SERVICE PART OF THE TIME FOR INTERNAL CLEANING AND GENERAL MAINTENANCE. THIS WORK WAS PERFORMED DURING LOW LOAD PERIODS, PERMITTING SINGLE MODULE OPERATION.

3/82	S-1	66.3	98.5	98.5	66.3						
	S-2	0.0	0.0		0.0						
	SYSTEM	33.2	49.2	98.5	33.2			744	501	247	28.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH MODULE S-2 REMAINED OUT OF SERVICE FOR MAINTENANCE. LOW LOADS WERE EXPERIENCED PERMITTING SUCCESSFUL SINGLE MODULE OPERATION WITH S-1.

THE UNIT MAINTENANCE OUTAGE BEGAN ON MARCH 22.

4/82	S-1	0.0			0.0						
	S-2	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE UNIT AND THE FGD SYSTEM WERE OFF-LINE FOR A SCHEDULED MAINTENANCE OUTAGE.

5/82	S-1	60.6	80.3	95.4	55.8						
	S-2	58.8	51.2	97.9	35.6						
	SYSTEM	59.7	65.7	96.6	45.7			744	517	340	39.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT OUTAGE STARTED IN APRIL EXTENDED INTO MAY, DURING WHICH SOME MAJO REPAIRS WERE ACCOMPLISHED ON THE FGD SYSTEM MODULES. THE REMAINDER OF THE MONTH INCLUDED SEVERAL PERIODS OF LOW UNIT LOAD REQUIRING THE OPERATION OF ONLY ONE MODULE. ADDITIONAL SYSTEM MAINTENANCE WAS ACCOMPLISHED AT THESE TIMES.

6/82	A	82.4	41.6	98.2	40.8						
	B	96.2	98.0	97.6	85.0						
	SYSTEM	89.3	69.8	97.9	62.9			720	706	453	52.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE, LOW UNIT LOADS WERE EXPERIENCED DURING MUCH OF THE MONTH, REQUIRING ONLY ONE MODULE TO BE IN SERVICE. ROUTINE CLEANING AND MAINTENANCE WAS ACCOMPLISHED AS REQUIRED.

7/82	S-1	83.9	76.3	96.9	64.1						
	S-2	83.8	85.9	98.9	72.2						
	SYSTEM	83.8	81.1	97.9	68.1			744	625	507	54.5

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A UNIT OUTAGE OCCURRED DURING THE PERIOD OF JULY 1 THROUGH 6 DUE TO THE REPAIR OF A CONDENSER LEAK. THIS PERIOD WAS CONSIDERED AS UNAVAILABLE TIM FOR THE FGD MODULES AS MINOR MAINTENANCE WAS PERFORMED WHILE THE UNIT WAS OFF LINE.									
		ALL OTHER FGD SYSTEM OUTAGES DURING JULY OCCURRED AT LOW LOAD PERIODS WITH ONLY ONE MODULE REQUIRED TO OPERATE.									
8/82	S-1	88.0	86.1	95.7	82.4						
	S-2	93.0	81.8	97.8	78.4						
	SYSTEM	90.5	83.9	96.7	80.4			744	713	598	66.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM OUTAGES FOR AUGUST OCCURRED PRIMARILY DURING PERIODS OF LOW UNIT LOAD REQUIRING ONLY SINGLE MODULE OPERATION AND DURING START-UP PERIODS FOLLOWING UNIT TRIPS. TWO INSTANCES OF SHORT DURATION OCCURRED WHEN BOTH MODULES WERE TAKEN OUT OF SERVICE TO PERMIT ACCESS INTO THE MODULE REQUIRING MAINTENANCE.									
9/82	S-1	99.8	69.5	80.9	69.5						
	S-2	100.0	79.0	91.2	79.0						
	SYSTEM	99.9	74.2	86.0	74.2			720	720	534	65.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD MODULES WERE REMOVED FROM SERVICE AT VARIOUS TIMES DURING SEPTEMBE DUE IN PART TO LOW UNIT LOADS.									
		INSTALLATION OF NEW LIMESTONE CLASSIFIER SYSTEMS ALSO CONTRIBUTED TO THE MODULE OUTAGE TIME DURING SEPTEMBER.									
		ALTHOUGH SOME MAINTENANCE WAS ACCOMPLISHED ON THE MODULES, THEY WERE CONSIDERED AVAILABLE DURING THE OUTAGE PERIODS.									
10/82	S-1	89.2	87.7	98.6	87.8						
	S-2	96.4	89.6	93.7	89.8						
	SYSTEM	92.8	88.7	96.1	88.8			744	744	661	68.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TWO INSTANCES OF PLUGGING OCCURRED IN THE S-1 MODULE DURING OCTOBER.									
		THE S-2 MODULE REQUIRED A BRIEF OUTAGE PERIOD IN OCTOBER FOR CLEANING.									
11/82	S-1	97.4	93.1	96.9	93.1						
	S-2	96.7	95.0	98.3	95.0						
	SYSTEM	97.1	94.0	97.6	94.0			720	720	677	68.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING NOVEMBER.									
12/82	S-1	7.6	83.7	92.1	6.6						
	S-2	8.4	91.9	93.4	7.2						
	SYSTEM	8.0	87.8	92.7	6.9			744	58	51	4.8

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A UNIT TRIP OCCURRED ON DECEMBER 2 WHEN LIGHTNING INTERRUPTED THE ELECTRICAL SYSTEM INTERTIE. THIS RESULTED IN A UNIT FORCED OUTAGE OF APPROXIMATELY 4 HOURS.									
		THE UNIT WAS REMOVED FROM SERVICE ON DECEMBER 3, 1982 FOR AN EXTENSIVE MAINTENANCE OUTAGE. START-UP IS ANTICIPATED FOR MAY, 1983.									
1/83	S-1	0.0			0.0						
	S-2	0.0			0.0						
	SYSTEM	0.0			0.0			744	0	0	0.0
2/83	S-1	0.0			0.0						
	S-2	0.0			0.0						
	SYSTEM	0.0			0.0			672	0	0	0.0
3/83	S-1	0.0			0.0						
	S-2	0.0			0.0						
	SYSTEM	0.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE DECEMBER 1982 - MAY 1983 MAINTENANCE OUTAGE CONTINUED THROUGHOUT THE MONTH OF MARCH.									
4/83	SYSTEM							720	0		0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A UNIT MAINTENANCE OUTAGE TOOK PLACE DURING THE ENTIRE MONTH OF APRIL.									
5/83	S-1	41.4	71.9	92.1	22.3						
	S-2	40.4	40.8	87.3	12.7						
	SYSTEM	40.9	56.4	89.7	17.5			744	231	130	13.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT MAINTENANCE OUTAGE WHICH BEGAN IN APRIL, ENDED ON MAY 19, 1983.									
6/83	S-1	94.1	56.8	97.6	51.9						
	S-2	99.8	60.8	82.5	55.6						
	SYSTEM	96.9	58.8	90.0	53.7			720	657	387	39.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.									
7/83	S-1	98.6	95.2	99.2	89.7						
	S-2	98.8	68.6	98.8	64.7						
	SYSTEM	98.7	81.9	99.0	77.2			744	701	574	63.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JULY.									
8/83	S-1	90.8	84.0	99.2	65.3						
	S-2	93.5	95.5	97.9	74.2						
	SYSTEM	92.2	89.7	98.5	69.8			744	578	519	56.7

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT LOW BOILER AVAILABILITY DURING AUGUST WAS DUE TO WATER WALL TUBE LEAKS.									
9/83	S-1	100.0	82.7	99.7	82.7						
	S-2	100.0	96.5	99.8	96.5						
	SYSTEM	100.0	89.6	99.8	89.6			720	720	645	59.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING SEPTEMBER.									
10/83	S-1	22.3	98.6	99.4	22.0						
	S-2	22.3	94.6	100.0	21.1						
	SYSTEM	22.3	96.6	99.7	21.5			744	166	160	13.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A SCHEDULED UNIT OUTAGE OCCURRED DURING OCTOBER TO REPLACE SECTIONS OF BOILER WATER WALL TUBING.									
		ABSORBER TRAY REPAIRS AND ALTERATIONS WERE MADE DURING THE UNIT OUTAGE IN OCTOBER.									
11/83	S-1	100.0	40.6	99.6	5.6						
	S-2	100.0	74.0	99.6	10.3						
	SYSTEM	100.0	57.3	99.6	8.0			720	100	57	6.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS OUT OF SERVICE FOR SEVERAL EXTENDED PERIODS DURING NOVEMBER DUE TO WATER WALL TUBE FAILURES AND SUBSEQUENT REPAIRS.									
12/83	S-1	71.2	10.8	89.7	5.0						
	S-2	98.0	95.3	95.3	43.9						
	SYSTEM	84.6	53.1	92.5	24.4			744	342	182	20.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE S-1 WAS OUT OF SERVICE APPROXIMATELY 9 DAYS DURING DECEMBER DUE TO FROZEN LINES AND VALVES.									
1/84	S-1	99.8	99.0	99.7	90.8						
	S-2	99.1	96.7	98.8	88.7						
	SYSTEM	99.4	97.9	99.3	89.7			744	682	668	68.3
2/84	S-1	100.0	100.0	100.0	100.0						
	S-2	99.5	89.7	99.5	89.7						
	SYSTEM	99.8	94.9	99.7	94.9			696	696	660	68.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JANUARY AND FEBRUARY.									
3/84	S-1	98.0	77.5	96.6	59.5						
	S-2	93.1	51.2	98.2	39.3						
	SYSTEM	95.6	64.4	97.4	49.4			744	571	368	49.1

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		HIGH BACK PRESSURE ON MODULE S-1 WAS REPORTED AND DISCOVERED TO BE CAUSED BY A BROKEN LINKAGE ON A DAMPER BLADE.									
		THE REPAIR OF A SEAL WATER LINE CONTRIBUTED TO FGD-SYSTEM OUTAGE TIME DURING MARCH.									
		A SLURRY RECYCLE LINE LEAK ON MODULE S-2 WAS TEMPORARILY REPAIRED DURING MARCH.									
4/84	S-1	64.7	75.1	97.3	50.0						
	S-2	66.0	43.1	99.2	28.7						
	SYSTEM	65.4	59.1	98.3	39.4			720	480	284	45.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		VIBRATION PROBLEMS WERE REPORTED ON THE "A" ID FAN. THE FAN WHEEL WAS CLEANED AND RETURNED TO SERVICE.									
5/84	S-1	7.7	0.0		0.0						
	S-2	7.7	87.6	93.5	7.2						
	SYSTEM	7.7	43.8	93.5	3.6			744	61	27	40.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A PLANNED UNIT OUTAGE OCCURRED DURING APRIL AND MAY TO REPLACE WATERWALL TUBES.									
6/84	S-1	99.5	65.9	97.1	60.9						
	S-2	98.9	89.4	99.1	82.7						
	SYSTEM	99.2	77.7	98.1	71.8			720	665	517	61.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MINOR PLUGGING IN THE ABSORBER BOTTOM TRAY AREA WAS REPORTED. HIGH EXCESS OXYGEN REQUIREMENTS AND PH ADJUSTMENTS AT LOW LOADS WERE BELIEVED TO BE TH CAUSE.									
		CONDENSATE PUMP PROBLEMS DURING JUNE CONTRIBUTED TO FGD SYSTEM DOWN TIME.									
7/84	S-1	100.0	72.5	98.2	72.2						
	S-2	98.9	92.6	98.9	92.3						
	SYSTEM	99.4	82.5	98.6	82.3			744	742	612	67.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JULY.									
8/84	S-1	99.6	83.1	98.2	83.1						
	S-2	98.4	78.9	96.8	78.9						
	SYSTEM	99.0	81.0	97.5	81.0			744	744	603	72.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE PERIOD OF AUGUST 26 TO AUGUST 28, THE PROCESS CONTROLLER POWER SUPPLY FAILED CAUSING AN AUTOMATIC SHUT DOWN.									
		DURING AUGUST, THE SUPERNATE LINE TO THE ABSORBER BROKE AT AN ELBOW AND WA LATER REPLACED.									
9/84	S-1	84.8	72.5	98.5	72.5						

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	S-2	99.1	90.6	98.5	90.6						
	SYSTEM	91.9	81.6	98.5	81.6			720	720	587	66.7

** PROBLEMS/SOLUTIONS/COMMENTS

UTILITY REPORTED THAT MODULE S-1 HAD SOME BAD SCALE BUILD-UP ON THE TRAY AND ON THE INTERNAL STRUCTURE LOCATED BELOW. THE ABSORBER WAS REMOVED FROM SERVICE SEVERAL DAYS FOR CLEANING. IN ADDITION, THE MODULE WAS OFF A FEW HOURS DUE TO POWER SUPPLY PROBLEMS.

10/84	S-1	82.9	82.8	98.2	68.7						
	S-2	82.2	76.8	97.6	63.7						
	SYSTEM	82.5	79.8	97.9	66.2			744	617	492	58.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE CEM EQUIPMENT HAD SEVERAL PERIODS OF DOWN TIME BETWEEN OCTOBER 20 AND OCTOBER 24 DUE TO PLUGGING IN THE STACK FILTER THIS WAS CAUSED BY A CARRYOVER FROM THE S-2 MODULE DEMISTERS DEMISTERS WHICH HAD BECOME PARTIALLY PLUGGED.

THE UNIT CAME OFF-LINE FOR A SCHEDULED MAINTAINENCE OUTAGE ON THE 26TH OF OCTOBER.

11/84	S-1	40.0	43.6	97.4	16.8						
	S-2	40.0	86.8	98.6	33.4						
	SYSTEM	40.0	65.2	98.0	25.1			720	277	180	49.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF-LINE FROM THE 1ST THRU THE 19TH DUE TO THE SCHEDULED OUTAGE.

12/84	S-1	66.2	70.1	97.8	50.4						
	S-2	74.2	76.2	99.9	54.8						
	SYSTEM	70.2	73.2	98.8	52.6			744	535	391	41.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF-LINE DECEMBER 11-17 FOR INSPECTION AND MAINTAINENCE FOR A TEST BURN OF A NEW COAL SUPPLY. IN ADDITION THE E.S.P. WAS CLEANED AND SEVERAL BROKEN WIRES WERE REPLACED.

THE UTILITY ALSO CLEANED BOTH MODULES, REPLACED THE DISCHARGE WELL ON S-2 RECYCLE PUMP, AND REPROGRAMMED THE KAYE EMISSION RECORDER(LOSS OF MEMORY HAD CAUSED SEVERAL PERIODS OF DATA TO BE LOST).

1/85	S-1	26.0	93.6	96.6	25.7						
	S-2	25.8	40.6	98.5	11.2						
	SYSTEM	25.9	67.1	97.6	18.4			744	204	137	47.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS OFF LINE FROM THE FIRST THROUGH THE 23RD OF THE MONTH SO THAT AN INDEPENDENT REVIEW OF THE OPERATING/ MAINTENANCE PROCEDURES COULD BE COMPLETED AND A MASTER PLAN TO PREVENT FUTURE COAL PREPARATION SYSTEM EXPLOSIONS COULD BE IMPLEMENTED. THE ORDERING/INSTALLATION OF THE IMMEDIATE AND SHORT TERM RECOMMENDATIONS WERE PUT INTO PRACTICE PRIOR TO THE UNIT START-UP IN ORDER TO MAXIMIZE SAFETY DURING THE INTERIM PERIOD, BEFORE THE INSTALLATION OF A STEAM INERTING SYSTEM.

TRAY PLUGGING CAUSED A FORCED OUTAGE ON MODULE S-1 DURING THE MONTH.

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/85	S-1	99.7	98.5	98.8	98.1						
	S-2	100.0	95.3	98.8	95.0						
	SYSTEM	99.8	96.9	98.8	96.5			672	669	649	56.3

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE S-1 WAS TAKEN OUT OF SERVICE DURING THE MONTH TO MAKE TEMPORARY REPAIRS TO THE PRESATURATOR SECTION. A PERMANENT REPAIR WILL BE MADE DURING THE SCHEDULED APRIL OUTAGE.

BOTH ID FANS WERE BALANCED DURING THE MONTH IN RESPONSE TO HIGH VIBRATION PROBLEMS. THE UTILITY EMPLOYED THE SERVICES OF A CONTRACTOR TO PERFORM FAN VIBRATION TESTS TO HELP DETERMINE THE CAUSE OF THE FAN SENSITIVITY TO SMALL WEIGHT CHANGES. THE CONTRACTOR WILL RECOMMEND CHANGES UPON COMPLETING THE ANALYSIS.

3/85	S-1	98.9	56.8	97.8	56.2						
	S-2	99.2	73.0	97.7	72.3						
	SYSTEM	99.0	64.9	97.8	64.2			744	737	478	46.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY MADE SEVERAL TEMPORARY REPAIRS TO BOTH THE S-1 AND S-2 PRESATURATORS AS WELL AS TO THE DISCHARGE LINING ON MODULE S-1. PERMANENT REPAIRS WILL BE MADE DURING THE UPCOMING SCHEDULED APRIL OUTAGE.

POWER SUPPLY PROBLEMS ASSOCIATED WITH THE FOUR OPACITY MONITORS WERE REPORTED DURING THE MONTH. THESE WERE TRACED DOWN TO A SHORT IN AN ADJACENT CABLE IN THE CABLE TRAY BURNING THROUGH THEIR SUPPLY CABLE. BOTH CABLES WERE REPAIRED AND THE MONITORS WERE RETURNED TO SERVICE.

4/85	S-1	15.9	99.1	99.3	15.8						
	S-2	15.9	97.3	99.0	15.5						
	SYSTEM	15.9	98.2	99.2	15.6			720	114	112	56.6
5/85	S-1	82.1	96.5	93.9	77.5						
	S-2	47.5	48.4	93.9	38.9						
	SYSTEM	64.8	72.4	93.9	58.2			744	598	433	54.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT A SCHEDULED UNIT/FGD SYSTEM OUTAGE BEGAN ON THE FIRST OF APRIL AND EXTENDED THROUGH MAY 6.

ALTHOUGH THE UNIT OUTAGE ENDED ON MAY 6, MODULE S-2 WAS NOT AVAILABLE UNTIL THE 15TH OF THE MONTH. THIS TIME WAS REQUIRED TO COMPLETE THE RELINING WORK IN THE PRESATURATOR WITH HASTELLOY C-276. THE MODULE WAS TAKEN OFF LINE SEVERAL TIMES AFTER THE 15TH TO REPAIR PLUG WELD LEAKS.

6/85	S-1	46.5	97.3	99.7	37.3						
	S-2	46.6	98.5	99.5	37.7						
	SYSTEM	46.6	97.9	99.6	37.5			720	276	270	73.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS TAKEN OUT OF SERVICE ON THE 14TH OF THE MONTH FOR INSPECTION AND/OR REMOVAL OF BAD BOILER WATERWALL TUBES. A RANDOM SAMPLE OF TUBES IN ALL AREAS OF THE BOILER WAS TAKEN TO CHECK FOR REDUCTION IN WALL THICKNESS.

7/85	S-1	99.0	94.0	95.3	92.9						
	S-2	99.8	93.8	99.2	92.7						
	SYSTEM	99.4	93.9	97.2	92.8			744	735	690	71.7

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTHS OF JUNE OR JULY.									
8/85	S-1	98.9	98.8	98.8	98.8						
	S-2	98.9	98.7	98.7	98.7						
	SYSTEM	98.9	98.8	98.8	98.8			744	744	735	73.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT BOTH SCRUBBING TRAINS WERE TAKEN OUT OF SERVICE SEVERAL TIMES DURING AUGUST FOR CLEANING.									
9/85	S-1	99.6	87.5	99.4	87.4						
	S-2	99.1	98.9	98.9	98.8						
	SYSTEM	99.3	93.2	99.1	93.1			720	719	670	67.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED NO FGD SYSTEM-RELATED OUTAGES DURING THE MONTH; HOWEVER, BOILER ID FAN PROBLEMS AND UNIT CONTINUOUS EMISSION MONITOR FAILURES WERE NOTED.									
10/85	S-1	18.1	15.9	77.2	15.8						
	S-2	84.0	80.5	94.5	80.0						
	SYSTEM	51.0	48.2	85.8	47.9			744	739	356	42.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FAN PROBLEMS CONTINUED FROM LAST MONTH. ONE BOILER ID FAN WAS REMOVED AND SENT OUT FOR REWINDING. BECAUSE OF THE FORCED LOAD REDUCTION THAT RESULTED, A PLANNED OUTAGE WAS CANCELLED SINCE MOST REPAIRS COULD BE MADE ON LINE AT THE LOWER LOAD LEVEL. THOSE REPAIRS REQUIRING A UNIT OUTAGE WERE POSTPONED UNTIL THE SPRING, 1986, OUTAGE.									
		DURING THE LOW LOAD PERIOD SOME SCRUBBER WORK WAS PERFORMED. THE S-2 MODULE WAS REMOVED FROM SERVICE TO MAKE REPAIRS.									
11/85	S-1	57.9	57.9	99.9	57.8						
	S-2	50.8	27.6	65.1	27.6						
	SYSTEM	54.4	42.8	82.5	42.7			720	719	307	44.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE S-1 MODULE WAS OUT OF SERVICE FROM THE 18TH THROUGH THE 30TH OF THE MONTH FOR MIST ELIMINATOR CLEANING AND PRESATURATOR WORK.									
		MODULE S-2 WAS OUT OF SERVICE FROM THE 1ST THROUGH THE 18TH OF THE MONTH FOR CLEANING/REPAIR WORK.									
		OPACITY MONITORS WERE OUT OF SERVICE FROM NOVEMBER 6TH THROUGH THE 14TH. THE MONITORS HAD PROBLEMS HOLDING CALIBRATION AND HIGH MOISTURE LEVELS CAUSED NEGATIVE READINGS. THE OPTICS WERE COMPLETELY CLEANED AND PC BOARDS WERE RESEATED. A COMPLETE MANUAL CALIBRATION WAS PERFORMED ON EACH UNIT BEFORE THE MONITORS WERE RETURNED TO SERVICE.									
		THE S-1 PRESATURATOR SHELL MATERIAL WAS REPLACED WITH A 1/4 INCH CARBON STEEL PLATE COVERED WITH ALLOY C-276.									
12/85	S-1	43.0	41.9	98.3	41.9						
	S-2	58.8	58.7	99.6	58.7						
	SYSTEM	50.9	50.3	99.0	50.3			744	744	374	43.3

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE S-1 WAS OUT OF SERVICE FROM THE 1ST THROUGH THE 18TH OF THE MONTH FOR CLEANING/REPAIR WORK.									
		THE S-2 MODULE WAS OUT OF SERVICE FROM THE I8TH THROUGH THE 31ST OF THE MONTH FOR UPPER MIST ELIMINATOR CLEANING.									
		THE S-2 PRESATURATOR UNDERWENT A SHELL REPLACEMENT WITH AN ALLOY C-276 COVERED 1/4 INCH CARBON STEEL PLATE MATERIAL IN DECEMBER.									
1/86	S-1	86.4	83.1	98.3	83.1						
	S-2	99.7	49.7	99.7	49.7						
	SYSTEM	93.0	66.4	99.0	66.4			744	744	494	50.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE S-1 WAS TAKEN OFF-LINE FOR CLEANING JANUARY 16. THE MODULE CAME BACK ON LINE JANUARY 21. MODULE S-2 WAS OFF-LINE UNTIL JANUARY 16 DUE TO LOW UNIT LOAD.									
2/86	S-1	97.1	72.8	99.7	72.8						
	S-2	94.0	89.1	99.9	89.1						
	SYSTEM	95.5	80.9	99.8	80.9			672	672	544	51.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE S-1 WAS OFF-LINE FOR CLEANING/REPAIRS ON FEBRUARY 18 THROUGH THE 19TH. THE MODULE WAS OFF AGAIN ON THE 22ND DUE TO LOW LOAD. MODULE S-2 WAS OFF-LINE FOR CLEANING/REPAIRS ON FEBRUARY 19 THROUGH THE 20TH AND AGAIN ON THE 27TH.									
3/86	S-1	87.1	1.2	90.0	1.0						
	S-2	84.3	98.4	98.4	84.1						
	SYSTEM	85.7	49.8	94.2	42.5			744	636	317	44.6
4/86	S-1	0.0			0.0						
	S-2	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS TAKEN OFF-LINE MARCH 27 FOR A SCHEDULED ESP/ECONOMIZER OUTAGE. DURING THIS OUTAGE OTHER SCHEDULED BOILER FGD AND COAL HANDLING SYSTEM MAINTENANCE ITEMS WERE ADDRESSED. THE OUTAGE CONTINUED THROUGH APRIL.									
5/86	S-1	75.1	75.4	96.8	46.6						
	S-2	78.4	74.6	98.6	46.1						
	SYSTEM	76.7	75.0	97.7	46.3			744	459	345	54.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SEVERAL CONTINUOUS EMISSION MONITOR (CEM) PROBLEMS WERE REPORTED IN MAY. THESE WERE AS FOLLOWS- 1) NOX CELL OUT OF CALIBRATION 2) HIGH O2 DUE TO TIMER PROBLEM AND VALVE ACTUATOR HANGING UP 3) CALIBRATION PROBLEM ON OPACITY MONITOR (REPLACED A CONTROL BOARD AND POWER SUPPLY).									
		A DAMPER PROBLEM CAUSED ROUGHLY 2 DAYS OF DOWNTIME DURING MAY. THIS WAS FOLLOWED BY SEVERAL DAYS OF BOILER-RELATED OUTAGE TIME.									
		THE SCHEDULED UNIT OUTAGE ENDED MAY 5, 1986.									

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/86	S-1	99.8	66.6	98.7	66.6						
	S-2	98.7	74.2	99.3	74.2						
	SYSTEM	99.3	70.4	99.0	70.4			720	720	507	54.7

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD SYSTEM-RELATED PROBLEMS OCCURRED IN JUNE.

7/86	S-1	81.8	91.3	98.4	72.0						
	S-2	81.0	72.2	98.2	56.9						
	SYSTEM	81.4	81.8	98.3	64.4			744	586	479	71.3

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE THREE UNIT TRIPS IN JULY, TWO OF WHICH LASTED FOR AN EXTENDED PERIOD. DURING THIS TIME INSPECTIONS/REPAIRS OF THE MODULES WERE PERFORMED.

8/86	S-1	89.8	98.9	99.3	87.9						
	S-2	89.4	95.7	98.8	85.0						
	SYSTEM	89.6	97.3	99.1	86.4			744	661	643	70.6

** PROBLEMS/SOLUTIONS/COMMENTS

FAN AND SCREEN TUBE PLUGGING PROBLEMS CAUSED THE UNIT TO BE OUT OF SERVICE THE FIRST THREE DAYS OF AUGUST AND PART OF THE FOURTH.

9/86	S-1	89.6	92.4	99.4	84.9						
	S-2	91.4	91.9	99.6	84.4						
	SYSTEM	90.5	92.2	99.5	84.7			720	661	610	62.3

** PROBLEMS/SOLUTIONS/COMMENTS

OPACITY MONITOR PROBLEMS WERE TRACED TO A FAULTY COMMUNICATION CORD. THE CORD WAS REPLACED AS SOON AS THE NEW ONE WAS RECEIVED.

10/86	S-1	9.7	100.0	100.0	9.6						
	S-2	9.7	97.5	100.0	9.4						
	SYSTEM	9.7	98.7	100.0	9.5			744	71	71	52.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF-LINE FOR A SCHEDULED OUTAGE THROUGH MOST OF OCTOBER.

11/86	S-1	23.3	86.0	99.5	18.2						
	S-2	23.3	97.5	99.6	20.6						
	SYSTEM	23.3	91.8	99.5	19.4			720	153	140	53.2

** PROBLEMS/SOLUTIONS/COMMENTS

AN OPACITY MONITOR HAD TO BE SENT OUT FOR REPAIRS AND TO HAVE THE READ ONLY MEMORY PROGRAMMED IN NOVEMBER.

THE UNIT WAS PLACED BACK IN SERVICE 11/24/86 UPON COMPLETING A SCHEDULED OUTAGE.

12/86	S-1	99.7	98.9	98.9	98.9						
	S-2	99.5	98.7	98.7	98.7						
	SYSTEM	99.6	98.8	98.8	98.8			744	744	735	57.5

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR DECEMBER.										
1/87	S-1	99.4	99.4	99.4	99.4						
	S-2	99.3	99.3	99.3	99.3						
	SYSTEM	99.4	99.4	99.4	99.4			744	744	739	57.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF JANUARY.										
2/87	S-1	100.0	98.3	99.5	75.3						
	S-2	100.0	97.4	99.9	74.7						
	SYSTEM	100.0	97.9	99.7	75.0			672	515	504	56.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UNIT WAS OFF-LINE FEBRUARY 26-27 DUE TO PRECIPITATOR PROBLEMS.										
	THE UNIT WAS OFF-LINE FEBRUARY 3-9 DUE TO A BLOWN REHEATER TUBE.										
3/87	S-1	99.9	99.9	99.9	99.9						
	S-2	99.9	99.8	99.8	99.8						
	SYSTEM	99.9	99.8	99.8	99.8			744	744	743	58.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF MARCH.										
4/87	S-1	10.1	96.6	100.0	9.8						
	S-2	10.1	99.8	100.0	10.1						
	SYSTEM	10.1	98.2	100.0	9.9			720	73	72	76.3
5/87	S-1	89.4	98.4	99.5	86.1						
	S-2	89.7	97.1	99.8	84.9						
	SYSTEM	89.5	97.8	99.6	85.5			744	651	636	66.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
	UNIT WAS OFF-LINE FOR A SCHEDULED OUTAGE APRIL 4 THROUGH MAY 4.										
6/87	S-1	99.7	98.3	98.6	86.4						
	S-2	99.6	98.2	98.8	86.3						
	SYSTEM	99.6	98.2	98.7	86.4			720	633	622	65.4
6/87	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
BAD C3471 ****											
7/87	S-1	99.8	99.8	99.8	99.8						
	S-2	99.4	99.4	99.4	99.4						
	SYSTEM	99.6	99.6	99.6	99.6			744	744	741	66.3
8/87	S-1	100.0	98.8	99.3	91.0						
	S-2	99.9	98.2	99.9	90.5						
	SYSTEM	100.0	98.5	99.6	90.8			744	685	675	78.3
9/87	S-1	100.0	100.0	100.0	99.7						
	S-2	100.0	100.0	100.0	99.7						
	SYSTEM	100.0	100.0	100.0	99.7			720	716	718	82.6

CITY UTILITIES OF SPRINGFIELD: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE PERIOD JUNE THROUGH SEPTEMBER 1987.									
10/87	S-1	6.1	98.0	100.0	6.0						
	S-2	6.1	100.0	100.0	6.1						
	SYSTEM	6.1	99.0	100.0	6.0			744	45	45	72.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OFF-LINE FOR A SCHEDULED OUTAGE TO REPLACE BOILER CONTROLS.									
11/87	S-1	26.7	83.4	98.9	21.3						
	S-2	26.7	96.5	99.8	24.6						
	SYSTEM	26.7	90.0	99.3	22.9			720	183	165	54.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE SCHEDULED OUTAGE, THE OPACITY MONITOR WAS DAMAGED BY PAINTERS SANDBLASTING. TWO UNITS WERE SENT TO BE REBUILT AND RECALIBRATED.									
		THE UNIT WAS OFF-LINE UNTIL NOVEMBER 23 FOR A SCHEDULED OUTAGE TO REPLACE BOILER CONTROLS.									
12/87	S-1	99.9	84.2	99.8	81.3						
	S-2	99.5	85.1	99.5	82.2						
	SYSTEM	99.7	84.7	99.7	81.7			744	718	608	51.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS TAKEN OFF-LINE FOR PRECIPITATOR CLEANING AND MAINTENANCE. AIR FILTERS WERE CLEANED AND FAN CONTROL SYSTEMS CHECKED.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COLORADO UTE ELECTRIC	
PLANT NAME	CRAIG	
UNIT NUMBER	1	
CITY	CRAIG	
STATE	COLORADO	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	172.	(0.400 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	900	
GROSS UNIT GENERATING CAPACITY - MW	454	
NET UNIT GENERATING CAPACITY W/FGD - MW	428	
NET UNIT GENERATING CAPACITY WO/FGD - MW	431	
EQUIVALENT SCRUBBED CAPACITY - MW	350	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	722.29	(1530600 ACFM)
BOILER FLUE GAS TEMPERATURE - C	121.1	(250 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	10.9	(35.8 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	23260.	(10000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		9100-10300
AVERAGE ASH CONTENT - %	8.00	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	16.00	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	0.45	
RANGE SULFUR CONTENT - %	0.4-0.5	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	0.00-0.02	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	HOT SIDE	
SUPPLIER	BELCO	
INLET FLUE GAS CAPACITY - CU.M/S	1392.1	(2950000 ACFM)
INLET FLUE GAS TEMPERATURE - C	398.9	(750 F)
PRESSURE DROP - KPA	0.7	(3. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.9	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS	
A-E FIRM	STEARNS-ROGER	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	85.00	
ENERGY CONSUMPTION - %	0.7	
CURRENT STATUS	1	
COMMERCIAL START-UP	12/1980	
INITIAL START-UP	10/1980	
CONTRACT AWARDED	5/1977	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	0.96	
DESIGN COAL HEAT CONTENT - J/G	22329.6	(9600 BTU/LB)
DESIGN COAL ASH CONTENT - %	11.60	
DESIGN MOISTURE CONTENT - %	15.30	
DESIGN CHLORIDE CONTENT - %	0.10	
SPACE REQUIREMENTS - SQ M	12140.2	(130680 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	264.0	
** QUENCHER/PRESATURATOR		
NUMBER	4	
TYPE	QUENCH DUCT	
SUPPLIER	PEABODY PROCESS SYSTEMS	
INLET GAS FLOW - CU. M/S	217.07	(460000 ACFM)
INLET GAS TEMPERATURE - C	121.1	(250 F)
PRESSURE DROP - KPA	0.2	(1.0 IN-H2O)
LIQUID RECIRCULATION RATE - LITERS/S	32.	(500 GPM)
L/G RATIO - L/CU. M	0.1	(1.1 GAL/1000 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM	
** ABSORBER		
NUMBER	4	
NUMBER OF SPARES	1	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	PEABODY PROCESS SYSTEMS	
DIMENSIONS - FT	32.0 DIA X 52.5	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC 'SPRAY ZONE!; GLASS FLAKE-FILLED POLYEST	
LINER SPECIFIC MATERIAL	NATURAL RUBBER	
LINER MATERIAL TRADE NAME/COMMON TYPE	BLACK NATURAL RUBBER	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	4	
LIQUID RECIRCULATION RATE - LITER/S	1512.	(24000 GPM)
L/G RATIO - L/CU.M	7.0	(52.2 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.4	(1.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	217.07	(460000 ACFM)
INLET GAS TEMPERATURE - C	121.1	(250 F)
SO2 REMOVAL EFFICIENCY - %	85.0	
PARTICLE REMOVAL EFFICENCY - %	50.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	4	
NUMBER OF SPARES PER SYSTEM	1	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	4	
FREEBOARD DISTANCE - M	1.52	(5.0 FT)
DISTANCE BETWEEN VANES - CM	3.0	(1.20 IN)
VANE ANGLES - DEGREES	45	
PRESSURE DROP - KPA	0.2	(1.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	RAW WATER	
WASH FREQUENCY	CONTINUOUS	
WASH RATE - L/S	6.3	(100 GAL/MIN)

** REHEATER

NUMBER	4	
NUMBER OF SPARES	1	
NUMBER PER MODULE	1	
GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
LOCATION	OUTLET DUCT BETWEEN ME & OUTLET DAMPER	
PERCENT GAS BYPASSED - AVG	23.0	
TEMPERATURE INCREASE - C	27.8	(50 F)
INLET FLUE GAS FLOW RATE - CU. M/S	194.89	(413000 ACFM)
INLET FLUE GAS TEMPERATURE - C	43.3	(110 F)
OUTLET FLUE GAS FLOW RATE - CU. M/S	302.02	(640000 ACFM)
OUTLET FLUE GAS TEMPERATURE - C	73.9	(165 F)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	

** FANS

NUMBER	4	
NUMBER OF SPARES	0	
DESIGN	AXIAL	
SUPPLIER	BUFFALO FORGE	
FUNCTION	INDIRECT REHEAT	
APPLICATION	N/A	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	46.03	(97545 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** FANS

NUMBER	4	
NUMBER OF SPARES	1	
DESIGN	AXIAL	
SUPPLIER	BUFFALO FORGE	
FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	372.80	(790000 ACFM)
FLUE GAS TEMPERATURE - C	121.1	(250 F)
PRESSURE DROP - KPA	3.4	(11.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	4	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER	
MANUFACTURER	FORNEY ENGINEERING	
MODULATION	OPEN	
SEAL AIR FLOW - CU. M/S	3.07	(6500 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-285	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** DAMPERS

NUMBER	4	
GENERIC TYPE	LOUVER	

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	FORNEY ENGINEERING
MODULATION	OPEN
SEAL AIR FLOW - CU. M/S	3.07 (6500 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-285
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	4
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	FORNEY ENGINEERING
MODULATION	OPEN
SEAL AIR FLOW - CU. M/S	3.07 (6500 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-285
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	4
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	FORNEY ENGINEERING
MODULATION	OPEN
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; NR
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	2
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	FORNEY ENGINEERING
MODULATION	OPEN
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-285
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	1
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	FORNEY ENGINEERING
MODULATION	OPEN
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-285
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	2
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	FORNEY ENGINEERING
MODULATION	CLOSED
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-285
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

** DUCTWORK

LOCATION	INLET TO QUENCH
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	OUTLET TO DAMPER
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER

** DUCTWORK

LOCATION	DAMPER TO STACK
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	BYPASS
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	9.1 (10 TPH)
PRODUCT QUALITY - % SOLIDS	35.0

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	4
REAGENT PREP PRODUCT	1
THICKENER OVERFLOW	1
CLASSIFIER OVERFLOW	4
FLOCCULANT	1
WASTE SLURRY BLEED	1

** PUMPS

SERVICE	NUMBER
RAW WATER	2
RECLAIM SUMP	7
POND	1
COOLING TOWER BLOWDOWN BOOSTER	2
ABSORBER RECIRCULATION	8
WASH SLURRY	8
SUPERNATANT	2
THICKENER UNDERFLOW	2
POLYELECTROLYTE	1
WASTE SLURRY	2
MILL RECIRCULATION	2
LIMESTONE SLURRY FEED	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	CENTRIFUGE
NUMBER	1
NUMBER OF SPARES	1
DIMENSIONS - FT	3.0 DIA X 6.0
CAPACITY	126 GPM

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

SHELL GENERIC MATERIAL TYPE	HIGH ALLOY	
SHELL SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	
BELT GENERIC MATERIAL TYPE	N/A	
BELT SPECIFIC MATERIAL TYPE	N/A	
FEED STREAM SOURCE	THICKENER UNDERFLOW	
FEED STREAM CHARACTERISTICS	35% SOLIDS	
OUTLET STREAM CHARACTERISTICS	60% SOLIDS	
OVERFLOW STREAM CHARACTERISTICS	60 GPM	
OUTLET STREAM DISPOSITION	LANDFILL	
OVERFLOW STREAM DISPOSITION	TO WASTE SUMP & THEN TO THICKENER	

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER	
NUMBER	1	
NUMBER OF SPARES	0	
CONFIGURATION	CENTER DRAW	
DIMENSIONS - FT	75.0 DIA X 15.0	
SHELL GENERIC MATERIAL TYPE	CARBON STEEL	
SHELL SPECIFIC MATERIAL TYPE	AISI 1110	
LINER GENERIC MATERIAL TYPE	ORGANIC	
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER 'WALLS!; MAT-REINFO	
FEED STREAM SOURCE	ABSORBER BLEED	
FEED STREAM CHARACTERISTICS	5% SOLIDS	
OUTLET STREAM CHARACTERISTICS	35% SOLIDS	
OVERFLOW STREAM CHARACTERISTICS	100 GPM, <1% SUSPENDED SOLIDS	
OUTLET STREAM DISPOSITION	TO CENTRIFUGES	
OVERFLOW STREAM DISPOSITION	RECYCLED TO PROCESS	

*** SALEABLE BYPRODUCTS

*** SLUDGE

FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	10.5	(11.6 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	40.0	
% CASO3 - DRY	22.6	
% CASO4 - DRY	70.2	
% CAOH2 - DRY	0.0	
% CACO3 - DRY	2.9	
% ASH - DRY	0.3	
% OTHER COMPOUNDS - DRY	3.9	

** TREATMENT

METHOD	UNSTABILIZED	

** DISPOSAL

NATURE	FINAL	
TYPE	LANDFILL	
LOCATION	OFF-SITE	
SITE TRANSPORTATION METHOD	TRUCK	

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH, SO2 CONCENTRATION	
PHYSICAL VARIABLES	DENSITY, GAS FLOW, LIQUID FLOW	
CONTROL LEVELS	PH 5.4, SOLIDS 12-15%	
MONITOR TYPE	UNILOK-PH, OHMART-DENSITY, BROOKS-FLOW, DYNASCIE	
MONITOR LOCATION	AT MODULE RECYCLE TANK	
PROCESS CONTROL MANNER	AUTOMATIC	
PROCESS CHEMISTRY MODE	FEEDBACK	

** WATER BALANCE

WATER LOOP TYPE	CLOSED	
EVAPORATION WATER LOSS - LITER/S	17.8	(282 GPM)
SLUDGE HYDRATION WATER LOSS - LITER/S	0.6	(9 GPM)
SLUDGE INTERSTITIAL WATER LOSS - LITERS/S	2.1	(33 GPM)
POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	0	
EFFLUENT WATER LOSS - LITERS/S	0.0	(0 GPM)

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

RECEIVING WATER STREAM	N/A
MAKEUP WATER ADDITION - LITERS/S	20.2 (321 GPM)
SOURCE OF MAKEUP WATER	COOLING TOWER BLOWDOWN

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	CACO3
CONSUMPTION	7000 LB/HR
UTILIZATION - %	75.0
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	33.3
MIST ELIMINATOR - %	33.3
REHEATER - %	33.3
BALL MILL - %	0.0
EFFLUENT HOLD TANK - %	33.3
THICKENER - %	0.0
CENTRIFUGE - %	50.0

** FGD SPARE COMPONENT INDICES

ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/80	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM BEGAN INITIAL OPERATIONS ON OCTOBER 9, 1980 WHEN MODULE D CAME ON LINE. HOWEVER MODULE'S A THROUGH C ARE STILL UNDER CONSTRUCTION.

11/80	D	48.6	44.7	46.2	38.5						
	SYSTEM							720	619		47.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER OPERATED AT ABOUT 50 TO 60% LOAD CAPACITY DURING NOVEMBER. ONL ONE MODULE IS REQUIRED FOR COMPLIANCE WHEN OPERATING UNDER THE REDUCED LOAD CONDITION.

12/80	A	0.0	0.0		0.0						
	B	53.8	44.3	70.4	42.6						
	C	73.9	70.4	84.0	67.7						
	D	60.5	56.0	80.2	53.9						
	SYSTEM	62.7	56.8	78.7	54.7			744	716	407	63.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM EQUIPMENT CHECKOUT CONTINUED THROUGH DECEMBER. MODULE A NEEDED MECHANICAL PARTS FOR REPAIR. AS OF DECEMBER 23, THE PROBLEMS CAUSING LOAD RESTRICTION WERE CORRECTED AND THE UNIT INCREASED TO FULL LOAD.

1/81	A	0.0	0.0	0.0	0.0						
	B	59.7	70.2	71.0	55.4						
	C	48.9	59.8	60.5	47.2						
	D	11.3	12.6	12.7	9.9						
	SYSTEM	39.9	47.5	48.1	37.5			744	587	279	62.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE FGD SYSTEM EQUIPMENT CHECKOUT CONTINUED. MODULE A REMAINED OUT OF SERVICE BECAUSE THE MECHANICAL PARTS NEEDED FOR REPAIR WORK WERE NOT AVAILABLE.

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	A	0.0	0.0	0.0	0.0						
	B	12.2	12.4	12.9	10.7						
	C	13.6	12.4	12.9	10.7						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	8.6	8.3	8.6	7.1			672	580	36	64.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE CHECKOUT OF THE FGD SYSTEM EQUIPMENT CONTINUED DURING FEBRUARY. MODUL A NEEDED MECHANICAL PARTS FOR REPAIR. THREE OF THE FOUR MODULES WERE TO BE OPERATING BY THE END OF THE MONTH.

MODULES B AND C ENCOUNTERED PROBLEMS WITH THE INLET AND OUTLET DAMPERS DURING FEBRUARY.

3/81	A	0.0	0.0	0.0	0.0						
	B	0.0	0.0	0.0	0.0						
	C	0.0	0.0	0.0	0.0						
	D	35.5	35.5	35.7	35.5						
	SYSTEM	11.8	11.8	11.9	11.8			744	744	88	88.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH MODULES A, B, AND C EXPERIENCED OPERATING PROBLEMS WITH THE DAMPERS.

ADDITIONAL OUTAGE TIME WAS DUE TO THE READJUSTMENT OF THE FAN BLADE PITCHES.

4/81	A	0.0	0.0	0.0	0.0						
	B	36.1	59.9	60.9	35.6						
	C	2.8	4.2	4.3	2.5						
	D	25.0	40.5	41.2	23.9						
	SYSTEM	21.3	34.9	26.6	20.7			720	427	149	52.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST HALF OF APRIL THE SYSTEM EXPERIENCED PROBLEMS WITH THE DAMPERS AND CONTROLS MALFUNCTIONING. MODULE A NEEDED PARTS AND THE OTHER MODULES WERE REPAIRED.

ON APRIL 18 THE UNIT WAS SHUT DOWN FOR A SCHEDULED FIVE WEEK MAINTENANCE OUTAGE.

5/81	SYSTEM	0.0	0.0	0.0	0.0			744	101	0	
6/81	SYSTEM	0.0	0.0	0.0	0.0			720	699	0	97.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY AND JUNE THE SYSTEM WAS OUT OF SERVICE DUE TO DAMAGED MIST ELIMINATOR PADS AND PLUGGING OF THE MIST ELIMINATOR.

THICKENER REPAIRS WERE PERFORMED DURING JUNE.

7/81	SYSTEM	0.0	0.0	0.0	0.0			744	724	0	58.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM REMAINED OFF LINE THROUGH JULY AS A RESULT OF THE BROKEN MIST ELIMINATOR TRAYS.

8/81	SYSTEM	0.0	0.0	0.0	0.0			744	709	0	90.0

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		AS OF THE END OF AUGUST, MODULES A AND C WERE READY FOR OPERATION; HOWEVER MODULE B NEEDED MORE MIST ELIMINATOR TRAYS.									
		DURING THE MONTH, THE THICKENER WAS DRAINED FOR REPAIRS THAT WERE EXPECTED TO BE COMPLETED BY THE MIDDLE OF SEPTEMBER.									
9/81	SYSTEM	0.0	0.0	0.0	0.0			720	677	0	85.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MIST ELIMINATOR INSTALLATION WAS COMPLETED ON MODULES A,C, AND D BUT WAS CONTINUING ON MODULE B.									
		THE THICKENER WAS REFILLED AFTER WORK WAS COMPLETED TO REPAIR LEAKS IN THE BASE. AFTER REFILLING, MORE LEAKS WERE FOUND SO THE THICKENER WAS DRAINED AGAIN.									
10/81	A	15.4	15.4	15.5	15.3						
	B	0.0	0.0	0.0	0.0						
	C	14.1	13.8	13.9	13.7						
	D	12.8	12.2	12.2	12.1						
	SYSTEM	14.1	13.8	13.9	13.7			744	739	102	81.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER INSTRUMENTATION PROBLEMS WITH MODULES A, C AND D WERE ENCOUNTERED.									
11/81	A	91.9	91.9	91.9	91.9						
	B	0.0	0.0	0.0	0.0						
	C	68.5	68.4	68.4	68.4						
	D	78.8	78.6	78.6	78.6						
	SYSTEM	79.6	79.5	79.6	79.6			720	720	573	90.8
12/81	A	79.5	79.4	79.4	79.4						
	B	0.0	0.0	0.0	0.0						
	C	89.6	89.4	89.4	89.4						
	D	83.6	83.5	83.5	83.5						
	SYSTEM	84.2	84.1	84.1	84.1			744	744	626	88.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		REPLACEMENT PARTS NEEDED FOR MODULE B KEPT THE MODULE OFF-LINE THROUGH THE FOURTH QUARTER.									
		DURING NOVEMBER AND DECEMBER PLUGGING IN THE LIMESTONE BALL MILL WAS A MINOR PROBLEM.									
1/82	A	82.0	82.5	82.8	81.8						
	B	0.0	0.0	0.0	0.0						
	C	87.4	87.5	87.8	86.7						
	D	89.8	90.3	90.6	89.5						
	SYSTEM	86.4	86.8	87.1	86.0			744	737	640	84.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY THE MIST ELIMINATORS WERE CLEANED WEEKLY.									
		ROCKS IN THE LIMESTONE HAS CAUSED PLUGGING OF THE BALL MILL. THE SUPPLIER IS WORKING ON THE PROBLEM.									

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		THE UTILITY IS WAITING FOR PARTS TO MAKE THE NECESSARY REPAIRS TO MODULE B									
2/82	A	72.9	73.1	73.9	72.8						
	B	2.2	2.1	2.1	2.1						
	C	88.8	89.1	90.0	88.7						
	D	65.3	65.5	66.2	65.2						
	SYSTEM	76.5	76.6	76.3	76.3			672	669	513	83.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE B WAS REPAIRED DURING THE MONTH AND IS IN THE PROCESS OF BEING STARTED UP.									
		DURING FEBRUARY PROBLEMS WERE ENCOUNTERED WITH THE LIMESTONE BALL MILL LUBRICATION SYSTEM.									
3/82	A	40.9	40.9	41.5	40.9						
	B	85.4	85.4	86.5	85.2						
	C	85.1	85.1	86.2	84.9						
	D	79.7	79.7	80.7	79.5						
	SYSTEM	96.9	97.1	98.3	96.8			744	742	720	80.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH MODULE A WAS DOWN 428 HOURS FOR CLEANING.									
4/82	A	46.9	47.1	49.2	46.8						
	B	70.7	71.0	74.2	70.6						
	C	76.1	76.3	79.7	75.8						
	D	20.8	20.8	21.8	20.7						
	SYSTEM	71.5	71.7	75.0	71.3			720	715	513	82.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING APRIL PROBLEMS WERE ENCOUNTERED WITH THE SUPERNATE PUMPS.									
5/82	A	22.7	56.4	64.9	22.6						
	B	29.2	72.6	83.6	29.1						
	C	29.2	72.5	83.4	29.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	27.0	67.2	77.3	26.9			744	298	200	25.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY THE UNIT WAS OFF-LINE FOR THREE WEEKS FOR A SCHEDULED OUTAGE. THE FGD SYSTEM WAS IN COMPLIANCE PRIOR TO THE SHUT DOWN.									
6/82	A	0.0	0.0	0.0	0.0						
	B	58.2	58.1	58.1	58.1						
	C	58.5	58.2	58.2	58.2						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	38.9	38.8	38.8	38.8			720	720	279	77.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		AT THE BEGINNING OF JUNE, ALL MODULES WERE DOWN DUE TO FAULTY PIPING ON THE SUPERNATE SYSTEM, WHICH WAS REPAIRED BY THE 10TH.									
		MODULES A AND D WERE OFF-LINE THE REST OF THE MONTH DUE TO LINER PROBLEMS.									
7/82	A	0.0	0.0	0.0	0.0						
	B	7.9	8.2	9.4	7.9						
	C	41.1	42.4	48.5	41.0						

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	D	0.0	0.0	0.0	0.0						
	SYSTEM	16.4	16.9	19.3	16.3			744	720	121	62.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY ABSORBER LINER REPAIRS CONTRIBUTED TO MODULAR OUTAGES.

MAJOR DEMISTER REPAIRS ALSO RESULTED IN DOWN TIME DURING JULY.

8/82	A	68.1	69.7	77.1	68.0						
	B	5.1	5.2	5.7	5.0						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	24.4	25.0	27.6	24.3			744	725	181	64.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES C AND D WERE DOWN DURING AUGUST FOR LINING REPAIRS. A BOILERMAKER STRIKE PREVENTED COMPLETION OF THESE REPAIRS DURING THE MONTH, AND THUS ALSO CONTRIBUTED TO DOWN TIME.

MODULE B EXPERIENCED BOOSTER FAN PROBLEMS DURING AUGUST. THEY WERE CORRECTED, HOWEVER BY THE END OF THE MONTH.

9/82	A	3.5	3.7	3.6	3.5						
	B	84.2	89.2	88.2	84.0						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	29.2	31.0	30.6	29.2			720	678	210	68.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER MODULES C AND D WERE DOWN AWAITING COMPLETION OF THE ABSORBER LINER REPAIRS.

MODULE A WAS DOWN DURING THE MONTH FOR DEMISTER WASH MODIFICATIONS.

10/82	A	61.8	61.7	61.7	61.7						
	B	61.8	61.6	61.6	61.6						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	41.2	41.1	41.1	41.1			744	744	306	78.1

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES A AND B WERE DOWN DURING OCTOBER FOR DEMISTER REPAIRS AND CLEANING

MODULES C AND D REMAINED OUT OF SERVICE DURING OCTOBER AWAITING REPAIRS ON THE ABSORBER LINER.

11/82	A	63.2	77.1	90.1	63.1						
	B	55.4	67.6	79.0	55.3						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	39.5	48.2	56.3	39.4			720	589	284	41.8

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES C AND D REMAINED OUT OF SERVICE DURING NOVEMBER AWAITING ABSORBER LINER REPAIRS.

THE UNIT WAS DOWN FOR PART OF THE MONTH DUE TO A SCHEDULED OUTAGE.

12/82	A	100.0	100.0	100.0	100.0						

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	7.7	7.5	7.5	7.5						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	35.9	35.8	35.8	35.8			744	744	266	71.3

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES C AND D WERE DOWN THE ENTIRE MONTH FOR ABSORBER LINER REPAIRS. MODULE B WAS DOWN SHORTLY AFTER THE FIRST OF THE MONTH, ALSO FOR LINER REPAIRS.

1/83	A	95.8	95.8	98.1	95.7						
	B	0.0	0.0	0.0	0.0						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	31.9	31.9	32.7	31.9			744	743	237	68.5

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES B, C AND D WERE DOWN DURING JANUARY FOR ABSORBER LINER REPAIRS.

2/83	A	57.2	57.5	59.1	57.2						
	B	0.0	0.0	0.0	0.0						
	C	0.0	0.0	0.0	0.0						
	D	88.1	45.5	46.7	45.2						
	SYSTEM	48.4	34.3	35.3	34.2			672	668	230	63.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS DOWN DURING FEBRUARY FOR PREVENTIVE MAINTENANCE.

MODULE B WAS DOWN DURING FEBRUARY FOR ABSORBER LINER REPAIRS.

MODULE C WAS DOWN DURING THE MONTH FOR REPAIRS ON THE BOOSTER FAN LUBE SET

MODULE D WAS AVAILABLE DURING FEBRUARY BUT NOT IN SERVICE. THE UTILITY WA ONLY OPERATING ONE MODULE.

3/83	A	0.0	0.0	0.0	0.0						
	B	67.1	76.7	79.5	67.1						
	C	0.0	0.0	0.0	0.0						
	D	71.0	81.1	84.2	71.0						
	SYSTEM	46.1	52.6	54.6	46.1			744	652	343	61.7

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS DOWN DURING MARCH DUE TO PROBLEMS WITH SCALE BUILD-UP ON THE INLET DUCTWORK.

RECYCLE PUMP PROBLEMS ALSO CONTRIBUTED TO DOWN TIME FOR MODULE A DURING TH MONTH.

MODULE C AWAITED COMPLETION OF WORK ON THE INTERFACE WASH SPRAY HEADER DURING MARCH.

4/83	A	0.0	0.0	0.0	0.0						
	B	10.3	9.3	9.7	9.3						
	C	0.0	0.0	0.0	0.0						
	D	92.4	89.4	93.4	89.2						
	SYSTEM	33.8	32.9	34.3	32.8			720	718	236	73.6

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS DOWN DURING THE MONTH TO ALLOW FOR WORK ON A RECYCLE PUMP.									
		A CLEANING OF THE INLET DUCTWORK ALSO CAUSED DOWN TIME FOR MODULE A DURING APRIL.									
		MODULE B WAS OUT OF SERVICE FOR MIST ELIMINATOR CLEANING.									
		MODULE C WAS DOWN SO THAT REPAIRS COULD BE MADE TO A SECTION OF A WASH SPRAY HEADER.									
5/83	A	0.0	0.0	0.0	0.0						
	B	64.8	66.9	79.8	64.8						
	C	0.0	0.0	0.0	0.0						
	D	32.8	33.7	40.2	32.7						
	SYSTEM	32.5	33.5	40.0	32.5			744	721	242	70.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS DOWN DURING THE MONTH FOR RECYCLE PUMP REPAIRS.									
		MODULE C WAS OUT OF SERVICE SO THAT REPAIRS COULD BE MADE ON A WASH SPRAY HEADER.									
6/83	A	31.1	4.6	5.1	4.4						
	B	57.0	31.1	34.5	30.3						
	C	0.0	0.0	0.0	0.0						
	D	66.7	68.4	75.8	66.7						
	SYSTEM	51.6	34.7	38.5	33.8			720	701	243	68.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS DOWN DURING THE FIRST PART OF JUNE DUE TO PROBLEMS WITH RECYCLE PUMP BEARINGS.									
		MODULE C WAS DOWN FOR THE ENTIRE MONTH OF JUNE DUE TO PROBLEMS WITH THE BOOSTER FAN BLADE PITCH CONTROL.									
7/83	A	82.9	82.9	100.0	82.9						
	B	85.3	56.3	71.5	56.3						
	C	50.5	34.4	43.7	34.4						
	D	0.0	0.0		0.0						
	SYSTEM	72.9	57.9	73.5	57.8			744	743	430	74.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE C WAS OUT OF SERVICE DURING THE FIRST 12 DAYS OF JULY DUE TO MIST ELIMINATOR HEADER PROBLEMS.									
		MODULE D WAS OUT OF SERVICE UNTIL JULY 25 DUE TO RECYCLE PUMP PROBLEMS.									
8/83	A	96.0	96.1	96.5	96.0						
	B	0.0	0.0		0.0						
	C	100.0	100.0	100.0	100.0						
	D	91.0	8.5	8.5	8.5						
	SYSTEM	95.7	68.2	68.5	68.1			744	743	507	
9/83	A	94.5	94.8	96.3	94.5						
	B	48.4	51.7	52.6	51.6						
	C	56.5	43.6	44.3	43.5						
	D	0.0	0.0		0.0						
	SYSTEM	66.5	63.4	64.4	63.2			720	718	455	75.6

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING AUGUST AND SEPTEMBER.									
10/83	A	67.7	100.0	100.0	67.7						
	B	22.3	65.2	65.1	44.1						
	C	0.0	0.0		0.0						
	D	53.0	21.9	21.8	14.8						
	SYSTEM	47.7	62.4	62.3	42.2			744	503	314	82.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OUT OF SERVICE FROM OCTOBER 21 THROUGH THE END OF THE MONTH FOR AN ANNUAL MAINTENANCE OUTAGE.									
11/83	A	0.0		0.0	0.0						
	B	46.7		96.0	46.7						
	C	39.3		80.9	39.3						
	D	0.0			0.0						
	SYSTEM	28.7		59.0	28.7			720		206	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE ANNUAL MAINTENANCE OUTAGE WHICH BEGAN IN OCTOBER CONTINUED THROUGH NOVEMBER 12.									
		THE UTILITY REPORTED PROBLEMS WITH A CIRCULATING WATER PUMP FROM NOVEMBER 13 TO NOVEMBER 15, 1983. THE UNIT WAS BROUGHT DOWN DURING THIS PERIOD.									
		MODULES A AND C WERE DOWN DURING PART OF NOVEMBER DUE TO ABSORBER GAS AND LIQUID SIDE EQUIPMENT PROBLEMS.									
		THE UNIT WAS PLACED BACK IN SERVICE ON NOVEMBER 16.									
12/83	A	0.0	0.0		0.0						
	B	99.2	100.0	100.0	99.2						
	C	99.2	100.0	100.0	99.2						
	D	15.7	15.9	100.0	15.7						
	SYSTEM	71.4	72.0	100.0	71.4			744	736	531	98.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES A AND D EXPERIENCED PROBLEMS WITH ABSORBER LIQUID SIDE EQUIPMENT DURING DECEMBER.									
1/84	A	0.0	0.0		0.0						
	B	100.0	100.0	100.0	100.0						
	C	32.5	32.5	32.5	32.5						
	D	96.2	96.2	96.2	96.2						
	SYSTEM	76.3	76.3	76.3	76.3			744	744	567	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS DOWN FOR LIQUID SIDE EQUIPMENT PROBLEMS DURING JANUARY.									
		MODULE C WAS DOWN FOR LIQUID AND GAS SIDE EQUIPMENT PROBLEMS.									
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF FEBRUARY THROUGH APRIL 1984.									
5/84	A	99.2	83.7	99.9	83.1						
	B	0.0	0.0		0.0						
	C	99.3	100.0	100.0	99.3						
	D	98.6	99.2	99.2	98.6						
	SYSTEM	99.0	94.3	99.7	93.7			744	739	697	
6/84	A	100.0	100.0	100.0	100.0						
	B	28.3	0.0	0.0	0.0						
	C	100.0	76.5	100.0	76.5						
	D	100.0	89.0	100.0	89.0						
	SYSTEM	100.0	88.5	100.0	88.5			720	720	637	
7/84	A	100.0	78.8	100.0	100.0						
	B	41.9	21.3	93.1	27.0						
	C	91.5	53.7	100.0	68.1						
	D	99.9	78.7	100.0	99.9						
	SYSTEM	100.0	77.5	100.0	98.3			744	744	732	
8/84	A	84.3	80.1	100.0	80.1						
	B	68.4	67.5	100.0	67.5						
	C	100.0	95.6	95.6	95.6						
	D	29.0	19.4		19.4						
	SYSTEM	93.9	87.5	100.0	87.5			744	744	651	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE PERIOD OF MAY THROUGH AUGUST 1984.									
9/84	A	100.0	91.3	100.0	90.7						
	B	100.0	78.9	100.0	78.4						
	C	100.0	75.7	100.0	75.1						
	D	0.0	0.0		0.0						
	SYSTEM	100.0	82.0	100.0	81.4			720	715	586	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF SEPTEMBER.									
10/84	A	60.9	100.0	100.0	60.9						
	B	60.9	100.0	100.0	60.9						
	C	60.3	96.9	100.0	59.0						
	D	0.0	0.0		0.0						
	SYSTEM	60.7	99.0	100.0	60.3			744	453	448	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS DOWN FOR AN ANNUAL MAINTAINENCE OUTAGE. THE UNIT WAS OFF LINE FOR APPROXIMATELY 2 WEEKS.									
11/84	A	78.0	94.9	100.0	75.9						
	B	78.0	87.4	100.0	69.9						
	C	0.0	0.0	0.0	0.0						
	D	34.8	41.8	100.0	33.4						
	SYSTEM	63.6	74.7	100.0	59.8			720	576	430	

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT CAME BACK ON-LINE NOVEMBER 7, 1984. THE UTILITY EXPERIENCED FGD SYSTEM INLET DAMPER AND MODICON CONTROL PROBLEMS DURING THE MONTH OF NOVEMBER FOLLOWING UNIT STARTUP.									
12/84	A	98.8	100.0	100.0	98.8						
	B	96.8	98.0	100.0	96.8						
	C	0.0	0.0		0.0						
	D	95.4	63.6	100.0	62.8						
	SYSTEM	97.0	87.2	100.0	86.1			744	735	641	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE C WAS UNAVAILABLE ALL OF DECEMBER DUE TO LIQUID HANDLING EQUIPMENT PROBLEMS. NO OTHER MAJOR FGD-RELATED PROBLEMS WERE REPORTED.									
1/85	A	56.5	60.8	100.0	56.5						
	B	87.6	89.1	94.5	82.8						
	C	39.5	42.5	100.0	39.5						
	D	91.4	94.5	96.7	87.8						
	SYSTEM	91.7	95.7	100.0	88.8			744	691	661	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTH OF JANUARY.									
2/85	SYSTEM							672			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO INFORMATION WAS AVAILABLE FROM THE UTILITY FOR THE MONTH OF FEBRUARY.									
3/85	A	59.5	40.3	100.0	36.0						
	B	100.0	94.9	99.9	84.6						
	C	99.4	85.3	99.9	76.0						
	D	70.7	65.9	100.0	58.7						
	SYSTEM	100.0	95.5	100.0	85.1			744	663	633	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED FOR THE MONTH OF MARCH.									
4/85	A	96.7	3.8	54.7	3.7						
	B	96.9	96.9	100.0	95.6						
	C	99.7	97.9	99.9	96.6						
	D	99.9	97.1	100.0	95.8						
	SYSTEM	100.0	98.6	100.0	97.2			720	710	700	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED C-MODULE OUTAGES TOTALING FEWER THAN 3 HOURS RELATED TO BOOSTER FAN AND RECYCLE PUMP MAINTENANCE. EXCEPT WHERE OTHERWISE REPORTED THE BALANCE OF THE MODULAR OUTAGE HOURS WERE ATTRIBUTED TO STANDBY PERIODS WHERE MODULARS WERE AVAILABLE BUT NOT CALLED TO OPERATE. MODULE B WAS DOWN 22 HOURS FOR RECYCLE PUMP PROBLEMS/MAINTENANCE. MODULE D WAS ONLY UNAVAILABLE FOR 1 HOUR. THE DOWNTIME WAS ATTRIBUTED TO WORK PERFORMED ON A RECYCLE PUMP.									

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			MODULE A WAS OUT OF SERVICE FOR 24 HOURS DURING APRIL. MOST OF THE OUTAGE TIME WAS ATTRIBUTED TO BOOSTER FAN PROBLEMS/MAINTENANCE.								
5/85	A	85.2	37.4	99.8	36.9						
	B	84.8	54.5	99.9	53.7						
	C	50.0	50.7	99.9	49.9						
	D	99.4	98.8	100.0	97.4						
	SYSTEM	100.0	80.5	100.0	79.3			744	733	590	

** PROBLEMS/SOLUTIONS/COMMENTS

EXCEPT WHERE OTHERWISE NOTED THE MODULAR OUTAGE TIMES WERE OUTAGE PERIODS THE MODULES WERE AVAILABLE BUT NOT CALLED TO OPERATE.

THE UTILITY REPORTED THAT MODULE A WAS DOWN FOR BOOSTER FAN WORK FOR APPROXIMATELY 110 HOURS IN MAY.

MODULE B WAS OUT OF SERVICE FOR 113 HOURS TO MAKE REPAIRS TO A RECYCLE PUMP.

THE UTILITY REPORTED THAT MODULE C WAS DOWN FOR 372 HOURS. THE OUTAGE TIME WAS REQUIRED TO PERFORM MIST ELIMINATOR WORK.

RECYCLE/WASH PUMP PROBLEMS CAUSED 4 HOURS OF OUTAGE TIME ON MODULE D.

6/85	A	100.0	100.0	99.9	92.8						
	B	100.0	98.8	99.9	91.7						
	C	0.0	0.0		0.0						
	D	100.0	93.9	100.0	87.2						
	SYSTEM	100.0	97.6	100.0	90.6			720	668	652	

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED BY THE UTILITY FOR JUNE. ALL OUTAGE TIME ASSOCIATED WITH THE SCRUBBER MODULES WAS ATTRIBUTED TO PERIODS THE INDIVIDUAL MODULES WERE NOT CALLED TO OPERATE.

7/85	A	82.2	77.8	100.0	76.3						
	B	40.0	39.5	99.8	38.8						
	C	96.9	69.2	100.0	67.9						
	D	100.0	99.6	100.0	97.7						
	SYSTEM	100.0	95.4	100.0	93.6			744	730	696	

** PROBLEMS/SOLUTIONS/COMMENTS

APPROXIMATELY 447 HOURS OF DOWNTIME WERE ATTRIBUTED TO ABSORBER LINER REPAIR WORK ON MODULE B.

98 HOURS OF DOWNTIME WERE ATTRIBUTED TO RECYCLE/WASH PUMP PROBLEMS AND RELATED LIQUID SIDE EQUIPMENT REPAIR/MAINTENANCE WORK ON MODULE A.

MODULES A AND C LOGGED APPROXIMATELY 11 AND 6 HOURS OF DOWNTIME RESPECTIVELY FOR BOOSTER FAN WORK.

MIST ELIMINATOR PROBLEMS CAUSED OUTAGES OF ROUGHLY 24 AND 18 HOURS RESPECTIVELY FOR MODULES A AND C.

EXCEPT WHERE OTHERWISE NOTED ALL OTHER MODULAR OUTAGE HOURS INCLUDED PERIODS WHERE MODULES WERE AVAILABLE BUT NOT CALLED TO OPERATE.

8/85	A	100.0	85.1	100.0	85.1						
	B	0.0	0.0		0.0						
	C	79.1	44.0	100.0	44.0						

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	D	100.0	96.2	99.9	96.2						
	SYSTEM	93.0	75.1	100.0	75.1			744	744	559	

** PROBLEMS/SOLUTIONS/COMMENTS

EXCEPT WHERE OTHERWISE INDICATED MODULAR OUTAGE HOURS WERE HOURS WHERE MODULES WERE AVAILABLE BUT NOT CALLED INTO SERVICE.

MODULE C WAS OUT OF SERVICE FOR APPROXIMATELY 156 HOURS FOR MIST ELIMINATOR REPAIR/MAINTENANCE.

ABSORBER LINER REPAIR/REPLACEMENT CAUSED MODULE B TO BE OUT OF SERVICE FOR THE ENTIRE 744 HOUR PERIOD.

9/85	A	98.6	98.3	97.6	97.9						
	B	0.0	0.0		0.0						
	C	95.3	79.5	97.3	79.2						
	D	76.5	69.0	96.5	68.8						
	SYSTEM	90.1	82.3	97.1	81.9			720	717	590	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULAR DOWNTIME EXCEPT WHERE OTHERWISE NOTED WAS ATTRIBUTED TO AVAILABLE MODULAR HOURS WHEN INDIVIDUAL MODULES WERE NOT REQUIRED FOR SCRUBBING SERVICE.

THE UTILITY REPORTED REAGENT PREPARATION PROBLEMS OCCURRED THAT RESULTED IN 10 AND 34 HOURS OF DOWNTIME FOR MODULES A AND D RESPECTIVELY.

MODULE B WAS DOWN THE ENTIRE 720 HOUR PERIOD FOR ABSORBER LINER REPAIRS.

MIST ELIMINATOR REPAIR/MAINTENANCE RESULTED IN 169 HOURS OF OUTAGE TIME ON MODULE D.

10/85	A	80.6	97.4	95.6	76.7						
	B	31.3	29.0	87.2	22.8						
	C	79.4	92.2	95.6	72.6						
	D	43.3	49.1	92.0	38.7						
	SYSTEM	78.2	89.2	100.0	70.3			744	586	523	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTHS OF APRIL THROUGH OCTOBER.

MIST ELIMINATOR MAINTENANCE/REPAIR ACCOUNTED FOR 204 AND APPROXIMATELY 14 HOURS OF DOWNTIME ON MODULES B AND D RESPECTIVELY.

MODULE B WAS OUT OF SERVICE FOR 162 HOURS DUE TO UNSPECIFIED LIQUID SIDE SCRUBBER EQUIPMENT REPAIR/MAINTENANCE.

A SCHEDULED UNIT OUTAGE BEGAN ON OCTOBER 26 AND EXTENDED THROUGH THE END OF THE MONTH. EXCEPT WHERE OTHERWISE REPORTED MODULAR OUTAGE HOURS WERE HOURS THE MODULES WERE AVAILABLE BUT NOT CALLED TO OPERATE.

PUMP PROBLEMS ACCOUNTED FOR APPROXIMATELY 10 HOURS OF THE MODULE C DOWNTIME REPORTED BY THE UTILITY.

GAS SIDE EQUIPMENT PROBLEMS CAUSED 48 HOURS OF DOWNTIME ON MODULE D DURING OCTOBER.

11/85	A	0.0	0.0	0.0	0.0						
	B	0.0	0.0	0.0	0.0						

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	0.0	0.0	0.0	0.0			720	431	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OUT OF SERVICE FROM NOVEMBER 13 THROUGH THE END OF THE MONTH FOR ABSORBER OUTLET DAMPER INSTALLATION WORK.

THE ANNUAL OUTAGE WHICH BEGAN IN OCTOBER CONTINUED THROUGH NOVEMBER 12.

12/85	A	88.6	75.5	83.3	73.8						
	B	0.0	0.0		0.0						
	C	88.3	76.7	84.9	74.9						
	D	89.0	88.6	99.6	86.6						
	SYSTEM	88.6	80.3	89.3	78.4			744	727	584	

** PROBLEMS/SOLUTIONS/COMMENTS

EXCEPT WHERE OTHERWISE NOTED SCRUBBER MODULE DOWNTIME WAS ATTRIBUTED TO AVAILABLE HOURS WHERE MODULES WERE NOT CALLED TO OPERATE.

THE FGD SYSTEM WAS OUT OF SERVICE FROM DECEMBER 1 THROUGH 4 FOR INSTALLATION OF MODULE OUTLET ISOLATION DAMPERS.

MODULE B WAS OUT OF SERVICE FOR 672 HOURS DURING DECEMBER WITH BOOSTER FAN PROBLEM/REPAIRS.

1/86	A	97.0	90.5	98.8	90.5						
	B	0.0	0.0		0.0						
	C	99.9	77.6	84.6	77.6						
	D	100.0	94.8	100.0	94.8						
	SYSTEM	99.0	87.6	94.5	87.6			744	744	652	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED BOOSTER FAN PROBLEMS ON MODULES A, B, AND C IN JANUARY.

2/86	A	85.8	57.9	96.8	57.6						
	B	0.0	0.0		0.0						
	C	48.1	46.7	99.1	46.4						
	D	100.0	100.0	100.0	99.4						
	SYSTEM	78.0	68.2	98.6	67.8			672	668	456	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

BOOSTER FAN PROBLEMS WERE REPORTED ON MODULE C AND CONTRIBUTED TO THE MONTH LONG SHUT DOWN OF MODULE B.

MODULES A AND B EXPERIENCED MIST ELIMINATOR PROBLEMS DURING THE MONTH OF FEBRUARY 1986. THIS AND OTHER PROBLEMS CAUSED MODULE B TO BE DOWN ALL MONTH.

3/86	A	88.4	93.1	100.0	87.8						
	B	0.0	0.0		0.0						
	C	99.1	94.4	100.0	89.0						
	D	97.4	91.5	100.0	86.2						
	SYSTEM	95.0	93.0	100.0	87.6			744	701	652	0.0

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BOOSTER FAN PROBLEMS ON MODULE B CONTINUED TO CONTRIBUTE TO THE MONTH LONG SHUT-DOWN.									
		THE MIST ELIMINATOR PROBLEMS ON MODULES A AND B CONTINUED INTO MARCH. MODULE B REMAINED DOWN ALL MONTH.									
		THE UTILITY REPORTED MINOR GAS DAMPER PROBLEMS ON MODULES A, C, AND D DURING FEBRUARY.									
4/86	A	98.8	76.7	100.0	76.3						
	B	0.0	0.0		0.0						
	C	100.0	100.0	100.0	99.4						
	D	67.9	44.8	100.0	44.6						
	SYSTEM	88.9	73.8	100.0	73.4			720	716	529	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE B REMAINED DOWN THE ENTIRE MONTH OF APRIL DUE TO BOOSTER FAN PROBLEMS. MODULE A ALSO EXPERIENCED MINOR FAN PROBLEMS EARLY IN THE MONTH.									
		THE UTILITY REPORTED MIST ELIMINATOR PROBLEMS DURING THE MIDDLE OF APRIL ON MODULE D.									
5/86	A	98.0	97.9	100.0	92.7						
	B	0.0	0.0		0.0						
	C	96.2	65.5	100.0	62.1						
	D	96.4	49.9	100.0	47.3						
	SYSTEM	96.9	71.1	100.0	67.4			744	705	501	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNSPECIFIED GAS-SIDE EQUIPMENT PROBLEMS SHUT DOWN MODULES A, C, AND D FOR PART OF ONE DAY IN MAY.									
		A PROBLEM WITH LIMESTONE PREPARATION EQUIPMENT KEPT MODULES C AND D OUT OF SERVICE FOR A SHORT TIME.									
		BOOSTER FAN PROBLEMS AGAIN KEPT MODULE B DOWN FOR THE ENTIRE MONTH OF MAY.									
6/86	A	100.0	48.6	100.0	48.6						
	B	0.0	0.0		0.0						
	C	100.0	60.9	100.0	60.9						
	D	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	69.8	100.0	69.8			720	720	503	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE B REMAINED DOWN THE ENTIRE MONTH OF APRIL BECAUSE OF BOOSTER FAN PROBLEMS.									
7/86	A	100.0	49.8	100.0	49.6						
	B	0.0	0.0		0.0						
	C	99.7	98.1	100.0	97.8						
	D	100.0	100.0	100.0	99.7						
	SYSTEM	99.9	82.6	100.0	82.4			744	742	613	

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BOOSTER FAN PROBLEMS CONTINUED TO PLAGUE MODULE B, CAUSING IT TO REMAIN DOWN ALL MONTH.									
		MODULE C REMAINED ALMOST TROUBLE-FREE DURING JULY, SHUTTING DOWN ONLY 2 HOURS FOR GAS-SIDE ABSORBER EQUIPMENT PROBLEMS.									
8/86	A	98.7	86.8	100.0	86.8						
	B	30.9	28.1	100.0	28.1						
	C	100.0	97.3	100.0	97.3						
	D	97.3	72.3	100.0	72.3						
	SYSTEM	100.0	94.8	100.0	94.8			744	744	706	
9/86	A	100.0	85.6	100.0	81.5						
	B	90.2	85.8	100.0	81.6						
	C	100.0	100.0	100.0	95.1						
	D	30.0	9.8	100.0	9.3						
	SYSTEM	100.0	93.7	100.0	89.2			720	685	642	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DAMPER PROBLEMS ON MODULE D CAUSED A SHUTDOWN FOR MOST OF THE MONTH OF SEPTEMBER.									
		LIQUID-SIDE ABSORBER EQUIPMENT TROUBLE CONTRIBUTED TO THE NEARLY MONTH SHUTDOWN OF MODULE D.									
		THE UTILITY REPORTED PROBLEMS WITH THE RECYCLE/WASH PUMP EQUIPMENT ON MODULE B EARLY IN SEPTEMBER.									
		MINOR BOOSTER FAN PROBLEMS SHUT DOWN MODULE B FOR A FEW HOURS.									
10/86	A	9.3	44.9	100.0	4.2						
	B	9.3	100.0	100.0	9.3						
	C	9.3	100.0	100.0	9.3						
	D	5.0	0.0		0.0						
	SYSTEM	10.9	81.6	100.0	7.6			744	69	56	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT'S ANNUAL OUTAGE BEGAN OCTOBER 3RD AND CONTINUED THROUGHOUT THE REMAINDER OF THE MONTH. MODULE D HAD GAS SIDE ABSORBER EQUIPMENT PROBLEMS, THE FIRST FEW DAYS, BUT IT WAS CORRECTED BEFORE THE OUTAGE.									
11/86	A	0.0			0.0						
	B	0.0			0.0						
	C	0.0			0.0						
	D	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT'S ANNUAL OUTAGE CONTINUED THROUGHOUT THE MONTH OF NOVEMBER									
12/86	A	100.0	79.8	100.0	65.6						
	B	100.0	85.1	100.0	70.0						
	C	0.0	0.0		0.0						
	D	0.0	0.0		0.0						
	SYSTEM	66.7	55.0	100.0	45.2			744	612	336	

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED MODULES C AND D WERE DOWN ALL MONTH BECAUSE OF LIQUID-SIDE ABSORBER EQUIPMENT PROBLEMS.									
1/87	A	83.6	84.2	100.0	83.6						
	B	97.1	86.8	100.0	86.3						
	C	24.5	24.2	100.0	24.1						
	D	0.0	0.0		0.0						
	SYSTEM	68.4	65.1	100.0	64.6			744	739	481	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNSPECIFIED MODULE LIQUID SIDE EQUIPMENT PROBLEMS CAUSED 3 HOURS OF DOWNTIME ON MODULES A AND B, 562 HOURS ON MODULE C, AND THE ENTIRE MONTH ON MODULE D.									
		BOOSTER FAN PROBLEMS WERE REPORTED ON MODULE B DURING JANUARY.									
		UNSPECIFIED GAS-SIDE EQUIPMENT PROBLEMS SHUT DOWN MODULES A AND B FOR PART OF ONE DAY IN JANUARY.									
		THE UTILITY REPORTED 116 HOURS OF DOWNTIME FOR MODULE A DUE TO MIST ELIMINATOR PROBLEMS.									
		RECYCLE PUMP PROBLEMS WERE ENCOUNTERED ON MODULE B DURING JANUARY.									
2/87	A	99.9	82.4	100.0	82.4						
	B	58.3	43.2	100.0	43.2						
	C	96.4	96.4	100.0	96.4						
	D	0.0	0.0		0.0						
	SYSTEM	84.8	74.0	100.0	74.0			672	672	497	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNSPECIFIED GAS-SIDE PROBLEMS SHUT DOWN MODULE C FOR 3 DAYS IN FEBRUARY.									
		RECYCLE PUMP PROBLEMS WERE THE CAUSE OF 635 HOURS OF DOWNTIME ON MODULE B.									
		THE UTILITY REPORTED 9 DAYS OF DOWNTIME ON MODULE B DUE TO MIST ELIMINATOR PROBLEMS.									
		UNSPECIFIED LIQUID EQUIPMENT PROBLEMS CAUSED MODULES A, B, AND C TO BE SHUT DOWN FOR ONE HOUR AND FORCED MODULE D DOWN FOR THE ENTIRE MONTH.									
3/87	A	60.1	84.5	100.0	60.1						
	B	74.2	84.7	100.0	60.3						
	C	61.3	84.6	100.0	60.2						
	D	0.0	0.0		0.0						
	SYSTEM	65.2	84.6	100.0	60.2			744	530	448	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNSPECIFIED LIQUID-SIDE EQUIPMENT PROBLEMS FORCED MODULE D OUT OF SERVICE FOR THE ENTIRE MONTH.									
		THE UTILITY REPORTED THAT MODULES A AND C WERE OUT OF SERVICE FOR 4 DAYS IN MARCH DUE TO MIST ELIMINATOR PROBLEMS.									
		THE UNIT WAS DOWN FOR A SCHEDULED OUTAGE MARCH 14-22.									
4/87	A	100.0	100.0	100.0	100.0						

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	100.0	100.0	100.0						
	C	100.0	100.0	100.0	100.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	

** PROBLEMS/SOLUTIONS/COMMENTS

BOOSTER FAN PROBLEMS FORCED MODULE D OUT OF SERVICE FOR THE ENTIRE MONTH OF APRIL.

5/87	A	88.3	86.4	94.7	83.5						
	B	84.4	80.8	92.5	78.1						
	C	33.3	34.5	61.8	33.3						
	D	26.8	23.7	42.5	22.9						
	SYSTEM	77.6	75.1	97.2	72.6			744	719	540	

** PROBLEMS/SOLUTIONS/COMMENTS

BOOSTER FAN PROBLEMS AGAIN FORCED MODULE D OUT OF SERVICE FOR MOST OF MAY.

THE UTILITY REPORTED THAT MODULE A ENCOUNTERED RECYCLE PUMP PROBLEMS FOR A SHORT TIME IN MAY.

THE FGD SYSTEM WAS OUT OF SERVICE FOR PART OF MAY DUE TO ABSORBER LINING REPAIRS.

6/87	A	77.2	73.4	97.7	67.8						
	B	97.4	96.1	98.3	88.8						
	C	0.0	0.0		0.0						
	D	99.8	98.9	96.9	91.4						
	SYSTEM	91.5	89.5	97.6	82.6			720	665	595	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE D EXPERIENCED BOOSTER FAN PROBLEMS FOR 2 DAYS IN JUNE.

RECYCLE PUMP PROBLEMS CAUSED MODULE B TO BE DOWN FOR PART OF ONE DAY IN JUNE.

MIST ELIMINATOR PROBLEMS FORCED MODULE A OUT OF SERVICE FOR 7 DAYS AND MODULE C OUT OF SERVICE FOR THE ENTIRE MONTH.

7/87	A	93.5	92.0	100.0	90.7						
	B	100.0	93.0	100.0	91.7						
	C	8.3	8.4	100.0	8.3						
	D	91.4	90.7	100.0	89.5						
	SYSTEM	97.8	94.7	100.0	93.4			744	734	695	

** PROBLEMS/SOLUTIONS/COMMENTS

MIST ELIMINATOR PROBLEMS FORCED MODULES A AND D OUT OF SERVICE FOR A FEW DAYS AND MODULE C OUT OF SERVICE FOR MOST OF THE MONTH.

MODULE D WAS OUT OF SERVICE FOR PART OF ONE DAY DUE TO DAMPER PROBLEMS.

8/87	A	100.0	89.8	100.0	89.8						
	B	99.6	99.6	100.0	99.6						
	C	100.0	100.0	100.0	100.0						
	D	0.0	0.0		0.0						
	SYSTEM	99.9	96.5	100.0	96.5			744	744	718	

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MIST ELIMINATOR PROBLEMS FORCED MODULE D OUT OF SERVICE FOR 7 DAYS DURING AUGUST.									
		BOOSTER FAN PROBLEMS CONTINUED TO PLAGUE MODULE D, KEEPING IT OUT OF SERVICE FOR 24 DAYS IN AUGUST.									
		RECYCLE PUMP PROBLEMS CAUSED MODULE B TO BE DOWN FOR PART OF ONE DAY IN AUGUST.									
9/87	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO INFORMATION WAS AVAILABLE ON THIS UNIT FOR THE MONTH OF SEPTEMBER.									
10/87	A	100.0	100.0	100.0	100.0						
	B	100.0	100.0	100.0	100.0						
	C	0.0	0.0		0.0						
	D	0.0	0.0		0.0						
	SYSTEM	66.7	66.7	100.0	66.7			744	744	496	
10/87	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		LIQUID-SIDE ABSORBER EQUIPMENT TROUBLE WAS THE CAUSE OF MODULE C BEING OUT OF SERVICE FOR 12 DAYS IN OCTOBER.									
		GAS-SIDE ABSORBER EQUIPMENT TROUBLE CAUSED MODULE C TO BE OUT OF SERVICE FOR 19 DAYS IN OCTOBER AND MODULE D TO BE DOWN THE ENTIRE MONTH.									
11/87	A	98.8	98.8	99.4	98.8						
	B	22.5	22.5	76.4	22.5						
	C	94.6	94.6	95.2	94.6						
	D	0.0	0.0		0.0						
	SYSTEM	71.9	71.9	90.4	71.9			720	720	518	
11/87	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MIST ELIMINATOR PROBLEMS CAUSED MODULE A TO BE OUT OF SERVICE FOR 9 HOURS IN NOVEMBER.									
		BOOSTER FAN TROUBLE FORCED MODULE D OUT OF SERVICE FOR MOST OF NOVEMBER, AND MODULE D FOR ALL OF THE MONTH.									
		UNSPECIFIED GAS-SIDE EQUIPMENT FORCED MODULE C OUT OF SERVICE FOR A SHORT TIME IN NOVEMBER.									
12/87	A	86.6	86.6	100.0	86.6						
	B	98.7	96.0	100.0	96.0						
	C	100.0	100.0	100.0	100.0						
	D	0.0	0.0		0.0						
	SYSTEM	95.1	94.2	100.0	94.2			744	744	701	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BOOSTER FAN PROBLEMS CAUSED THE MODULE D FORCED OUTAGE TO CONTINUE FOR ANOTHER COMPLETE MONTH.									

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		LIQUID-SIDE AND GAS-SIDE EQUIPMENT PROBLEMS FORCED MODULE B OUT OF SERVICE FOR A FEW HOURS IN DECEMBER.									
		MIST ELIMINATOR PROBLEMS FORCED MODULE A OUT OF SERVICE FOR 100 HOURS IN DECEMBER.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COLORADO UTE ELECTRIC	
PLANT NAME	CRAIG	
UNIT NUMBER	2	
CITY	CRAIG	
STATE	COLORADO	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	172.	(0.400 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	900	
GROSS UNIT GENERATING CAPACITY - MW	454	
NET UNIT GENERATING CAPACITY W/FGD - MW	428	
NET UNIT GENERATING CAPACITY WO/FGD - MW	431	
EQUIVALENT SCRUBBED CAPACITY - MW	350	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	722.29	(1530600 ACFM)
BOILER FLUE GAS TEMPERATURE - C	121.1	(250 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	10.9	(35.8 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	23260.	(10000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		9100-10300
AVERAGE ASH CONTENT - %	8.00	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	16.00	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	0.45	
RANGE SULFUR CONTENT - %	0.4-0.5	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	0.00-0.02	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	HOT SIDE	
SUPPLIER	BELCO	
INLET FLUE GAS CAPACITY - CU.M/S	1392.1	(2950000 ACFM)
INLET FLUE GAS TEMPERATURE - C	398.9	(750 F)
PRESSURE DROP - KPA	0.7	(3. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.9	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS	
A-E FIRM	STEARNS-ROGER	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	85.00	
ENERGY CONSUMPTION - %	0.7	
CURRENT STATUS	1	
COMMERCIAL START-UP	5/1980	
INITIAL START-UP	12/1979	
CONTRACT AWARDED	5/1977	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	0.96	
DESIGN COAL HEAT CONTENT - J/G	22329.6	(9600 BTU/LB)
DESIGN COAL ASH CONTENT - %	11.60	
DESIGN MOISTURE CONTENT - %	15.30	
DESIGN CHLORIDE CONTENT - %	0.10	
SPACE REQUIREMENTS - SQ M	12140.2	(130680 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	264.0	
** QUENCHER/PRESATURATOR		
NUMBER	4	
TYPE	QUENCH DUCT	
SUPPLIER	PEABODY PROCESS SYSTEMS	
INLET GAS FLOW - CU. M/S	217.07	(460000 ACFM)
INLET GAS TEMPERATURE - C	121.1	(250 F)
PRESSURE DROP - KPA	0.2	(1.0 IN-H2O)
LIQUID RECIRCULATION RATE - LITERS/S	32.	(500 GPM)
L/G RATIO - L/CU. M	0.1	(1.1 GAL/1000 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM	
** ABSORBER		
NUMBER	4	
NUMBER OF SPARES	1	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	PEABODY PROCESS SYSTEMS	
DIMENSIONS - FT	32.0 DIA X 52.5	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC 'SPRAY ZONE!; GLASS FLAKE-FILLED POLYEST	
LINER SPECIFIC MATERIAL	NATURAL RUBBER	
LINER MATERIAL TRADE NAME/COMMON TYPE	BLACK NATURAL RUBBER	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	4	
LIQUID RECIRCULATION RATE - LITER/S	1512.	(24000 GPM)
L/G RATIO - L/CU.M	7.0	(52.2 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.4	(1.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	217.07	(460000 ACFM)
INLET GAS TEMPERATURE - C	121.1	(250 F)
SO2 REMOVAL EFFICIENCY - %	85.0	
PARTICLE REMOVAL EFFICENCY - %	50.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	4	
NUMBER OF SPARES PER SYSTEM	1	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	4	
FREEBOARD DISTANCE - M	1.52	(5.0 FT)
DISTANCE BETWEEN VANES - CM	3.0	(1.20 IN)
VANE ANGLES - DEGREES	45	
PRESSURE DROP - KPA	0.2	(1.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	RAW WATER	
WASH FREQUENCY	CONTINUOUS	
WASH RATE - L/S	6.3	(100 GAL/MIN)

** REHEATER

NUMBER	4	
NUMBER OF SPARES	1	
NUMBER PER MODULE	1	
GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
LOCATION	OUTLET DUCT BETWEEN ME & OUTLET DAMPER	
PERCENT GAS BYPASSED - AVG	23.0	
TEMPERATURE INCREASE - C	27.8	(50 F)
INLET FLUE GAS FLOW RATE - CU. M/S	194.89	(413000 ACFM)
INLET FLUE GAS TEMPERATURE - C	43.3	(110 F)
OUTLET FLUE GAS FLOW RATE - CU. M/S	302.02	(640000 ACFM)
OUTLET FLUE GAS TEMPERATURE - C	73.9	(165 F)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	

** FANS

NUMBER	4	
NUMBER OF SPARES	0	
DESIGN	AXIAL	
SUPPLIER	BUFFALO FORGE	
FUNCTION	INDIRECT REHEAT	
APPLICATION	N/A	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	46.03	(97545 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** FANS

NUMBER	4	
NUMBER OF SPARES	1	
DESIGN	AXIAL	
SUPPLIER	BUFFALO FORGE	
FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	372.80	(790000 ACFM)
FLUE GAS TEMPERATURE - C	121.1	(250 F)
PRESSURE DROP - KPA	3.4	(11.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	4	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER	
MANUFACTURER	FORNEY ENGINEERING	
MODULATION	OPEN	
SEAL AIR FLOW - CU. M/S	3.07	(6500 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-285	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** DAMPERS

NUMBER	4	
GENERIC TYPE	LOUVER	

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	FORNEY ENGINEERING
MODULATION	OPEN
SEAL AIR FLOW - CU. M/S	3.07 (6500 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-285
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	4
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	FORNEY ENGINEERING
MODULATION	OPEN
SEAL AIR FLOW - CU. M/S	3.07 (6500 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-285
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	4
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	FORNEY ENGINEERING
MODULATION	OPEN
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; NR
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	2
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	FORNEY ENGINEERING
MODULATION	OPEN
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-285
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	1
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	FORNEY ENGINEERING
MODULATION	OPEN
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-285
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	2
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	FORNEY ENGINEERING
MODULATION	CLOSED
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	ASTM A-285
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

** DUCTWORK

LOCATION	INLET TO QUENCH
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	OUTLET TO DAMPER
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER

** DUCTWORK

LOCATION	DAMPER TO STACK
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	BYPASS
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	9.1 (10 TPH)
PRODUCT QUALITY - % SOLIDS	35.0

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	4
REAGENT PREP PRODUCT	1
THICKENER OVERFLOW	1
CLASSIFIER OVERFLOW	4
FLOCCULANT	1
WASTE SLURRY BLEED	1

** PUMPS

SERVICE	NUMBER
RAW WATER	2
RECLAIM SUMP	7
POND	1
COOLING TOWER BLOWDOWN BOOSTER	2
ABSORBER RECIRCULATION	8
WASH SLURRY	8
SUPERNATANT	2
THICKENER UNDERFLOW	2
POLYELECTROLYTE	1
WASTE SLURRY	2
MILL RECIRCULATION	2
LIMESTONE SLURRY FEED	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	CENTRIFUGE
NUMBER	1
NUMBER OF SPARES	1
DIMENSIONS - FT	3.0 DIA X 6.0
CAPACITY	126 GPM

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

SHELL GENERIC MATERIAL TYPE	HIGH ALLOY	
SHELL SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	
BELT GENERIC MATERIAL TYPE	N/A	
BELT SPECIFIC MATERIAL TYPE	N/A	
FEED STREAM SOURCE	THICKENER UNDERFLOW	
FEED STREAM CHARACTERISTICS	35% SOLIDS	
OUTLET STREAM CHARACTERISTICS	60% SOLIDS	
OVERFLOW STREAM CHARACTERISTICS	60 GPM	
OUTLET STREAM DISPOSITION	LANDFILL	
OVERFLOW STREAM DISPOSITION	TO WASTE SUMP & THEN TO THICKENER	

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER	
NUMBER	1	
NUMBER OF SPARES	0	
CONFIGURATION	CENTER DRAW	
DIMENSIONS - FT	75.0 DIA X 15.0	
SHELL GENERIC MATERIAL TYPE	CARBON STEEL	
SHELL SPECIFIC MATERIAL TYPE	AISI 1110	
LINER GENERIC MATERIAL TYPE	ORGANIC	
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER 'WALLS!; MAT-REINFO	
FEED STREAM SOURCE	ABSORBER BLEED	
FEED STREAM CHARACTERISTICS	5% SOLIDS	
OUTLET STREAM CHARACTERISTICS	35% SOLIDS	
OVERFLOW STREAM CHARACTERISTICS	100 GPM, <1% SUSPENDED SOLIDS	
OUTLET STREAM DISPOSITION	TO CENTRIFUGES	
OVERFLOW STREAM DISPOSITION	RECYCLED TO PROCESS	

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	10.5	(11.6 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	40.0	
% CASO3 - DRY	22.6	
% CASO4 - DRY	70.2	
% CAOH2 - DRY	0.0	
% CACO3 - DRY	2.9	
% ASH - DRY	0.3	
% OTHER COMPOUNDS - DRY	3.9	

** TREATMENT

METHOD	UNSTABILIZED

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	OFF-SITE
SITE TRANSPORTATION METHOD	TRUCK

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH, SO2 CONCENTRATION
PHYSICAL VARIABLES	DENSITY, GAS FLOW, LIQUID FLOW
CONTROL LEVELS	PH 5.4, SOLIDS 12-15%
MONITOR TYPE	UNILOK-PH, OHMART-DENSITY, BROOKS-FLOW, DYNASCIE
MONITOR LOCATION	AT MODULE RECYCLE TANK
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	CLOSED	
EVAPORATION WATER LOSS - LITER/S	17.8	(282 GPM)
SLUDGE HYDRATION WATER LOSS - LITER/S	0.6	(9 GPM)
SLUDGE INTERSTITIAL WATER LOSS - LITERS/S	2.1	(33 GPM)

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	0
EFFLUENT WATER LOSS - LITERS/S	0.0 (0 GPM)
RECEIVING WATER STREAM	N/A
MAKEUP WATER ADDITION - LITERS/S	20.2 (321 GPM)
SOURCE OF MAKEUP WATER	COOLING TOWER BLOWDOWN

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	CACO3
CONSUMPTION	7000 LB/HR
UTILIZATION - %	75.0
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	33.3
MIST ELIMINATOR - %	33.3
REHEATER - %	33.3
BALL MILL - %	0.0
EFFLUENT HOLD TANK - %	33.3
THICKENER - %	0.0
CENTRIFUGE - %	50.0

** FGD SPARE COMPONENT INDICES

ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/79	SYSTEM							744			
8/79	SYSTEM							744			
9/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM AT CRAIG 2 WAS UNDERGOING TESTING IN JULY. INITIAL TESTING WITH THE SYSTEM OPERATING ON FLUE GAS TOOK PLACE IN AUGUST 1979. COMMERCIAL OPERATIONS ARE SCHEDULED FOR NOVEMBER 1979.

10/79	SYSTEM							744			
11/79	SYSTEM							720			
12/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE CRAIG 2 SCRUBBING SYSTEM COMMENCED INITIAL OPERATION OFFICIALLY IN DECEMBER 1979.

THE SYSTEM WAS TAKEN OUT OF SERVICE ON DECEMBER 3 FOR INSPECTION AND SCHEDULED MAINTENANCE. THE FINE SCREEN ON THE TURBINE THROTTLE VALVE WAS REMOVED AND CLEANED. THE BOILER WAS PUT BACK ON LINE ON DECEMBER 9 AT FULL LOAD. THE FGD SYSTEM WAS PUT BACK ON LINE ON DECEMBER 19. SHAKEDOWN OPERATIONS ARE CONTINUING.

1/80	SYSTEM							744			
2/80	SYSTEM							696			
3/80	SYSTEM							744			

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS DOWN AT THE END OF THE PERIOD DUE TO TURBINE RELATED PROBLEMS.									
		WHEN FULL LOAD OPERATIONS WERE ATTEMPTED CONTROL PROBLEMS WERE ENCOUNTERED WITH THE SCRUBBER.									
		PROBLEMS WITH OPENING/CLOSING THE BYPASS DAMPER HAVE BEEN ENCOUNTERED. LARGER OPERATORS ARE BEING TESTED THAT MAY SOLVE THE PROBLEM.									
4/80	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM IS STILL IN THE STARTUP PHASE OF OPERATIONS. TESTING IS BEING PERFORMED ON THE SYSTEM, BUT THERE HAS BEEN NO OPERATIONAL DATA REPORTED.									
5/80	A	38.4	27.5	28.4	24.5						
	B	42.5	32.1	33.1	28.5						
	C	47.0	37.2	38.4	33.1						
	D	30.0	18.0	18.6	16.0						
	SYSTEM	52.6	38.3	39.5	34.0			640	661	253	76.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE CRAIG 2 UNIT (BOILER AND SCRUBBER) COMMENCED COMMERCIAL OPERATION ON MAY 4, 1980.									
		NOTE: THIS SYSTEM EFFECTIVELY HAS ONE SPARE MODULE SO THAT ONLY THREE ARE CURRENTLY NEEDED AT FULL LOAD TO MAINTAIN COMPLIANCE WITH SO2 EMISSION REGULATIONS. WHEN THE CURRENT LOW SULFUR COAL SOURCE IS EXHAUSTED (SEVERAL YEARS FROM NOW) GREATER SCRUBBING CAPACITY WILL BE REQUIRED SO THAT THERE WILL NO LONGER BE AN ENTIRE MODULE SET ASIDE AS A SPARE DURING FULL LOAD BOILER OPERATIONS. THE "SYSTEM" DEPENDABILITY FACTORS WILL BE BASED ON THREE MODULES UNTIL THE CURRENT COAL SOURCE IS EXHAUSTED.									
6/80	A	47.6	41.2	42.0	37.9						
	B	53.9	48.0	48.9	44.2						
	C	61.1	55.8	56.9	51.4						
	D	34.6	27.0	27.5	24.9						
	SYSTEM	65.7	57.3	58.4	52.8			720	663	380	68.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY AND JUNE, PROBLEMS WERE ENCOUNTERED WITH PLUGGING OF THE ABSORBER SPRAY NOZZLES.									
		A PROBLEM WAS ALSO ENCOUNTERED DURING INITIATION OF COMMERCIAL OPERATION WITH A HIGH PH LEVEL IN THE THICKENER UNDERFLOW.									
		THE SCRUBBING SYSTEM IS STILL UNDERGOING SHAKEDOWN OPERATIONS.									
7/80	A	59.1	51.0	51.7	43.8						
	B	61.8	54.1	54.9	46.5						
	C	37.6	26.0	26.3	22.3						
	D	43.7	33.0	33.5	28.4						
	SYSTEM	67.4	54.7	55.5	47.0			744	640	350	65.8

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JULY, FGD OUTAGE TIME WAS CAUSED BY PLUGGED ABSORBER SPRAY NOZZLES.									
8/80	A	50.0	46.7	48.3	42.2						
	B	50.0	48.4	50.0	43.7						
	C	50.0	47.5	49.1	42.9						
	D	50.0	52.3	54.0	47.2						
	SYSTEM	66.7	65.0	67.1	58.7			744	672	327	75.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING AUGUST THE FGD SYSTEM EXPERIENCED ASSORTED MECHANICAL PROBLEMS.									
		SPRAY NOZZLE PLUGGING OCCURRED, CAUSING ADDITIONAL OUTAGE TIME WHICH ADDED TO THE LOW AVAILABILITY FACTOR DURING THE MONTH.									
9/80	A	48.6	47.5	48.4	47.1						
	B	58.2	58.8	59.9	58.2						
	C	61.1	59.6	60.7	59.0						
	D	67.4	66.2	67.4	65.6						
	SYSTEM	78.4	77.4	78.8	76.6			720	713	552	85.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SPRAY NOZZLES IN THE ABSORBER MODULE CONTINUED TO PLUG UP DURING SEPTEMBER.									
10/80	A	99.5	89.4	93.7	11.9						
	B	99.5	91.5	95.8	12.2						
	C	99.5	88.4	92.6	11.8						
	D	99.5	92.5	96.8	12.4						
	SYSTEM	99.5	90.5	94.7	12.1			744	99	90	12.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS TAKEN OFF LINE ON OCTOBER 5 FOR A FIVE WEEK SCHEDULED OUTAGE.									
		AN IN-LINE SPOT CHECK PERFORMED ON OCTOBER 4 INDICATED THAT THE FGD SYSTEM WAS ACHIEVING A 66.2% SO2 REMOVAL EFFICIENCY. THE STACK OPACITY WAS MEASURED AT 5.7%.									
11/80	A	69.4	61.7	66.0	27.5						
	B	0.0	0.0	0.0	0.0						
	C	70.8	71.0	76.0	31.6						
	D	72.2	89.7	96.0	40.0						
	SYSTEM	70.8	74.1	79.3	33.0			720	321		38.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS RETURNED TO SERVICE ON NOVEMBER 10 AFTER A FIVE WEEK SCHEDULED MAINTENANCE OUTAGE.									
		MODULE B WAS TAKEN OFF LINE DURING NOVEMBER DUE TO BOOSTER FAN PROBLEMS.									
12/80	A	43.0	57.5	58.7	42.6						
	B	0.0	0.0		0.0						
	C	53.8	69.3	70.7	51.3						
	D	60.5	78.4	80.0	58.1						
	SYSTEM	52.4	68.4	69.8	50.7			744	551	377	54.6

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE B REMAINED OFF LINE DURING DECEMBER DUE TO BOOSTER FAN BLADE PITCH PROBLEMS.									
1/81	A	67.2	66.0	66.2	65.9						
	B	0.0	0.0	0.0	0.0						
	C	79.8	78.2	78.4	77.9						
	D	89.2	88.9	89.2	88.7						
	SYSTEM	78.7	77.7	77.9	77.5			744	742	414	85.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY MODULE B REMAINED OUT OF SERVICE DUE TO BOOSTER FAN BLADE PITCH PROBLEMS AND PROBLEMS WITH THE SYSTEM INTERLOCKS.									
2/81	A	32.7	32.1	32.2	32.1						
	B	65.5	64.3	64.5	64.3						
	C	0.0	0.0	0.0	0.0						
	D	100.0	100.0	99.8	100.0						
	SYSTEM	66.1	65.5	65.5	65.5			672	672		90.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PROBLEMS WERE ENCOUNTERED DURING THE MONTH WITH OPENING THE MODULE A, B, AND C DAMPERS.									
		DURING FEBRUARY MODULE A ALSO ENCOUNTERED PLUGGAGE IN THE MOISTURE SEPARATOR.									
3/81	A	68.5	69.8	70.1	67.9						
	B	80.5	82.3	82.8	80.1						
	C	0.0	0.0	0.0	0.0						
	D	7.5	7.7	7.8	7.5						
	SYSTEM	52.2	53.3	53.6	51.8			744	724	385	85.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH MODULES C AND D EXPERIENCED PROBLEMS WITH THE MIST ELIMINATOR PLUGGING.									
		ADDITIONAL OUTAGE TIME OF MODULE C WAS DUE TO OPERATIONAL PROBLEMS OF THE DAMPERS.									
4/81	SYSTEM	0.0	0.0	0.0	0.0			720	596	0	59.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SYSTEM DID NOT OPERATE DURING APRIL BECAUSE OF PLUGGED MIST ELIMINATORS. THE MIST ELIMINATORS ARE BEING CLEANED.									
5/81	SYSTEM	0.0	0.0	0.0	0.0			744	744	0	
6/81	SYSTEM	0.0	0.0	0.0	0.0			720	717	0	78.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
	.	DURING MAY AND JUNE THE SYSTEM WAS OUT OF SERVICE DUE TO DAMAGED MIST ELIMINATOR PADS AND PLUGGING OF THE MIST ELIMINATOR.									
7/81	SYSTEM	0.0	0.0	0.0	0.0			744	686	0	61.6

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ALL MODULES REMAINED OUT OF SERVICE DURING JULY AS A RESULT OF THE BROKEN MIST ELIMINATOR TRAYS.									
8/81	A	0.0	0.0	0.0	0.0						
	B	0.0	0.0	0.0	0.0						
	C	59.7	61.0	61.8	59.4						
	D	39.5	40.5	41.0	39.4						
	SYSTEM	33.1	33.8	34.3	32.9			744	724	245	73.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES A AND B REMAINED DOWN DURING AUGUST AS THE UTILITY WAS WAITING FOR NEW MIST ELIMINATOR TRAYS.									
		MODULE D WAS UNAVAILABLE FOR PART OF THE MONTH AS A RESULT OF PROBLEMS WIT DAMPERS.									
9/81	A	18.1	18.4	18.6	17.8						
	B	40.3	40.9	41.4	39.6						
	C	81.9	83.6	84.5	80.8						
	D	13.9	13.4	13.5	12.9						
	SYSTEM	51.4	52.1	52.7	50.4			720	696	363	81.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ALL FOUR MODULES BECAME OPERABLE TOWARD THE END OF THE MONTH. MODULE D HA BEEN OUT OF SERVICE AS A RESULT OF OUTLET DAMPER PROBLEMS. MODULE A WAS PUT IN SERVICE THE THIRD WEEK OF THE MONTH AFTER HAVING THE MIST ELIMINATORS REPLACED. THE MODULES ARE NOW BEING SHUT DOWN ON A REGULAR BASIS TO CLEAN THE MIST ELIMINATORS.									
10/81	A	83.9	83.7	83.8	83.7						
	B	44.6	44.3	44.4	44.3						
	C	85.2	84.9	85.1	84.9						
	D	85.3	84.9	85.1	84.9						
	SYSTEM	99.7	99.3	99.5	99.3			744	744	739	85.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER MODULE B EXPERIENCED BOOSTER FAN BEARING PROBLEMS.									
		PROBLEMS WITH INSTRUMENTATION HINDERED ALL FOUR MODULES DURING THE MONTH.									
11/81	A	19.3	43.8	48.4	19.2						
	B	1.9	4.1	4.6	1.8						
	C	11.8	26.7	29.5	11.7						
	D	29.6	67.3	74.4	29.4						
	SYSTEM	20.8	47.3	52.3	20.7			720	315	149	32.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS SHUT DOWN FROM NOVEMBER 8 THRU NOVEMBER 23 FOR SCHEDULED MAINTENANCE.									
		A PROBLEM WITH MANY OF THE VALVES STICKING AT STARTUP WAS RESOLVED BY FLUSHING.									
		LIMESTONE BALL MILL PLUGGING PROBLEMS WERE ENCOUNTERED DURING DECEMBER.									
12/81	A	33.2	33.3	33.8	32.9						

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	32.9	33.1	33.6	32.7						
	C	88.0	88.7	89.9	87.6						
	D	51.6	51.9	52.6	51.3						
	SYSTEM	68.5	69.0	70.0	68.1			744	735	507	82.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER PROBLEMS WERE ENCOUNTERED WITH THE BOOSTER FAN BEARING.

MODULE D EXPERIENCED PROBLEMS WITH A BINDING OUTLET DAMPER.

1/82	A	81.3	83.9	84.9	81.0						
	B	75.0	77.5	78.4	74.8						
	C	77.1	79.8	80.7	77.0						
	D	83.3	86.1	87.1	83.1						
	SYSTEM	100.0	100.0	100.0	100.0			744	718	744	88.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE MIST ELIMINATORS WERE CLEANED WEEKLY.

ROCKS IN THE LIMESTONE HAS CAUSED PLUGGING OF THE BALL MILL. THE SUPPLIER IS WORKING ON THE PROBLEM.

2/82	A	86.0	86.8	87.5	85.9						
	B	86.5	87.2	87.9	86.3						
	C	54.3	54.7	55.1	54.2						
	D	30.9	31.1	31.4	30.8						
	SYSTEM	86.0	86.7	85.9	85.9			672	665	577	85.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY MODULE D WAS OFF-LINE FOR 464 HOURS DUE TO A BROKEN RECYCL PUMP SHAFT.

PROBLEMS WITH THE THICKENER UNDERFLOW PUMP CONTROLLERS WAS ALSO ENCOUNTERE DURING FEBRUARY.

3/82	A	62.6	62.5	62.5	62.5						
	B	68.5	68.3	68.3	68.3						
	C	69.9	69.7	69.7	69.7						
	D	41.5	41.3	41.3	41.3						
	SYSTEM	80.9	80.6	80.6	80.6			744	744	600	80.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE RECYCLE PUMP SHAFT ON THE D MODULE WAS REPAIRED AND THE MODULE RETURNED TO SERVICE.

4/82	A	60.7	64.6	68.9	60.6						
	B	56.5	60.3	64.2	56.5						
	C	56.0	59.6	63.5	55.8						
	D	34.2	36.4	38.8	34.1						
	SYSTEM	69.1	73.6	78.5	69.0			720	674	497	69.8

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE D EXPERIENCED SOME OUTLET DAMPER PROBLEMS DURING APRIL.

5/82	A	1.8	1.7	2.0	1.7						
	B	4.6	4.5	5.4	4.5						
	C	0.0	0.0	0.0	0.0						
	D	14.1	14.0	16.7	14.0						
	SYSTEM	6.8	6.7	8.0	6.7			744	744	50	60.8

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY THE SYSTEM WAS DOWN MOST OF THE TIME DUE TO THICKENER REPAIRS.									
6/82	A	48.1	50.4	51.8	47.9						
	B	0.0	0.0	0.0	0.0						
	C	54.6	57.5	59.0	54.6						
	D	84.0	88.4	90.7	84.0						
	SYSTEM	62.2	65.4	67.2	62.2			720	684	447	59.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE B WAS OFF-LINE DURING JUNE DUE TO DAMAGED TURNING VANES.									
		MODULES A, C, AND D WERE TAKEN DOWN FOR CLEANING AND REPAIR OF THE MIST ELIMINATOR DURING PART OF THE MONTH.									
7/82	A	67.9	67.7	69.4	67.7						
	B	47.2	47.2	48.3	47.2						
	C	74.1	74.0	75.8	74.0						
	D	43.8	43.7	44.8	43.7						
	SYSTEM	77.6	77.5	79.4	77.5			744	744	577	79.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JULY THE UNIT EXPERIENCED NUMEROUS INSTRUMENT FAILURES AS A RESULT OF EXCESSIVE MOISTURE IN THE INSTRUMENT AIR SUPPLY.									
8/82	A	56.3	57.3	63.2	56.2						
	B	0.0	0.0	0.0	0.0						
	C	85.5	87.1	96.1	85.4						
	D	29.5	29.9	33.0	29.4						
	SYSTEM	57.1	58.1	64.1	57.0			744	730	424	68.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING AUGUST MODULES B AND D WERE DOWN DUE TO INOPERABLE OUTLET DAMPERS. MODULE D WAS REPAIRED BY THE END OF THE MONTH, HOWEVER REPAIRS CONTINUED O MODULE B.									
9/82	A	0.0	0.0	0.0	0.0						
	B	0.0	0.0	0.0	0.0						
	C	36.7	65.3	79.5	36.5						
	D	27.6	49.1	59.8	27.5						
	SYSTEM	21.4	38.1	46.4	21.3			720	403	153	36.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS OUT OF SERVICE DURING SEPTEMBER DUE TO ABSORBER LINER DAMAGE.									
		MODULE B WAS DOWN DURING SEPTEMBER DUE TO OUTLET DAMPER PROBLEMS.									
		DUCTWORK PROBLEMS WERE ALSO EXPERIENCED BY MODULE B DURING THE MONTH.									
		THE UNIT WAS TAKEN OUT OF SERVICE ON SEPTEMBER 18 FOR AN ANNUAL OUTAGE LASTING THE REMAINDER OF THE MONTH.									
10/82	A	0.0	0.0	0.0	0.0						
	B	0.0	0.0	0.0	0.0						
	C	50.9	57.3	94.0	50.8						
	D	25.0	28.1	46.1	24.9						
	SYSTEM	25.3	28.5	46.7	25.2			744	659	187	65.1

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES A AND B WERE DOWN DURING OCTOBER AWAITING ABSORBER LINER REPAIRS.									
		MODULE D DEVELOPED A BOOSTER FAN OIL LEAK DURING THE MONTH. THE PROBLEM OCCURRED FOLLOWING THE UNIT OUTAGE AND FORCED THE MODULE OUT OF SERVICE FO REPAIRS.									
11/82	A	0.0	0.0	0.0	0.0						
	B	0.0	0.0	0.0	0.0						
	C	63.6	63.5	63.7	63.5						
	D	93.8	93.6	94.0	93.6						
	SYSTEM	52.5	52.4	52.6	52.4			720	720	377	71.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES A AND B REMAINED OUT OF SERVICE DURING NOVEMBER AWAITING ABSORBER LINER REPAIRS.									
12/82	A	0.0	0.0	0.0	0.0						
	B	0.0	0.0	0.0	0.0						
	C	93.8	93.7	93.7	93.7						
	D	18.5	18.5	18.5	18.5						
	SYSTEM	37.5	37.4	37.4	37.4			744	744	278	69.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES A AND B REMAINED OUT OF SERVICE DURING DECEMBER AWAITING ABSORBER LINER REPAIRS.									
		MODULE D DEVELOPED A BOOSTER FAN LUBE OIL LEAK DURING DECEMBER.									
1/83	A	0.0	0.0	0.0	0.0						
	B	45.8	46.0	46.6	45.7						
	C	62.2	62.5	63.4	62.1						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	36.0	36.1	36.7	35.9			744	740	267	64.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS DOWN THE ENTIRE MONTH FOR ABSORBER LINER REPAIRS.									
		MODULE D WAS DOWN DURING JANUARY DUE TO A BOOSTER FAN OVERHAUL. MODULES B AND C ALSO EXPERIENCED FAN PROBLEMS DURING THE MONTH.									
		MODULES B AND C EXPERIENCED DAMPER PROBLEMS IN JANUARY.									
2/83	A	0.0	0.0	0.0	0.0						
	B	40.7	40.9	41.3	40.7						
	C	57.5	57.8	58.3	57.5						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	32.7	32.9	33.2	32.7			672	668	220	67.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES A AND C WERE DOWN DURING FEBRUARY FOR ABSORBER LINER REPAIRS.									
		MODULE B WAS DOWN DURING THE MONTH FOR REPAIRS ON THE INLET DAMPER.									
		MODULES B AND D WERE DOWN DURING FEBRUARY FOR BOOSTER FAN REPAIRS.									
3/83	A	34.8	36.2	37.8	34.8						

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	49.4	51.4	53.6	49.4						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	28.1	29.2	30.5	28.1			744	715	209	68.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE C WAS DOWN DURING MARCH FOR ABSORBER LINER REPAIRS.

4/83	A	42.2	85.0	97.4	42.2						
	B	0.0	0.0	0.0	0.0						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	14.0	28.3	24.3	14.0			720	357	102	34.3

** PROBLEMS/SOLUTIONS/COMMENTS

ON APRIL 15, THE UNIT WAS TAKEN DOWN FOR AN ANNUAL OUTAGE.

MODULES B AND C WERE UNDERGOING LINER REPAIR WORK DURING THE MONTH.

MODULE D WAS DOWN IN APRIL AWAITING THE RETURN OF A BOOSTER FAN FROM THE MANUFACTURER.

5/83	A	35.1	48.0	54.4	35.1						
	B	0.0	0.0	0.0	0.0						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	11.7	16.0	18.1	11.7			744	544	87	49.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN MOST OF MAY FOR AN ANNUAL OUTAGE.

6/83	A	70.1	70.6	72.7	70.1						
	B	9.0	7.9	8.2	7.9						
	C	65.8	66.3	68.3	65.8						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	48.3	48.3	49.7	47.9			720	715	345	69.6

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE B WAS DOWN DURING MOST OF JUNE DUE TO PROBLEMS WITH A BOOSTER FAN BLADE PITCH CONTROL.

DAMPER PROBLEMS ALSO ACCOUNTED FOR THE MODULE B OUTAGE IN JUNE.

MODULE D WAS DOWN DURING JUNE AWAITING THE RETURN OF A BOOSTER FAN FROM TH MANUFACTURER.

7/83	A	72.6	72.7	73.2	72.6						
	B	92.2	37.4	37.7	37.4						
	C	49.9	52.7	53.1	52.6						
	D	0.0	0.0		0.0						
	SYSTEM	71.6	54.3	54.7	54.2			744	742	403	73.7

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS DOWN DURING PART OF JULY FOR MIST ELIMINATOR CLEANING.

MODULE C WAS DOWN DURING PART OF THE MONTH FOR RECYCLE PUMP REPAIRS.

MODULE D WAS OUT OF SERVICE DURING JULY AWAITING DELIVERY OF A BOOSTER FAN

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/83	A	75.8	75.8	75.8	75.8						
	B	12.0	88.1	88.0	88.0						
	C	74.2	25.8	25.8	25.8						
	D	0.0	0.0		0.0						
	SYSTEM	54.0	63.3	63.2	63.2			744	744	470	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE D WAS DOWN DURING AUGUST DUE TO BOOSTER FAN REPAIRS.

9/83	A	95.3	95.6	100.0	95.3						
	B	43.1	57.1	59.9	56.9						
	C	32.8	67.4	70.7	67.2						
	D	0.0	0.0		0.0						
	SYSTEM	57.1	73.4	76.9	73.2			720	718	527	75.8

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING SEPTEMBER.

10/83	A	96.8	100.0	100.0	96.8						
	B	94.4	0.8	0.8	0.8						
	C	0.0	0.0		0.0						
	D	0.0	0.0		0.0						
	SYSTEM	63.7	33.6	50.4	32.5			744	718	242	81.3
11/83	A	99.9		99.9	99.9						
	B	89.9		89.9	89.9						
	C	0.0		0.0	0.0						
	D	0.0			0.0						
	SYSTEM	63.3		63.3	63.3			720		456	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING OCTOBER AND NOVEMBER 1983.

12/83	A	64.0	68.5	67.1	64.0						
	B	72.2	77.3	75.7	72.2						
	C	78.2	83.7	82.0	78.2						
	D	0.0	0.0		0.0						
	SYSTEM	71.4	76.5	75.0	71.4			744	695	532	98.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED A UNIT TRIP ON DECEMBER 14 AND 15, 1983.

1/84	A	86.0	89.6	94.8	86.0						
	B	72.8	75.9	80.3	72.8						
	C	50.3	52.4	55.4	50.3						
	D	0.0	0.0		0.0						
	SYSTEM	69.7	72.6	76.8	69.7			744	714	519	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT SUFFERED A UNIT-TRIP AND SPENT 10 HOURS OUT OF SERVICE.

THE UNIT LOST HOURS ON JUNE 27-29 DUE TO REPAIRS TO THE THICKENER.

2/84	SYSTEM							696			
3/84	SYSTEM							744			

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF FEBRUARY THROUGH APRIL 1984.									
5/84	A	50.7	77.6	77.6	41.0						
	B	51.8	98.1	98.1	51.8						
	C	0.0	0.0		0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	34.2	58.6	58.6	30.9			744	393	230	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE RECYCLE TANK AGITATOR WAS OUT OF SERVICE DURING MAY.									
		THE MIST ELIMINATOR PAD ON MODULE C WAS CLEANED DURING MAY.									
6/84	A	86.2	87.0	96.3	86.2						
	B	87.1	62.3	69.0	61.7						
	C	0.0	0.0		0.0						
	D	75.6	74.4	82.3	73.7						
	SYSTEM	83.0	74.6	82.5	73.8			720	713	532	
7/84	A	91.7	98.4	100.0	90.5						
	B	86.7	94.3	100.0	86.7						
	C	0.0	0.0	0.0	0.0						
	D	91.8	99.9	100.0	91.8						
	SYSTEM	90.1	97.5	100.0	89.7			744	684	667	
8/84	A	100.0	86.3	100.0	86.3						
	B	100.0	100.0	100.0	100.0						
	C	0.0	0.0		0.0						
	D	100.0	86.0	100.0	86.0						
	SYSTEM	100.0	90.8	100.0	90.8			744	744	675	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE PERIOD OF JUNE THROUGH AUGUST.									
9/84	A	93.3	89.0	100.0	89.0						
	B	98.6	98.6	100.0	98.6						
	C	0.0	0.0		0.0						
	D	95.3	91.1	100.0	91.1						
	SYSTEM	95.7	92.9	100.0	92.9			720	720	669	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED MODULE C WAS DOWN ALMOST ALL OF SEPTEMBER FOR MIST EL MINATOR CLEANING AND THAT MODULE A REQUIRED SOME MINOR PIPING/PUMP REPAIRS									
10/84	A	99.2	99.7	100.0	98.9						
	B	99.1	99.8	100.0	99.0						
	C	0.0	0.0		0.0						
	D	87.3	87.5	100.0	86.8						
	SYSTEM	95.2	95.7	100.0	94.9			744	738	706	

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MODULE C REMAINED OUT OF SERVICE ALL OF OCTOBER FOR GENERAL CLEANING AND MAINTENENCE.									
11/84	A	61.0	68.6	100.0	60.8						
	B	87.9	88.6	100.0	78.5						
	C	0.0	0.0	0.0	0.0						
	D	88.3	88.6	100.0	78.5						
	SYSTEM	79.1	81.9	100.0	72.6			720	638	523	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS DOWN FOR APPROXIMATELY 3 DAYS FOR AN UNSCHEDULED OUTAGE. THE UTILITY ALSO MENTIONED HAVING MECHANICAL AND ELECTRICAL PROBLEMS WITH SCRUBBER BOOSTER FAN,LUBE SET AND CAVITY BLOWERS PROBLEMS, AND WASH PUMP FAILURES.									
12/84	A	95.2	96.7	100.0	95.2						
	B	95.8	97.4	100.0	95.8						
	C	0.0	0.0		0.0						
	D	98.1	98.6	100.0	97.0						
	SYSTEM	96.4	97.6	100.0	96.0			744	732	714	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MODULE C WAS UNAVAILABLE DUE TO GENERAL CLEANING AND MAINTAINENCE OF MIST ELINIMATOR AND SLURRY HANDLING EQUIPMENT.									
1/85	A	54.8	55.4	76.0	54.8						
	B	89.9	90.8	100.0	89.9						
	C	20.4	20.6	24.5	20.4						
	D	89.9	90.8	100.0	89.9						
	SYSTEM	85.0	85.8	100.0	85.0			744	737	633	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT PLUGGED MIST ELIMINATOR PADS ON ALL FOUR MODULES ACCOUNTED FOR THE LOWER JANUARY DEPENDABILITY.									
2/85	SYSTEM							672			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO INFORMATION WAS AVAILABLE FROM THE UTILITY FOR THE MONTH OF FEBRUARY.									
3/85	A	70.8	100.0	100.0	70.8						
	B	0.0	0.0		0.0						
	C	69.8	98.5	100.0	69.8						
	D	25.6	36.1	99.0	25.6						
	SYSTEM	55.4	78.2	99.7	55.4			744	527	412	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE MAIN PLANT OUTAGE BEGAN ON MARCH 22ND AND EXTENDED THROUGH THE END OF THE MONTH.									
4/85	A	0.0			0.0						
	B	0.0			0.0						
	C	0.0			0.0						
	D	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE FGD SYSTEM WAS OUT OF SERVICE FOR A SCHEDULED UNIT OUTAGE. NO FGD SYSTEM PROBLEMS WERE REPORTED.									
5/85	A	71.5	88.3	99.9	68.5						
	B	33.5	43.1	100.0	33.4						
	C	0.0	0.0		0.0						
	D	78.2	57.2	99.8	44.4						
	SYSTEM	61.1	62.9	100.0	48.8			744	577	363	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A UNIT OUTAGE CONTINUED THROUGH THE MAY 1 TO MAY 6 PERIOD. EXCEPT WHERE OTHERWISE REPORTED THE MODULES WERE AVAILABLE BUT WERE NOT CALLED TO OPERATE DURING MODULAR OUTAGE PERIODS.									
		MUCH OF THE DOWNTIME ASSOCIATED WITH THE FGD SYSTEM MODULES WAS ATTRIBUTED TO BOOSTER FAN WORK BY THE UTILITY. DOWNTIMES RECORDED FOR MODULES A THROUGH C RESPECTIVELY WERE APPROXIMATELY 55, 351, AND 600 HOURS. NO FAN WORK WAS REPORTED FOR MODULE D.									
		OUTAGES REPORTED FOR MODULES A AND D ATTRIBUTED TO LIQUID SIDE EQUIPMENT INCLUDED ABOUT 14 HOURS FOR PUMP WORK ON MODULE A AND 16 HOURS ON MODULE D FOR PUMP AND OTHER RELATED REPAIR WORK.									
6/85	A	97.2	90.6	99.9	87.3						
	B	97.2	95.7	99.9	92.3						
	C	0.0	0.0	0.0	0.0						
	D	91.5	68.1	99.9	65.6						
	SYSTEM	95.3	84.8	99.9	81.7			720	694	589	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ALL MODULE DOWNTIME, EXCEPT WHERE OTHERWISE REPORTED, WAS REPORTED AS AVAILABLE HOURS THE MODULES WERE NOT CALLED INTO SERVICE.									
		APPROXIMATELY 20 HOURS OF OUTAGE TIME REPORTED FOR MODULE A WERE ATTRIBUTED TO DAMPER PROBLEMS. NO OTHER PROBLEMS WERE REPORTED FOR MODULE A.									
		MODULE D LOGGED 61 HOURS OF DOWNTIME ATTRIBUTED TO RECYCLE/WASH PUMP MAINTENANCE/REPAIRS.									
		PROBLEMS ASSOCIATED WITH MODULE B INCLUDED COOLING TOWER BLOWDOWN MAKE UP WATER SYSTEM AND OTHER LIQUID SIDE EQUIPMENT TOTALLING 10 HOURS OF OUTAGE TIME.									
		MODULE C WAS OUT OF SERVICE THROUGH THE ENTIRE 720 HOUR PERIOD WITH BOOSTER FAN PROBLEMS.									
7/85	A	100.0	100.0	100.0	99.5						
	B	100.0	100.0	100.0	99.5						
	C	0.0	0.0		0.0						
	D	98.7	88.0	100.0	87.5						
	SYSTEM	99.6	96.0	100.0	95.5			744	740	710	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULAR DOWNTIME EXCEPT WHERE OTHERWISE NOTED WAS ATTRIBUTED TO PERIODS THE ABSORBERS WERE AVAILABLE BUT NOT CALLED INTO SERVICE.									
		MODULE D WAS OUT OF SERVICE 10 HOURS FOR RECYCLE PUMP REPAIR/MAINTENANCE									

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			WORK.								
			THE UTILITY REPORTED THAT MODULE C WAS OUT OF SERVICE FOR THE ENTIRE 744 HOUR PERIOD FOR BOOSTER FAN REPAIRS.								
8/85	A	97.2	93.6	99.9	85.9						
	B	96.6	71.6	71.7	65.8						
	C	0.0	0.0		0.0						
	D	88.0	85.4	99.9	78.4						
	SYSTEM	94.0	83.5	90.5	76.7			744	683	571	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			RECYCLE/WASH PUMP REPAIR/MAINTENANCE CAUSED 16 HOURS OF OUTAGE TIME ON MODULE D DURING THE MONTH.								
			ONE OF FOUR MODULES WAS UNAVAILABLE THE ENTIRE MONTH. THE UTILITY REPORTED THAT SO2 READINGS INDICATED THAT FOUR MODULES WERE REQUIRED ON NINE DAYS. EXCEPT WHERE OTHERWISE NOTED, MODULAR OUTAGE HOURS OCCURRED DURING PERIODS WHEN MODULES WERE AVAILABLE BUT NOT CALLED TO OPERATE.								
			THE UTILITY REPORTED THAT MODULE B WAS DOWN FOR 2 HOURS WITH DAMPER PROBLEMS.								
			BOOSTER FAN PROBLEMS FORCED MODULE C OUT OF SERVICE FOR THE ENTIRE 744 HOUR PERIOD.								
			MIST ELIMINATOR REPAIR/MAINTENANCE REQUIRED OUTAGE TIMES OF 21, 23 AND 73 HOURS RESPECTIVELY FOR MODULES A, B AND D.								
9/85	A	98.3	97.6	97.6	96.9						
	B	89.2	81.0	89.2	80.4						
	C	0.0	0.0		0.0						
	D	94.4	94.4	98.1	93.8						
	SYSTEM	94.0	91.0	95.0	90.4			720	715	651	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULES A, B AND D EXPERIENCED REAGENT PREPARATION PROBLEMS RESULTING IN DOWNTIME OF 8, 32 AND 30 HOURS RESPECTIVELY.								
			THE UTILITY REPORTED RECYCLE PUMP PROBLEMS ON MODULES A AND C DURING THE MONTH. MODULE A WAS DOWN FOR 2 HOURS AND MODULE C WAS OUT OF SERVICE FOR 46 HOURS.								
			BOTH MODULES A AND C HAD BOOSTER FAN PROBLEMS. MODULE A WAS DOWN FOR 2 HOURS. HOWEVER, MODULE C WAS OUT OF SERVICE THE ENTIRE 720 HOUR PERIOD.								
			MIST ELIMINATOR REPAIR/MAINTENANCE CAUSED MODULE D TO BE TAKEN OUT OF SERVICE FOR 10 HOURS DURING THE MONTH.								
			MODULAR OUTAGE HOURS WHERE NOT OTHERWISE NOTED WERE ATTRIBUTED TO PERIODS WHERE MODULES WERE AVAILABLE BUT NOT CALLED TO OPERATE.								
10/85	A	94.1	93.5	96.8	92.2						
	B	96.8	84.7	86.4	83.6						
	C	0.0	0.0		0.0						
	D	100.0	100.0	98.7	98.7						
	SYSTEM	97.0	92.7	93.9	91.5			744	734	681	

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE C WAS OUT OF SERVICE THE ENTIRE 744 HOUR PERIOD FOR BOOSTER FAN REPAIR WORK.									
		EXCEPT WHERE OTHERWISE REPORTED MODULAR OUTAGE HOURS FOR OCTOBER WERE HOURS THE MODULES WERE AVAILABLE BUT NOT CALLED TO OPERATE.									
		MODULES A AND B EXPERIENCED RECYCLE/WASH PUMP PROBLEMS/MAINTENANCE ACCOUNTING FOR 44 AND 8 HOURS OF DOWNTIME RESPECTIVELY.									
		REAGENT PREPARATION PROBLEMS CAUSED 16 HOURS OF DOWNTIME ON MODULE B.									
11/85	A	29.5	31.7	35.4	29.5						
	B	79.7	78.5	87.6	73.0						
	C	0.0	0.0	0.0	0.0						
	D	79.7	77.6	86.7	72.2						
	SYSTEM	63.0	62.6	69.9	58.3			720	670	419	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BOOSTER FAN WORK WAS UNDERTAKEN ON MODULES B, C AND D DURING THE ABSORBER OUTLET DAMPER INSTALLATION WORK. MODULE C WAS OUT OF SERVICE FOR MOST OF THE MONTH FOR FAN PROBLEMS.									
		THE UTILITY REPORTED THAT THE FGD SYSTEM WAS REMOVED FROM SERVICE BEGINNING NOVEMBER 26 AND EXTENDING THROUGH THE END OF THE MONTH FOR ABSORBER OUTLET DAMPER INSTALLATION WORK.									
		RECYCLE/WASH PUMP PROBLEMS CAUSED 385 HOURS OF OUTAGE TIME ON MODULE A.									
		REAGENT PREPARATION SYSTEM PROBLEM ACCOUNTED FOR ROUGHLY 3, 5 AND 3 HOURS OF DOWNTIME FOR MODULES A, B AND D RESPECTIVELY.									
		ROUGHLY 21 AND 8 HOURS OF DOWNTIME RESPECTIVELY FOR MODULES B AND D WERE ATTRIBUTED TO GAS SIDE EQUIPMENT REPAIR WORK NOT SPECIFIED BY THE UTILITY.									
12/85	A	31.9	28.4	31.7	28.4						
	B	37.0	25.6	28.6	25.6						
	C	0.0	0.0		0.0						
	D	29.8	29.8	33.2	29.8						
	SYSTEM	32.9	27.9	31.2	27.9			744	744	208	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT 288 HOURS OF OUTAGE TIME OCCURRED ON MODULE C FOR UNSPECIFIED GAS SIDE EQUIPMENT REPAIR WORK.									
		MODULE D WAS DOWN FOR ROUGHLY 65 HOURS WITH RECYCLE/WASH PUMP REPAIR/ MAINTENANCE.									
		THE UTILITY REPORTED THAT THE FGD SYSTEM WAS OUT OF SERVICE FROM DECEMBER 1 THROUGH 20 FOR INSTALLATION OF MODULE OUTLET ISOLATION DAMPERS.									
		MODULE A EXPERIENCED 39 HOURS OF OUTAGE TIME ATTRIBUTED TO THE LIQUID SIDE EQUIPMENT BY THE UTILITY DURING DECEMBER.									
		EXCEPT WHERE OTHERWISE INDICATED MODULE OUTAGE HOURS LOGGED WERE HOURS MODULES WERE AVAILABLE BUT NOT CALLED TO OPERATE DURING THE MONTH.									
1/86	A	39.8	41.4	48.9	39.7						
	B	87.8	83.0	98.0	79.5						

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	C	0.0	0.0		0.0						
	D	75.3	73.4	86.7	70.3						
	SYSTEM	67.6	65.9	77.9	63.2			744	713	470	

** PROBLEMS/SOLUTIONS/COMMENTS

THE LOWER AVAILABILITY DURING THE MONTH RESULTED FROM AN EXTENDED 2-MODULE MAINTENANCE OUTAGE.

2/86	A	0.0	0.0		0.0						
	B	100.0	100.0	100.0	100.0						
	C	52.6	51.8	100.0	51.8						
	D	83.2	50.6	93.4	50.6						
	SYSTEM	78.6	67.5	97.8	67.5			672	672	454	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS OUT OF SERVICE THE ENTIRE MONTH OF FEBRUARY AS A RESULT OF LIQUID-SIDE ABSORBER EQUIPMENT PROBLEMS.

RECYCLE PUMP/WASH PUMP PROBLEMS SHUT DOWN MODULE C FOR 12 DAYS AND WERE ALSO A PROBLEM ON MODULE D.

MINOR BOOSTER FAN PROBLEMS WERE REPORTED ON MODULE C AND WERE A CHRONIC PROBLEM FOR MODULE D.

3/86	A	0.0	0.0		0.0						
	B	22.6	43.5	100.0	22.6						
	C	54.8	100.0	100.0	51.9						
	D	30.0	4.1	16.8	2.2						
	SYSTEM	35.8	49.2	72.3	25.6			744	386	190	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

EXCEPT FOR A 13-DAY UNIT OUTAGE, MODULE A WAS OUT OF SERVICE THE ENTIRE MONTH OF MARCH FOR LIQUID SIDE ABSORBER EQUIPMENT PROBLEMS. MODULE B EXPERIENCED SIMILAR PROBLEMS LATE IN THE MONTH.

MODULE D EXPERIENCED BOOSTER FAN PROBLEMS EARLY IN THE MONTH OF MARCH.

4/86	A	65.4	61.7	100.0	61.0						
	B	0.0	0.0		0.0						
	C	77.3	77.1	100.0	76.2						
	D	100.0	62.4	100.0	61.7						
	SYSTEM	80.9	67.0	100.0	66.3			720	712	477	

** PROBLEMS/SOLUTIONS/COMMENTS

LIQUID SIDE ABSORBER EQUIPMENT PROBLEMS SHUT DOWN MODULE B FOR THE ENTIRE

LIQUID SIDE ABSORBER EQUIPMENT PROBLEMS SHUT DOWN MODULE B FOR THE ENTIRE MONTH OF APRIL. MODULE C ALSO HAD ABSORBER OPERATIONAL TROUBLE.

5/86	A	100.0	95.9	100.0	95.9						
	B	0.0	0.0		0.0						
	C	93.7	53.8	100.0	53.8						
	D	98.1	57.7	100.0	57.7						
	SYSTEM	97.3	69.1	100.0	69.1			744	744	514	

** PROBLEMS/SOLUTIONS/COMMENTS

A PROBLEM WITH LIMESTONE PREPARATION EQUIPMENT KEPT MODULES C AND D DOWN FOR A SHORT TIME.

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			MODULE B REMAINED DOWN THE ENTIRE MONTH OF MAY, THIS TIME EXPERIENCING ABSORBER LIQUID-SIDE PIPING PROBLEMS, AS DID MODULE C EARLY IN THE MONTH.								
			THE UTILITY REPORTED MIST ELIMINATOR PLUGGING PROBLEMS ON MODULE C DURING THE MIDDLE OF JUNE.								
			PIPING PROBLEMS CONTINUED TO KEEP MODULE B OUT OF SERVICE ALL MONTH.								
			MODULE A WAS AVAILABLE THE ENTIRE MONTH OF JUNE EXCEPT FOR A BRIEF PROBLEM WITH ABSORBER GAS SIDE EQUIPMENT.								
6/86	A	99.7	99.2	100.0	93.9						
	B	0.0	0.0		0.0						
	C	74.0	70.9	100.0	67.1						
	D	100.0	30.5	100.0	28.9						
	SYSTEM	91.2	66.8	100.0	63.3			720	682	456	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE B REMAINED DOWN DOWN DURING THE MONTH OF JULY BECAUSE OF CONTINUING PROBLEMS WITH THE LIQUID-SIDE ABSORBER EQUIPMENT.								
			WITH THE EXCEPTION OF 2 HOURS FOR BOOSTER FAN PROBLEMS, MODULE A WAS TROUBLE-FREE ALL MONTH.								
			THE UTILITY REPORTED MODULE C WAS SHUT DOWN MUCH OF THE MONTH FOR RECYCLE /WASH PUMP TROUBLE.								
7/86	A	99.7	99.7	100.0	99.7						
	B	0.0	0.0		0.0						
	C	41.5	36.4	100.0	36.4						
	D	100.0	76.2	100.0	76.2						
	SYSTEM	80.4	70.8	100.0	70.8			744	744	527	
8/86	A	53.8	43.5	100.0	35.6						
	B	0.0	0.0		0.0						
	C	77.3	88.0	100.0	72.0						
	D	99.5	73.7	100.0	60.3						
	SYSTEM	76.9	68.4	100.0	55.9			744	609	416	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MIST ELIMINATOR PLUGGING CONTRIBUTED TO THE SHUT-DOWN OF MODULE A AND ALSO CAUSED PROBLEMS ON MODULE B LATER IN AUGUST.								
			MODULES C AND D EXPERIENCED SCATTERED BOOSTER FAN PROBLEMS DURING THE MONTH.								
			BOTH MODULES A AND D EXPERIENCED MINOR RECYCLE/WASH PUMP TROUBLE DURING AUGUST.								
			MODULE B WAS OPERATING THE LAST FEW DAYS IN AUGUST AFTER EXPERIENCING BOOSTER FAN TROUBLE ALL YEAR.								
			LIQUID SIDE ABSORBER EQUIPMENT PROBLEMS CAUSED SHUTDOWNS AT MODULES A, B, AND C DURING THE MONTH OF AUGUST. MODULE B REMAINED DOWN ALL MONTH; MODULE A WAS DOWN NEARLY HALF THE MONTH.								
9/86	A	99.1	88.6	100.0	66.3						
	B	0.0	0.0		0.0						
	C	83.7	66.7	100.0	49.9						
	D	100.0	69.2	100.0	51.8						
	SYSTEM	94.3	74.9	100.0	56.0			720	539	404	

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		RECYCLE/WASH PUMP PROBLEMS SHUT DOWN MODULE C FOR A FEW DAYS DURING THE MIDDLE OF SEPTEMBER.									
		WITH THE EXCEPTION OF A FEW MINOR PROBLEMS, MODULES A AND D OPERATED NEARLY TROUBLE FREE MOST OF THE MONTH. THE BOILER WAS DOWN FOR TUBE REPAIRS FROM SEPTEMBER 1-7.									
		MODULE C WAS DOWN A FEW DAYS EARLY IN THE MONTH WITH MIST ELIMINATOR PLUGGING PROBLEMS.									
		MODULE B CONTINUED TO REMAIN DOWN THE ENTIRE MONTH OF SEPTEMBER, NOW EXPERIENCING TROUBLE WITH THE GAS-SIDE ABSORBER EQUIPMENT. MODULE A WAS DOWN FOR A FEW HOURS ONE DAY WITH LIQUID-SIDE ABSORBER EQUIPMENT.									
10/86	A	27.6	27.6	79.5	27.6						
	B	84.5	66.3	70.4	66.3						
	C	93.2	93.2	99.1	93.2						
	D	92.1	67.2	71.4	67.2						
	SYSTEM	99.2	84.8	100.0	84.8			744	744	631	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BOTH GAS-SIDE AND LIQUID-SIDE ABSORBER EQUIPMENT PROBLEMS KEPT MODULE OUT OF SERVICE SEVERAL TIMES DURING THE MONTH.									
		THE AVERAGE AVAILABILITY WAS LOWER THAN USUAL ON 3 MODULES DUE TO MIST ELIMINATOR CLEANING AND AN INCREASE IN THE SULFUR CONTENT OF THE COAL. MODULES B, C, AND D WERE ALL DOWN SEVERAL DAYS FOR THIS.									
		DAMPER PROBLEMS SHUT DOWN MODULE B FOR ONE DAY EARLY IN OCTOBER.									
		DAMPER PROBLEMS SHUT DOWN MODULE B FOR ONE DAY EARLY IN OCTOBER.									
		MODULE A WAS DOWN FOR MOST OF THE MONTH WITH BOOSTER FAN TROUBLE; MODULE B WAS OUT A FEW HOURS WITH THE SAME PROBLEM.									
11/86	A	0.0	0.0	0.0	0.0						
	B	99.9	99.9	99.2	99.0						
	C	99.2	99.2	99.2	98.3						
	D	98.1	98.1	99.2	97.3						
	SYSTEM	99.0	99.0	99.2	98.2			720	714	707	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MIST ELIMINATOR PLUGGING SHUT DOWN MODULE B FOR A FEW HOURS.									
		BOTH MODULES C AND D EXPERIENCED SOME MINOR LIQUID-SIDE ABSORBER EQUIPMENT TROUBLE AND WERE DOWN BRIEFLY.									
		THE HIGHER SULFUR CONTENT IN THE COAL THE UTILITY IS CURRENTLY USING CONTINUED TO CAUSE TROUBLE AT UNIT 2. IN ADDITION, BOTH MODULES B AND D WERE DOWN A FEW HOURS BECAUSE OF COMPUTER-RELATED PROBLEMS.									
		MODULE A WAS DOWN ALL MONTH WITH A CONTINUING BOOSTER FAN PROBLEM.									
12/86	A	0.0	0.0		0.0						
	B	89.8	90.3	97.6	89.2						
	C	85.3	85.1	99.3	84.1						
	D	84.9	60.0	70.8	59.3						
	SYSTEM	86.7	78.5	89.3	77.6			744	735	577	

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE D EXPERIENCED BOTH GAS-SIDE AND LIQUID-SIDE ABSORBER EQUIPMENT TROUBLE BRIEFLY IN DECEMBER.									
		PLUGGING IN THE MIST ELIMINATOR KEPT MODULES B, C, AND D OUT OF SERVICE FOR A FEW DAYS EACH DURING THE MONTH OF DECEMBER.									
		MODULE A CONTINUED TO HAVE BOOSTER FAN PROBLEMS AND WAS OUT OF SERVICE THE ENTIRE MONTH OF DECEMBER.									
1/87	A	38.7	38.7	100.0	38.7						
	B	100.0	93.5	100.0	93.5						
	C	100.0	100.0	100.0	100.0						
	D	100.0	57.0	100.0	57.0						
	SYSTEM	100.0	96.4	100.0	96.4			744	744	717	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS OUT OF SERVICE FOR 456 HOURS IN JANUARY DUE TO BOOSTER FAN PROBLEMS.									
2/87	A	94.6	76.5	98.9	76.5						
	B	100.0	71.1	99.5	71.1						
	C	53.1	51.0	97.9	51.0						
	D	100.0	15.1	65.2	15.1						
	SYSTEM	100.0	71.2	100.0	71.2			672	672	479	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		RECYCLE/WASH PUMP PROBLEMS FORCED MODULE A OUT OF SERVICE FOR 36.5 HOURS AND MODULE C FOR 6.1 HOURS.									
		MIST ELIMINATOR PROBLEMS FORCED MODULE C OUT OF SERVICE FOR 10 DAYS IN FEBRUARY.									
		MODULE C EXPERIENCED DAMPER PROBLEMS AT THE END OF FEBRUARY, FORCING IT OUT OF SERVICE FOR 3 DAYS.									
3/87	A	99.8	99.8	100.0	99.8						
	B	99.2	62.0	83.1	62.0						
	C	93.2	90.6	100.0	90.6						
	D	0.0	0.0		0.0						
	SYSTEM	97.4	84.1	94.4	84.1			744	744	626	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		RECYCLE/WASH PUMP PROBLEMS CAUSED MODULES A, B, AND C TO BE OUT OF SERVICE FOR A FEW HOURS DURING THE MONTH.									
		MODULE D ENCOUNTERED MIST ELIMINATOR PROBLEMS AND WAS OUT OF SERVICE THE ENTIRE MONTH.									
		MODULE C CONTINUED TO EXPERIENCE DAMPER PROBLEMS FOR 2 MORE DAYS IN MARCH.									
4/87	A	33.3	100.0	100.0	32.9						
	B	33.3	100.0	100.0	32.9						
	C	1.9	5.9	6.2	1.9						
	D	0.0	0.0		0.0						
	SYSTEM	22.9	68.6	68.7	22.6			720	237	163	

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNSPECIFIED LIQUID-SIDE EQUIPMENT PROBLEMS FORCED MODULE C OUT OF SERVICE FOR THE FIRST 10 DAYS OF THE MONTH.									
		UNSPECIFIED GAS-SIDE EQUIPMENT PROBLEMS FORCED MODULE D OUT OF SERVICE FOR 10 DAYS IN APRIL.									
		THE UNIT WAS DOWN FOR A SCHEDULED OUTAGE BEGINNING APRIL 10, AND CONTINUING THROUGH THE MONTH.									
5/87	A	76.7	84.9	100.0	60.2						
	B	77.4	61.8	100.0	43.8						
	C	0.0	0.0		0.0						
	D	77.4	12.5	100.0	8.8						
	SYSTEM	77.2	53.0	100.0	37.6			744	528	280	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNSPECIFIED GAS-SIDE EQUIPMENT PROBLEMS CAUSED MODULE A TO BE DOWN FOR A FEW HOURS IN MAY.									
		THE ANNUAL SCHEDULED OUTAGE CONTINUED THROUGH MAY 7, 1987.									
		UNSPECIFIED LIQUID-SIDE EQUIPMENT PROBLEMS FORCED MODULE C OUT OF SERVICE AFTER THE SCHEDULED OUTAGE TO THE END OF THE MONTH.									
		RECYCLE/WASH PUMP PROBLEMS CAUSED MODULE B TO BE DOWN FOR PART OF ONE DAY IN MAY.									
6/87	A	100.0	68.0	100.0	55.3						
	B	100.0	94.7	100.0	77.0						
	C	0.0	0.0		0.0						
	D	100.0	78.1	100.0	63.5						
	SYSTEM	100.0	80.3	100.0	65.3			720	586	470	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNSPECIFIED LIQUID-SIDE EQUIPMENT PROBLEMS CONTINUED TO KEEP MODULE C OUT OF SERVICE THROUGHOUT JUNE.									
7/87	A	100.0	82.5	100.0	67.7						
	B	98.6	87.3	100.0	71.7						
	C	0.0	0.0		0.0						
	D	100.0	76.1	100.0	62.5						
	SYSTEM	99.5	81.9	100.0	67.3			744	611	501	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		RECYCLE/WASH PUMP PROBLEMS FORCED MODULE B OUT OF SERVICE FOR A FEW HOURS IN JULY.									
		MODULE C WAS OUT OF SERVICE THE ENTIRE MONTH DUE TO GAS-SIDE ABSORBER EQUIPMENT PROBLEMS.									
8/87	A	76.7	76.7	100.0	76.7						
	B	100.0	84.5	100.0	84.5						
	C	0.0	0.0		0.0						
	D	56.3	55.8	100.0	55.8						
	SYSTEM	77.7	72.3	100.0	72.3			744	744	538	

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE D WAS SHUT DOWN FOR 328.8 HOURS DURING AUGUST DUE TO MIST ELIMINATOR PROBLEMS.									
		BOOSTER FAN PROBLEMS CAUSED MODULE A TO BE SHUT DOWN FOR A FEW HOURS.									
		LIQUID-SIDE ABSORBER PROBLEMS FORCED MODULE A TO BE OUT OF SERVICE FOR 8 DAYS AND CAUSED MODULE C TO BE DOWN THE ENTIRE MONTH.									
9/87	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO INFORMATION WAS AVAILABLE ON THIS UNIT FOR SEPTEMBER 1987.									
10/87	SYSTEM							744			
10/87	A	100.0	100.0	100.0	93.1						
	B	41.9	0.0		0.0						
	C	61.3	0.0		0.0						
	D	100.0	99.9	100.0	93.0						
	SYSTEM	100.0	66.6	100.0	62.1			744	693	462	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE C WAS SHUT DOWN IN OCTOBER DUE TO LIQUID-SIDE ABSORBER EQUIPMENT PROBLEMS.									
		MODULE B WAS OUT OF SERVICE FOR 15 DAYS IN OCTOBER DUE TO MIST ELIMINATOR TROUBLE.									
11/87	SYSTEM							720			
11/87	A	54.7	54.7	100.0	54.7						
	B	0.0	0.0		0.0						
	C	100.0	68.9	100.0	68.9						
	D	77.9	77.9	100.0	77.9						
	SYSTEM	77.5	67.2	100.0	67.2			720	720	484	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE B WAS OFF-LINE FOR 1 DAY IN NOVEMBER DUE TO DAMPER PROBLEMS.									
		MIST ELIMINATOR TROUBLE CAUSED MODULE A TO BE OUT OF SERVICE FOR 14 DAYS, MODULE B FOR 11 DAYS, AND MODULE D FOR 7 DAYS DURING THE MONTH.									
		UNSPECIFIED GAS-SIDE EQUIPMENT PROBLEMS CAUSED MODULE B TO BE OUT OF SERVICE FOR 2 DAYS.									
		INFORMATION WAS UNAVAILABLE FOR THE MONTHS OF SEPTEMBER TO NOVEMBER 1987.									
12/87	A	97.8	91.1	100.0	75.7						
	B	0.0	0.0		0.0						
	C	98.8	83.2	100.0	69.1						
	D	100.0	89.7	100.0	74.5						
	SYSTEM	98.9	88.0	100.0	73.1			744	618	544	

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERFORMANCE DATA										
PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE B WAS SHUT DOWN THE ENTIRE MONTH DUE TO GAS DAMPER PROBLEMS.

UNSPECIFIED GAS-SIDE ABSORBER EQUIPMENT CAUSED MODULES A AND C TO BE SHUT DOWN FOR A FEW HOURS IN DECEMBER.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COLORADO UTE ELECTRIC	
PLANT NAME	CRAIG	
UNIT NUMBER	3	
CITY	CRAIG	
STATE	COLORADO	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	13.	(0.030 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	86.	(0.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	900	
GROSS UNIT GENERATING CAPACITY - MW	427	
NET UNIT GENERATING CAPACITY W/FGD - MW	408	
NET UNIT GENERATING CAPACITY WO/FGD - MW	409	
EQUIVALENT SCRUBBED CAPACITY - MW	427	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	722.29	(1530600 ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	23260.	(10000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		9100-10300
AVERAGE ASH CONTENT - %	8.00	
RANGE ASH CONTENT - %	10.0-12.0	
AVERAGE MOISTURE CONTENT - %	14.00	
RANGE MOISTURE CONTENT - %	10.0-12.0	
AVERAGE SULFUR CONTENT - %	0.45	
RANGE SULFUR CONTENT - %	0.4-0.5	
AVERAGE CHLORIDE CONTENT - %	0.10	
RANGE CHLORIDE CONTENT - %	0.05-0.10	
*** PARTICLE CONTROL		
** FABRIC FILTER		
NUMBER	1	
PRESSURE DROP - KPA	1.5	(6.0 IN-H2O)
TYPICAL GAS/CLOTH RATIO - M/MIN	0.7	(2.3 FT/MIN)
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	SPRAY DRYING	
PROCESS TYPE	LIME/SPRAY DRYING	
SYSTEM SUPPLIER	BABCOCK & WILCOX	
A-E FIRM	STANLEY CONSULTANTS	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	85.00	

COLORADO UTE ELECTRIC: CRAIG 3 (CONT.)

ENERGY CONSUMPTION - %	0.2	
CURRENT STATUS	1	
COMMERCIAL START-UP	2/1985	
INITIAL START-UP	6/1984	
CONTRACT AWARDED	4/1980	
** DESIGN AND OPERATING PARAMETERS		
DESIGN CHLORIDE CONTENT - %	********	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	4	
GENERIC TYPE	SPRAY DRYER	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	HYDRAULIC PRESSURE NOZZLE	
SHELL GENERIC MATERIAL	NR	
SHELL SPECIFIC MATERIAL	NR	
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR	
LINER GENERIC MATERIAL	NR	
LINER SPECIFIC MATERIAL	NR	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	2	
INLET GAS FLOW - CU. M/S	528.29	(1119490 ACFM)
INLET GAS TEMPERATURE - C	83.3	(182 F)
SO2 REMOVAL EFFICIENCY - %	90.0	
PARTICLE REMOVAL EFFICENCY - %	99.8	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	NONE	
GENERIC TYPE	N/A	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** REHEATER		
NUMBER	4	
NUMBER OF SPARES	1	
GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	STEAM	
TRADE NAME/COMMON TYPE	NR	
PERCENT GAS BYPASSED - AVG	0.0	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** FANS		
DESIGN	NR	
FUNCTION	NR	
APPLICATION	INDUCED DRAFT	
SERVICE	DRY	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
** DAMPERS		
FUNCTION	NR	
GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	
** DUCTWORK		
SHELL GENERIC MATERIAL TYPE	NR	
SHELL SPECIFIC MATERIAL TYPE	NR	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	

COLORADO UTE ELECTRIC: CRAIG 3 (CONT.)

** REAGENT PREPARATION EQUIPMENT

FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR

** TANKS

SERVICE	NUMBER
NR	****

** PUMPS

SERVICE	NUMBER
NR	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	N/A

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT

METHOD	UNSTABILIZED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
SITE TREATMENT	NONE

** WATER BALANCE

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT INITIAL START UP COMMENCED IN JUNE 1984. COMMERCIAL START UP IS SCHEDULED FOR FEBRUARY 1985.

THE SPRAY DRYER SYSTEM AT CRAIG 3 IS THE SECOND BABCOCK AND WILCOX LIME/SPRAY DRYING PROCESS IN OPERATION TO DATE. THE UTILITY REPORTED THAT MODIFICATIONS ARE BEING MADE BASED ON PROBLEMS EXPERIENCED AT THE FIRST BABCOCK AND WILCOX INSTALLATION (LARAMIE RIVER 3).

10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

COLORADO UTE ELECTRIC: CRAIG 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
					INFORMATION WAS UNAVAILABLE FOR THE FOURTH QUARTER OF 1984.						
1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
					A ONE-WEEK OUTAGE WAS NECESSARY DURING THE MONTH OF MAY IN ORDER TO MAKE THE NECESSARY DESIGN MODIFICATIONS TO INCREASE THE RECYCLE ASH SLURRY PIPE DIAMETER FROM 4 INCHES TO 6 INCHES. THIS WAS DONE IN ORDER TO HANDLE THE INCREASED PUMPING CAPACITY WHICH WAS ADDED TO THE SYSTEM.						
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
					THE UNIT AND FGD SYSTEM WERE DOWN 1 WEEK DURING THE MONTH OF AUGUST FOR A SCHEDULED MAINTENANCE OUTAGE.						
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
					THE UTILITY REPORTED THAT THE FGD SYSTEM WAS VERY RELIABLE DURING THE PERIOD JULY THROUGH DECEMBER, 1985. THE ONLY FGD-RELATED PROBLEM ENCOUNTERED DURING THIS PERIOD WAS THE DEPOSITION OF DRIED MATERIAL IN THE PNEUMATIC CONVEYOR LINES AT THE ELBOWS. THE UTILITY PLANS TO INSTALL RUBBER HOSE CONNECTIONS WITH WIDE SWEEPING TURNS TO REDUCE PLUGGING.						
					THE UTILITY REPORTED CHANGING ATOMIZER NOZZLES TO INCREASE SLURRY CAPACITY. NO DOWNTIME WAS NEEDED TO MAKE THIS CHANGE. THE SYSTEM SUPPLIER, B&W, HAS HAD TO INCREASE PUMP, SPRAY NOZZLE, AND SLURRY PIPE CAPACITY IN ORDER TO MEET 0.7% SULFUR COAL SO2 REMOVAL GUARANTEE.						
1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			

COLORADO UTE ELECTRIC: CRAIG 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED OUTAGES WERE REPORTED FOR THE YEAR 1986 WITH THE EXCEPTION OF A PLANNED TWO WEEK OUTAGE IN AUGUST. THE UTILITY REPORTS HAVING ONLY MINOR FGD-RELATED PROBLEMS SUCH AS SCALING, PLUGGED SLAKERS, AND PLUGGED PNEUMATIC LINES.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE YEAR 1987. THE UNIT WAS OFF-LINE FOR A SCHEDULED UNIT OUTAGE IN THE FALL WHICH LASTED APPROXIMATELY 6 WEEKS.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COLUMBUS & SOUTHERN OHIO ELEC	
PLANT NAME	CONESVILLE	
UNIT NUMBER	5	
CITY	CONESVILLE	
STATE	OHIO	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1885	
GROSS UNIT GENERATING CAPACITY - MW	405	
NET UNIT GENERATING CAPACITY W/FGD - MW	375	
NET UNIT GENERATING CAPACITY WO/FGD - MW	382	
EQUIVALENT SCRUBBED CAPACITY - MW	350	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	CYCLING	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	596.95	(1265000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	146.7	(296 F)
STACK HEIGHT - M	244.	(800 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	7.9	(26.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25237.	(10850 BTU/LB)
RANGE HEAT CONTENT - BTU/LB	10000-12000	
AVERAGE ASH CONTENT - %	14.90	
RANGE ASH CONTENT - %	10.0-24.0	
AVERAGE MOISTURE CONTENT - %	7.50	
RANGE MOISTURE CONTENT - %	5.0-18.0	
AVERAGE SULFUR CONTENT - %	4.50	
RANGE SULFUR CONTENT - %	4.2-5.1	
AVERAGE CHLORIDE CONTENT - %	0.01	
RANGE CHLORIDE CONTENT - %	0.01-0.11	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	657.8	(1393893 ACFM)
INLET FLUE GAS TEMPERATURE - C	146.7	(296 F)
PRESSURE DROP - KPA	0.5	(2. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.6	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

** GENERAL DATA			
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT		
SO2 REMOVAL MODE	WET SCRUBBING		
PROCESS TYPE	LIME		
PROCESS ADDITIVES	MAGNESIUM OXIDE		
SYSTEM SUPPLIER	AIR CORRECTION DIVISION, UOP		
A-E FIRM	BLACK & VEATCH		
DEVELOPMENT LEVEL	FULL SCALE		
NEW/RETROFIT	NEW		
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.65		
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	89.50		
ENERGY CONSUMPTION - %	1.7		
CURRENT STATUS	1		
COMMERCIAL START-UP	2/1977		
INITIAL START-UP	1/1977		
CONTRACT AWARDED	10/1974		
** DESIGN AND OPERATING PARAMETERS			
DESIGN CHLORIDE CONTENT - %	********		
OPER. & MAINT. REQUIREMENT - MANHR/DAY	280.0		
** QUENCHER/PRESATURATOR			
NUMBER	2		
TYPE	SPRAY CHAMBER		
SUPPLIER	AIR CORRECTION DIVISION, UOP		
INLET GAS TEMPERATURE - C	141.1	(286 F)	
L/G RATIO - L/CU. M	0.1	(0.6 GAL/1000 ACFM)	
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY		
CONSTRUCTION MATERIAL SPECIFIC TYPE	IRON BASE/NICKEL-CHROMIUM-COPPER-MOLYBDENUM		
** ABSORBER			
NUMBER	2		
NUMBER OF SPARES	0		
GENERIC TYPE	PACKED TOWER		
SPECIFIC TYPE	MOBILE BED PACKING		
TRADE NAME/COMMON TYPE	TURBULENT CONTACT ABSORBER		
SUPPLIER	AIR CORRECTION DIVISION, UOP		
DIMENSIONS - FT	45.0 X 17.5 X 79.5		
SHELL GENERIC MATERIAL	CARBON STEEL		
SHELL SPECIFIC MATERIAL	AISI 1110		
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A		
LINER GENERIC MATERIAL	ORGANIC		
LINER SPECIFIC MATERIAL	SYNTHETIC RUBBER		
LINER MATERIAL TRADE NAME/COMMON TYPE	NEOPRENE LS-576		
GAS CONTACTING DEVICE TYPE	GRID CAGES		
NUMBER OF CONTACTING ZONES	1		
LIQUID RECIRCULATION RATE - LITER/S	1988.	(31560 GPM)	
L/G RATIO - L/CU.M	6.6	(49.3 GAL/1000 ACF)	
GAS-SIDE PRESSURE DROP - KPA	2.0	(8.1 IN-H20)	
SUPERFICAL GAS VELOCITY - M/SEC	4.0	(13.1 FT/S)	
INLET GAS FLOW - CU. M/S	301.81	(639568 ACFM)	
INLET GAS TEMPERATURE - C	51.7	(125 F)	
SO2 REMOVAL EFFICIENCY - %	92.0		
PARTICLE REMOVAL EFFICENCY - %	99.6		
** MIST ELIMINATOR			
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR		
NUMBER PER SYSTEM	2		
NUMBER OF SPARES PER SYSTEM	0		
NUMBER PER MODULE	1		
GENERIC TYPE	IMPINGEMENT		
SPECIFIC TYPE	BAFFLE		
TRADE NAME/COMMON TYPE	CLOSED VANE		
CONFIGURATION	HORIZONTAL		
NUMBER OF STAGES	2		
NUMBER OF PASSES PER STAGE	4		
FREEBOARD DISTANCE - M	3.05	(10.0 FT)	
DISTANCE BETWEEN STAGES - CM	11.43	(4.5 IN)	
DISTANCE BETWEEN VANES - CM	5.1	(2.00 IN)	
VANE ANGLES - DEGREES	90		

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PRESSURE DROP - KPA	0.5	(1.9 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	RECLAIMED	
WASH FREQUENCY	CONTINUOUS	
WASH RATE - L/S	63.1	(1000 GAL/MIN)

** REHEATER

GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	N/A	
CONSTRUCTION MATERIAL SPECIFIC TYPE	N/A	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FAN	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	401.11	(850000 ACFM)
FLUE GAS TEMPERATURE - C	146.7	(296 F)
PRESSURE DROP - KPA	0.6	(2.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	GUILLOTINE & LOUVER
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	INLET
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	OUTLET TO DAMPER
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

** DUCTWORK	
LOCATION	OUTLET BEYOND DAMPER
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!
LINER GENERIC MATERIAL TYPE	INORGANIC
LINER SPECIFIC MATERIAL TYPE	CHEMICALLY-BONDED CONCRETE
** DUCTWORK	
LOCATION	BYPASS
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	PASTE
DEVICE TYPE	N/A
MANUFACTURER	WALLACE & TIERNAN
NUMBER	5

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	2
RECLAIMED WATER	1
REAGENT PREP PRODUCT	2
MIST ELIMINATOR WASH	2

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	10
LIME SLURRY TRANSFER	2
SLURRY MAKEUP	3
RECYCLE TANK DRAWOFF	4
MIST ELIMINATOR WASH	4
RECLAIM WATER	2
THICKENER UNDERFLOW	****

** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	VACUUM FILTER
NUMBER	3
NUMBER OF SPARES	1
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
BELT GENERIC MATERIAL TYPE	ORGANIC
BELT SPECIFIC MATERIAL TYPE	POLYPROPYLENE
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	30% SOLIDS
OUTLET STREAM CHARACTERISTICS	50% SOLIDS
OUTLET STREAM DISPOSITION	TO IUCS PROCESS
OVERFLOW STREAM DISPOSITION	TO RECLAIMED WATER TANK
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER	2
NUMBER OF SPARES	0
DIMENSIONS - FT	145.0 DIA X 16.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	EPOXY
FEED STREAM SOURCE	ABSORBER BLEED
FEED STREAM CHARACTERISTICS	7-12% SOLIDS
OUTLET STREAM CHARACTERISTICS	30% SOLIDS
OUTLET STREAM DISPOSITION	TO IUCS THICKENER & THEN TO VACUUM FILTER
OVERFLOW STREAM DISPOSITION	TO RECLAIMED WATER TANK

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT

METHOD	FIXATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!
INLET QUALITY - %	50.0

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE/CONVEYED
SITE TREATMENT	NONE
SITE DIMENSIONS	80 ACRES/50 FT

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	RECYCLE TANK LEVEL
CONTROL LEVELS	OUTLET PH 5.5-6.3; RECYCLE PH 7.0-7.5
MONITOR LOCATION	SLURRY DISCHARGE FROM MODULE
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	CLOSED
MAKEUP WATER ADDITION - LITERS/S	31.5 (500 GPM)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIME
PRINCIPAL CONSTITUENT	90-95% CAO, 3-8% MGO
SOURCE/SUPPLIER	DRAVO
CONSUMPTION	16 TPH
UTILIZATION - %	90.0
POINT OF ADDITION	SLAKER

** FGD SPARE CAPACITY INDICES

ABSORBER - %	0.0

** FGD SPARE COMPONENT INDICES

ABSORBER	0.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/76	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

A MAJOR FIRE IN MODULE A DELAYED THE UNIT START-UP. THE FIRE CAUSED $2.1 MILLION DAMAGE. THE UTILITY'S INSURANCE COVERED THE DAMAGE AND A NEW SCRUBBER MODULE WILL BE PURCHASED FROM AND INSTALLED BY UOP.

THE UTILITY IS CURRENTLY CONDUCTING AIR AND WATER TESTS ON MODULE B.

1/77	SYSTEM							744			

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			INITIAL START-UP FOR DEBUGGING AND COMMISSIONING PURPOSES OCCURRED IN EARLY JANUARY. COMMERCIAL AVAILABILITY FOR SERVICE OCURRED ON JANUARY 27.								
			EARLY OPERATIONS WERE MARKED BY COLD WEATHER RELATED PROBLEMS SUCH AS FROZEN LINES AND GEARS, CRACKED FLANGES, A FROZEN LIME BELT CONVEYOR, AND A FROZEN PIPELINE FROM THE THICKENER TO THE IUCS FACILITY.								
2/77	B		43.0		43.0						
	SYSTEM							672	668		
	** PROBLEMS/SOLUTIONS/COMMENTS										
			COMMERCIAL START-UP OF MODULE B OCCURRED ON FEBRUARY 13, 1977. THE LONGEST PERIOD OF CONTINUOUS OPERATION WAS 132 HOURS.								
			THE UTILITY REPORTED THAT THE ESP OPERATED SATISFACTORILY.								
			PRESSURE SURGES OCCURRED IN THE PRESATURATOR PIPING.								
			THE CONTINUOUS SO2 ANALYZERS OPERATED UNSATISFACTORILY.								
			MODULE B EXPERIENCED POOR VELOCITY DISTRIBUTION THROUGH THE TCA BEDS.								
			SCRUBBING LIQUOR WAS CARRYING OVER INTO THE MIST ELIMINATOR SECTION.								
3/77	B		72.9		50.9						
	SYSTEM							744	520		
4/77	B	41.8	40.0	40.5	37.4						
	SYSTEM							720	685		
	** PROBLEMS/SOLUTIONS/COMMENTS										
			A STACK OUTLET TEMPERATURE OF 200 F IS BEING MAINTAINED IN ORDER TO MINIMIZE ACID RAINOUT AND STACK CORROSION PROBLEMS.								
			THE 316 SS PRESATURATOR AREA HAS EXPERIENCED CORROSION.								
			THE RUBBER LINER IN THE RECYCLE TANK HAS BEEN PEELING AWAY. THE PROBLEM APPEARED TO BE APPLICATION-RELATED.								
			SOME PLUGGING HAS OCCURRED IN THE TUBE THICKENERS.								
			THE QUALITY OF THE LIME SLURRY HAS BEEN A PROBLEM AREA. ROCKS UP TO FIVE INCHES IN DIAMETER HAVE BEEN DETECTED. THIS HAS PROMPTED DRAVO TO INSTAL MECHANICAL SEPARATORS AND METAL DETECTORS AT THE LIME SHIPMENT FACILITY.								
5/77	B	58.0	50.0	51.0	48.0						
	SYSTEM							744	712		
6/77	B	66.0	59.0	60.0	58.0						
	SYSTEM							720	713		
7/77	B	0.0	0.0	0.0	0.0						
	SYSTEM							744	744		

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE B-SIDE MODULE DID NOT OPERATE THE ENTIRE MONTH PENDING COMPLETION OF A NUMBER OF NECESSARY MODIFICATIONS AND REPAIRS.									
		MODIFICATIONS WERE MADE TO THE UNIT PROCESS CONTROL SYSTEM.									
		MODIFICATIONS WERE MADE TO THE UNIT INSTRUMENTATION SYSTEM.									
		REPAIRS WERE MADE TO THE ABSORBER LINER.									
		REPAIRS WERE MADE TO THE PIPING BETWEEN THE THICKENER AND IUCS BUILDING.									
		THE UTILITY IS CURRENTLY PLANNING TO CONDUCT A PARTICULATE DROP TEST SCHEDULED FOR SEPTEMBER 1977.									
		THE REPLACEMENT A-SIDE TCA MODULE REPLACING THE ORIGINAL MODULE DESTROYED BY FIRE IN DECEMBER 1976 IS EXPECTED TO BE AVAILABLE FOR COMMERCIAL SERVICE IN JANUARY 1978.									
8/77	B	0.0	0.0	0.0	0.0						
	SYSTEM							744	613		
9/77	B	52.9	39.9	46.9	26.0						
	SYSTEM							720	469		
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE PARTICULATE DROP TEST SCHEDULED FOR SEPTEMBER 1977 WAS PUSHED BACK TO THE WEEK OF OCTOBER 24 1977.									
		THE SCRUBBER WAS NOT OPERATED THE ENTIRE MONTH OF AUGUST. REPAIRS AND MODIFICATIONS CONTINUED UNTIL SEPTEMBER 13. THERE WERE SOME WEATHER-RELATED DELAYS.									
10/77	B	32.0	24.0	25.0	18.0						
	SYSTEM							744	559		
11/77	A	10.0	4.0	4.0	4.0						
	B	33.0	33.0	33.0	33.0						
	SYSTEM	21.5	18.5	18.5	18.5			720	715	133	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WENT ON LINE NOVEMBER 21. DURING LOW LOAD PERIODS SOLIDS BUILD UP TENDED TO CAUSE PLUGGING BECAUSE OF LOW FLOW RATES. DURING THE LOW LOAD PERIODS ALL GAS WAS DUCTED THROUGH ONE MODULE WHILE THE OTHER WA SHUT DOWN.									
		THE SCRUBBER WAS DOWN FROM OCTOBER 10 TO NOVEMBER 10 FOR RELINING WITH NEOPRENE RUBBER.									
12/77	A	93.0	64.0	62.0	22.0						
	B	97.0	79.0	76.0	27.0						
	SYSTEM	95.0	71.5	69.0	24.5			744	252	180	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WENT DOWN DECEMBER 12 FOR A 3-MONTH SCHEDULED OUTAGE. MODULE A BEGAN COMMERCIAL OPERATIONS DECEMBER 3 OPERATING AS MUCH AS POSSIBLE THROUGH DECEMBER 12. MODULE B OPERATED DECEMBER 1 THROUGH 12. DURING TH SHUTDOWN THE UTILITY WILL DECIDE IF THE SYSTEM SUPPLIERS HAVE MET SPECS ON THE BOILER AND TURBINES. THE UNIT IS SCHEDULED TO BE BACK ON LINE IN									

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			MID-MARCH BUT THIS MAY BE PUSHED BACK TO APRIL 1.								
			DURING THE DECEMBER TO MARCH 1978 SHUTDOWN THE CARBON STEEL FLUE WILL BE REPLACED WITH AN ACID-BRICK LINING.								
1/78	SYSTEM	0.0			0.0			744	0	0	0.0
2/78	SYSTEM	0.0			0.0			672	0	0	0.0
3/78	A	20.0	19.0	64.0	10.0						
	B	20.0	15.8	54.0	8.0						
	SYSTEM	20.0	17.4	59.0	9.0			744	379	66	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UNIT STARTED UP AGAIN ON MARCH 16.								
			PH CONTROLS AND SO2 ANALYZERS HAVE EXPERIENCED OPERATIONAL PROBLEMS.								
			IMPURITIES IN THE LIME HAVE CAUSED PLUGGING PROBLEMS.								
4/78	A	67.0	58.0	61.0	58.0						
	B	65.0	59.0	63.0	59.0						
	SYSTEM	66.0	58.5	62.0	58.5			720	716	421	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE SYSTEM WAS DOWN DUE TO AN EXCESS OF FLOCCULANT IN THE THICKENER.								
			EXCESS FLOCCULANT IN THE THICKENER YIELDED A HIGH SOLIDS LEVEL IN THE OVERFLOW AND RESULTED IN PLUGGING PROBLEMS IN THE ABSORBER MODULES.								
5/78	A	52.0	45.0	45.0	44.0						
	B	54.0	50.0	51.0	69.0						
	SYSTEM	53.0	47.5	48.0	56.5			744	720	420	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE SYSTEM WAS TAKEN OUT OF SERVICE BECAUSE OF CONTINUED PROBLEMS WITH TH FLOCCULANT FEED SYSTEM. THE THICKENER WAS EMPTIED TO RESTORE PROPER FLOC CULANT BALANCE.								
6/78	A	48.0	37.0	37.0	37.0						
	B	30.0	30.0	30.0	30.0						
	SYSTEM	39.0	33.5	33.5	33.5			720	720	243	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			AN FRP PIPING FAILURE IN THE MIST ELIMINATOR WASH SYSTEM OCCURRED.								
7/78	A	66.0	66.0	66.0	64.0						
	B	43.0	33.0	33.0	32.0						
	SYSTEM	54.5	49.5	49.5	49.0			744	727	359	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			OUTAGE TIME WAS DUE TO PLUGGING IN THE MIST ELIMINATOR AND SCRUBBER BALL REGIONS.								
8/78	A	18.0	20.0	20.0	18.0						
	B	18.0	21.0	21.0	18.0						
	SYSTEM	18.0	20.5	20.5	18.0			744	667	135	

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FORCED OUTAGE TIME WAS DUE, IN PART, TO TIME REQUIRED TO REMOVE SCALE FROM THE MIST ELIMINATOR.									
		THE FORCED OUTAGE TIME WAS DUE, IN PART, TO TIME REQUIRED TO REPLACE SOME OF THE PING PONG BALLS IN THE MODULES.									
		THE UTILITY EXPERIENCED BYPASS DAMPER PROBLEMS DURING THE PERIOD.									
		PROBLEMS OCCURRED RELATED TO BROKEN SLUDGE LINES AND PLUGGING IN THE LIME SLURRY FEED LINES.									
9/78	A	61.0	46.0	55.0	45.0						
	B	54.0	44.0	53.0	43.0						
	SYSTEM	57.5	45.0	54.0	44.0			720	707	316	
10/78	A	72.0	37.0	38.0	36.0						
	B	82.0	46.0	47.0	45.0						
	SYSTEM	77.0	41.5	42.5	40.5			744	713	301	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DAMPER DRIVE PROBLEMS WERE REPORTED BY THE UTILITY.									
		MINIMAL RUBBER LINER FAILURE WAS OBSERVED AT THE TOP OF ONE OF THE SCRUBBER MODULES AND JUST AFTER THE PRESATURATOR.									
11/78	A	43.0	29.0	29.0	25.0						
	B	84.0	74.0	75.0	66.0						
	SYSTEM	63.5	51.5	52.0	45.5			720	642	331	
12/78	A	6.6	0.3	0.3	0.3						
	B	33.1	36.3	36.6	30.0						
	SYSTEM	19.8	18.3	18.4	15.1			744	609	112	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE LOW HOURS FOR THIS PERIOD ARE ATTRIBUTED TO FREEZE UPS.									
1/79	SYSTEM	0.0	0.0	0.0	0.0			744	602	0	
2/79	SYSTEM	0.0	0.0	0.0	0.0			672	629	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SYSTEM WAS UNAVAILABLE DURING JANUARY AND FEBRUARY BECAUSE OF SEVERE WINTER WEATHER.									
3/79	A	50.0	49.0	50.0	43.0						
	B	0.0	0.0	0.0	0.0						
	SYSTEM	25.0	24.5	25.0	21.5			744	652	160	
4/79	A	17.0	58.0	73.0	12.0						
	B	0.0	0.0	0.0	0.0						
	SYSTEM	8.5	29.0	36.5	6.0			720	149	43	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE B DID NOT OPERATE DURING MARCH AND APRIL BECAUSE OF SEVERE CORROSION AT THE PRESATURATOR INLET DUCT WHICH IS BEING REPAIRED BY UOP.									
5/79	SYSTEM	0.0	0.0	0.0	0.0			744	744	0	

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		REPAIRS WERE MADE TO THE SEAL BETWEEN THE THICKENER BASE AND SIDEWALL.									
		THE FGD SYSTEM WAS DOWN DURING MAY FOR AN ANNUAL OUTAGE.									
6/79	A	69.0	35.0	36.0	33.0						
	B	50.0	21.0	22.0	20.0						
	SYSTEM	59.5	28.0	29.0	26.5			720	670	191	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PLUGGED PH LINES WERE A PROBLEM DURING MAY AND JUNE.									
		FLYASH CONVEYING PROBLEMS RESULTED IN ABOUT A TWO DAY OUTAGE.									
		OUTLET DAMPER PROBLEMS WERE REPORTED BY THE UTILITY.									
7/79	A	75.3	76.3	77.6	69.0						
	B	93.4	89.8	90.8	80.6						
	SYSTEM	84.4	82.8	84.2	74.8			744	672	557	
8/79	A	86.6	24.7	25.0	10.1						
	B	85.6	22.7	23.0	9.3						
	SYSTEM	86.1	23.7	24.0	9.7			744	305	72	
9/79	A	89.3	52.6	59.5	27.9						
	B	95.9	51.3	58.0	27.2						
	SYSTEM	92.6	51.9	58.8	27.6			720	383	199	
10/79	A	53.2	76.3	77.0	45.4						
	B	47.8	77.4	78.1	46.1						
	SYSTEM	50.5	76.9	77.6	45.8			744	443	341	
11/79	A	74.0	90.0	91.0	52.0						
	B	70.0	88.0	89.0	51.0						
	SYSTEM	72.0	89.0	90.0	51.2			720	414	369	
12/79	SYSTEM	0.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE LAST HALF OF 1979 THE UNIT EXPERIENCED PROBLEMS WITH THE LIME BLOWER COMPRESSOR MOTOR.									
		CAVITATION WAS SITED IN THE SLUDGE PUMP.									
		THE FLYASH CONVEYOR SYSTEM CAUSED PROBLEMS DURING THE LATTER HALF OF THE YEAR.									
		PLUGGING IN THE REAGENT CIRCULATION SYSTEMS WAS ENCOUNTERED.									
		THERE WERE PROBLEMS WITH THE GUIDE BARS AND SEALS IN THE INLET DAMPER DURING THE LAST HALF OF 1979.									
1/80	A	89.0	38.0	45.0	13.0						
	B	93.0	50.0	59.0	17.0						
	SYSTEM	91.0	44.0	52.0	15.0			744	257	113	21.4

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY A BOILER OUTAGE OCCURRED FROM THE FIRST OF THE MONTH TO JANUARY 20, DURING WHICH TIME MAINTENANCE WAS PERFORMED ON THE FGD SYSTEM.									
2/80	A	90.0	63.0	77.0	31.0						
	B	93.0	69.0	84.0	34.0						
	SYSTEM	92.0	66.0	81.0	33.0			696	343	226	31.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A BOILER OUTAGE LASTING APPROXIMATELY 17 DAYS ALSO OCCURRED DURING FEBRUARY.									
		IN FEBRUARY, MIST ELIMINATOR NOZZLE PLUGGING OCCURRED CAUSING SOME FGD SYSTEM OUTAGE TIME.									
3/80	A	88.0	82.0	82.0	82.0						
	B	88.0	81.0	82.0	81.0						
	SYSTEM	88.0	82.0	82.0	82.0			744	744	606	75.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH PROBLEMS WERE EXPERIENCED WITH THE IUCS SLUDGE STABILIZATION PROCESS AND SOME OUTAGE TIME RESULTED. ALSO DURING MARCH SOME GRID RODS REQUIRED REPLACING AND SOME RUBBER LINER FAILURES OCCURRED.									
		THE MAJORITY OF THE MARCH FGD SYSTEM OUTAGE TIME WAS DUE TO CONTINUING PROBLEMS WITH THE MIST ELIMINATOR NOZZLES.									
4/80	A	94.6	84.4	87.7	78.9						
	B	74.9	65.8	68.4	61.5						
	SYSTEM	84.7	75.2	78.0	70.3			720	673	506	63.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		CONTINUAL PROBLEMS WITH THE DAMPERS, PRESATURATOR HOSES, AND NOZZLES WERE THE CAUSES OF FGD SYSTEM OUTAGE TIME IN APRIL.									
5/80	A	92.1	86.2	86.2	86.2						
	B	90.3	84.3	84.3	84.3						
	SYSTEM	91.3	85.2	85.2	85.2			744	744	634	69.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		IN MAY, CONTROLS AND INSTRUMENTATION DEVELOPED PROBLEMS THAT CAUSED SOME OUTAGE TIME.									
6/80	A	89.6	71.0	71.0	70.7						
	B	94.3	74.8	74.8	74.4						
	SYSTEM	91.9	72.9	72.9	72.6			720	717	523	65.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		EXTERNAL CAUSES (IUCS DISPOSAL FACILITY, LOW UNIT DEMAND, SERVICE WATER PROBLEMS, ETC.) WERE RESPONSIBLE FOR THE MAJORITY OF THE JUNE OUTAGES.									
7/80	A	90.6	70.7	72.4	43.8						
	B	88.8	82.0	84.0	50.8						
	SYSTEM	89.7	76.4	78.2	47.3			744	461	352	36.6

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE PRESATURATOR HOSES AND NOZZLES PLUGGED CAUSING THE UNIT TO SHUT DOWN FOR PART OF JULY.									
8/80	A	98.0	83.5	84.9	48.5						
	B	95.4	88.8	90.4	51.6						
	SYSTEM	96.7	86.2	87.6	50.1			744	432	373	40.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT PROBLEMS WITH THE RECLAIM WATER SYSTEM OCCURRED IN AUGUST CAUSING SOME OUTAGE TIME.									
9/80	A	87.6	73.4	74.4	73.1						
	B	88.8	85.1	86.3	82.0						
	SYSTEM	88.2	79.2	80.3	78.9			720	717	568	71.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE JULY-SEPTEMBER PERIOD INLET DAMPER SEAL LEAKING WAS A MAJOR PROBLEM.									
		THE PRESATURATOR PROBLEMS CONTINUED IN SEPTEMBER CAUSING ADDITIONAL OUTAGE TIME FOR THE FGD SYSTEM.									
10/80	A	92.7	77.8	80.8	75.7						
	B	89.2	80.0	82.9	77.7						
	SYSTEM	91.0	78.9	81.9	76.7			744	723	571	59.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER MINOR OUTAGES WERE THE RESULT OF DAMPER AND AGITATOR MOTOR PROBLEMS.									
11/80	A	79.0	35.7	36.9	31.3						
	B	86.1	64.6	66.8	56.5						
	SYSTEM	82.6	50.1	51.9	43.9			720	630	316	35.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE LOW SYSTEM AVAILABILITY DURING THE MONTH OF NOVEMBER WAS A DIRECT RESULT OF A 28 HOUR OUTAGE ATTRIBUTED TO LIME SLURRY TRANSFER TANK AND AGITATOR MOTOR PROBLEMS.									
		ADDITIONAL MINOR PROBLEMS WERE ENCOUNTERED WITH THE PRESATURATOR HOSES, TEMPERATURE PROBES, THICKENERS AND SERVICE WATER DURING THE MONTH OF NOVEMBER.									
12/80	A	93.1	88.8	89.2	82.2						
	B	90.9	86.6	85.3	80.2						
	SYSTEM	92.0	87.7	87.2	81.2			744	689	604	72.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.									
1/81	A	90.6	85.7	87.4	77.4						
	B	90.5	86.0	84.9	77.2						
	SYSTEM	90.5	86.0	84.9	77.2			744	672	575	71.0

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.									
2/81	A	93.2	89.9	91.2	83.4						
	B	95.4	94.9	93.6	88.1						
	SYSTEM	94.2	92.3	92.4	85.7			672	624	576	100.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.									
3/81	A	3.7	15.7	21.0	0.5						
	B	4.0	23.5	31.0	0.9						
	SYSTEM	3.9	19.6	26.0	0.7			744	26	5	1.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MOST OF MARCH THE BOILER AND FGD SYSTEM WERE OFF LINE FOR SCHEDULED MAINTENANCE.									
4/81	A	98.9	83.7	90.1	64.5						
	B	94.3	78.6	84.5	60.6						
	SYSTEM	96.6	81.1	87.3	63.8			720	555	450	
5/81	A	99.7	100.0	100.0	95.0						
	B	99.7	100.0	100.0	95.0						
	SYSTEM	99.7	100.0	100.0	95.0			744	707	707	
6/81	A	99.4	100.0	100.0	96.4						
	B	98.5	100.0	100.0	96.9						
	SYSTEM	99.0	100.0	100.0	96.9			720	698	698	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR OPERATIONAL PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1981.									
7/81	A	99.8	100.0	100.0	55.4						
	B	100.0	100.0	100.0	55.4						
	SYSTEM	99.9	100.0	100.0	55.4			744	412	412	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JULY, THE BOILER ONLY OPERATED 412 HOURS AS A RESULT OF FAILURE OF BOILER FEED PUMP.									
8/81	A	99.0	76.0	95.0	43.0						
	B	99.0	30.0	88.0	39.0						
	SYSTEM	99.0	53.0	91.5	41.0			744	422	305	
9/81	A	100.0	59.0	100.0	6.0						
	B	87.0	48.0	81.0	5.0						
	SYSTEM	93.5	53.5	90.5	5.5			720	69	41	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SEVERE OUTLET DUCT CORROSION HAS OCCURRED ON UNIT 5. THE GUNITE LINER HAS FAILED DUE TO INADEQUATE STRENGTH OF THE SUPPORTING MESH. THE UTILITY IS LOOKING INTO INCONEL OR FRP AS A REPLACEMENT LINER.									

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			UNIT 5 WAS REMOVED FROM SERVICE ON SEPTEMBER 19 AS A RESULT OF LOW DEMAND. THE UNIT IS NOT EXPECTED TO BE BROUGHT BACK ON LINE UNTIL DECEMBER. THIS OUTAGE PERIOD WILL BE UTILIZED FOR OUTLET DUCTWORK REPAIRS.								
10/81	A	100.0	0.0	0.0	0.0						
	B	100.0	0.0	0.0	0.0						
	SYSTEM	100.0	0.0	0.0	0.0			744		0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING OCTOBER MAJOR MODIFICATIONS WERE BEING PERFORMED ON THE BOILER DUCTWORK. THIS INCLUDED REPAIRING THE CORRODED INNER SUPPORTS AND REPLACING THE GUNITE.								
11/81	A	27.0	0.0	0.0	0.0						
	B	27.0	0.0	0.0	0.0						
	SYSTEM	27.0	0.0	0.0	0.0			720		0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING NOVEMBER MAJOR MODIFICATION TO THE FGD SYSTEM DUCTWORK WAS PERFORMED. THIS WORK INCLUDED REPAIRING THE CORRODED SUPPORTS AND RECOATING WITH GUNITE.								
			ADDITIONAL OUTAGE TIME DURING THE MONTH WAS DUE TO GENERAL FGD MAINTENANCE								
12/81	A	84.0	82.0	86.0	77.0						
	B	84.0	82.0	86.0	77.0						
	SYSTEM	84.0	82.0	86.0	77.0			744	699	573	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING DECEMBER TEST WERE CONDUCTED ON THE ESP.								
			ADDITIONAL OUTAGE TIME DURING THE MONTH WAS DUE TO HIGH THICKENER SOLIDS AND PROBLEMS WITH THE FLYASH HANDLING SYSTEM.								
1/82	A	97.0	83.0	87.0	69.0						
	B	88.0	81.0	85.0	67.0						
	SYSTEM	92.5	82.0	86.0	68.0			744	617	506	
2/82	A	99.0	80.0	89.0	64.0						
	B	98.0	76.0	84.0	60.0						
	SYSTEM	98.5	78.0	86.5	62.0			672	535	417	
3/82	A	100.0	89.0	95.0	76.0						
	B	93.0	90.0	96.0	77.0						
	SYSTEM	96.5	89.5	95.5	76.5			744	636	569	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1982.								
4/82	A	98.0	81.0	89.0	50.0						
	B	67.0	62.0	67.0	38.0						
	SYSTEM	82.5	71.5	78.0	44.0			720	443	317	
5/82	A	100.0	83.0	98.0	48.0						
	B	100.0	78.0	92.0	46.0						
	SYSTEM	100.0	80.5	95.0	47.0			744	434	350	
6/82	A	100.0	77.0	93.0	17.0						

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	98.0	64.0	77.0	14.0						
	SYSTEM	99.0	70.5	85.0	15.5			720	158	112	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1982.

7/82	5A	94.6	93.7	96.5	58.1						
	5B	94.3	85.6	88.2	53.1						
	SYSTEM	94.4	89.6	92.3	55.6			744	461	414	43.9
8/82	5A	99.2	89.4	87.5	66.9						
	5B	99.5	99.1	97.0	74.1						
	SYSTEM	99.4	94.2	92.3	70.5			744	557	524	56.2
9/82	5A	96.4	89.7	92.3	55.5						
	5B	97.0	83.5	85.9	51.6						
	SYSTEM	96.7	86.6	89.1	53.5			720	445	386	47.5
10/82	5A	86.4	88.0	89.1	64.2						
	5B	86.3	86.5	87.6	63.1						
	SYSTEM	86.3	87.3	88.4	63.7			744	543	474	55.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF JULY THROUGH OCTOBER, 1982.

11/82	5A	0.0			0.0						
	5B	0.0			0.0						
	SYSTEM	0.0			0.0			720	0		0.0

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 5 WAS OUT OF SERVICE DURING NOVEMBER FOR AN ANNUAL OUTAGE.

12/82	5A	23.7			0.0						
	5B	23.7			0.0						
	SYSTEM	23.7			0.0			744	0		0.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE ANNUAL OUTAGE CONTINUED FOR UNIT 5 THROUGHOUT THE MONTH OF DECEMBER.

1/83	5A	88.5	58.7	62.9	19.5						
	5B	92.4	70.7	75.8	23.5						
	SYSTEM	90.5	64.7	69.4	21.5			744	248	160	24.0

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 5 WAS PLACED BACK IN SERVICE DURING JANUARY FOLLOWING THE ANNUAL OUTAGE.

2/83	5A	91.8	89.3	89.7	87.2						
	5B	88.3	86.6	87.0	84.5						
	SYSTEM	90.0	88.0	88.3	85.8			672	656	577	60.7

** PROBLEMS/SOLUTIONS/COMMENTS

PRIOR TO FEBRUARY 16, 1983, THE UTILITY WAS CONSIDERING FGD SYSTEM AVAILABLE TIME TO INCLUDE PERIODS WHEN SCRUBBER MAINTENANCE WAS PERFORMED DURING A UNIT OUTAGE. THE UTILITY NOW CONFORMS TO THE CORRECT DEFINITION OF AVAILABILITY AND CONSIDERS THE SCRUBBER UNAVAILABLE DURING THESE

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERIODS.								
3/83	5A	92.3	93.5	94.5	78.8						
	5B	90.5	87.6	88.5	73.8						
	SYSTEM	91.4	90.5	91.5	76.3			744	627	568	55.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MARCH.								
4/83	5A	92.6	90.2	92.4	89.9						
	5B	95.3	93.0	95.3	92.6						
	SYSTEM	94.0	91.6	93.9	91.3			720	717	657	66.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY ATTRIBUTED THE VERY GOOD PERFORMANCE OF MODULES A AND B DURING APRIL TO PROPER MAINTENANCE PERFORMED AND THE COMPLETION OF ESSENTIAL CHANGES IN THE SCRUBBING SYSTEM DESIGN.								
5/83	5A	82.3	78.1	78.7	60.6						
	5B	74.6	77.6	78.2	60.2						
	SYSTEM	78.4	77.8	78.4	60.4			744	578	450	49.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT OUTAGE TIME WAS ATTRIBUTED TO THE CLEANING OF MIST ELIMINATORS DURING MAY.								
			MAINTENANCE WORK ON MIST ELIMINATOR PUMPS ALSO CAUSED OUTAGE TIME IN MAY.								
			A 72 HOUR OUTAGE OCCURRED DUE TO A CHEMICAL IMBALANCE OF THE MAKEUP WATER POND. AIR HEATER DRAINAGE DURING A CLEANING OPERATION PRODUCED ACIDIC CONDITIONS IN THE POND.								
6/83	5A	88.2	75.5	77.6	39.0						
	5B	96.5	90.9	93.4	46.9						
	SYSTEM	92.4	83.2	85.5	43.0			720	372	310	37.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.								
7/83	5A	87.9	83.3	84.2	63.6						
	5B	90.2	81.9	82.7	62.5						
	SYSTEM	89.0	82.6	83.5	63.0			744	568	469	54.0
8/83	5A	94.1	83.8	88.0	67.3						
	5B	91.3	84.1	88.4	67.6						
	SYSTEM	92.7	83.9	88.2	67.5			744	598	502	46.0
9/83	5A	99.0	97.2	98.0	47.8						
	5B	93.8	86.7	87.5	42.6						
	SYSTEM	96.4	91.9	92.7	45.2			720	354	326	34.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF JULY THROUGH SEPTEMBER 1983.								
10/83	5A	99.1	98.0	98.0	46.9						

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	5B	98.1	94.7	94.7	45.3						
	SYSTEM	98.6	96.3	96.3	46.1			744	356	343	33.5

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING OCTOBER.

11/83	5A	58.6	98.2	98.2	54.4						
	5B	57.1	94.7	94.7	52.5						
	SYSTEM	57.8	96.5	96.5	53.5			720	399	385	38.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT ANNUAL OUTAGES OCCURRED DURING NOVEMBER FOR UNIT 5 AND 6.

12/83	A	30.2	59.2	67.1	19.5						
	B	31.3	60.8	69.0	20.0						
	SYSTEM	30.8	60.0	68.1	19.8			744	245	147	17.9

** PROBLEMS/SOLUTIONS/COMMENTS

FGD SYSTEM OUTAGE TIME DURING DECEMBER WAS DUE IN PART TO THE LOSS OF A LIME FEED LINE AND FROZEN WATER LINES ON THE SLAKERS.

THE UNAVAILABILITY OF THE SLUDGE TREATMENT FACILITY CONTRIBUTED TO FGD SYSTEM DOWN TIME DURING THE MONTH.

A LOCALIZED ABSORBER RUBBER LINER FAILURE ALSO CONTRIBUTED TO FGD SYSTEM OUTAGE TIME DURING DECEMBER.

1/84	A	94.1	87.8	89.7	46.6						
	B	98.1	95.4	97.4	50.7						
	SYSTEM	96.1	91.6	93.5	48.7			744	395	362	35.0

** PROBLEMS/SOLUTIONS/COMMENTS

ABSORBER RUBBER LININGS WERE REPAIRED DURING THE MONTH.

MIST ELIMINATOR AND RECYCLE SPRAY NOZZLES WERE CLEANED DURING JANUARY.

A POWER SUPPLY FAILURE AND COMPUTER-RELATED PROBLEMS ACCOUNTED FOR OUTAGE TIME IN JANUARY.

2/84	5A	98.9	70.4	81.3	20.5						
	5B	96.0	68.5	79.0	20.0						
	SYSTEM	97.4	69.5	80.1	20.3			696	203	141	17.5

** PROBLEMS/SOLUTIONS/COMMENTS

POOR LIME QUALITY ACCOUNTED FOR OUTAGE TIME DURING FEBRUARY.

A POWER FAILURE AT THE SLUDGE TREATMENT PLANT CONTRIBUTED TO DOWN TIME.

ABSORBER LINER FAILURE ACCOUNTED FOR ADDITIONAL OUTAGE TIME IN FEBRUARY.

3/84	A	98.3	96.4	98.0	85.8						
	B	99.6	97.9	99.5	87.1						
	SYSTEM	98.9	97.1	98.8	86.4			744	662	643	64.4

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS OUT OF SERVICE 14 HOURS DUE TO FAULTY DAMPERS.									
		RECYCLE TANK AGITATOR PROBLEMS WERE REPORTED DURING MARCH.									
4/84	5A	100.0	99.0	100.0	72.4						
	5B	98.5	97.0	97.9	70.8						
	SYSTEM	99.2	98.0	98.9	71.6			720	526	516	51.0
5/84	5A	99.9	99.7	99.7	79.6						
	5B	99.6	99.5	99.5	79.4						
	SYSTEM	99.7	99.6	99.6	79.5			744	594	592	58.0
6/84	5A	98.3	96.6	97.9	81.8						
	5B	99.3	97.9	99.3	82.9						
	SYSTEM	98.8	97.3	98.6	82.3			720	609	593	55.5
7/84	5A	93.5	96.7	99.3	36.4						
	5B	93.5	96.7	99.3	36.4						
	SYSTEM	93.5	96.7	99.3	36.4			744	280	271	24.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF APRIL THROUGH JULY, 1984.									
8/84	A	99.5	97.9	99.3	75.9						
	B	100.0	98.6	100.0	76.5						
	SYSTEM	99.7	98.3	99.6	76.2			744	577	567	53.0
9/84	A	96.1	99.0	99.2	54.4						
	B	100.0	99.7	100.0	54.9						
	SYSTEM	98.1	99.4	99.6	54.7			720	396	394	36.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF AUGUST AND SEPTEMBER.									
10/84	A	46.2	95.2	100.0	29.4						
	B	46.2	95.2	100.0	29.4						
	SYSTEM	46.2	95.2	100.0	29.4			744	230	219	19.0
11/84	A	33.8	100.0	100.0	6.3						
	B	32.2	100.0	100.0	6.3						
	SYSTEM	33.0	100.0	100.0	6.3			720	45	45	3.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS DOWN MOST OF OCTOBER AND NOVEMBER FOR AN ANNUAL MAINTAINENCE OUTAGE.									
12/84	A	100.0	100.0	100.0	49.3						
	B	98.8	99.2	95.9	47.3						
	SYSTEM	99.4	99.6	98.0	48.3			744	355	350	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF DECEMBER.									

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/85	5A	100.0	100.0	100.0	70.4						
	5B	100.0	100.0	100.0	70.4						
	SYSTEM	100.0	100.0	100.0	70.4			744	514	524	52.0
2/85	5A	100.0	100.0	100.0	100.0						
	5B	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			672	672	672	66.0
3/85	5A	99.9	100.0	99.8	81.6						
	5B	97.8	98.2	97.5	79.7						
	SYSTEM	98.9	99.1	98.7	80.6			744	604	600	54.0
4/85	5A	99.7	98.9	99.7	91.1						
	5B	99.9	98.6	99.4	90.8						
	SYSTEM	99.8	98.8	99.5	91.0			720	663	655	65.0
5/85	5A	99.9	100.0	98.3	63.7						
	5B	100.0	100.0	93.4	60.5						
	SYSTEM	99.9	100.0	95.9	62.1			744	422	462	39.0

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTHS OF JANUARY THROUGH MAY.

6/85	5A	100.0	100.0	100.0	29.3						
	5B	86.5	100.0	100.0	29.3						
	SYSTEM	93.3	100.0	100.0	29.3			720	211	211	21.3

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 5B WAS OUT OF SERVICE FOR A SHORT TIME DURING THE MONTH AS A RESULT OF A PIPING RUBBER LINING FAILURE.

7/85	5A	100.0	98.0	100.0	59.7						
	5B	100.0	98.0	100.0	59.7						
	SYSTEM	100.0	98.0	100.0	59.7			744	453	444	38.2
8/85	5A	99.1	98.7	99.0	92.3						
	5B	99.1	98.7	99.0	92.3						
	SYSTEM	99.1	98.7	99.0	92.3			744	696	687	63.9
9/85	5A	99.6	99.8	100.0	72.9						
	5B	99.6	98.5	98.7	71.9						
	SYSTEM	99.6	99.1	99.3	72.4			720	526	522	43.1
10/85	5A	100.0	98.4	100.0	65.2						
	5B	99.7	97.4	99.0	64.5						
	SYSTEM	99.9	97.9	99.5	64.9			744	493	482	44.1
11/85	5A	100.0	100.0	100.0	90.1						
	5B	100.0	100.0	100.0	90.1						
	SYSTEM	100.0	100.0	100.0	90.1			720	649	649	56.7
12/85	5A	94.5	98.4	99.8	64.7						
	5B	94.5	98.2	99.6	64.5						
	SYSTEM	94.5	98.3	99.7	64.6			744	489	480	40.1

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED BY THE UTILITY FOR THE MONTHS OF JULY THROUGH DECEMBER.

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/86	5A	100.0	100.0	99.7	16.1						
	5B	90.9	100.0	99.7	16.1						
	SYSTEM	95.4	100.0	99.7	16.1			744	107	120	9.0
2/86	5A	100.0	100.0	99.6	86.1						
	5B	100.0	100.0	99.9	86.4						
	SYSTEM	100.0	100.0	99.8	86.2			672	574	580	56.7

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF JANUARY OR FEBRUARY.

3/86	5A	97.8	100.0	100.0	81.7						
	5B	88.7	90.1	89.1	72.5						
	SYSTEM	93.3	95.0	94.7	77.1			744	599	574	15.1

** PROBLEMS/SOLUTIONS/COMMENTS

A 5B-MODULE DAMPER FAILURE CAUSED A 68 HOUR SCRUBBER OUTAGE IN MARCH.

4/86	5A	0.0			0.0						
	5B	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	0.0
5/86	5A	9.7			0.0						
	5B	9.7			0.0						
	SYSTEM	9.7			0.0			744	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

A SCHEDULED UNIT 5 OUTAGE BEGAN ON MARCH 31 AND CONTINUED THROUGH MAY 29, 1986.

6/86	5A	97.9	100.0	97.7	76.4						
	5B	99.4	100.0	98.0	76.6						
	SYSTEM	98.7	100.0	97.9	76.5			720	526	551	45.4

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES 5A AND 5B WERE REMOVED FROM SERVICE 12 HOURS FOR ESP TESTS.

7/86	5A	98.5	98.8	98.4	90.7						
	5B	95.7	95.8	95.4	88.0						
	SYSTEM	97.1	97.3	96.9	89.3			744	683	665	49.6
8/86	5A	98.9	100.0	100.0	71.3						
	5B	98.7	100.0	99.7	71.0						
	SYSTEM	98.8	100.0	99.9	71.2			744	518	530	36.0
9/86	5A	100.0	99.0	98.1	83.6						
	5B	98.4	97.1	96.2	82.0						
	SYSTEM	99.2	98.1	97.1	82.8			720	608	596	45.8
10/86	5A	99.9	100.0	99.8	47.6						
	5B	99.9	100.0	99.7	47.5						
	SYSTEM	99.9	100.0	99.7	47.5			744	345	354	26.3

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF APRIL THROUGH OCTOBER 1986.

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/86	5A	100.0	100.0	100.0	8.4						
	5B	98.4	100.0	82.2	6.8						
	SYSTEM	99.2	100.0	91.8	7.6			720	36	55	3.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
	A DAMPER FAILURE ON MODULE 5B FORCED THE FGD SYSTEM OUT OF SERVICE FOR 12 HOURS IN NOVEMBER.										
12/86	5A	100.0	95.8	100.0	27.8						
	5B	100.0	95.7	99.9	27.8						
	SYSTEM	100.0	95.7	100.0	27.8			744	216	207	17.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR DECEMBER.										
1/87	5A	100.0	97.9	100.0	15.1						
	5B	100.0	97.9	100.0	15.1						
	SYSTEM	100.0	97.9	100.0	15.1			744	115	113	8.9
2/87	5A	100.0	99.4	100.0	61.0						
	5B	100.0	99.4	100.0	61.0						
	SYSTEM	100.0	99.4	100.0	61.0			672	412	410	36.0
3/87	5A	100.0	97.8	99.9	67.8						
	5B	100.0	97.8	99.9	67.9						
	SYSTEM	100.0	97.8	99.9	67.9			744	516	505	41.6
4/87	5A	99.5	97.5	99.1	56.2						
	5B	100.0	98.3	100.0	56.7						
	SYSTEM	99.8	97.9	99.6	56.4			720	415	406	34.8
5/87	5A	97.7	96.9	98.3	54.8						
	5B	100.0	98.4	99.9	55.6						
	SYSTEM	98.9	97.6	99.1	55.2			744	421	411	33.5
6/87	5A	100.0	95.1	99.9	57.7						
	5B	100.0	95.1	99.9	57.7						
	SYSTEM	100.0	95.1	99.9	57.7			720	437	415	34.4
7/87	5A	100.0	97.0	100.0	45.3						
	5B	100.0	97.0	100.0	45.3						
	SYSTEM	100.0	97.0	100.0	45.3			744	347	337	28.9
8/87	5A	99.7	98.3	99.6	68.1						
	5B	98.6	96.8	98.1	67.0						
	SYSTEM	99.2	97.5	98.8	67.5			744	515	503	45.1
9/87	5A	100.0	98.3	100.0	32.4						
	5B	100.0	98.5	100.0	32.5						
	SYSTEM	100.0	98.4	100.0	32.5			720	238	234	21.3
10/87	5A	96.3	99.1	99.4	82.4						
	5B	96.5	99.4	99.7	82.6						
	SYSTEM	96.4	99.3	99.5	82.5			744	619	614	53.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE PERIOD JANUARY THROUGH OCTOBER 1987.										
11/87	5A	0.0			0.0						

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	5B	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	0.0
12/87	5A	58.1	98.8	100.0	25.4						
	5B	58.1	98.8	100.0	25.4						
	SYSTEM	58.1	98.8	100.0	25.4			744	191	189	10.9

** PROBLEMS/SOLUTIONS/COMMENTS

A SCHEDULED UNIT 5 OUTAGE BEGAN IN NOVEMBER AND EXTENDED THROUGH DECEMBER.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COLUMBUS & SOUTHERN OHIO ELEC	
PLANT NAME	CONESVILLE	
UNIT NUMBER	6	
CITY	CONESVILLE	
STATE	OHIO	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(0.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1885	
GROSS UNIT GENERATING CAPACITY - MW	405	
NET UNIT GENERATING CAPACITY W/FGD - MW	375	
NET UNIT GENERATING CAPACITY WO/FGD - MW	382	
EQUIVALENT SCRUBBED CAPACITY - MW	350	

** UNIT DATA - BOILER AND STACK

BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	CYCLING	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	596.95	(1265000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	146.7	(296 F)
STACK HEIGHT - M	244.	(800 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	7.9	(26.0 FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25237.	(10850 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10000-12000
AVERAGE ASH CONTENT - %	14.90	
RANGE ASH CONTENT - %	10.0-24.0	
AVERAGE MOISTURE CONTENT - %	7.50	
RANGE MOISTURE CONTENT - %	5.0-18.0	
AVERAGE SULFUR CONTENT - %	4.50	
RANGE SULFUR CONTENT - %	4.2-5.1	
AVERAGE CHLORIDE CONTENT - %	0.01	
RANGE CHLORIDE CONTENT - %	0.01-0.11	

*** PARTICLE CONTROL

** MECHANICAL COLLECTOR

NUMBER	0
TYPE	NONE

** ESP

NUMBER	1	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	657.8	(1393893 ACFM)
INLET FLUE GAS TEMPERATURE - C	146.7	(296 F)
PRESSURE DROP - KPA	0.5	(2. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.6	

** PARTICLE SCRUBBER

NUMBER	0
GENERIC TYPE	NONE
SPECIFIC TYPE	N/A
TRADE NAME/COMMON NAME	N/A
SHELL GENERIC MATERIAL	N/A
SHELL SPECIFIC MATERIAL	N/A
LINER GENERIC MATERIAL	N/A
LINER SPECIFIC MATERIAL	N/A
GAS CONTACTING DEVICE TYPE	N/A

*** FGD SYSTEM

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

** GENERAL DATA			
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT		
SO2 REMOVAL MODE	WET SCRUBBING		
PROCESS TYPE	LIME		
PROCESS ADDITIVES	MAGNESIUM OXIDE		
SYSTEM SUPPLIER	AIR CORRECTION DIVISION, UOP		
A-E FIRM	BLACK & VEATCH		
DEVELOPMENT LEVEL	FULL SCALE		
NEW/RETROFIT	NEW		
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.65		
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	89.50		
ENERGY CONSUMPTION - %	1.7		
CURRENT STATUS	1		
COMMERCIAL START-UP	7/1978		
INITIAL START-UP	6/1978		
CONTRACT AWARDED	10/1974		
** DESIGN AND OPERATING PARAMETERS			
DESIGN CHLORIDE CONTENT - %	********		
OPER. & MAINT. REQUIREMENT - MANHR/DAY	280.0		
** QUENCHER/PRESATURATOR			
NUMBER	2		
TYPE	SPRAY CHAMBER		
SUPPLIER	AIR CORRECTION DIVISION, UOP		
INLET GAS TEMPERATURE - C	141.1	(286 F)	
L/G RATIO - L/CU. M	0.1	(0.6 GAL/1000 ACFM)	
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY		
CONSTRUCTION MATERIAL SPECIFIC TYPE	IRON BASE/NICKEL-CHROMIUM-COPPER-MOLYBDENUM		
** ABSORBER			
NUMBER	2		
NUMBER OF SPARES	0		
GENERIC TYPE	PACKED TOWER		
SPECIFIC TYPE	MOBILE BED PACKING		
TRADE NAME/COMMON TYPE	TURBULENT CONTACT ABSORBER		
SUPPLIER	AIR CORRECTION DIVISION, UOP		
DIMENSIONS - FT	45.0 X 17.5 X 79.5		
SHELL GENERIC MATERIAL	CARBON STEEL		
SHELL SPECIFIC MATERIAL	AISI 1110		
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A		
LINER GENERIC MATERIAL	ORGANIC		
LINER SPECIFIC MATERIAL	SYNTHETIC RUBBER		
LINER MATERIAL TRADE NAME/COMMON TYPE	NEOPRENE LS-576		
GAS CONTACTING DEVICE TYPE	GRID CAGES		
NUMBER OF CONTACTING ZONES	1		
LIQUID RECIRCULATION RATE - LITER/S	1988.	(31560 GPM)	
L/G RATIO - L/CU.M	6.6	(49.3 GAL/1000 ACF)	
GAS-SIDE PRESSURE DROP - KPA	2.0	(8.1 IN-H2O)	
SUPERFICAL GAS VELOCITY - M/SEC	4.0	(13.1 FT/S)	
INLET GAS FLOW - CU. M/S	301.81	(639568 ACFM)	
INLET GAS TEMPERATURE - C	51.7	(125 F)	
SO2 REMOVAL EFFICIENCY - %	92.0		
PARTICLE REMOVAL EFFICENCY - %	99.6		
** MIST ELIMINATOR			
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR		
NUMBER PER SYSTEM	2		
NUMBER OF SPARES PER SYSTEM	0		
NUMBER PER MODULE	1		
GENERIC TYPE	IMPINGEMENT		
SPECIFIC TYPE	BAFFLE		
TRADE NAME/COMMON TYPE	CLOSED VANE		
CONFIGURATION	HORIZONTAL		
NUMBER OF STAGES	2		
NUMBER OF PASSES PER STAGE	4		
FREEBOARD DISTANCE - M	3.05	(10.0 FT)	
DISTANCE BETWEEN STAGES - CM	11.43	(4.5 IN)	
DISTANCE BETWEEN VANES - CM	5.1	(2.00 IN)	
VANE ANGLES - DEGREES	90		

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PRESSURE DROP - KPA	0.5	(1.9 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	RECLAIMED	
WASH FREQUENCY	CONTINUOUS	
WASH RATE - L/S	63.1	(1000 GAL/MIN)

** REHEATER

GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	N/A	
CONSTRUCTION MATERIAL SPECIFIC TYPE	N/A	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FAN	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	401.11	(850000 ACFM)
FLUE GAS TEMPERATURE - C	146.7	(296 F)
PRESSURE DROP - KPA	0.6	(2.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	GUILLOTINE & LOUVER
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	INLET
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	OUTLET TO DAMPER
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

** DUCTWORK	
LOCATION	OUTLET BEYOND DAMPER
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!
LINER GENERIC MATERIAL TYPE	INORGANIC
LINER SPECIFIC MATERIAL TYPE	CHEMICALLY-BONDED CONCRETE
** DUCTWORK	
LOCATION	BYPASS
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	PASTE
DEVICE TYPE	N/A
MANUFACTURER	WALLACE & TIERNAN
NUMBER	5

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	2
RECLAIMED WATER	1
REAGENT PREP PRODUCT	2
MIST ELIMINATOR WASH	2

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	10
LIME SLURRY TRANSFER	2
SLURRY MAKEUP	3
RECYCLE TANK DRAWOFF	4
MIST ELIMINATOR WASH	4
RECLAIM WATER	2
THICKENER UNDERFLOW	****

** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	VACUUM FILTER
NUMBER	3
NUMBER OF SPARES	1
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
BELT GENERIC MATERIAL TYPE	ORGANIC
BELT SPECIFIC MATERIAL TYPE	POLYPROPYLENE
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	30% SOLIDS
OUTLET STREAM CHARACTERISTICS	50% SOLIDS
OUTLET STREAM DISPOSITION	TO IUCS PROCESS
OVERFLOW STREAM DISPOSITION	TO RECLAIMED WATER TANK
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER	2
NUMBER OF SPARES	0
DIMENSIONS - FT	145.0 DIA X 16.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	EPOXY
FEED STREAM SOURCE	ABSORBER BLEED
FEED STREAM CHARACTERISTICS	7-12% SOLIDS
OUTLET STREAM CHARACTERISTICS	30% SOLIDS
OUTLET STREAM DISPOSITION	TO IUCS THICKENER & THEN TO VACUUM FILTER
OVERFLOW STREAM DISPOSITION	TO RECLAIMED WATER TANK

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT

METHOD	FIXATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!
INLET QUALITY - %	50.0

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE/CONVEYED
SITE TREATMENT	NONE
SITE DIMENSIONS	80 ACRES/50 FT

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	RECYCLE TANK LEVEL
CONTROL LEVELS	OUTLET PH 5.5-6.3; RECYCLE PH 7.0-7.5
MONITOR LOCATION	SLURRY DISCHARGE FROM MODULE
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	CLOSED
MAKEUP WATER ADDITION - LITERS/S	31.5 (500 GPM)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIME
PRINCIPAL CONSTITUENT	90-95% CAO, 3-8% MGO
SOURCE/SUPPLIER	DRAVO
CONSUMPTION	16 TPH
UTILIZATION - %	90.0
POINT OF ADDITION	SLAKER

** FGD SPARE CAPACITY INDICES

ABSORBER - %	0.0

** FGD SPARE COMPONENT INDICES

ABSORBER	0.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/78	A	56.0	49.0	51.0	42.0						
	B	44.0	33.0	34.0	30.0						
	SYSTEM	50.0	41.0	42.5	36.0			720	524	174	

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATIONS OF THE CONESVILLE 6 FGD SYSTEM BEGAN IN JUNE.

CONTROL OF THE LOUVERED DAMPER OF THE BYPASS SYSTEM WAS LOST. THE RESULT WAS BACK PRESSURE BUILDUP THAT AUTOMATICALLY SHUT DOWN THE BOILER.

SCRUBBER CONTROLS WERE NOT OPERATING PROPERLY AND NEEDED ADJUSTMENT.

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/78	A	83.0	37.0	63.0	25.0						
	B	70.0	19.0	33.0	13.0						
	SYSTEM	76.5	28.0	48.0	19.0			744	502	141	

** PROBLEMS/SOLUTIONS/COMMENTS

THE LOUVERED DAMPER PROBLEM CONTINUED.

THE FRP TRANSFER LINE FROM THE THICKENER TO THE IUCS SYSTEM RUPTURED AS A RESULT OF WATER HAMMER IN THE LINE AND HAD TO BE REPAIRED.

8/78	A	47.0	50.0	66.0	43.0						
	B	62.0	60.0	81.0	52.0						
	SYSTEM	54.5	55.0	73.5	47.5			744	642	354	

** PROBLEMS/SOLUTIONS/COMMENTS

PROBLEMS WERE ENCOUNTERED WITH THE SLUDGE LINE. THE UTILITY REPORTED THAT THIS IS TYPICALLY A HIGH MAINTENANCE AREA.

PROBLEMS WERE ENCOUNTERED WITH THE BYPASS CONTROL DAMPERS. THE UTILITY REPORTED THAT THIS IS TYPICALLY A HIGH MAINTENANCE AREA.

9/78	A	55.0	50.0	53.0	49.0						
	B	69.0	55.0	57.0	54.0						
	SYSTEM	62.0	52.5	55.0	51.5			720	706	372	

** PROBLEMS/SOLUTIONS/COMMENTS

A PROBLEM AREA WAS THE PLUGGING OF THE LIME SLURRY FEED LINES.

BYPASS DAMPER CONTROL PROBLEMS CONTINUED THROUGH SEPTEMBER.

10/78	A	98.0	29.0	30.0	24.0						
	B	37.0	35.0	36.0	29.0						
	SYSTEM	67.5	32.0	33.0	26.5			744	603	199	

** PROBLEMS/SOLUTIONS/COMMENTS

PROBLEMS WITH DAMPER SEALS AND GUIDEBARS WERE ENCOUNTERED. THE UTILITY PLANS TO REPLACE THEM DURING THE NEXT BOILER OUTAGE.

11/78	A	26.0	3.0	3.0	2.0						
	B	26.0	9.0	9.0	8.0						
	SYSTEM	26.0	6.0	6.0	5.0			720	600	36	

** PROBLEMS/SOLUTIONS/COMMENTS

LIME TRANSFER BAGHOUSE SHAKER PROBLEMS WERE EXPERIENCED.

THE THICKENER RAKE MOTOR BURNED OUT AND HAD TO BE REWOUND.

12/78	A	34.8	26.3	26.8	24.2						
	B	26.6	19.0	19.3	17.5						
	SYSTEM	30.7	22.6	23.0	20.8			744	672	155	
1/79	A	5.0	2.0	2.0	2.0						
	B	0.0	0.0	0.0	0.0						
	SYSTEM	2.5	1.0	1.0	1.0			744	730	8	

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FREEZE UPS WERE A SERIOUS PROBLEM DURING THE DECEMBER-JANUARY PERIOD.									
2/79	SYSTEM	0.0	0.0	0.0	0.0			672	629	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM DID NOT OPERATE DURING FEBRUARY DUE TO SEVERE WINTER WEATHE CAUSING SYSTEM FREEZE UPS.									
3/79	A	43.0	37.0	39.0	33.0						
	B	32.0	28.0	29.0	25.0						
	SYSTEM	37.5	32.5	34.0	29.0			744	664	216	
4/79	A	82.0	79.0	79.0	78.0						
	B	72.0	59.0	59.0	58.0						
	SYSTEM	77.0	69.0	69.0	68.0			720	711	489	
5/79	SYSTEM	100.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		REPAIRS WERE MADE TO THE SEAL BETWEEN THE THICKENER BASE AND SIDEWALL.									
		THE BOILER DID NOT OPERATE DURING MAY DUE TO A SCHEDULED ANNUAL OUTAGE.									
6/79	A	43.0	37.0	39.0	27.0						
	B	49.0	49.0	52.0	31.0						
	SYSTEM	46.0	43.0	45.5	29.0			720	433	209	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FLYASH CONVEYING PROBLEMS RESULTED IN ABOUT A TWO DAY OUTAGE.									
		PLUGGED PH LINES WERE A PROBLEM DURING THIS PERIOD.									
7/79	A	83.9	29.5	29.7	22.0						
	B	88.7	41.2	41.4	30.8						
	SYSTEM	86.3	35.4	35.6	26.4			744	554	196	
8/79	A	76.2	40.8	40.8	40.8						
	B	77.6	42.6	42.6	42.6						
	SYSTEM	76.9	41.7	41.7	41.7			744	744	310	
9/79	A	87.6	58.5	57.4	54.4						
	B	86.5	55.5	56.2	53.3						
	SYSTEM	87.0	57.0	56.8	53.9			720	681	388	
10/79	A	75.9	66.2	66.5	63.3						
	B	43.1	23.6	23.7	22.6						
	SYSTEM	59.5	44.9	45.1	43.0			744	713	320	
11/79	A	67.0	58.0	58.0	48.0						
	B	52.0	49.0	49.0	41.0						
	SYSTEM	59.5	53.5	53.5	44.5			720	599	320	
12/79	A	84.0	76.0	76.0	76.0						
	B	91.0	87.0	87.0	87.0						
	SYSTEM	87.5	81.5	81.5	81.5			744	744	606	

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE LAST HALF OF 1979 THE UNIT EXPERIENCED PROBLEMS WITH THE LIME BLOWER COMPRESSOR MOTOR.									
		CAVITATION WAS SITED IN THE SLUDGE PUMP.									
		THE FLYASH CONVEYOR SYSTEM CAUSED PROBLEMS DURING THE LATTER HALF OF THE YEAR.									
		PLUGGING IN THE REAGENT CIRCULATION SYSTEMS WAS ENCOUNTERED.									
		THERE WERE PROBLEMS WITH THE GUIDE BARS AND SEALS IN THE INLET DAMPER DURING THE LAST HALF OF 1979.									
1/80	A	88.0	74.0	74.0	74.0						
	B	89.0	78.0	78.0	78.0						
	SYSTEM	89.0	76.0	76.0	76.0			744	744	566	73.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD SYSTEM RELATED PROBLEMS WERE REPORTED FOR JANUARY.									
2/80	A	87.0	75.0	78.0	69.0						
	B	92.0	81.0	85.0	75.0						
	SYSTEM	90.0	78.0	82.0	72.0			696	648	503	70.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		IN FEBRUARY, MIST ELIMINATOR NOZZLE PLUGGING OCCURRED CAUSING SOME OUTAGE TIME.									
3/80	A	93.0	69.0	69.0	15.0						
	B	94.0	76.0	76.0	16.0						
	SYSTEM	94.0	73.0	73.0	16.0			744	160	117	17.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WENT DOWN ON MARCH 9 FOR A BOILER/TURBINE INSPECTION AND REMAINED OUT OF SERVICE THROUGH THE END OF THE MONTH.									
4/80	A	98.8	25.6	29.4	11.1						
	B	98.9	54.2	62.1	23.5						
	SYSTEM	98.9	40.1	45.8	17.4			720	312	125	19.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		CONTINUOUS PROBLEMS WITH DAMPERS, PRESATURATOR HOSES, AND NOZZLES ACCOUNTED FOR MOST OF THE APRIL FGD SYSTEM OUTAGES.									
5/80	A	96.9	58.3	63.8	55.0						
	B	96.1	33.8	37.0	31.9						
	SYSTEM	96.5	46.1	50.4	43.4			744	701	323	39.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		CONTROL AND INSTRUMENTATION PROBLEMS THAT DEVELOPED IN MAY WERE RESPONSIBLE FOR SOME FGD SYSTEM OUTAGE TIME.									
6/80	A	97.1	73.6	73.4	73.1						
	B	97.1	50.5	50.3	50.1						
	SYSTEM	97.1	62.1	61.9	61.7			720	715	444	52.5

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE MAJORITY OF THE JUNE FGD SYSTEM OUTAGES WERE A RESULT OF EXTERNAL CAUSES (IUCS DISPOSAL SYSTEM, LOW UNIT DEMAND, SERVICE WATER, ETC.).									
7/80	A	96.0	85.1	85.9	82.7						
	B	99.1	89.1	89.9	86.6						
	SYSTEM	97.5	87.1	87.9	84.6			744	722	630	61.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM EXPERIENCED PROCESS CONTROL PROBLEMS DURING JULY.									
		PROBLEMS WITH LEAKING INLET DAMPER SEALS ALSO OCCURRED DURING JULY.									
8/80	A	90.2	65.4	67.3	30.1						
	B	97.4	85.5	88.0	39.4						
	SYSTEM	93.8	75.5	77.6	34.7			744	343	259	28.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT PROBLEMS WERE ENCOUNTERED WITH THE RECLAIM WATER AND THE RECYCLE SLURRY SYSTEMS DURING AUGUST.									
9/80	A	93.6	88.2	88.5	87.8						
	B	94.2	90.7	91.0	90.3						
	SYSTEM	93.9	89.5	89.8	89.0			720	716	641	72.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE INLET DAMPER SEAL PROBLEM CONTINUED THROUGH AUGUST AND SEPTEMBER.									
		EXTERNAL PROBLEMS WERE EXPERIENCED WITH THE IUCS SYSTEM.									
10/80	A	89.2	72.0	72.6	64.9						
	B	94.1	87.6	88.3	78.9						
	SYSTEM	91.7	79.8	80.5	71.9			744	670	535	57.2
11/80	A	99.6	92.9	91.1	55.4						
	B	98.2	81.5	79.9	48.6						
	SYSTEM	98.9	87.3	85.5	51.9			720	429	374	43.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING OCTOBER AND NOVEMBER.									
12/80	A	86.0	84.0	84.0	84.0						
	B	87.6	76.7	76.7	76.7						
	SYSTEM	86.8	80.3	80.3	80.3			744	744	744	79.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER SYSTEM AVAILABILITY WAS LOW DUE TO NECESSARY REPAIRS TO THE RECLAIM WATER TANK.									
1/81	A	97.6	92.7	92.7	92.7						
	B	98.4	90.5	90.4	90.4						
	SYSTEM	97.9	92.0	91.5	91.5			744	744	681	79.0
2/81	A	89.7	81.0	81.3	74.7						
	B	95.2	89.2	89.6	82.3						
	SYSTEM	92.4	85.0	85.4	78.4			672	620	528	75.4

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY AND FEBRUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.									
3/81	A	74.7	96.6	98.0	58.9						
	B	75.0	97.5	99.0	59.4						
	SYSTEM	74.9	97.0	98.5	59.1			744	453	440	57.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE MAJORITY OF OUTAGE TIME DURING MARCH WAS THE RESULT OF LOW BOILER LOAD OR A LACK OF POWER DEMAND.									
		DURING THE MONTH SOME MINOR PROBLEMS WERE ENCOUNTERED WITH VARIOUS PIECES OF AUXILIARY EQUIPMENT. NO PROBLEMS WERE EXPERIENCED WITH EITHER MODULE.									
4/81	A	53.3	95.0	99.1	31.9						
	B	49.4	100.0	100.0	33.6						
	SYSTEM	51.4	97.5	99.5	32.8			720	242	236	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ON MAY 1, THE UNIT WAS OUT OF SERVICE FOR A SCHEDULED OUTAGE. THE UNIT REMAINED OFF LINE THROUGH MAY 14.									
5/81	A	99.6	100.0	100.0	83.3						
	B	99.6	100.0	100.0	83.3						
	SYSTEM	99.6	100.0	100.0	83.3			744	620	620	
6/81	A	99.2	100.0	100.0	90.0						
	B	99.2	100.0	100.0	90.0						
	SYSTEM	99.2	100.0	100.0	90.0			720	648	648	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR OPERATIONAL PROBLEMS WERE ENCOUNTERED DURING MAY AND JUNE.									
7/81	A	99.6	100.0	100.0	73.9						
	B	99.2	100.0	100.0	73.9						
	SYSTEM	99.4	100.0	100.0	73.9			744	550	550	
8/81	A	99.0	90.0	94.0	74.0						
	B	98.0	89.0	92.0	73.0						
	SYSTEM	98.5	89.5	93.0	73.5			744	607	547	
9/81	A	100.0	85.0	94.0	35.0						
	B	89.0	87.0	97.0	36.0						
	SYSTEM	94.5	86.0	95.5	35.5			720	297	256	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SEVERE OUTLET DUCT CORROSION HAS OCCURRED ON UNIT 6. THE GUNITE LINER HAS FAILED DUE TO INADEQUATE STRENGTH OF THE SUPPORTING MESH. THE UTILITY IS LOOKING INTO INCONEL OR FRP AS A REPLACEMENT LINER.									
		UNIT 6 WAS REMOVED FROM SERVICE ON SEPTEMBER 19 AS A RESULT OF LOW DEMAND. THE UNIT IS NOT EXPECTED TO BE BROUGHT BACK ON LINE UNTIL DECEMBER. THIS OUTAGE PERIOD WILL BE UTILIZED FOR OUTLET DUCTWORK REPAIRS.									
10/81	A	100.0	0.0	0.0	0.0						

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	0.0	0.0	0.0						
	SYSTEM	100.0	0.0	0.0	0.0			744		0	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER MAJOR MODIFICATIONS WERE BEING PERFORMED ON THE BOILER DUCTWORK. THIS INCLUDED REPAIRING THE CORRODED INNER SUPPORTS AND REPLACING THE GUNITE.

11/81	A	27.0	0.0	0.0	0.0						
	B	27.0	0.0	0.0	0.0						
	SYSTEM	27.0	0.0	0.0	0.0			720		0	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER MAJOR MODIFICATION TO THE FGD SYSTEM DUCTWORK WAS PERFORMED. THIS WORK INCLUDED REPAIRING THE CORRODED SUPPORTS AND RECOATING WITH GUNITE.

DURING THE MONTH ADDITIONAL OUTAGE TIME WAS DUE TO GENERAL FGD MAINTENANCE

12/81	A	88.0	83.0	93.0	66.0						
	B	88.0	83.0	93.0	66.0						
	SYSTEM	88.0	83.0	93.0	66.0			744	592	491	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER MISCELLANEOUS EQUIPMENT PROBLEMS WERE ENCOUNTERED.

ALSO DURING THE MONTH OPACITY MONITORS WERE INSTALLED AND TESTED.

1/82	A	100.0	88.0	95.0	70.0						
	B	100.0	88.0	95.0	70.0						
	SYSTEM	100.0	88.0	95.0	70.0			744	592	521	
2/82	A	98.0	87.0	92.0	60.0						
	B	99.0	90.0	90.0	62.0						
	SYSTEM	98.5	88.5	94.0	61.0			672	463	410	
3/82	A	99.0	88.0	91.0	80.0						
	B	99.0	92.0	95.0	83.0						
	SYSTEM	99.0	90.0	93.0	81.5			744	673	606	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1982.

4/82	A	100.0	89.0	96.0	63.0						
	B	100.0	88.0	94.0	62.0						
	SYSTEM	100.0	88.5	95.0	62.5			720	509	450	
5/82	A	100.0	66.0	97.0	23.0						
	B	100.0	66.0	97.0	23.0						
	SYSTEM	100.0	66.0	97.0	23.0			744	259	171	
6/82	A	100.0	86.0	96.0	46.0						
	B	100.0	89.0	99.0	47.0						
	SYSTEM	100.0	87.5	97.5	46.5			720	383	335	

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1982.									
7/82	6A	99.7	92.9	93.7	62.6						
	6B	99.9	95.9	96.8	64.7						
	SYSTEM	99.8	94.4	95.2	63.7			744	502	474	50.2
8/82	6A	99.8	93.9	97.7	72.1						
	6B	100.0	91.9	95.5	70.5						
	SYSTEM	99.9	92.9	96.6	71.3			744	571	530	56.7
9/82	6A	97.2	90.4	91.3	75.3						
	6B	96.5	91.0	91.9	75.8						
	SYSTEM	96.8	90.7	91.6	75.6			720	600	544	64.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF JULY THROUGH SEPTEMBER, 1982.									
10/82	6A	33.3	98.4	100.0	24.7						
	6B	33.0	93.2	94.6	23.4						
	SYSTEM	33.2	95.8	97.3	24.1			744	187	179	17.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 6 WAS OUT OF SERVICE DURING PART OF OCTOBER FOR AN ANNUAL OUTAGE.									
11/82	6A	46.3	81.5	78.3	35.7						
	6B	46.5	76.1	73.0	33.3						
	SYSTEM	46.4	78.8	75.6	34.5			720	315	248	31.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 6 WAS OUT OF SERVICE DURING PART OF NOVEMBER FOR THE ANNUAL OUTAGE.									
12/82	6A	98.0	87.9	88.0	64.5						
	6B	96.9	87.1	87.2	63.9						
	SYSTEM	97.5	87.5	87.6	64.2			744	546	478	58.3
1/83	6A	96.7	88.5	90.6	55.6						
	6B	96.8	88.4	90.5	55.6						
	SYSTEM	96.7	88.4	90.5	55.6			744	468	414	45.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER, 1982 THROUGH JANUARY, 1983.									
2/83	6A	90.9	82.4	85.2	61.5						
	6B	91.4	84.1	87.0	62.8						
	SYSTEM	91.2	83.3	86.1	62.1			672	501	418	45.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PRIOR TO FEBRUARY 16, 1983, THE UTILITY WAS CONSIDERING FGD SYSTEM AVAILABLE TIME TO INCLUDE PERIODS WHEN SCRUBBER MAINTENANCE WAS PERFORMED DURING A UNIT OUTAGE. THE UTILITY NOW CONFORMS TO THE CORRECT DEFINITION OF AVAILABILITY AND CONSIDERS THE SCRUBBER UNAVAILABLE DURING THESE PERIODS.									

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/83	6A	88.8	86.6	87.5	80.2						
	6B	90.2	89.6	90.5	82.9						
	SYSTEM	89.5	88.1	89.0	81.6			744	689	607	61.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MARCH.

4/83	6A	80.4	79.6	80.3	79.6						
	6B	96.3	95.4	96.2	95.4						
	SYSTEM	88.3	87.5	88.2	87.5			720	720	630	67.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY ATTRIBUTED THE VERY GOOD PERFORMANCE OF MODULE 6B DURING APRIL TO PROPER MAINTENANCE PERFORMED AND THE COMPLETION OF ESSENTIAL CHANGES IN THE SCRUBBING SYSTEM DESIGN.

5/83	6A	94.5	80.0	82.4	22.6						
	6B	96.0	85.2	87.7	24.1						
	SYSTEM	95.2	82.6	85.0	23.3			744	210	174	17.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT OUTAGE TIME WAS ATTRIBUTED TO THE CLEANING OF MIST ELIMINATORS DURING MAY.

MAINTENANCE WORK ON MIST ELIMINATOR PUMPS ALSO CAUSED OUTAGE TIME IN MAY.

A 72 HOUR OUTAGE OCCURRED DUE TO A CHEMICAL IMBALANCE OF THE MAKEUP WATER POND. DRAINAGE FROM THE CLEANING OF AN AIR HEATER PRODUCED ACIDIC CONDITIONS IN THE POND.

6/83	6A	95.0	84.0	89.2	28.8						
	6B	96.8	86.9	92.2	29.7						
	SYSTEM	95.9	85.4	90.7	29.2			720	246	211	24.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.

7/83	6A	94.9	86.8	88.9	39.8						
	6B	95.6	88.3	90.4	40.5						
	SYSTEM	95.2	87.5	89.6	40.1			744	341	299	32.0
8/83	6A	87.0	92.4	93.5	73.7						
	6B	91.1	95.1	96.2	75.8						
	SYSTEM	89.0	93.8	94.9	74.7			744	593	556	47.0
9/83	6A	93.3	91.3	92.0	49.6						
	6B	93.2	90.8	91.5	49.3						
	SYSTEM	93.3	91.0	91.8	49.4			720	391	356	33.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF JULY THROUGH SEPTEMBER, 1983.

10/83	6A	98.9	98.9	98.9	61.7						
	6B	99.6	99.8	99.8	62.2						
	SYSTEM	99.3	99.4	99.4	62.0			744	464	461	44.4

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING OCTOBER.									
11/83	6A	76.7	96.1	96.1	51.4						
	6B	76.1	95.1	95.1	50.8						
	SYSTEM	76.4	95.6	95.6	51.1			720	385	368	33.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT ANNUAL OUTAGES OCCURRED DURING NOVEMBER FOR UNIT 5 AND 6.									
12/83	A	38.6	69.8	75.4	31.3						
	B	41.3	75.7	81.9	34.0						
	SYSTEM	39.9	72.8	78.6	32.7			744	334	243	26.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		LOSS OF LINE FEED DUE TO FROZEN WATER LINES ON THE SLAKERS CONTRIBUTED TO FGD SYSTEM DOWN TIME DURING DECEMBER.									
		A MODULE OUTAGE WAS REQUIRED TO CLEAN PLUGGED ABSORBER & MIST ELIMINATOR SPRAY NOZZLES.									
		THE UNAVAILABILITY OF THE SLUDGE TREATMENT FACILITY DURING DECEMBER CONTRIBUTED TO FGD SYSTEM DOWN TIME.									
1/84	A	96.2	93.9	95.2	73.9						
	B	96.8	94.5	95.8	74.5						
	SYSTEM	96.5	94.2	95.5	74.2			744	586	552	54.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PLUGGED RECYCLE, MIST ELIMINATOR AND PRESATURATOR SPRAY NOZZLES CONTRIBUTE TO DOWN TIME IN JANUARY.									
		DAMPER OPERATION FAILURE OCCURRED DURING THE MONTH.									
		COMPUTER-RELATED PROBLEMS WERE ENCOUNTERED DURING JANUARY.									
2/84	6A	95.8	73.8	84.9	23.4						
	6B	79.3	81.0	93.2	25.7						
	SYSTEM	87.6	77.4	89.1	24.6			696	221	171	18.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PROBLEMS WITH PLUGGED SPRAY NOZZLES WERE REPORTED IN THE MIST ELIMINATOR, RECYCLE SYSTEM AND PRESATURATOR.									
		A POWER FAILURE AT THE SLUDGE TREATMENT PLANT OCCURRED DURING THE MONTH.									
		ABSORBER LINER FAILURE WAS REPORTED DURING FEBRUARY.									
3/84	A	99.9	98.1	100.0	57.0						
	B	75.4	93.1	94.8	54.0						
	SYSTEM	87.6	95.6	97.4	55.5			744	432	413	40.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PRESATURATOR PLUGGAGE ACCOUNTED FOR 8 HOURS OF OUTAGE TIME IN MARCH.									
		COMPUTER-RELATED PROBLEMS WERE REPORTED DURING MARCH.									

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			ABSORBER LINER FAILURE RESULTED IN 5 HRS. OF DOWN TIME IN MARCH.								
			THE UTILITY REPORTED THAT MODULE B WAS UNAVAILABLE 160 HOURS DUE TO DAMPER FAILURE.								
4/84	6A	100.0	99.8	100.0	59.0						
	6B	100.0	99.8	100.0	59.0						
	SYSTEM	100.0	99.8	100.0	59.0			720	426	425	40.5
5/84	6A	100.0	99.0	100.0	41.9						
	6B	99.9	99.0	100.0	41.9						
	SYSTEM	99.9	99.0	100.0	41.9			744	315	312	32.0
6/84	6A	100.0	97.6	100.0	60.6						
	6B	100.0	97.6	100.0	60.6						
	SYSTEM	100.0	97.6	100.0	60.6			720	447	436	44.5
7/84	6A	99.7	97.1	99.4	57.2						
	6B	99.7	97.1	99.4	57.2						
	SYSTEM	99.7	97.1	99.4	57.2			744	438	426	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF APRIL THROUGH JULY, 1984.								
8/84	A	100.0	95.2	100.0	80.5						
	B	100.0	95.2	100.0	80.5						
	SYSTEM	100.0	95.2	100.0	80.5			744	629	599	56.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF AUGUST.								
9/84	A	73.3	100.0	100.0	62.1						
	B	73.1	100.0	100.0	62.1						
	SYSTEM	73.2	100.0	100.0	62.1			720	447	447	40.0
10/84	A	12.9	100.0	100.0	11.2						
	B	12.9	100.0	100.0	11.2						
	SYSTEM	12.9	100.0	100.0	11.2			744	83	83	8.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT THE UNIT WAS DOWN MOST OF SEPTEMBER AND OCTOBER FOR AN ANNUAL MAINTAINENCE OUTAGE.								
11/84	A	100.0	99.8	99.8	56.5						
	B	99.9	99.5	99.5	56.4						
	SYSTEM	99.9	99.6	99.6	56.5			720	408	406	41.0
12/84	A	99.7	100.0	99.5	53.2						
	B	99.7	100.0	99.5	53.2						
	SYSTEM	99.7	100.0	99.5	53.2			744	388	396	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF NOVEMBER AND DECEMBER.								
1/85	6A	100.0	100.0	100.0	97.7						
	6B	100.0	100.0	100.0	97.7						
	SYSTEM	100.0	100.0	100.0	97.7			744	717	727	72.0

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/85	6A	100.0	100.0	100.0	65.2						
	6B	99.4	100.0	99.1	64.6						
	SYSTEM	99.7	100.0	99.5	64.9			672	423	436	43.0
3/85	6A	99.9	100.0	99.9	90.6						
	6B	100.0	100.0	100.0	90.7						
	SYSTEM	99.9	100.0	99.9	90.7			744	667	675	63.0
4/85	6A	100.0	99.3	99.8	92.1						
	6B	100.0	99.1	99.7	91.9						
	SYSTEM	100.0	99.2	99.8	92.0			720	668	662	67.0
5/85	6A	100.0	100.0	100.0	91.3						
	6B	100.0	100.0	99.9	91.1						
	SYSTEM	100.0	100.0	99.9	91.2			744	668	678	66.0
6/85	6A	99.2	97.1	98.4	60.0						
	6B	100.0	98.7	100.0	61.0						
	SYSTEM	99.6	97.9	99.2	60.5			720	445	436	41.3
7/85	6A	99.9	99.4	99.8	62.6						
	6B	100.0	99.4	99.8	62.6						
	SYSTEM	99.9	99.4	99.8	62.6			744	469	466	41.9
8/85	6A	98.9	97.8	98.6	76.6						
	6B	98.9	97.8	98.6	76.6						
	SYSTEM	98.9	97.8	98.6	76.6			744	583	570	51.6
9/85	6A	100.0	99.2	100.0	70.4						
	6B	100.0	99.2	100.0	70.4						
	SYSTEM	100.0	99.2	100.0	70.4			720	511	507	42.7
10/85	6A	100.0	99.5	100.0	57.3						
	6B	100.0	99.5	100.0	57.3						
	SYSTEM	100.0	99.5	100.0	57.3			744	428	426	38.9
11/85	6A	100.0	99.5	100.0	85.8						
	6B	100.0	99.4	99.8	85.7						
	SYSTEM	100.0	99.4	99.9	85.8			720	621	617	55.5
12/85	6A	98.7	99.4	100.0	68.0						
	6B	98.7	99.4	100.0	68.0						
	SYSTEM	98.7	99.4	100.0	68.0			744	509	506	44.0

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED BY THE UTILITY DURING THE MONTHS OF JANUARY THROUGH DECEMBER.

1/86	6A	78.0	79.8	100.0	32.8						
	6B	100.0	100.0	100.0	44.8						
	SYSTEM	89.0	89.9	86.7	38.8			744	306	289	24.3
2/86	6A	92.9	95.8	92.1	56.9						
	6B	95.3	95.7	92.0	56.9						
	SYSTEM	94.1	95.8	92.0	56.9			672	399	382	38.3

** PROBLEMS/SOLUTIONS/COMMENTS

PIPING PROBLEMS FORCED THE FGD SYSTEM OUT OF SERVICE 16 HOURS DURING THE MONTH.

THE FGD SYSTEM WAS FORCED OUT OF SERVICE 164 HOURS IN JANUARY AND 16 HOURS

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			IN EARLY FEBRUARY FOR MODULE 6A DAMPER PROBLEMS.								
3/86	6A	30.1	100.0	100.0	22.6						
	6B	30.1	100.0	99.9	22.6						
	SYSTEM	30.1	100.0	99.9	22.6			744	167	168	49.2
4/86	6A	46.3	100.0	100.0	22.8						
	6B	46.1	100.0	100.0	22.7						
	SYSTEM	46.2	100.0	100.0	22.8			720	145	164	7.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES 6A AND 6B WERE OUT OF SERVICE WITH THE UNIT FOR A SCHEDULED UNIT ANNUAL OUTAGE OVER THE MARCH 10 THROUGH APRIL 17 PERIOD.									
5/86	6A	100.0	100.0	100.0	40.6						
	6B	100.0	100.0	100.0	40.5						
	SYSTEM	100.0	100.0	100.0	40.5			744	266	302	14.8
6/86	6A	99.9	100.0	100.0	80.2						
	6B	99.9	100.0	100.0	80.2						
	SYSTEM	99.9	100.0	100.0	80.2			720	561	577	37.3
7/86	6A	99.9	100.0	99.9	83.3						
	6B	99.9	100.0	99.9	83.3						
	SYSTEM	99.9	100.0	99.9	83.3			744	614	620	48.2
8/86	6A	100.0	100.0	100.0	61.7						
	6B	100.0	100.0	100.0	61.8						
	SYSTEM	100.0	100.0	100.0	61.8			744	442	460	30.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF MAY THROUGH AUGUST 1986.									
9/86	6A	100.0	100.0	99.1	91.2						
	6B	100.0	97.2	96.4	88.7						
	SYSTEM	100.0	98.6	97.8	90.0			720	657	648	48.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A MODULE 6B DAMPER FAILURE CAUSED AN 11-HOUR FGD SYSTEM OUTAGE.									
		MODULES 6A AND 6B WERE REMOVED FROM SERVICE 63 HOURS FOR ESP TESTS.									
10/86	6A	100.0	100.0	100.0	51.2						
	6B	98.8	100.0	97.8	50.0						
	SYSTEM	99.4	100.0	98.9	50.6			744	326	377	25.5
11/86	6A	100.0	99.5	98.8	76.1						
	6B	100.0	99.5	98.8	76.1						
	SYSTEM	100.0	99.5	98.8	76.1			720	551	548	43.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULES 6A AND 6B WERE REMOVED FROM SERVICE 7.2 HOURS FOR ESP TESTS. NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE OCTOBER THROUGH NOVEMBER PERIOD.									
12/86	6A	100.0	100.0	100.0	75.0						
	6B	99.8	100.0	99.7	74.7						
	SYSTEM	99.9	100.0	100.0	74.8			744	541	557	41.6

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR DECEMBER.									
1/87	6A	100.0	99.2	99.9	71.5						
	6B	100.0	99.2	99.9	71.5						
	SYSTEM	100.0	99.2	99.9	71.5			744	536	532	47.9
2/87	6A	100.0	95.0	99.8	28.4						
	6B	100.0	95.2	100.0	28.5						
	SYSTEM	100.0	95.1	99.9	28.5			672	201	191	14.1
3/87	6A	100.0	99.1	100.0	87.8						
	6B	100.0	99.1	100.0	87.8						
	SYSTEM	100.0	99.1	100.0	87.8			744	660	653	54.5
4/87	6A	100.0	98.9	99.9	83.5						
	6B	100.0	98.9	99.9	83.5						
	SYSTEM	100.0	98.9	99.9	83.5			720	608	601	56.8
5/87	6A	100.0	98.0	99.8	55.1						
	6B	100.0	98.0	99.8	55.1						
	SYSTEM	100.0	98.0	99.8	55.1			744	418	410	36.2
6/87	6A	99.8	97.4	99.4	59.1						
	6B	100.0	97.7	99.7	59.3						
	SYSTEM	99.9	97.6	99.6	59.2			720	437	426	36.4
7/87	6A	97.6	100.0	99.9	40.2						
	6B	97.6	100.0	99.9	40.2						
	SYSTEM	97.6	100.0	99.9	40.2			744	298	299	24.2
8/87	6A	99.9	99.4	99.4	57.9						
	6B	99.9	99.4	99.4	57.9						
	SYSTEM	99.9	99.4	99.4	57.9			744	433	431	28.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE PERIOD JANUARY THROUGH AUGUST 1987.									
9/87	6A	56.6	99.0	99.8	33.2						
	6B	56.6	98.9	99.7	33.2						
	SYSTEM	56.6	98.9	99.8	33.2			720	242	239	20.4
10/87	6A	0.0			0.0						
	6B	0.0			0.0						
	SYSTEM	0.0			0.0			744	0	0	0.0
11/87	6A	30.6	74.1	82.8	13.0						
	6B	24.8	62.9	70.3	11.0						
	SYSTEM	27.7	68.5	76.6	12.0			720	126	86	6.0
12/87	6A	99.5	92.9	96.5	14.1						
	6B	99.8	95.8	99.5	14.6						
	SYSTEM	99.6	94.4	98.0	14.4			744	113	107	7.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A SCHEDULED UNIT 6 OUTAGE BEGAN IN SEPTEMBER AND CONTINUED THROUGH DECEMBER.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COOPERATIVE POWER ASSOCIATION	
PLANT NAME	COAL CREEK	
UNIT NUMBER	1	
CITY	UNDERWOOD	
STATE	NORTH DAKOTA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1100	
GROSS UNIT GENERATING CAPACITY - MW	550	
NET UNIT GENERATING CAPACITY W/FGD - MW	500	
NET UNIT GENERATING CAPACITY WO/FGD - MW	501	
EQUIVALENT SCRUBBED CAPACITY - MW	327	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1038.18	(2200000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	160.0	(320 F)
STACK HEIGHT - M	201.	(658 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	6.7	(22.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	14556.	(6258 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		3068-7660
AVERAGE ASH CONTENT - %	7.14	
RANGE ASH CONTENT - %	3.9-16.0	
AVERAGE MOISTURE CONTENT - %	39.83	
RANGE MOISTURE CONTENT - %	27.8-52.6	
AVERAGE SULFUR CONTENT - %	0.63	
RANGE SULFUR CONTENT - %	0.2-1.4	
AVERAGE CHLORIDE CONTENT - %	0.02	
RANGE CHLORIDE CONTENT - %	0.00-0.08	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	WHEELABRATOR-FRYE	
INLET FLUE GAS CAPACITY - CU.M/S	1090.1	(2310000 ACFM)
INLET FLUE GAS TEMPERATURE - C	160.6	(321 F)
PRESSURE DROP - KPA	0.6	(3. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.5	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME/ALKALINE FLYASH	
PROCESS ADDITIVES	NONE	

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

SYSTEM SUPPLIER	COMBUSTION ENGINEERING	
A-E FIRM	BLACK & VEATCH	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	54.00	
ENERGY CONSUMPTION - %	0.2	
CURRENT STATUS	1	
COMMERCIAL START-UP	8/1979	
INITIAL START-UP	7/1979	
CONTRACT AWARDED	5/1976	
** DESIGN AND OPERATING PARAMETERS		
DESIGN CHLORIDE CONTENT - %	********	
SPACE REQUIREMENTS - SQ M	8091.6	(87100 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	72.0	
** QUENCHER/PRESATURATOR		
NUMBER	0	
** ABSORBER		
NUMBER	4	
NUMBER OF SPARES	0	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	COMBUSTION ENGINEERING	
DIMENSIONS - FT	21.5 WIDE X 20 DEEP X 55 HIGH	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 316L	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1310.	(20790 GPM)
L/G RATIO - L/CU.M	8.0	(60.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.7	(3.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.2	(10.6 FT/S)
INLET GAS FLOW - CU. M/S	163.51	(346500 ACFM)
INLET GAS TEMPERATURE - C	160.6	(321 F)
SO2 REMOVAL EFFICIENCY - %	90.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	4	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	2	
NUMBER OF PASSES PER STAGE	2	
FREEBOARD DISTANCE - M	2.44	(8.0 FT)
DISTANCE BETWEEN STAGES - CM	76.20	(30.0 IN)
DISTANCE BETWEEN VANES - CM	7.6	(3.00 IN)
PRESSURE DROP - KPA	0.1	(0.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	2.7	(8.9 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	COOLING TOWER BLOWDOWN	
WASH FREQUENCY	INTERMITTENT	
WASH RATE - L/S	37.8	(600 GAL/MIN)
** REHEATER		
NUMBER	1	
NUMBER OF SPARES	0	
GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	40.0	
TEMPERATURE INCREASE - C	47.2	(85 F)
INLET FLUE GAS TEMPERATURE - C	57.2	(135 F)
OUTLET FLUE GAS TEMPERATURE - C	98.9	(210 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	4	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FAN	
FUNCTION	BALANCED DRAFT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	163.51	(346500 ACFM)
FLUE GAS TEMPERATURE - C	160.6	(321 F)
PRESSURE DROP - KPA	12.8	(42.0 IN-H20)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	8
FUNCTION	ISOLATION
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	8
FUNCTION	ISOLATION
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	4
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	8
FUNCTION	ISOLATION
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	OUTLET
SHELL GENERIC MATERIAL TYPE	STAINLESS STEEL
SHELL SPECIFIC MATERIAL TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	INLET
SHELL GENERIC MATERIAL TYPE	CARBON STEEL

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	BYPASS
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	PLENUM TO STACK
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	INORGANIC
LINER SPECIFIC MATERIAL TYPE	HYDRAULICALLY-BONDED MORTAR

** REAGENT PREPARATION EQUIPMENT

FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	WALLACE & TIERMAN
NUMBER	2
PRODUCT QUALITY - % SOLIDS	10.0

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	2
FLYASH	****
REAGENT PREP PRODUCT	****

** PUMPS

SERVICE	NUMBER
BLEED STREAM	3
SLURRY FEED	2
REACTION TANK TRANSFER	6

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT

METHOD	BLEED
DEVICE	NR
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	CLAY LINING
SITE DIMENSIONS	400 ACRES
SITE SERVICE LIFE - YRS	35

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH, SO2
PHYSICAL VARIABLES	SOLIDS, LIQUID LEVEL
MONITOR TYPE	UNILOC FOR PH, LEAR-SIEGLER FOR SO2, MOORE FOR S

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

MONITOR LOCATION	REACTION TANK FOR PH
** WATER BALANCE	
WATER LOOP TYPE	OPEN
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	LIME
PRINCIPAL CONSTITUENT	CAO
SOURCE/SUPPLIER	PETE LIEN & SONS, INC.
CONSUMPTION	RAPID CITY, SOUTH DAKOTA
POINT OF ADDITION	SLAKER
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	0.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	0.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER BEGAN OPERATIONS IN MAY 1979. WET TEST RUNS WERE MADE WITH THE SCRUBBERS DURING THE SECOND WEEK OF JULY AND THE SYSTEM WAS OPERATED WITH LIME SLURRY DURING THE THIRD WEEK OF JULY. THE UTILITY BEGAN INITIAL FGD SYSTEM OPERATIONS AS DEFINED BY THE UTILITY (24-HOUR MINIUM PERIOD) ON JULY 19.

8/79	SYSTEM							744			
9/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THIS UNIT STARTED COMMERCIAL OPERATIONS ON AUGUST 1, 1979. SOME MINOR SHAKEDOWN PROBLEMS WERE REPORTED FOR THE AUGUST-SEPTEMBER PERIOD.

10/79	SYSTEM							744	711		
11/79	SYSTEM							720	703		
12/79	SYSTEM							744	719		

** PROBLEMS/SOLUTIONS/COMMENTS

SINCE STARTUP THE UNIT HAS EXPERIENCED NUMEROUS SHAKEDOWN PROBLEMS BOTH BOILER AND FGD SYSTEM-RELATED. AFTER THE NEXT SCHEDULED OUTAGE IN APRIL, THE UTILITY EXPECTS STABLE FGD OPERATIONS TO BE ESTABLISHED.

DURING DECEMBER TWO OF THE EIGHT COAL PULVERIZERS WERE OUT OF SERVICE DUE TO A PRIMARY AIR DUCT EXPLOSION. LITTLE DOWN TIME RESULTED, HOWEVER, THE UNIT HAD TO OPERATE AT A REDUCED LOAD. NO FGD SYSTEM PROBLEMS WERE REPORTED.

1/80	SYSTEM		100.0		96.1			744	715	715	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY TWO MODULES AT A TIME WERE TAKEN OFF-LINE FOR INSPECTION AND CLEANING. SOME CRACKED NOZZLES AND PLUGGING PROBLEMS WERE FOUND DURING THE INSPECTION. THE BOILER WAS OPERATED AT A REDUCED LOAD.

SOME OUTAGE TIME DURING THE MONTH WAS CAUSED BY BOILER-RELATED PROBLEMS.

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

A BOILER TRIP WAS CAUSED BY A TURBINE ELECTRICIAL RELAY ON JANUARY 13.

AN HOUR OF OUTAGE TIME RESULTED FROM A LOSS OF POWER TO THE CONTROL SYSTEM AND AN ABNORMAL BOILER DRUM LEVEL WAS ALSO ENCOUNTERED ON JANUARY 16.

A THREE TO FOUR HOUR OUTAGE WAS SCHEDULED ON JANUARY 27 TO MAKE REPAIRS ON FGD SYSTEM EQUIPMENT.

2/80	SYSTEM				99.9			696	695		

** PROBLEMS/SOLUTIONS/COMMENTS

WHILE THE BOILER WAS OUT OF SERVICE DUE TO ID FAN PROBLEMS CAUSED BY ELECTRICAL GROUNDING, TWO MODULES WERE TAKEN OUT OF SERVICE SO CALIBRATIONS COULD BE DONE.

3/80	SYSTEM		100.0		96.1			744	715	715	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER TRIPS OCCURRED THREE TIMES DURING THE MONTH. ONE TRIP WAS DUE TO THE CUT DOWN OF TRANSMISSION POWER ON MARCH 12.

THE FGD SYSTEM WAS SHUTDOWN WITH THE BOILER FOR FOUR HOURS TO CLEAN THE FILTER ON THE BOILER STATOR COOLING PUMPS.

DURING MARCH STACK EMISSION TESTS WERE UNDERTAKEN. THE SYSTEM OPERATED WITH ONE MODULE DOWN DURING TESTING.

4/80	11	96.7	58.3	100.0	21.4						
	12	100.0	81.7	100.0	30.0						
	13	100.0	96.1	100.0	35.3						
	14	100.0	96.9	100.0	35.6						
	SYSTEM	99.2	83.3	100.0	30.6			720	264	220	26.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OFF LINE FOR APPROXIMATELY 19 DAYS FOR THE ANNUAL UNIT OUTAGE. THE SCRUBBING SYSTEM WAS AVAILABLE DURING THE BOILER OUTAGE.

5/80	11	88.3	68.8	100.0	34.4						
	12	79.3	18.6	100.0	9.3						
	13	91.9	79.6	100.0	39.8						
	14	91.3	35.5	100.0	17.7						
	SYSTEM	87.7	50.6	100.0	25.3			744	372	188	28.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE ANNUAL UNIT OUTAGE WAS COMPLETED IN THE BEGINNING OF THE MONTH. THERE WERE PROBLEMS WITH BOILER STARTUP AFTER THIS OUTAGE CAUSING LOW OPERABILITY OF THE FGD SYSTEM.

6/80	11	92.9	49.3	100.0	49.2						
	12	98.5	47.6	100.0	47.5						
	13	74.7	42.2	100.0	42.1						
	14	93.5	73.0	100.0	72.8						
	SYSTEM	89.9	53.0	100.0	52.9			720	718	381	58.5

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE NO MAJOR PROBLEMS REPORTED DURING JUNE. ROUTINE MAINTENANCE AND REPAIRS WERE DONE THROUGHOUT THE MONTH.

7/80	SYSTEM	100.0	100.0	100.0	87.1			744	648	648	47.1

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		IN JULY, NO PROBLEMS WERE ENCOUNTERED WITH THE FGD SYSTEM.									
8/80	11		24.8		17.5						
	12		43.5		30.6						
	13		42.7		30.1						
	14		78.9		55.6						
	SYSTEM		47.5		33.5			744	525	249	31.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST.									
9/80	SYSTEM		0.0		0.0			720	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT DID NOT OPERATE DURING SEPTEMBER DUE TO A TURBINE BEARING FAILURE									
10/80	11		65.6		13.2						
	12		80.3		16.1						
	13		2.7		0.0						
	14		36.1		7.3						
	SYSTEM		46.2		9.3			744	149	69	12.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MOST OF OCTOBER THE UNIT DID NOT OPERATE DUE TO THE REPAIRS BEING PERFORMED ON THE TURBINE BEARINGS. THE UNIT OPERATED APPROXIMATELY 150 HOURS DURING THE MONTH.									
11/80	11		46.7		45.8						
	12		48.1		47.2						
	13		33.7		33.1						
	14		45.0		44.2						
	SYSTEM		43.4		42.6			720	707	307	30.8
12/80	11		60.6		60.2						
	12		30.3		30.1						
	13		85.0		84.4						
	14		10.0		9.9						
	SYSTEM		46.6		46.2			744	739	344	72.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR PROBLEMS WERE ENCOUNTERED DURING NOVEMBER AND DECEMBER.									
1/81	11	100.0	45.2		45.2						
	12	100.0	46.8		46.8						
	13	100.0	38.7		38.7						
	14	100.0	44.6		44.6						
	SYSTEM	100.0	43.8		43.8			744	744	326	58.3
2/81	11	82.5	57.4		47.5						
	12	82.5	79.1		65.2						
	13	82.5	71.8		59.2						
	14	82.5	1.8		1.5						
	SYSTEM	82.5	52.5		43.3			672	554	291	45.6
3/81	11	47.4	50.4		23.9						

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	12	47.4	73.7		34.9						
	13	47.4	57.8		27.4						
	14	47.4	58.4		29.0						
	SYSTEM	47.4	60.9		28.8			744	353	215	30.7

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 VIBRATION PROBLEMS WERE EXPERIENCED CAUSING FAILURE OF THE REACTION TANK BLADES.

4/81	11	100.0	64.7	100.0	64.7						
	12	100.0	94.7	100.0	94.7						
	13	100.0	36.7	100.0	36.7						
	14	100.0	87.2	100.0	87.2						
	SYSTEM	100.0	70.8	100.0	70.8			720	720	510	68.6
5/81	11	100.0	62.9	100.0	62.9						
	12	100.0	65.6	100.0	65.6						
	13	100.0	31.5	100.0	31.5						
	14	100.0	39.0	100.0	39.0						
	SYSTEM	100.0	49.7	100.0	49.7			744	744	370	68.3
6/81	11	100.0	51.3	100.0	47.2						
	12	100.0	76.9	100.0	70.8						
	13	100.0	15.7	100.0	14.4						
	14	100.0	10.6	100.0	9.7						
	SYSTEM	100.0	38.6	100.0	35.6			720	663	256	57.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

7/81	11		34.3		34.1						
	12		49.9		49.7						
	13		8.9		8.9						
	14		54.8		54.6						
	SYSTEM		37.0		36.8			744	741	274	55.3
8/81	11		41.5		33.3						
	12		46.6		37.4						
	13		8.0		6.5						
	14		84.4		67.7						
	SYSTEM		45.2		36.3			744	597	270	62.9
9/81	SYSTEM				0.0			720	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR OPERATIONAL PROBLEMS WERE REPORTED FOR THE MONTHS OF JULY AND AUGUST. THE UNIT WAS TAKEN OFF LINE IN SEPTEMBER FOR AN ANNUAL OUTAGE.

10/81	11		64.7		17.5						
	12		20.9		5.6						
	13		79.6		21.5						
	14		49.8		13.4						
	SYSTEM		53.7		14.5			744	201	108	18.4
11/81	11		42.0		34.2						
	12		59.4		48.3						
	13		52.2		42.5						
	14		76.2		61.9						
	SYSTEM		57.4		46.7			720	586	336	52.6

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER THE UNIT WAS SHUTDOWN UNTIL THE 24TH FOR AN ANNUAL INSPECTION.									
12/81	11		72.4		54.3						
	12		67.4		50.5						
	13		49.1		36.8						
	14		49.4		37.1						
	SYSTEM		59.5		44.7			744	558	332	48.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		GENERAL MAINTENANCE WAS PERFORMED ON THE FGD SYSTEM DURING THE FOURTH QUARTER. NO FGD FORCED OUTAGES WERE ENCOUNTERED.									
1/82	11	100.0	66.1	100.0	65.9						
	12	100.0	58.3	100.0	58.1						
	13	100.0	73.1	100.0	72.8						
	14	100.0	92.2	100.0	91.9						
	SYSTEM	100.0	72.4	100.0	72.2			744	741	537	81.8
2/82	11	100.0	65.8	100.0	65.8						
	12	100.0	71.3	100.0	71.3						
	13	100.0	82.9	100.0	82.9						
	14	100.0	58.9	100.0	58.9						
	SYSTEM	100.0	69.7	100.0	69.7			672	672	469	76.7
3/82	11	100.0	37.9	100.0	37.9						
	12	100.0	50.0	100.0	50.0						
	13	100.0	39.9	100.0	39.9						
	14	100.0	30.6	100.0	30.6						
	SYSTEM	100.0	39.6	100.0	39.6			744	744	295	71.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR PROBLEMS OR FORCED OUTAGES WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1982.									
4/82	11	100.0	17.0	100.0	16.9						
	12	100.0	15.6	100.0	15.5						
	13	88.0	88.3	100.0	74.0						
	14	72.4	64.7	100.0	64.5						
	SYSTEM	90.1	46.4	100.0	42.7			720	718	308	75.1
5/82	11	100.0	3.7	100.0	3.2						
	12	100.0	13.6	100.0	11.9						
	13	100.0	52.7	100.0	46.2						
	14	100.0	54.4	100.0	47.7						
	SYSTEM	100.0	31.1	100.0	27.2			744	653	203	55.9
6/82	11	74.2	40.6	100.0	37.4						
	12	69.6	22.0	100.0	20.3						
	13	73.3	0.0	100.0	54.3						
	14	76.4	52.8	100.0	48.6						
	SYSTEM	73.4	43.6	100.0	40.1			720	663	289	92.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE SECOND QUARTER 1982 GENERAL MAINTENANCE AND CLEANING OF THE FGD SYSTEM ACCOUNTED FOR ANY UNAVAILABLE TIME.									
7/82	SYSTEM							744			

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1982 THROUGH MARCH 1983

4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1982 THROUGH JUNE 1983.

7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1983.

10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM AT COAL CREEK 1 WAS 100 PERCENT AVAILABLE THROUGHOUT THE FOURTH QUARTER OF 1983.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/84	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	FGD SYSTEM AVAILABILITY FOR THE PERIOD OF JANUARY THROUGH JULY 1984 WAS REPORTED AS 100%.										
8/84	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	DURING THE SCHEDULED OUTAGE IN AUGUST, CORRODING REHEAT DUCTWORK WAS REPLACED WITH 316L STAINLESS STEEL.										
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED REPLACING DETERIORATING MIST ELIMINATOR FIBERGLASS LININGS DURING THE FIRST THREE QUARTERS OF 1984.										
10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT BOILER LOAD WAS REDUCED DUE TO PLUGGED MIST ELIMINATORS AND SPRAY HEADERS. THE PROBLEM DEPOSITS ARE HARD IN NATURE AND ARE BELIEVED TO BE CAUSED BY ALKALINE FLYASH WHICH IS USED AS A SCRUBBING ADDITIVE. THE UTILITY IS PRESENTING TESTING A CRYSTAL GROWTH MODIFIER TO SEE IF THE SCALE CAN BE SOFTENED TO FACILITATE REMOVAL.										
1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THERE WERE NO UNIT/FGD SCHEDULED OR FORCED OUTAGES DURING 1985.									
		THE UTILITY STATED THAT THEY ARE STILL HAVING MIST ELIMINATOR PLUGGING PROBLEMS. THE HARD SCALE DEPOSITION SEEMS TO BE INDUCED BY THEIR FLYASH WHICH IS USED AS A SCRUBBING ADDITIVE. ONGOING SCALE MODIFIER TESTS HAVE PRODUCED MIXED RESULTS. MORE TESTING IS SCHEDULED FOR MAY OF NEXT YEAR. A SINGLE REACTION TANK ON ONE MODULE WILL BE TESTED WITH THE MODIFIER.									
1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THERE WERE NO UNIT/FGD SCHEDULED OR FORCED OUTAGES DURING THE FIRST QUARTER 1986.									
4/86	SYSTEM							720			
5/86	SYSTEM							774			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OFF-LINE DURING THE MONTHS OF APRIL AND MAY FOR A SCHEDULED TURBINE/BOILER OUTAGE. IN ADDITION, THE FRP MIST ELIMINATOR IN A SINGLE MODULE WAS REPLACED BY ONE CONSTRUCTED OF 316L STAINLESS STEEL. THE FRP CONSTRUCTED MIST ELIMINATOR CRACK DURING SCALE REMOVAL									
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO UNIT/FGD OUTAGES WERE ENCOUNTERED DURING THE SECOND HALF OF THE YEAR. THE NOZZLES INSTALLED DURING THE EARLIER PART OF THE YEAR WERE REPORTED TO BE WORKING SUCCESSFULLY. THERE IS LESS MIST ELIMINATOR SCALE WITH THESE NOZZLES AND LESS NOZZLE PLUGGING.									
1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT OPERATED ALL OF 1987. THE UNIT IS SCHEDULED FOR A 2 TO 3 WEEK OUTAGE IN APRIL 1988. NO PROBLEMS WERE REPORTED REGARDING THE FGD SYSTEM EXCEPT FOR HARD SCALE BUILDUP CAUSED BY THE ADDITION OF FLYASH. THE REMAINING BULK ENTRAINMENT SEPARATORS CONSTRUCTED OF 316L STAINLESS STEEL HAVE BEEN INSTALLED.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COOPERATIVE POWER ASSOCIATION	
PLANT NAME	COAL CREEK	
UNIT NUMBER	2	
CITY	UNDERWOOD	
STATE	NORTH DAKOTA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1100	
GROSS UNIT GENERATING CAPACITY - MW	550	
NET UNIT GENERATING CAPACITY W/FGD - MW	500	
NET UNIT GENERATING CAPACITY WO/FGD - MW	501	
EQUIVALENT SCRUBBED CAPACITY - MW	327	

** UNIT DATA - BOILER AND STACK

BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1038.18	(2200000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	160.0	(320 F)
STACK HEIGHT - M	201.	(658 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	6.7	(22.0 FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	14556.	(6258 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		3068-7660
AVERAGE ASH CONTENT - %	7.14	
RANGE ASH CONTENT - %	3.9-16.0	
AVERAGE MOISTURE CONTENT - %	39.83	
RANGE MOISTURE CONTENT - %	27.8-52.6	
AVERAGE SULFUR CONTENT - %	0.63	
RANGE SULFUR CONTENT - %	0.2-1.4	
AVERAGE CHLORIDE CONTENT - %	0.02	
RANGE CHLORIDE CONTENT - %	0.00-0.08	

*** PARTICLE CONTROL

** MECHANICAL COLLECTOR

NUMBER	0	
TYPE	NONE	

** ESP

NUMBER	1	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	WHEELABRATOR-FRYE	
INLET FLUE GAS CAPACITY - CU.M/S	1090.1	(2310000 ACFM)
INLET FLUE GAS TEMPERATURE - C	160.6	(321 F)
PRESSURE DROP - KPA	0.6	(3. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.5	

** PARTICLE SCRUBBER

NUMBER	0
GENERIC TYPE	NONE
SPECIFIC TYPE	N/A
TRADE NAME/COMMON NAME	N/A
SHELL GENERIC MATERIAL	N/A
SHELL SPECIFIC MATERIAL	N/A
LINER GENERIC MATERIAL	N/A
LINER SPECIFIC MATERIAL	N/A
GAS CONTACTING DEVICE TYPE	N/A

*** FGD SYSTEM

COOPERATIVE POWER ASSOCIATION: COAL CREEK 2 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME/ALKALINE FLYASH	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	COMBUSTION ENGINEERING	
A-E FIRM	BLACK & VEATCH	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	54.00	
ENERGY CONSUMPTION - %	0.2	
CURRENT STATUS	1	
COMMERCIAL START-UP	9/1980	
INITIAL START-UP	7/1980	
CONTRACT AWARDED	5/1976	
** DESIGN AND OPERATING PARAMETERS		
DESIGN CHLORIDE CONTENT - %	********	
SPACE REQUIREMENTS - SQ M	8091.6	(87100 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	72.0	
** QUENCHER/PRESATURATOR		
NUMBER	0	
** ABSORBER		
NUMBER	4	
NUMBER OF SPARES	0	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	COMBUSTION ENGINEERING	
DIMENSIONS - FT	21.5 WIDE X 20 DEEP X 55 HIGH	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 316L	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1310.	(20790 GPM)
L/G RATIO - L/CU.M	8.0	(60.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.7	(3.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.2	(10.6 FT/S)
INLET GAS FLOW - CU. M/S	163.51	(346500 ACFM)
INLET GAS TEMPERATURE - C	160.6	(321 F)
SO2 REMOVAL EFFICIENCY - %	90.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	4	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	2	
NUMBER OF PASSES PER STAGE	2	
FREEBOARD DISTANCE - M	2.44	(8.0 FT)
DISTANCE BETWEEN STAGES - CM	76.20	(30.0 IN)
DISTANCE BETWEEN VANES - CM	7.6	(3.00 IN)
PRESSURE DROP - KPA	0.1	(0.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	2.7	(8.9 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	COOLING TOWER BLOWDOWN	
WASH FREQUENCY	INTERMITTENT	
WASH RATE - L/S	37.8	(600 GAL/MIN)

COOPERATIVE POWER ASSOCIATION: COAL CREEK 2 (CONT.)

** REHEATER		
NUMBER	1	
NUMBER OF SPARES	0	
GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	40.0	
TEMPERATURE INCREASE - C	47.2	(85 F)
INLET FLUE GAS TEMPERATURE - C	57.2	(135 F)
OUTLET FLUE GAS TEMPERATURE - C	98.9	(210 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** FANS		
NUMBER	4	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FAN	
FUNCTION	BALANCED DRAFT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	163.51	(346500 ACFM)
FLUE GAS TEMPERATURE - C	160.6	(321 F)
PRESSURE DROP - KPA	12.8	(42.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
** DAMPERS		
NUMBER	8	
FUNCTION	ISOLATION	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	
** DAMPERS		
NUMBER	8	
FUNCTION	ISOLATION	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	
** DAMPERS		
NUMBER	4	
FUNCTION	CONTROL	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	
** DAMPERS		
NUMBER	8	
FUNCTION	ISOLATION	
GENERIC TYPE	LOUVER	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY 'HSLA!	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	
** DUCTWORK		
LOCATION	OUTLET	
SHELL GENERIC MATERIAL TYPE	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL TYPE	AUSTENITIC	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

COOPERATIVE POWER ASSOCIATION: COAL CREEK 2 (CONT.)

** DUCTWORK	
LOCATION	INLET
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	BYPASS
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	PLENUM TO STACK
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	INORGANIC
LINER SPECIFIC MATERIAL TYPE	HYDRAULICALLY-BONDED MORTAR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	WALLACE & TIERMAN
NUMBER	2
PRODUCT QUALITY - % SOLIDS	10.0

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	2
FLYASH	****
REAGENT PREP PRODUCT	****

** PUMPS

SERVICE	NUMBER
BLEED STREAM	3
SLURRY FEED	2
REACTION TANK TRANSFER	6

** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	NONE
*** SALEABLE BYPRODUCTS	
NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT	
METHOD	BLEED
DEVICE	NR
PROPRIETARY PROCESS	N/A
** DISPOSAL	
NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	CLAY LINING
SITE DIMENSIONS	400 ACRES
SITE SERVICE LIFE - YRS	35

COOPERATIVE POWER ASSOCIATION: COAL CREEK 2 (CONT.)

** PROCESS CONTROL AND INSTRUMENTATION	
CHEMICAL PARAMETERS	PH, SO2
PHYSICAL VARIABLES	SOLIDS, LIQUID LEVEL
MONITOR TYPE	UNILOC FOR PH, LEAR-SIEGLER FOR SO2, MOORE FOR S
MONITOR LOCATION	REACTION TANK FOR PH
** WATER BALANCE	
WATER LOOP TYPE	OPEN
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	LIME
PRINCIPAL CONSTITUENT	CAO
SOURCE/SUPPLIER	PETE LIEN & SONS, INC.
CONSUMPTION	RAPID CITY, SOUTH DAKOTA
POINT OF ADDITION	SLAKER
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	0.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	0.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/80	21	61.8	52.4								
	22	18.7	15.9								
	23	25.0	21.2								
	24	52.9	44.9								
	SYSTEM	39.6	33.6					744	631	250	34.5

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATION OF THE FGD SYSTEM BEGAN IN JULY 1980. NO MAJOR START UP PROBLEMS WERE REPORTED.

8/80	21	15.5	11.8								
	22	29.7	22.6								
	23	25.4	19.4								
	24	46.3	35.2								
	SYSTEM	58.5	44.5					744	566	331	36.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM HAS BEEN EXPERIENCING PROBLEMS WITH THE LIME HANDLING CONVEYOR BELT. THIS HAS NOT RESTRICTED OPERATION OF THE SYSTEM; HOWEVER THE UTILITY HAS PLANS TO INSTALL A VIBRATOR CONVEYOR IN JANUARY.

9/80	21	80.2	80.0								
	22	56.8	56.7								
	23	49.0	48.9								
	24	76.9	76.7								
	SYSTEM	65.7	65.6					720	718	472	59.1
10/80	21	92.0	91.7								
	22	86.3	86.0								
	23	22.1	22.0								
	24	70.4	70.2								
	SYSTEM							744	742		70.0
11/80	21	63.1	44.2								
	22	77.0	53.9								
	23	25.0	17.5								
	24	77.8	54.4								
	SYSTEM							720	504		41.0

COOPERATIVE POWER ASSOCIATION: COAL CREEK 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/80	21		58.7		57.5						
	22		51.3		50.3						
	23		22.2		21.8						
	24		89.4		87.6						
	SYSTEM		55.4		54.3			744	730	404	65.2

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR PROBLEMS HAVE BEEN ENCOUNTERED FOR THE MONTHS OF SEPTEMBER THROUGH DECEMBER.

1/81	21	99.8	75.7		75.5						
	22	99.8	37.6		37.5						
	23	99.8	46.3		46.2						
	24	99.8	68.9		68.8						
	SYSTEM	99.8	57.1		57.0			744	743	424	57.2
2/81	21	99.7	72.5		72.5						
	22	99.7	37.9		37.8						
	23	99.7	32.8		32.7						
	24	99.7	82.6		82.4						
	SYSTEM	99.7	56.5		56.4			672	670	379	57.6
3/81	21	55.4	56.3		31.2						
	22	55.4	44.7		24.7						
	23	55.4	27.7		15.3						
	24	55.4	91.3		50.5						
	SYSTEM	55.4	55.1		30.5			744	412	227	39.2

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

ON MARCH 17 THE BOILER WAS TAKEN OUT OF SERVICE FOR A BOILER/TURBINE OVERHAUL, MAINTENANCE AND MODIFICATIONS. THE UNIT WILL BE OUT OF SERVICE FOR APPROXIMATELY TEN WEEKS.

4/81	21	100.0			0.0						
	22	100.0			0.0						
	23	100.0			0.0						
	24	100.0			0.0						
	SYSTEM	100.0			0.0			720	0	0	0.0
5/81	21	100.0			0.0						
	22	100.0			0.0						
	23	100.0			0.0						
	24	100.0			0.0						
	SYSTEM	100.0			0.0			744	0	0	0.0
6/81	21	100.0	26.5	100.0	10.3						
	22	100.0	10.0	100.0	3.9						
	23	100.0	56.6	100.0	21.9						
	24	100.0	18.6	100.0	7.2						
	SYSTEM	100.0	27.9	100.0	10.8			720	279	78	50.3

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT WAS OFF-LINE DUE TO BOILER/TURBINE WARRANTY INSPECTION DURING THE MONTHS OF APRIL, MAY, AND PART OF JUNE.

DURING THE SECOND QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

COOPERATIVE POWER ASSOCIATION: COAL CREEK 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	21		72.5		63.7						
	22		9.5		8.3						
	23		60.6		53.2						
	24		23.9		21.0						
	SYSTEM		41.6		36.6			744	654	272	53.3
8/81	21		44.9		35.5						
	22		34.7		27.4						
	23		55.8		44.1						
	24		38.4		30.4						
	SYSTEM		43.5		34.4			744	588	256	51.0
9/81	21		16.6		16.4						
	22		91.8		90.6						
	23		50.1		49.4						
	24		82.8		81.7						
	SYSTEM		60.4		59.6			720	710	429	69.8

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD-RELATED PROBLEMS WERE REPORTED FOR THE THREE MONTH PERIOD.

10/81	21		54.6		54.6						
	22		86.8		86.8						
	23		76.6		76.6						
	24		85.7		85.7						
	SYSTEM		75.9		75.9			744	744	565	83.6
11/81	21		26.4		26.4						
	22		91.9		91.9						
	23		68.1		68.1						
	24		80.3		80.3						
	SYSTEM		66.7		66.7			720	720	480	67.4
12/81	21		77.2		77.1						
	22		56.2		56.1						
	23		70.8		70.7						
	24		63.3		63.2						
	SYSTEM		66.9		66.8			744	743	497	68.8

** PROBLEMS/SOLUTIONS/COMMENTS

GENERAL MAINTENANCE WAS PERFORMED ON THE FGD SYSTEM DURING THE FOURTH QUARTER. NO FGD FORCED OUTAGES WERE ENCOUNTERED.

1/82	21	100.0	82.4	100.0	82.3						
	22	100.0	54.9	100.0	54.8						
	23	100.0	92.9	100.0	92.7						
	24	100.0	63.0	100.0	62.9						
	SYSTEM	100.0	73.3	100.0	73.2			744	743	545	79.4
2/82	21	100.0	85.9	100.0	85.6						
	22	100.0	65.9	100.0	65.6						
	23	100.0	93.5	100.0	93.2						
	24	100.0	86.2	100.0	85.9						
	SYSTEM	100.0	82.9	100.0	82.6			672	670	555	73.8
3/82	21	100.0	93.6	100.0	88.3						
	22	100.0	61.5	100.0	58.1						
	23	100.0	46.0	100.0	43.4						
	24	100.0	54.3	100.0	51.2						
	SYSTEM	100.0	63.9	100.0	60.3			744	702	448	65.3

COOPERATIVE POWER ASSOCIATION: COAL CREEK 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR PROBLEMS OR FORCED OUTAGES WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1982.									
4/82	21	60.3	60.3	100.0	60.3						
	22	43.5	42.6	100.0	42.6						
	23	95.6	83.2	100.0	83.2						
	24	99.7	86.7	100.0	86.7						
	SYSTEM	74.8	68.2	100.0	68.2			720	720	491	73.1
5/82	21	98.6	72.0	100.0	71.9						
	22	87.2	32.7	100.0	32.7						
	23	64.5	28.0	100.0	27.9						
	24	36.3	7.0	100.0	7.0						
	SYSTEM	71.6	34.9	100.0	34.9			744	743	260	64.9
6/82	21	87.8	39.4	100.0	39.3						
	22	90.3	47.5	100.0	47.4						
	23	100.0	87.3	100.0	87.1						
	24	96.4	53.9	100.0	53.7						
	SYSTEM	93.6	57.0	100.0	56.9			720	718	409	64.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE SECOND QUARTER 1982 GENERAL MAINTENANCE AND CLEANING OF THE FGD SYSTEM ACCOUNTED FOR ANY UNAVAILABLE TIME.									
7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1982 THROUGH MARCH 1983									
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1982 THROUGH JUNE 1983.									
7/83	SYSTEM							744			
8/83	SYSTEM							744			

COOPERATIVE POWER ASSOCIATION: COAL CREEK 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PERFORMANCE DATA PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1983.

10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM AT COAL CREEK 2 WAS 100 PERCENT AVAILABLE THROUGHOUT THE FOURTH QUARTER OF 1983.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SCHEDULED OUTAGE IN MAY, CORRODING REHEAT DUCTWORK WAS REPLACED WITH STAINLESS STEEL.

6/84	SYSTEM							720			
7/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

FGD SYSTEM AVAILABILITY DURING THE PERIOD OF JANUARY THROUGH JULY WAS REPORTED AS 100%.

8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED REPLACING DETERIORATING MIST ELIMINATOR FIBERGLASS LININGS DURING THE FIRST THREE QUARTERS OF 1984.

10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE BOILER LOAD WAS REDUCED DUE TO PLUGGED MIST ELIMINATORS AND SPRAY HEADERS. THE PROBLEM DEPOSITS ARE HARD IN NATURE AND ARE BELIEVED TO BE CAUSED BY ALKALINE FLYASH WHICH IS USED AS A SCRUBBING ADDITIVE. THE UTILITY IS PRESENTING TESTING A CRYSTAL GROWTH

COOPERATIVE POWER ASSOCIATION: COAL CREEK 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							

MODIFIER TO SEE OF THE SCALE CAN BE SOFTENED TO FACILITATE REMOVAL.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THERE WERE NO MAJOR FGD-RELATED FORCED OUTAGES DURING THE YEAR 1985. HOWEVER, THE PLANT WAS DOWN SEPTEMBER 8 THROUGH OCTOBER 10 FOR A SCHEDULED TURBINE/BOILER MAINTENANCE OUTAGE. LIKE UNIT 1, THE SYSTEM IS STILL HAVING MIST ELIMINATOR PLUGGING PROBLEMS.

1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY PLANS TO REPLACE THE ABSORBER BULK ENTRAINMENT SEPARATORS WITH ONES CONSTRUCTED OF 316L STAINLESS STEEL DURING THE BOILER OUTAGE IN 1987. IN ADDITION, RIGHT ANGLE NOZZLES LIKE THOSE USED IN UNIT 1 WILL ALSO BE INSTALLED. THE FRP MIST ELIMINATOR WILL REMAIN UNTIL A BETTER 316L DESIGN IS FOUND.

COOPERATIVE POWER ASSOCIATION: COAL CREEK 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

THE UTILITY REPORTED THAT THE FGD SYSTEM AND UNIT OPERATED SUCCESSFULLY WITHOUT INCIDENT UNTIL NOVEMBER 18. ON THAT DATE, THE BOILER EXPLODED CAUSING APPROXIMATELY 50-60 MILLION DOLLARS WORTH OF DAMAGE. THE UNIT IS EXPECTED TO BE DOWN UNTIL DECEMBER 1987. THE UTILITY AND BOILER SUPPLIER ARE CURRENTLY INVESTIGATING THE REASON FOR THE EXPLOSION.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

REPAIRS CONTINUED ON UNIT 2 DURING THE MONTH OF JANUARY THROUGH SEPTEMBER OF 1987. DURING THIS PERIOD, THE UTILITY REPLACED THE ABSORBER BULK ENTRAINMENT SEPERATORS WITH NEW UNITS CONSTRUCTED OF 316L STAINLESS STEEL.

10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY ANNOUNCED THAT UNIT 2 WAS PLACED BACK IN SERVICE ON OCTOBER 30, 1987. BOTTOM-ASH BUILD-UP IN THE BOTTOM-ASH HOPPER AND IN THE THROAT OF THE BOILER WAS BELIEVED TO HAVE CAUSED THE BOILER EXPLOSION. THE WEIGHT OF THE ASH WAS BELIEVED TO HAVE RUPTURED SEVERAL WATER WALL STEAM TUBING BUNDLES CAUSING THE BOILER TO OVER PRESSURIZE.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	DELMARVA POWER & LIGHT	
PLANT NAME	DELAWARE CITY	
UNIT NUMBER	1	
CITY	DELAWARE CITY	
STATE	DELAWARE	
REGULATORY CLASSIFICATION	E	
PARTICULATE EMISSION LIMITATION - NG/J	129.	(0.300 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	180	
GROSS UNIT GENERATING CAPACITY - MW	28	
NET UNIT GENERATING CAPACITY W/FGD - MW	27	
NET UNIT GENERATING CAPACITY WO/FGD - MW	28	
EQUIVALENT SCRUBBED CAPACITY - MW	28	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	139.21	(295000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	215.6	(420 F)
STACK HEIGHT - M	152.	(500 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	6.1	(20.0 FT)
** FUEL DATA		
FUEL TYPE	COKE	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	32564.	(14000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		13500-14500
AVERAGE ASH CONTENT - %	0.50	
RANGE ASH CONTENT - %	0.3-0.7	
AVERAGE MOISTURE CONTENT - %	0.70	
RANGE MOISTURE CONTENT - %	0.5-1.2	
AVERAGE SULFUR CONTENT - %	7.00	
RANGE SULFUR CONTENT - %	5.0-8.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	3	
TYPE	TUBULAR	
SUPPLIER	PRAT-DANIEL	
PARTICLE REMOVAL EFFICENCY -%	92.0	
** FABRIC FILTER		
NUMBER	0	
TYPE	NONE	
TYPICAL GAS/CLOTH RATIO - M/MIN	0.6	(2.0 FT/MIN)
** ESP		
NUMBER	3	
TYPE	COLD SIDE	
SUPPLIER	WESTERN PREC. DIVISION, JOY	
INLET FLUE GAS CAPACITY - CU.M/S	34.8	(73700 ACFM)
INLET FLUE GAS TEMPERATURE - C	54.4	(130 F)
PRESSURE DROP - KPA	0.2	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	95.0	
** PARTICLE SCRUBBER		
NUMBER	3	
INITIAL START-UP DATE	4/1980	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/BOTTOM-ENTRY PLUMB BOB	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	AIRPOL	
DIMENSIONS - FT	20 DIA X 70.0	

DELMARVA POWER & LIGHT: DELAWARE CITY 1 (CONT.)

SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
LINER GENERIC MATERIAL	ORGANIC; INORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER; PREFIRED BRICK/SHA	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	315.0	(5000 GPM)
L/G RATIO - LITER/CU.M	6.8	(50.9 GAL/1000ACF)
PRESSURE DROP - KPA	0.5	(2.0 IN-H2O)
INLET GAS FLOW RATE - CU.M/S	46.4	(98300 ACFM)
INLET GAS TEMPERATURE - C	221.1	(430 F)
SO2 REMOVAL EFFICENCY - %	0.0	
PARTICLE REMOVAL EFFICIENCY - %	81.5	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	SALEABLE PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	WELLMAN LORD	
SYSTEM SUPPLIER	DAVY MCKEE	
A-E FIRM	DAVY MCKEE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	90.00	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	3.6	
CURRENT STATUS	1	
COMMERCIAL START-UP	5/1980	
INITIAL START-UP	5/1980	
CONTRACT AWARDED	9/1977	

** DESIGN AND OPERATING PARAMETERS

DESIGN CHLORIDE CONTENT - %	********	
SPACE REQUIREMENTS - SQ M	24280.3	(261360 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	144.0	

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	3	
NUMBER OF SPARES	0	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	VALVE TRAY	
TRADE NAME/COMMON TYPE	BUBBLE CAP TRAY TOWER	
SUPPLIER	DAVY MCKEE	
DIMENSIONS - FT	20.0 X 20.0	
SHELL GENERIC MATERIAL	INORGANIC	
SHELL SPECIFIC MATERIAL	HYDRAULICALLY-BONDED CONCRETE	
SHELL MATERIAL TRADE NAME/COMMON TYPE	PORTLAND CEMENT	
LINER GENERIC MATERIAL	INORGANIC	
LINER SPECIFIC MATERIAL	PREFIRED BRICK/SHAPES	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR	
GAS CONTACTING DEVICE TYPE	VALVE TRAY	
NUMBER OF CONTACTING ZONES	4	
LIQUID RECIRCULATION RATE - LITER/S	25.	(400 GPM)
L/G RATIO - L/CU.M	0.7	(5.5 GAL/1000 ACF)
INLET GAS FLOW - CU. M/S	34.59	(73300 ACFM)
INLET GAS TEMPERATURE - C	54.4	(130 F)
PARTICLE REMOVAL EFFICENCY - %	0.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
NUMBER PER SYSTEM	3
GENERIC TYPE	IMPINGEMENT
SPECIFIC TYPE	BAFFLE
TRADE NAME/COMMON TYPE	CLOSED VANE
CONFIGURATION	HORIZONTAL
NUMBER OF STAGES	1

DELMARVA POWER & LIGHT: DELAWARE CITY 1 (CONT.)

NUMBER OF PASSES PER STAGE	1	
FREEBOARD DISTANCE - M	1.83	(6.0 FT)
DISTANCE BETWEEN STAGES - CM	19.05	(7.5 IN)
PRESSURE DROP - KPA	0.1	(0.3 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	COOLED CONDENSATE	
WASH FREQUENCY	INTERMITTENT	
WASH RATE - L/S	3.2	(50 GAL/MIN)

** REHEATER

NUMBER	3	
GENERIC TYPE	DIRECT COMBUSTION	
SPECIFIC TYPE	EXTERNAL COMBUSTION CHAMBER	
TRADE NAME/COMMON TYPE	NATURAL GAS	
TEMPERATURE INCREASE - C	27.8	(50 F)
INLET FLUE GAS FLOW RATE - CU. M/S	108.54	(230000 ACFM)
INLET FLUE GAS TEMPERATURE - C	54.4	(130 F)
OUTLET FLUE GAS TEMPERATURE - C	85.0	(185 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	3	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	ROBINSON	
FUNCTION	BOOSTER	
APPLICATION	INDUCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	139.21	(295000 ACFM)
FLUE GAS TEMPERATURE - C	215.6	(420 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

DIMENSIONS	8.0 X 8.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	FIBER-REINFORCED POLYESTER

** REAGENT PREPARATION EQUIPMENT

FUNCTION	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK

** TANKS

SERVICE	NUMBER
NR	****

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

DELMARVA POWER & LIGHT: DELAWARE CITY 1 (CONT.)

NATURE	SULFURIC ACID
FULL LOAD QUANTITY - M T/H	11.34 (12.50 TPH)
QUALITY - %	93.0
DISPOSITION	MARKETED

*** SLUDGE

** TREATMENT

METHOD	N/A
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
SITE TREATMENT	CLAY LINING

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH, SOLIDS, SP.G., CONC.
MONITOR LOCATION	GAS OUTLET, SOLUTION OUTLET
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	CLOSED

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/80	SYSTEM	100.0	100.0	100.0	32.3			744	240	240	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM BEGAN INITIAL AND COMMERCIAL OPERATIONS ON MAY 22, 1980. NO MAJOR PROBLEMS WERE ENCOUNTERED FROM STARTUP THROUGH THE END OF THE MONTH.

6/80	SYSTEM	98.9	98.9	98.9	98.9			720	720	712	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR PROBLEMS WERE ENCOUNTERED DURING JUNE.

7/80	SYSTEM	97.2	97.0	97.0	90.7			744	696	675	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN FOR PART OF THE MONTH IN JULY TO REPAIR A LEAK IN THE MIST ELIMINATOR.

8/80	SYSTEM	99.9	99.9	99.9	99.9			744	744	743	

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD-RELATED PROBLEMS WERE REPORTED DURING AUGUST.

9/80	SYSTEM	78.3	78.3	78.3	78.3			720	720	564	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OFF LINE DURING SEPTEMBER DUE TO NECESSARY REPAIR OF THE CIRCULATING PUMPS AND THE MIST ELIMINATOR.

FGD SYSTEM OUTAGE TIME OCCURRED DUE TO INLET DUCT EXPANSION JOINT REPAIRS.

10/80	SYSTEM	66.1	66.1	66.1	66.1			744	744	492	

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER SOME OF THE OUTAGE TIME WAS DUE TO PLUGGED SPRAY HEADERS ON THE MIST ELIMINATOR.									
		PROBLEMS WITH LEAKING CIRCULATING PUMPS OCCURRED IN OCTOBER.									
		OTHER OUTAGE TIME WAS DUE TO THE FAILURE OF ESP DISTRIBUTOR BAFFLES.									
11/80	SYSTEM	93.8	96.0	96.0	93.8			720	704	676	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FAILURE OF PRESCRUBBER RECIRCULATION PUMPS CAUSED OUTAGE TIME IN NOVEMBER.									
12/80	SYSTEM	33.9	55.9	55.9	30.6			744	408	228	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER THE BOILER WAS OUT OF SERVICE DUE TO A SCHEDULED MAINTENANCE OVERHAUL FOR APPROXIMATELY 360 HOURS. START-UP OF THE FGD SYSTEM WAS DELAYED ABOUT FIVE DAYS DUE TO MATERIAL DELIVERY PROBLEMS.									
1/81	SYSTEM	90.0	90.0	90.0	90.0			744	744	670	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.									
2/81	SYSTEM	86.0	84.0	84.0	76.0			672	607	512	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY OUTAGE TIME WAS DUE TO LEAKS IN THE MIST ELIMINATOR AND FAILURE OF THE PRESCRUBBER SPRAY NOZZLES.									
3/81	SYSTEM	95.6	95.6	95.6	95.4			744	743	710	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.									
4/81	SYSTEM	74.0	83.0	83.0	74.0			720	643	531	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING APRIL SOME OUTAGE TIME WAS CAUSED BY THE REPAIRS TO THE MIST ELIMINATOR SHELL AND INTERNALS.									
		ADDITIONAL OUTAGE TIME WAS DUE TO THE REPLACEMENT OF THE BOOSTER BLOWER DISCHARGE DUCT EXPANSION JOINT.									
5/81	SYSTEM	98.1	98.1	98.1	98.1			744	744	730	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY REPAIRS WERE PERFORMED ON THE MIST ELIMINATOR SHELL.									
6/81	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	

DELMARVA POWER & LIGHT: DELAWARE CITY 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO PROBLEMS WERE ENCOUNTERED DURING JUNE.									
7/81	SYSTEM	99.2	99.2	99.2	99.2			744	744	738	
8/81	SYSTEM	77.4	77.4	77.4	46.9			744	451	349	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		EXTENSIVE REPAIRS WERE MADE TO THE VENTURI PRESCRUBBER BRICK WORK DURING A SCHEDULED AUGUST BOILER OUTAGE.									
9/81	SYSTEM	95.1	95.1	95.1	95.0			720	719	684	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS DOWN FOR PART OF SEPTEMBER FOR REPAIRS TO THE PRESCRUBBER MIST ELIMINATOR.									
10/81	SYSTEM	29.9	57.4	71.1	22.8			744	296	170	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ON OCTOBER 1 THE UNIT WAS SHUTDOWN FOR AN OVERHAUL.									
11/81	SYSTEM	70.1	70.1	70.1	70.1			720	720	505	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER AND NOVEMBER CONTINUAL PROBLEMS WERE ENCOUNTERED WITH THE PRESCRUBBER CIRCULATING PUMPS. THIS PROBLEM RESULTED FROM PUMP PLUGGING RELATED TO INADEQUATE SCRUBBING OF THE GAS. THIS ULTIMATELY WAS THE RESULT OF AN INSUFFICIENT NUMBER OF PUMPS.									
12/81	SYSTEM	72.6	67.6	68.4	59.4			744	654	442	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		OUTAGE TIME FOR THE BOILER DURING DECEMBER WAS DUE TO SUPERHEATER TUBE LEAKS.									
		CONTINUED PROBLEMS WITH THE PRESATURATOR CIRCULATING PUMPS AND PLUGGING OF THE PRESATURATOR AND ESP'S CAUSED THE SYSTEM UNAVAILABLE TIME.									
1/82	SYSTEM	68.5	69.4	69.5	68.5			744	735	510	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY THE SYSTEM WAS OFF-LINE PART OF THE MONTH DUE TO NECESSARY CLEANING OF THE MODULES AND TO REPLACE THE PRESATURATOR NOZZLE.									
2/82	SYSTEM	91.5	91.5	91.5	91.5			672	672	615	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY AND FEBRUARY LEAKS IN THE PRESATURATOR PIPING ACCOUNTED FOR SOME OF THE DOWN TIME.									
		PURGE LINE PLUGGING CAUSED ADDITIONAL OUTAGE TIME IN FEBRUARY.									
3/82	SYSTEM	64.9	64.9	64.9	64.9			744	744	483	

DELMARVA POWER & LIGHT: DELAWARE CITY 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PROBLEMS WERE ENCOUNTERED WITH THE REGENERATING SECTION OF THE SYSTEM DURING MARCH.									
4/82	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	
5/82	SYSTEM	92.2	92.2	92.2	92.2			744	744	686	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING APRIL AND MAY NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.									
6/82	SYSTEM	82.5	82.5	82.5	82.5			720	720	594	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JUNE THE SYSTEM WAS SHUT DOWN PART OF THE TIME TO REPAIR THE BRICK LINING IN THE PRESATURATOR.									
7/82	SYSTEM	63.8	63.8	63.8	63.8			744	744	475	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		OUTAGE TIME OCCURRED DURING JULY DUE TO A HIGH PRESSURE DROP IN THE PRESATURATOR. THE DROP WAS CAUSED BY COKE CARRYOVER TO THE ESP SEAL POTS.									
		EVAPORATOR PROBLEMS ACCOUNTED FOR AN OUTAGE DURING THE MONTH.									
8/82	SYSTEM	90.2	90.2	90.2	90.2			744	744	671	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PART OF THE OUTAGE TIME DURING AUGUST WAS DUE TO LEAKS IN THE PRESATURATOR CIRCULATION PIPING.									
		FAILURE OF THE PRESATURATOR SPRAY NOZZLE TIP ALSO RESULTED IN DOWN TIME DURING THE MONTH.									
9/82	SYSTEM	28.3	77.3	77.3	28.3			720	264	204	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN DURING PART OF SEPTEMBER FOR AN ANNUAL INSPECTION.									
		LEAKS IN THE PRESATURATOR RECIRCULATION PIPING CREATED DOWN TIME FOR THE FGD SYSTEM IN SEPTEMBER.									
		ADDITIONAL OUTAGE TIME RESULTED FROM LEAKS IN THE DUCTWORK EXPANSION JOINTS.									
		AN OUTAGE OCCURRED DURING SEPTEMBER FOR COKE SLAG BURN OUT.									
10/82	SYSTEM	98.9	98.9	98.9	98.9			744	744	736	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING OCTOBER.									
11/82	SYSTEM	97.9	97.9	97.9	97.9			720	720	705	

DELMARVA POWER & LIGHT: DELAWARE CITY 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED BY THE UTILITY DURING NOVEMBER.									
12/82	SYSTEM	81.6	81.6	81.6	81.6			744	744	607	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER THE UNIT WAS DOWN FOR 45 HOURS TO CLEAN PLUGGED SCREENS ON THE PRESATURATOR CIRCULATION PUMPS.									
		THE REMAINDER OF DOWN TIME DURING THE MONTH WAS DUE TO PROBLEMS WITH THE ACID PLANTS.									
1/83	SYSTEM	89.9	74.7	74.7	74.7			744	744	556	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		OUTAGE TIME OCCURRED DURING JANUARY DUE TO THE BALANCING OF A BOOSTER FAN.									
		THE CLEANING OF A SUCTION SCREEN ON THE PRESATURATOR PRODUCED ADDITIONAL OUTAGE TIME IN JANUARY.									
		THE UNIT WAS DOWN DURING JANUARY TO PERMIT REPAIR WORK ON THE ACID PLANT.									
2/83	SYSTEM	97.3	69.3	69.3	69.3			672	672	466	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		REPAIR WORK ON THE ESP CAUSED AN OUTAGE DURING FEBRUARY.									
		THE UNIT WAS DOWN DURING FEBRUARY TO PERMIT REPAIR WORK ON THE ACID PLANT TAIL GAS LINE.									
3/83	SYSTEM	95.6	95.6	95.6	95.6			744	744	711	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MARCH.									
4/83	SYSTEM	94.7	94.7	94.7	94.7			720	720	682	
5/83	SYSTEM	98.9	98.9	98.9	98.9			744	744	736	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING APRIL AND MAY.									
6/83	SYSTEM	84.7	84.7	84.7	84.7			720	720	610	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		REPAIRS ON THE BRICK LINING IN THE PRESATURATOR CAUSED A FORCED OUTAGE DURING JUNE.									
7/83	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
8/83	SYSTEM	96.0	96.0	100.0	96.0			744	744	714	

DELMARVA POWER & LIGHT: DELAWARE CITY 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PERIOD HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JULY AND AUGUST.									
9/83	SYSTEM	71.3	92.8	92.8	71.3			720	553	513	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS SHUT DOWN ON SEPTEMBER 24 FOR AN ANNUAL INSPECTION AND MAINTENANCE.									
10/83	SYSTEM	50.7	86.9	86.9	50.7			744	434	377	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 1 WAS OUT OF SERVICE FROM SEPTEMBER 24 TO OCTOBER 14, 1983 FOR A SCHEDULED OUTAGE. DURING THIS PERIOD AN ANNUAL BOILER INSPECTION AND FGD SYSTEM MAINTENANCE WAS CONDUCTED.									
		THE FGD SYSTEM WAS DOWN DURING PART OF OCTOBER DUE TO A LACK OF SODIUM SULFITE ABSORBING SOLUTION.									
11/83	SYSTEM	94.2	94.2	94.2	94.2			720	720	678	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING NOVEMBER.									
12/83	SYSTEM	82.8	82.8	82.8	82.8			744	744	616	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FGD SYSTEM OUTAGE TIME DURING DECEMBER WAS DUE IN PART TO EXTREME COLD WEATHER CONDITIONS.									
		BRIEF OUTAGES OCCURRED DURING THE MONTH DUE TO MIST ELIMINATOR LEAKS.									
1/84	SYSTEM	98.9	98.9	98.9	98.9			744	744	736	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A LACK OF ABSORBING SOLUTION DUE TO EVAPORATOR CIRCULATING PUMP PROBLEMS AND PLUGGED EVAPORATOR SOLUTION HEADERS LIMITED THE BURNING OF HIGH SULFUR COKE DURING JANUARY.									
2/84	SYSTEM	84.5	84.5	84.5	84.5			696	696	588	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PRESATURATOR CLEANING CONTRIBUTED TO OUTAGE TIME DURING FEBRUARY.									
		THE UTILITY REPORTED REPLACING FALLEN ACID BRICK DURING FEBRUARY.									
		MIST ELIMINATOR REPAIRS ACCOUNTED FOR ADDITIONAL DOWN TIME DURING THE MONTH.									
		PRESATURATOR RECIRCULATING PROBLEMS WERE REPORTED DURING FEBRUARY.									
3/84	SYSTEM	98.4	98.4	98.4	98.4			744	744	732	
4/84	SYSTEM	99.6	99.6	99.6	99.6			720	720	717	
5/84	SYSTEM	97.2	97.2	97.2	97.2			744	744	723	

DELMARVA POWER & LIGHT: DELAWARE CITY 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING MARCH THROUGH MAY.									
6/84	SYSTEM	93.0	92.0	92.0	79.0			720	615	569	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS DOWN PART OF THE MONTH TO REPAIR LEAKING BOILER TUBES. THE UTILITY ALSO EXPERIENCED PROBLEMS WITH THE FGD PRESCRUBBER CIRCULATING PUMPS AND SLURRY NEUTRALIZATION TANKS.									
7/84	SYSTEM	91.0	91.0	91.0	91.0			744	744	677	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF JULY.									
8/84	SYSTEM	57.0	57.0	57.0	57.0			744	744	424	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE FGD WAS DOWN APPROXIMATELY TWO WEEKS TO REPAIR A BOOSTER FAN AND TO CLEAN THE PRESCRUBBER.									
9/84	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF SEPTEMBER AND OCTOBER.									
10/84	SYSTEM	99.0	99.0	99.0	99.0			744	744	737	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF SEPTEMBER AND OCTOBER.									
11/84	SYSTEM	19.0	54.0	54.0	19.0			720	246	137	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS SHUT DOWN MOST OF NOVEMBER FOR AN ANNUAL OUTAGE.									
12/84	SYSTEM	79.0	79.0	79.0	79.0			744	744	588	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS DOWN 104 HOURS IN DECEMBER BECAUSE OF THE INABILITY OF THE BOILER TO BURN COKE. THE UNIT WAS NOT ABLE TO BURN COKE BECAUSE OF A FLY ASH FAN OUTAGE.									
1/85	SYSTEM	86.2	86.2	86.2	86.2			744	744	641	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS OUT OF SERVICE DURING PART OF THE MONTH SO THAT REPAIRS COULD BE MADE TO AN ASH POND RECIRCULATION LINE AND PUMP.									
2/85	SYSTEM	94.0	94.0	94.0	94.0			672	672	632	
3/85	SYSTEM	96.5	96.5	96.5	96.5			744	744	718	

DELMARVA POWER & LIGHT: DELAWARE CITY 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/85	SYSTEM	95.8	95.8	95.8	95.8			720	720	690	
5/85	SYSTEM	96.2	96.2	96.2	96.2			744	744	716	
6/85	SYSTEM	98.6	98.6	98.6	98.6			720	720	710	
7/85	SYSTEM	98.0	98.0	98.0	98.0			744	744	729	
8/85	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED FOR THE MONTHS OF FEBRUARY THROUGH AUGUST.									
9/85	SYSTEM	32.2	87.5	87.5	32.2			720	265	232	
10/85	SYSTEM	71.2	88.5	88.5	71.2			744	599	530	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS SHUT DOWN FOR A SCHEDULED ANNUAL OUTAGE DURING THE MONTH. THE FGD SYSTEM WAS SHUT DOWN EARLY TO ALLOW FOR BOILER MULTICLONE REPLACEMENT. THE OUTAGE CONTINUED INTO OCTOBER.									
11/85	SYSTEM	99.3	99.3	99.3	99.3			720	720	715	
12/85	SYSTEM	91.5	91.5	91.5	91.5			744	744	681	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF NOVEMBER AND DECEMBER.									
1/86	SYSTEM	98.0	98.0	98.0	98.0			744	744	729	
2/86	SYSTEM	88.0	98.0	98.0	88.0			672	600	591	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 1 WAS OUT OF SERVICE 3 DAYS FOR BOILER TUBE LEAK REPAIRS.									
3/86	SYSTEM	98.0	98.0	98.0	98.0			744	744	729	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE FIRST QUARTER OF 1986.									
4/86	SYSTEM	98.0	98.0	98.0	98.0			720	720	706	
5/86	SYSTEM	99.0	99.0	99.0	99.0			744	744	737	
6/86	SYSTEM	99.0	99.0	99.0	99.0			720	720	713	
7/86	SYSTEM	98.0	98.0	98.0	98.0			744	743	729	
8/86	SYSTEM	99.0	99.0	99.0	99.0			744	744	737	
9/86	SYSTEM	86.0	97.0	97.0	86.0			720	634	619	
10/86	SYSTEM	55.0	100.0	100.0	55.0			744	407	409	
11/86	SYSTEM	65.0	98.0	98.0	65.0			720	481	468	

DELMARVA POWER & LIGHT: DELAWARE CITY 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF APRIL THROUGH AUGUST 1986. THE FGD SYSTEM WAS OUT OF SERVICE 86 HOURS IN SEPTEMBER BECAUSE OF A RUPTURED BOILER TUBE. UNIT 1 WAS OUT OF SERVICE FOR PART OF OCTOBER AND NOVEMBER FOR A SCHEDULED UNIT OUTAGE.									
12/86	SYSTEM	97.0	97.0	97.0	97.0			744	744	722	
1/87	SYSTEM	99.1	99.1	99.1	99.1			744	744	737	
2/87	SYSTEM	99.6	99.6	99.6	99.6			672	672	669	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED NO FGD SYSTEM-RELATED PROBLEMS DURING JANUARY OR FEBRUARY 1987.									
3/87	SYSTEM	81.2	100.0	100.0	81.2			744	604	604	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 2 WAS OUT OF SERVICE FOR PART OF MARCH DUE TO BOILER TUBE LEAKS.									
4/87	SYSTEM	97.4	97.4	97.4	97.4			720	720	701	
5/87	SYSTEM	99.6	99.6	99.6	99.6			744	744	741	
6/87	SYSTEM	94.6	94.6	94.6	94.6			720	720	681	
7/87	SYSTEM	93.0	93.0	93.0	93.0			744	744	692	
8/87	SYSTEM	99.3	99.3	99.3	99.3			744	744	739	
9/87	SYSTEM	97.8	97.8	97.8	97.8			720	720	704	
10/87	SYSTEM	90.5	90.5	90.5	90.5			744	744	673	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE PERIOD APRIL THROUGH OCTOBER 1987.									
11/87	SYSTEM	17.8	100.0	100.0	17.8			720	128	128	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 1 WAS OUT OF SERVICE FOR AN ANNUAL OUTAGE IN NOVEMBER.									
12/87	SYSTEM	95.8	95.8	95.8	95.8			744	744	713	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF DECEMBER.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	DELMARVA POWER & LIGHT	
PLANT NAME	DELAWARE CITY	
UNIT NUMBER	2	
CITY	DELAWARE CITY	
STATE	DELAWARE	
REGULATORY CLASSIFICATION	E	
PARTICULATE EMISSION LIMITATION - NG/J	129.	(0.300 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	180	
GROSS UNIT GENERATING CAPACITY - MW	28	
NET UNIT GENERATING CAPACITY W/FGD - MW	27	
NET UNIT GENERATING CAPACITY WO/FGD - MW	28	
EQUIVALENT SCRUBBED CAPACITY - MW	28	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	139.21	(295000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	215.6	(420 F)
STACK HEIGHT - M	152.	(500 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	6.1	(20.0 FT)
** FUEL DATA		
FUEL TYPE	COKE	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	32564.	(14000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		13500-14500
AVERAGE ASH CONTENT - %	0.50	
RANGE ASH CONTENT - %	0.3-0.7	
AVERAGE MOISTURE CONTENT - %	0.70	
RANGE MOISTURE CONTENT - %	0.5-1.2	
AVERAGE SULFUR CONTENT - %	7.00	
RANGE SULFUR CONTENT - %	5.0-8.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	3	
TYPE	TUBULAR	
SUPPLIER	PRAT-DANIEL	
PARTICLE REMOVAL EFFICENCY -%	92.0	
** FABRIC FILTER		
NUMBER	0	
TYPE	NONE	
TYPICAL GAS/CLOTH RATIO - M/MIN	0.6	(2.0 FT/MIN)
** ESP		
NUMBER	3	
TYPE	COLD SIDE	
SUPPLIER	WESTERN PREC. DIVISION, JOY	
INLET FLUE GAS CAPACITY - CU.M/S	34.8	(73700 ACFM)
INLET FLUE GAS TEMPERATURE - C	54.4	(130 F)
PRESSURE DROP - KPA	0.2	(1. IN-H20)
PARTICLE REMOVAL EFFICENCY - %	95.0	
** PARTICLE SCRUBBER		
NUMBER	3	
INITIAL START-UP DATE	4/1980	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/BOTTOM-ENTRY PLUMB BOB	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	AIRPOL	
DIMENSIONS - FT	20 DIA X 70.0	

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
LINER GENERIC MATERIAL	ORGANIC; INORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER; PREFIRED BRICK/SHA	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	315.0	(5000 GPM)
L/G RATIO - LITER/CU.M	6.8	(50.9 GAL/1000ACF)
PRESSURE DROP - KPA	0.5	(2.0 IN-H20)
INLET GAS FLOW RATE - CU.M/S	46.4	(98300 ACFM)
INLET GAS TEMPERATURE - C	221.1	(430 F)
SO2 REMOVAL EFFICENCY - %	0.0	
PARTICLE REMOVAL EFFICIENCY - %	81.5	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	SALEABLE PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	WELLMAN LORD	
SYSTEM SUPPLIER	DAVY MCKEE	
A-E FIRM	DAVY MCKEE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	90.00	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	3.6	
CURRENT STATUS	1	
COMMERCIAL START-UP	5/1980	
INITIAL START-UP	5/1980	
CONTRACT AWARDED	9/1977	

** DESIGN AND OPERATING PARAMETERS

DESIGN CHLORIDE CONTENT - %	********	
SPACE REQUIREMENTS - SQ M	24280.3	(261360 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	144.0	

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	3	
NUMBER OF SPARES	0	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	VALVE TRAY	
TRADE NAME/COMMON TYPE	BUBBLE CAP TRAY TOWER	
SUPPLIER	DAVY MCKEE	
DIMENSIONS - FT	20.0 X 20.0	
SHELL GENERIC MATERIAL	INORGANIC	
SHELL SPECIFIC MATERIAL	HYDRAULICALLY-BONDED CONCRETE	
SHELL MATERIAL TRADE NAME/COMMON TYPE	PORTLAND CEMENT	
LINER GENERIC MATERIAL	INORGANIC	
LINER SPECIFIC MATERIAL	PREFIRED BRICK/SHAPES	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR	
GAS CONTACTING DEVICE TYPE	VALVE TRAY	
NUMBER OF CONTACTING ZONES	4	
LIQUID RECIRCULATION RATE - LITER/S	25.	(400 GPM)
L/G RATIO - L/CU.M	0.7	(5.5 GAL/1000 ACF)
INLET GAS FLOW - CU. M/S	34.59	(73300 ACFM)
INLET GAS TEMPERATURE - C	54.4	(130 F)
PARTICLE REMOVAL EFFICENCY - %	0.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
NUMBER PER SYSTEM	3
GENERIC TYPE	IMPINGEMENT
SPECIFIC TYPE	BAFFLE
TRADE NAME/COMMON TYPE	CLOSED VANE
CONFIGURATION	HORIZONTAL
NUMBER OF STAGES	1

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

NUMBER OF PASSES PER STAGE	1	
FREEBOARD DISTANCE - M	1.83	(6.0 FT)
DISTANCE BETWEEN STAGES - CM	19.05	(7.5 IN)
PRESSURE DROP - KPA	0.1	(0.3 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	COOLED CONDENSATE	
WASH FREQUENCY	INTERMITTENT	
WASH RATE - L/S	3.2	(50 GAL/MIN)

** REHEATER

NUMBER	3	
GENERIC TYPE	DIRECT COMBUSTION	
SPECIFIC TYPE	EXTERNAL COMBUSTION CHAMBER	
TRADE NAME/COMMON TYPE	NATURAL GAS	
TEMPERATURE INCREASE - C	27.8	(50 F)
INLET FLUE GAS FLOW RATE - CU. M/S	108.54	(230000 ACFM)
INLET FLUE GAS TEMPERATURE - C	54.4	(130 F)
OUTLET FLUE GAS TEMPERATURE - C	85.0	(185 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	3	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	ROBINSON	
FUNCTION	BOOSTER	
APPLICATION	INDUCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	139.21	(295000 ACFM)
FLUE GAS TEMPERATURE - C	215.6	(420 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

DIMENSIONS	8.0 X 8.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	FIBER-REINFORCED POLYESTER

** REAGENT PREPARATION EQUIPMENT

FUNCTION	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK

** TANKS

SERVICE	NUMBER
-------	------
NR	****

** PUMPS

SERVICE	NUMBER
-------	------
ABSORBER RECIRCULATION	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

NATURE	SULFURIC ACID
FULL LOAD QUANTITY - M T/H	11.34 (12.50 TPH)
QUALITY - %	93.0
DISPOSITION	MARKETED

*** SLUDGE

** TREATMENT

METHOD	N/A
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
SITE TREATMENT	CLAY LINING

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH, SOLIDS, SP.G., CONC.
MONITOR LOCATION	GAS OUTLET, SOLUTION OUTLET
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	CLOSED

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/80	SYSTEM	100.0	100.0	100.0	32.3			744	240	240	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM BEGAN INITIAL AND COMMERCIAL OPERATIONS ON MAY 22, 1980. NO MAJOR PROBLEMS WERE ENCOUNTERED DURING STARTUP OR THROUGH THE REST OF THE MONTH.

6/80	SYSTEM	80.4	80.4	80.4	80.4			720	720	579	

** PROBLEMS/SOLUTIONS/COMMENTS

THE CHEVRON PACKING IN THE MIST ELIMINATOR FAILED CAUSING SOME FGD SYSTEM OUTAGE TIME DURING JUNE.

FAILURE OF THE CIRCULATION PUMPS ALSO CAUSED OUTAGE TIME DURING THE MONTH.

7/80	SYSTEM	50.1	50.1	50.1	50.1			744	744	373	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN FOR PART OF THE MONTH TO REPAIR A LEAK IN THE MIST ELIMINATOR. IT WAS ALSO DOWN TO REBUILD THE CHEVRON PACKING.

8/80	SYSTEM	92.9	92.9	92.9	92.9			744	744	691	

** PROBLEMS/SOLUTIONS/COMMENTS

REPAIRS WERE MADE TO THE ESP DURING AUGUST.

9/80	SYSTEM	78.2	78.2	78.2	78.2			720	720	563	

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS OFF LINE DURING SEPTEMBER DUE TO NECESSARY REPAIR OF THE CIRCULATING PUMPS AND THE MIST ELIMINATOR.									
		FGD SYSTEM OUTAGE TIME OCCURRED DUE TO INLET DUCT EXPANSION JOINT REPAIRS.									
10/80	SYSTEM	60.0	60.0	60.0	60.0			744	743	445	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER THE MAJORITY OF DOWN TIME WAS DUE TO THE ACID PLANT BEING DOWN. IT WAS UNABLE TO PROCESS SO2 FROM THE WELLMAN LORD SOLUTION REGENERATION SECTION.									
11/80	SYSTEM	98.3	98.3	98.3	98.3			720	720	708	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER OUTAGE TIME WAS REQUIRED TO REPAIR LEAKS IN THE PRE-SCRUBBER.									
12/80	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED NO FGD-RELATED PROBLEMS DURING THE MONTH OF DECEMBER.									
1/81	SYSTEM	93.0	93.0	93.0	93.0			744	744	692	
2/81	SYSTEM	96.0	96.0	96.0	96.0			672	672	648	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY AND FEBRUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.									
3/81	SYSTEM	57.5	89.0	89.0	57.5			744	481	428	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH THE BOILER WAS OUT OF SERVICE FOR PART OF THE MONTH DUE TO AN OVERHAUL.									
		REPAIRS TO A LEAK IN THE MIST ELIMINATOR CAUSED SOME OUTAGE TIME.									
4/81	SYSTEM	64.0	84.0	84.0	64.0			720	553	464	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS OUT OF SERVICE APPROXIMATELY 167 HOURS DURING APRIL DUE TO A SCHEDULED MAINTENANCE OUTAGE.									
		THE FGD SYSTEM WAS UNAVAILABLE APPROXIMATELY 256 HOURS DUE TO THE REPLACEMENT OF THE PRESATURATOR MIST ELIMINATOR INTERNALS AND THE BRICK LINING.									
5/81	SYSTEM	97.5	97.5	97.5	97.5			744	744	726	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY REPAIRS WERE PERFORMED ON THE BOOSTER BLOWER INSPECTION DOOR.									
6/81	SYSTEM	75.8	75.8	75.8	75.8			720	720	546	

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ON JUNE 23 THE SYSTEM WAS SHUT DOWN DUE TO A HIGH PRESSURE DROP. ON INSPECTION, IT WAS DESCOVERED THAT THE PRESATURATOR NOZZLE HAD FAILED. THERE WAS A CONSIDERABLE COKE BUILDUP IN THE PRESATURATOR MIST ELIMINATOR BOX, THE MIST ELIMINATOR CHEVRONS HAD FAILED, THERE WAS A LARGE COKE BUILDUP IN THE ESP INLET SEAL POT AND A HIGH SOLIDS BUILDUP IN THE BOTTOM OF THE SO2 ABSORBER. REPAIRS CONSISTED OF REPLACING THE PRESATURATOR NOZZLE TIP AND CLEANING THE BUILDUP.									
7/81	SYSTEM	76.9	76.9	76.9	76.9			744	744	572	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JULY, THE ACID BRICK LINING ON THE INLET TO THE PRESCRUBBER FAILED. IN ADDITION, PROBLEMS WERE ENCOUNTERED WITH THE PRESCRUBBER NOZZLE TIP.									
8/81	SYSTEM	97.8	97.8	97.8	97.8			744	744	728	
9/81	SYSTEM	99.2	96.3	96.3	86.7			720	648	624	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING SEPTEMBER, THE BOILER WAS OFF LINE FOR 72 HOURS TO REPAIR A SUPERHEATER TUBE LEAK.									
10/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
11/81	SYSTEM	89.2	89.2	89.2	89.2			720	720	642	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER THE FGD SYSTEM WAS DOWN 62 HOURS TO CLEAN THE ESP SEAL POT AND TO REPLACE THE TIP OF A PRESATURATOR SPRAY NOZZLE.									
12/81	SYSTEM	98.9	98.9	98.9	98.9			744	744	736	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER.									
1/82	SYSTEM	78.5	78.5	78.5	78.5			744	744	584	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SOME OF THE OUTAGE TIME IN JANUARY WAS DUE TO A STEAM SHORTAGE.									
2/82	SYSTEM	79.7	79.7	79.7	79.7			672	672	536	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SOME OF THE OUTAGE TIME IN JANUARY AND FEBRUARY WAS DUE TO THE REPLACEMENT OF A BOOSTER BLOWER BEARING.									
		THE SYSTEM WAS OFF-LINE PART OF THE MONTH TO REPAIR A PRESATURATOR CIRCULATING PUMP.									
		OUTAGE TIME WAS NECESSARY TO UNPLUG THE PURGE LINE IN FEBRUARY.									
3/82	SYSTEM	46.4	75.3	75.3	46.4			744	458	345	

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH THE BOILER WAS OFF-LINE PART OF THE TIME FOR THE ANNUAL OVERHAUL.									
		THE SYSTEM WAS UNAVAILABLE PART OF THE MONTH DUE TO PROBLEMS WITH THE SCRUBBING SOLUTION SECTION.									
4/82	SYSTEM	69.7	97.8	97.8	69.7			720	513	502	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS OFF-LINE DURING APRIL DUE TO THE ANNUAL OVERHAUL WHICH STARTED IN MARCH.									
5/82	SYSTEM	96.0	96.0	96.0	96.0			744	744	714	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MAY.									
6/82	SYSTEM	96.6	96.6	96.6	96.6			720	720	696	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE EXPERIENCED DURING JUNE.									
7/82	SYSTEM	89.9	89.9	89.9	89.9			744	744	669	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A LACK OF SOLUTION DUE TO EVAPORATOR PROBLEMS ACCOUNTED FOR OUTAGE TIME DURING JULY.									
8/82	SYSTEM	94.2	95.0	95.0	94.2			744	738	701	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED BY THE UTILITY DURING AUGUST.									
9/82	SYSTEM	93.9	93.9	93.9	93.9			720	720	676	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING SEPTEMBER.									
10/82	SYSTEM	98.4	98.4	98.4	98.4			744	744	732	
11/82	SYSTEM	97.2	97.2	97.2	97.2			720	720	700	
12/82	SYSTEM	97.7	97.7	97.7	97.7			744	744	727	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE OCTOBER - DECEMBER PERIOD.									
1/83	SYSTEM	98.7	98.7	98.7	98.7			744	744	734	

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JANUARY.									
2/83	SYSTEM	97.5	97.5	97.5	97.5			672	672	655	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED BY THE UTILITY DURING FEBRUARY.									
3/83	SYSTEM	32.0	88.8	88.8	32.0			744	268	238	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS DOWN FROM MARCH 12 TO MARCH 31 FOR AN ANNUAL OUTAGE.									
4/83	SYSTEM	96.8	96.8	96.8	96.8			720	720	697	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING APRIL.									
5/83	SYSTEM	91.7	91.7	91.7	91.7			744	744	682	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		REPAIRS TO THE ESP CAUSED A FORCED OUTAGE DURING MAY.									
		BOOSTER FAN REPAIRS ALSO CAUSED DOWN TIME DURING THE MONTH.									
6/83	SYSTEM	81.0	81.0	81.0	81.0			720	720	583	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DOWN TIME OCCURRED DURING JUNE DUE TO REPAIRS ON A BOOSTER FAN.									
		REPAIRS ON A PRESATURATOR SPRAY NOZZLE ALSO FORCED THE SYSTEM OUT OF SERVICE DURING PART OF JUNE.									
7/83	SYSTEM	86.6	86.6	86.6	86.6			744	744	644	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 2 WAS DOWN DURING PART OF JULY TO REMOVE A SOLIDS BUILD UP IN THE PRE SCRUBBER AND PRESCRUBBER INLET DUCT. SOME PRESCRUBBER SPRAY NOZZLES WERE REPLACED DURING THIS PERIOD.									
		BOOSTER FAN REPAIRS WERE MADE AT UNIT 2 DURING JULY.									
8/83	SYSTEM	98.0	98.0	100.0	98.0			744	744	729	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST.									
9/83	SYSTEM	81.8	81.8	81.8	81.8			720	720	589	

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 2 WAS DOWN DURING PART OF SEPTEMBER TO REPAIR BRICKWORK AT THE INLET TO THE PRESCRUBBER AND TO CLEAN THE PRESCRUBBER.									
		THE UNIT WAS DOWN DURING PART OF THE MONTH TO CLEAN THE ESP INLET SEAL POTS.									
10/83	SYSTEM	98.7	98.7	98.7	98.7			744	744	734	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING OCTOBER.									
11/83	SYSTEM	82.2	82.2	82.2	82.2			720	720	592	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PRESCRUBBER SPRAY NOZZLES WERE REPLACED DURING NOVEMBER.									
		MIST ELIMINATOR LEAKS WERE REPAIRED DURING NOVEMBER.									
		THE PRESCRUBBER WAS CLEANED DURING THE MONTH CONTRIBUTING TO FGD SYSTEM DOWN TIME.									
12/83	SYSTEM	92.2	92.2	92.2	92.2			744	744	686	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MIST ELIMINATOR LEAKS RESULTED IN FGD SYSTEM OUTAGES DURING THE MONTH.									
		LEAKS IN THE PRESCRUBBER CIRCULATION PIPING ALSO CONTRIBUTED TO DOWN TIME DURING DECEMBER.									
1/84	SYSTEM	81.7	81.7	81.7	81.7			744	744	608	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A LACK OF ABSORBING SOLUTION DUE TO EVAPORATOR CIRCULATING PUMP PROBLEMS AND PLUGGED EVAPORATOR SOLUTION HEADERS LIMITED THE BURNING OF HIGH SULFUR COKE DURING JANUARY.									
		THE UTILITY REPORTED THAT BOOSTER FAN REPAIRS WERE MADE DURING JANUARY.									
		THE REPAIR OF BROKEN WIRES IN THE ESP'S RESULTED IN OUTAGE TIME DURING THE MONTH.									
		THE FAILURE OF PRESATURATOR CIRCULATING PUMPS ACCOUNTED FOR ADDITIONAL DOWN TIME DURING JANUARY.									
		THE REMOVAL OF COKE BUILD UP IN THE ESP'S CONTRIBUTED TO FGD SYSTEM DOWN TIME DURING THE MONTH.									
2/84	SYSTEM	93.8	93.8	93.8	93.8			696	696	653	
3/84	SYSTEM	96.4	96.4	96.4	96.4			744	744	717	
4/84	SYSTEM	98.2	98.2	98.2	98.2			720	720	707	

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING FEBRUARY THROUGH APRIL.									
5/84	SYSTEM	23.1	53.1	56.1	21.0			744	294	156	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE ABSORBER WAS DOWN FOR MAINTENANCE DURING THE ANNUAL BOILER OUTAGE IN MAY.									
		PROBLEMS WITH PLUGGING OF THE PRESATURATOR WERE REPORTED DURING MAY.									
6/84	SYSTEM	83.0	83.0	83.0	83.0			720	720	598	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE FGD SYSTEM WAS DOWN APPROXIMATELY 5 DAYS FOR SCHEDULED MAINTAINENCE.									
7/84	SYSTEM	54.0	54.0	54.0	54.0			744	744	402	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THE FGD WAS REMOVED FROM SERVICE PART OF JULY TO REPAIR A BOOSTER FAN BEARING AND ALSO TO CLEAN THE PRESCRUBBER MIST ELIMINATOR BOX, SEAL POT, AND ESP'S DUE TO FAILURE OF PRESCRUBBER SPRAY NOZZLE.									
8/84	SYSTEM	84.0	84.0	84.0	84.0			744	744	625	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS SHUT DOWN PART OF AUGUST TO REPAIR ESP'S.									
9/84	SYSTEM	89.0	89.0	89.0	89.0			720	720	641	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS SHUT DOWN PART OF SEPTEMBER TO REPAIR ESP'S.									
10/84	SYSTEM	95.0	95.0	95.0	95.0			744	744	707	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF OCTOBER.									
11/84	SYSTEM	81.0	81.0	81.0	81.0			720	720	583	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS DOWN PART OF NOVEMBER BECAUSE OF PROBLEMS WITH THE ACID PLANT.									
12/84	SYSTEM	43.0	43.0	43.0	43.0			744	744	310	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS DOWN MOST OF DECEMBER TO REPAIR THE LOST BRICK LINING IN THE PRESCRUBBER.									
1/85	SYSTEM	89.1	89.1	89.1	89.1			744	744	663	

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS OUT OF SERVICE DURING PART OF THE MONTH SO THAT REPAIRS COULD BE MADE TO AN ASH POND RECIRCULATION LINE AND PUMP.									
2/85	SYSTEM	98.4	98.4	98.4	98.4			672	672	661	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED FOR THE MONTH OF FEBRUARY.									
3/85	SYSTEM	32.4	83.9	96.3	28.1			744	249	209	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS REMOVED FROM SERVICE FOR A SCHEDULED ANNUAL OUTAGE DURING MARCH.									
4/85	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	
5/85	SYSTEM	99.1	99.1	99.1	99.1			744	744	737	
6/85	SYSTEM	98.6	98.6	98.6	98.6			720	720	710	
7/85	SYSTEM	97.8	97.8	97.8	97.8			744	744	728	
8/85	SYSTEM	98.8	98.8	98.8	98.8			744	744	735	
9/85	SYSTEM	99.6	99.6	99.6	99.6			720	720	717	
10/85	SYSTEM	87.2	87.2	87.2	87.2			744	744	649	
11/85	SYSTEM	94.9	94.9	94.9	94.9			720	720	683	
12/85	SYSTEM	98.4	98.4	98.4	98.4			744	744	732	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED FOR THE MONTHS OF APRIL THROUGH DECEMBER.									
1/86	SYSTEM	98.0	98.0	98.0	98.0			744	744	729	
2/86	SYSTEM	88.0	98.0	98.0	88.0			672	600	591	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 2 WAS OUT OF SERVICE 3 DAYS FOR BOILER TUBE LEAK REPAIRS.									
3/86	SYSTEM	19.0	100.0	100.0	19.0			744	141	141	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT WAS OUT OF SERVICE MOST OF THE MONTH FOR A SCHEDULED ANNUAL BOILER/ TURBINE OUTAGE.									
		NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE FIRST QUARTER OF 1986.									
4/86	SYSTEM	91.0	91.0	91.0	91.0			720	720	655	
5/86	SYSTEM	93.0	93.0	93.0	93.0			744	744	692	

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF APRIL OR MAY. THE UNIT WAS TAKEN OUT OF SERVICE IN MAY FOR A SCHEDULED ANNUAL OUTAGE.								
6/86	SYSTEM	97.0	97.0	97.0	97.0			720	720	698	
7/86	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
8/86	SYSTEM	97.0	97.0	97.0	97.0			744	744	722	
9/86	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	
10/86	SYSTEM	98.0	98.0	98.0	98.0			744	744	729	
11/86	SYSTEM	98.0	98.0	98.0	98.0			720	720	706	
12/86	SYSTEM	99.0	99.0	99.0	99.0			744	744	737	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF JUNE THROUGH DECEMBER 1986.								
1/87	SYSTEM	98.9	98.9	98.9	98.9			744	744	736	
2/87	SYSTEM	99.6	99.6	99.6	99.6			672	672	669	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED NO MAJOR FGD SYSTEM-RELATED PROBLEMS DURING JANUARY OR FEBRUARY, 1987.								
3/87	SYSTEM	87.0	99.4	99.4	87.0			744	651	647	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			UNIT 2 WAS OUT OF SERVICE FOR PART OF MARCH DUE TO BOILER TUBE LEAKS.								
4/87	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF APRIL.								
5/87	SYSTEM	22.0	100.0	100.0	22.0			744	164	164	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			UNIT 2 WAS OUT OF SERVICE FOR AN ANNUAL OUTAGE DURING THE MONTH OF MAY.								
6/87	SYSTEM	88.1	88.1	88.1	88.1			720	720	634	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			UNIT 2 ABSORBER WAS OUT OF SERVICE FOR PIPING REPAIRS DURING JUNE.								
			UNIT 2 ABSORBER WAS DOWN DURING JUNE FOR PRECIPITATOR REPAIRS.								
7/87	SYSTEM	4.3	4.3	4.3	4.3			744	744	32	

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 2 WAS OUT OF SERVICE FOR BLOWER MOTOR REPAIRS DURING JULY.									
8/87	SYSTEM	99.2	99.2	99.2	99.2			744	744	738	
9/87	SYSTEM	98.3	98.3	98.3	98.3			720	720	708	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR AUGUST OR SEPTEMBER.									
10/87	SYSTEM	84.9	84.9	84.9	84.9			744	744	632	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 2 ABSORBER WAS OUT OF SERVICE FOR PIPING REPAIRS DURING OCTOBER.									
11/87	SYSTEM	100.0	100.0	99.3	100.0			720	739	720	
12/87	SYSTEM	97.0	97.0	97.0	97.0			744	744	722	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF NOVEMBER OR DECEMBER 1987.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	DELMARVA POWER & LIGHT	
PLANT NAME	DELAWARE CITY	
UNIT NUMBER	3	
CITY	DELAWARE CITY	
STATE	DELAWARE	
REGULATORY CLASSIFICATION	E	
PARTICULATE EMISSION LIMITATION - NG/J	129.	(0.300 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	180	
GROSS UNIT GENERATING CAPACITY - MW	75	
NET UNIT GENERATING CAPACITY W/FGD - MW	40	
NET UNIT GENERATING CAPACITY WO/FGD - MW	44	
EQUIVALENT SCRUBBED CAPACITY - MW	75	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	139.21	(295000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	215.6	(420 F)
STACK HEIGHT - M	152.	(500 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	6.1	(20.0 FT)
** FUEL DATA		
FUEL TYPE	COKE	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	32564.	(14000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		13500-14500
AVERAGE ASH CONTENT - %	0.50	
RANGE ASH CONTENT - %	0.3-0.7	
AVERAGE MOISTURE CONTENT - %	0.70	
RANGE MOISTURE CONTENT - %	0.5-1.2	
AVERAGE SULFUR CONTENT - %	7.00	
RANGE SULFUR CONTENT - %	5.0-8.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	3	
TYPE	TUBULAR	
SUPPLIER	PRAT-DANIEL	
PARTICLE REMOVAL EFFICENCY -%	92.0	
** FABRIC FILTER		
NUMBER	0	
TYPE	NONE	
TYPICAL GAS/CLOTH RATIO - M/MIN	0.6	(2.0 FT/MIN)
** ESP		
NUMBER	3	
TYPE	COLD SIDE	
SUPPLIER	WESTERN PREC. DIVISION, JOY	
INLET FLUE GAS CAPACITY - CU.M/S	34.8	(73700 ACFM)
INLET FLUE GAS TEMPERATURE - C	54.4	(130 F)
PRESSURE DROP - KPA	0.2	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	95.0	
** PARTICLE SCRUBBER		
NUMBER	3	
INITIAL START-UP DATE	4/1980	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/BOTTOM-ENTRY PLUMB BOB	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	AIRPOL	
DIMENSIONS - FT	20 DIA X 70.0	

DELMARVA POWER & LIGHT: DELAWARE CITY 3 (CONT.)

SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
LINER GENERIC MATERIAL	ORGANIC; INORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER; PREFIRED BRICK/SHA	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	315.0	(5000 GPM)
L/G RATIO - LITER/CU.M	6.8	(50.9 GAL/1000ACF)
PRESSURE DROP - KPA	0.5	(2.0 IN-H2O)
INLET GAS FLOW RATE - CU.M/S	46.4	(98300 ACFM)
INLET GAS TEMPERATURE - C	221.1	(430 F)
SO2 REMOVAL EFFICENCY - %	0.0	
PARTICLE REMOVAL EFFICIENCY - %	81.5	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	SALEABLE PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	WELLMAN LORD	
SYSTEM SUPPLIER	DAVY MCKEE	
A-E FIRM	DAVY MCKEE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	90.00	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	5.3	
CURRENT STATUS	1	
COMMERCIAL START-UP	5/1980	
INITIAL START-UP	5/1980	
CONTRACT AWARDED	9/1977	

** DESIGN AND OPERATING PARAMETERS

DESIGN CHLORIDE CONTENT - %	********	
SPACE REQUIREMENTS - SQ M	24280.3	(261360 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	144.0	

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	3	
NUMBER OF SPARES	0	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	VALVE TRAY	
TRADE NAME/COMMON TYPE	BUBBLE CAP TRAY TOWER	
SUPPLIER	DAVY MCKEE	
DIMENSIONS - FT	20.0 X 20.0	
SHELL GENERIC MATERIAL	INORGANIC	
SHELL SPECIFIC MATERIAL	HYDRAULICALLY-BONDED CONCRETE	
SHELL MATERIAL TRADE NAME/COMMON TYPE	PORTLAND CEMENT	
LINER GENERIC MATERIAL	INORGANIC	
LINER SPECIFIC MATERIAL	PREFIRED BRICK/SHAPES	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR	
GAS CONTACTING DEVICE TYPE	VALVE TRAY	
NUMBER OF CONTACTING ZONES	4	
LIQUID RECIRCULATION RATE - LITER/S	25.	(400 GPM)
L/G RATIO - L/CU.M	0.7	(5.5 GAL/1000 ACF)
INLET GAS FLOW - CU. M/S	34.59	(73300 ACFM)
INLET GAS TEMPERATURE - C	54.4	(130 F)
PARTICLE REMOVAL EFFICENCY - %	0.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	3	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	

DELMARVA POWER & LIGHT: DELAWARE CITY 3 (CONT.)

NUMBER OF PASSES PER STAGE	1	
FREEBOARD DISTANCE - M	1.83	(6.0 FT)
DISTANCE BETWEEN STAGES - CM	19.05	(7.5 IN)
PRESSURE DROP - KPA	0.1	(0.3 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	COOLED CONDENSATE	
WASH FREQUENCY	INTERMITTENT	
WASH RATE - L/S	3.2	(50 GAL/MIN)

** REHEATER

NUMBER	3	
GENERIC TYPE	DIRECT COMBUSTION	
SPECIFIC TYPE	EXTERNAL COMBUSTION CHAMBER	
TRADE NAME/COMMON TYPE	NATURAL GAS	
TEMPERATURE INCREASE - C	27.8	(50 F)
INLET FLUE GAS FLOW RATE - CU. M/S	108.54	(230000 ACFM)
INLET FLUE GAS TEMPERATURE - C	54.4	(130 F)
OUTLET FLUE GAS TEMPERATURE - C	85.0	(185 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	3	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	ROBINSON	
FUNCTION	BOOSTER	
APPLICATION	INDUCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	139.21	(295000 ACFM)
FLUE GAS TEMPERATURE - C	215.6	(420 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

DIMENSIONS	8.0 X 8.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	FIBER-REINFORCED POLYESTER

** REAGENT PREPARATION EQUIPMENT

FUNCTION	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK

** TANKS

SERVICE	NUMBER
---	---
NR	****

** PUMPS

SERVICE	NUMBER
---	---
ABSORBER RECIRCULATION	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

DELMARVA POWER & LIGHT: DELAWARE CITY 3 (CONT.)

NATURE	SULFURIC ACID
FULL LOAD QUANTITY - M T/H	11.34 (12.50 TPH)
QUALITY - %	93.0
DISPOSITION	MARKETED

*** SLUDGE

** TREATMENT

METHOD	N/A
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
SITE TREATMENT	CLAY LINING

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH, SOLIDS, SP.G., CONC.
MONITOR LOCATION	GAS OUTLET, SOLUTION OUTLET
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	CLOSED

----------PERFORMANCE DATA----------

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/80	SYSTEM	100.0	100.0	100.0	32.3			744	240	240	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM BEGAN INITIAL AND COMMERCIAL OPERATIONS ON MAY 22, 1980. NO MAJOR PROBLEMS WERE ENCOUNTERED DURING STARTUP OR THROUGH THE REST OF THE MONTH.

6/80	SYSTEM	86.4	86.4	86.4	86.4			720	720	622	

** PROBLEMS/SOLUTIONS/COMMENTS

REPAIRS WERE MADE TO A LEAK AND DAMAGED CHEVRON PACKING IN THE MIST ELIMINATOR DURING JUNE.

7/80	SYSTEM	95.3	95.3	95.3	95.3			744	744	709	

** PROBLEMS/SOLUTIONS/COMMENTS

SOME FGD SYSTEM OUTAGE TIME DURING THE MONTH WAS CAUSED BY LEAKS IN THE MIST ELIMINATOR THAT NEEDED REPAIR.

AN ELECTRICAL FAILURE IN THE SHUTDOWN INSTRUMENTATION CAUSED THE FGD SYSTE TO BE OUT OF SERVICE PART OF THE MONTH.

8/80	SYSTEM	73.3	73.3	73.3	73.3			744	744	545	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OUT OF SERVICE FOR PART OF THE MONTH TO REPAIR THE PRESCRUBBER MIST ELIMINATOR.

9/80	SYSTEM	46.4	46.4	46.4	46.4			720	720	334	

DELMARVA POWER & LIGHT: DELAWARE CITY 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FGD SYSTEM OUTAGE TIME OCCURRED DUE TO THE NECESSARY REPAIR OF THE INLET EXPANSION JOINTS DURING SEPTEMBER.									
		PROBLEMS WERE ENCOUNTERED WITH THE PRE-MIST ELIMINATOR CAUSING ADDITIONAL OUTAGE TIME.									
		ADDITIONAL OUTAGE TIME WAS NECESSARY TO MAKE REPAIRS TO THE BOOSTER BLOWER ROTOR.									
10/80	SYSTEM	44.2	44.2	44.2	44.2			744	744	329	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER SOME OF THE OUTAGE TIME WAS DUE TO REPAIRS OF THE BOOSTER BLOWER ROTOR.									
		REPAIR WORK ON THE DUCT EXPANSION JOINTS ALSO CAUSED SOME OUTAGE TIME DURING THE MONTH.									
		DURING OCTOBER PROBLEMS WERE ENCOUNTERED WITH THE MIST ELIMINATORS.									
11/80	SYSTEM	0.0	0.0	0.0	0.0			720	279	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS OUT OF SERVICE FOR APPROXIMATELY 465 HOURS FOR AN ANNUAL SCHEDULED MAINTENANCE OVERHAUL DURING NOVEMBER. START-UP OF THE FGD SYSTEM WAS DELAYED DUE TO THE LATE DELIVERY OF PIECES OF THE MIST ELIMINATOR INTERNALS.									
12/80	SYSTEM	82.4	79.2	79.2	79.2			744	744	589	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		APPROXIMATELY 107 HOURS OF OUTAGE TIME IN DECEMBER WERE DUE TO LEAKS IN THE PRESATURATOR CIRCULATING PIPING.									
1/81	SYSTEM	64.0	64.0	64.0	64.0			744	744	479	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY PROBLEMS WERE ENCOUNTERED WITH LEAKS IN THE RECIRCULATION PIPES AND THE MIST ELIMINATOR CAUSING OUTAGE TIME.									
2/81	SYSTEM	88.0	88.0	88.0	88.0			672	672	590	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FAILURE OF THE RECIRCULATION PUMPS CAUSED SOME OUTAGE TIME DURING FEBRUARY									
		LEAKS IN THE RECIRCULATION PIPES CAUSED ADDITIONAL OUTAGE TIME DURING THE MONTH.									
3/81	SYSTEM	83.3	83.3	83.3	83.3			744	744	620	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH DOWNTIME WAS EXPERIENCED DUE TO CONTINUING REPAIRS TO THE RECIRCULATION PIPES.									
		ADDITIONAL OUTAGE TIME WAS DUE TO THE REPAIRS TO THE MIST ELIMINATOR.									

DELMARVA POWER & LIGHT: DELAWARE CITY 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	93.0	93.0	93.0	93.0			720	720	669	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL SOME OUTAGE TIME WAS DUE TO REPAIRS ON A HOLE IN THE ESP CELL

ADDITIONAL OUTAGE TIME WAS DUE TO THE REPLACEMENT OF A PRESATURATOR SPRAY NOZZLE.

5/81	SYSTEM	76.1	76.1	76.1	76.1			744	744	566	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE PRESATURATOR SHELL MATERIAL FAILED AND AN OUTAGE WAS NECESSARY TO REPAIR THE HOLE.

THE PRESATURATOR SPRAY NOZZLE FAILED ACCOUNTING FOR ADDITIONAL OUTAGE TIME.

6/81	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO PROBLEMS WERE ENCOUNTERED DURING JUNE.

7/81	SYSTEM	98.9	98.9	98.9	98.9			744	744	736	
8/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
9/81	SYSTEM	89.9	90.0	90.0	89.9			720	719	647	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OFF LINE FOR PART OF SEPTEMBER TO REPAIR THE ABSORBER MIST ELIMINATOR.

10/81	SYSTEM	78.2	86.3	86.4	78.2			744	674	582	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER SOME OUTAGE TIME WAS REQUIRED FOR MIST ELIMINATOR REPAIR. THE MIST ELIMINATOR WAS DAMAGED BY HEAT FROM THE REHEATER DURING AN ELECTRICAL SHUTDOWN IN SEPTEMBER.

CARRYOVER INTO THE OVERHEAD DUCT CAUSED A SYSTEM SHUTDOWN FOR CLEANING.

THE UNIT WAS SHUTDOWN ON OCTOBER 27 FOR AN OVERHAUL.

11/81	SYSTEM	42.2	88.9	88.9	42.2			720	342	304	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT OVERHAUL CONTINUED INTO NOVEMBER. FOLLOWING STARTUP IT WAS NECESSARY TO TAKE TWO SHORT SHUTDOWNS TO UNPLUG A WATER LINE.

12/81	SYSTEM	95.3	95.3	95.3	95.3			744	744	709	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER NO MAJOR PROBLEMS WERE ENCOUNTERED WITH EITHER THE BOILER OR THE FGD SYSTEM.

1/82	SYSTEM	84.8	84.8	84.8	84.8			744	744	631	

DELMARVA POWER & LIGHT: DELAWARE CITY 3 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY SOME OUTAGE TIME WAS DUE TO A STEAM SHORTAGE.									
		THE ESP DRAIN LINES WERE CLEANED DURING THE MONTH.									
2/82	SYSTEM	97.2	97.2	97.2	97.2			672	672	653	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY THE PURGE LINE WAS REPAIRED.									
3/82	SYSTEM	56.8	56.8	56.8	56.8			744	744	423	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH PROBLEMS WITH THE SOLUTION REGENERATION SECTION HINDERED THE FGD SYSTEM OPERATION PART OF THE TIME.									
4/82	SYSTEM	78.9	78.9	78.9	78.9			720	720	568	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING APRIL THE SYSTEM WAS SHUT DOWN FOR 152 HOURS TO BALANCE THE BOOSTER BLOWER.									
5/82	SYSTEM	96.4	96.4	96.4	96.4			744	744	717	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY THE FGD SYSTEM OPERATED WITH NO MAJOR PROBLEMS BEING ENCOUNTERED.									
6/82	SYSTEM	99.4	99.4	99.4	99.4			720	720	716	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE EXPERIENCED DURING JUNE.									
7/82	SYSTEM	90.7	90.7	90.7	90.7			744	744	675	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A LACK OF SOLUTION DUE TO EVAPORATOR PROBLEMS ACCOUNTED FOR OUTAGE TIME DURING JULY.									
8/82	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST.									
9/82	SYSTEM	65.7	65.7	65.7	65.7			720	720	473	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PROBLEMS WITH BOOSTER FAN VIBRATIONS RESULTED IN OUTAGE TIME DURING SEPTEMBER.									
		A PLUGGAGE PROBLEM IN THE ESP SEAL POTS ALSO CONTRIBUTED TO OUTAGE TIME DURING THE MONTH.									

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
			ADDITIONAL OUTAGE TIME WAS ATTRIBUTED TO LEAKS IN THE PRESATURATOR CIRCULATION PIPING.								
10/82	SYSTEM	44.6	92.0	92.0	44.6			744	361	332	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING OCTOBER THE UNIT WAS DOWN FOR AN ANNUAL INSPECTION.								
11/82	SYSTEM	78.9	97.9	97.9	78.9			720	580	568	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING NOVEMBER THE UNIT WAS DOWN FOR AN ANNUAL INSPECTION.								
12/82	SYSTEM	98.7	98.7	98.7	98.7			744	744	734	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER.								
1/83	SYSTEM	93.4	93.0	93.0	88.0			744	704	655	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			AN OUTAGE OCCURRED DURING THE MONTH DUE TO THE CLEANING OF THE PRESATURATO SUCTION SCREENS.								
			THE REPAIR OF A CRACKED NOZZLE ON THE PRESATURATOR CAUSED ADDITIONAL DOWN TIME DURING JANUARY.								
2/83	SYSTEM	100.0	100.0	100.0	100.0			672	672	672	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING FEBRUARY.								
3/83	SYSTEM	94.8	94.8	94.8	94.8			744	744	705	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			AN OUTAGE OCCURRED DURING MARCH DUE TO THE CLEANING OF A PRESATURATOR CIRCULATION PUMP SUCTION SCREEN.								
			THE REPAIR OF BROKEN WIRE IN AN ESP ALSO RESULTED IN DOWN TIME DURING MARCH.								
4/83	SYSTEM	99.3	99.3	99.3	99.3			720	720	715	
5/83	SYSTEM	99.3	99.3	99.3	99.3			744	744	739	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING APRIL AND MAY.								
6/83	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	

DELMARVA POWER & LIGHT: DELAWARE CITY 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.									
7/83	SYSTEM	92.5	92.5	92.5	92.5			744	744	688	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 3 WAS DOWN DURING PART OF JULY FOR ESP REPAIRS.									
		THE UNIT WAS DOWN DURING THE MONTH FOR REMOVAL OF SOLIDS BUILD UP IN THE PRESCRUBBER.									
8/83	SYSTEM	93.0	93.0	100.0	93.0			744	744	692	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST.									
9/83	SYSTEM	86.3	86.3	86.3	86.3			720	720	621	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 3 WAS DOWN DURING PART OF SEPTEMBER TO REPAIR LEAKS ON THE PRESCRUBBER SPRAY NOZZLE FLANGE. IN ADDITION, A CERAMIC SPRAY NOZZLE TIP FAILED TWICE DURING THIS PERIOD.									
10/83	SYSTEM	100.0	97.4	97.4	84.1			744	643	626	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING OCTOBER.									
11/83	SYSTEM	58.6	89.4	89.4	53.8			720	433	387	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT AN ANNUAL BOILER OUTAGE TOOK PLACE DURING NOVEMBER.									
12/83	SYSTEM	58.7	78.7	78.7	58.7			744	555	437	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN DURING PART OF DECEMBER FOR AN ANNUAL OUTAGE.									
		FGD SYSTEM OUTAGE TIME DURING DECEMBER WAS DUE IN PART TO A LACK OF SODIUM SULFITE ABSORBING SOLUTION RESULTING FROM EVAPORATOR PROBLEMS.									
1/84	SYSTEM	95.6	95.6	95.6	95.6			744	744	711	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A LACK OF ABSORBING SOLUTION DUE TO EVAPORATOR CIRCULATING PUMP PROBLEMS AND PLUGGED EVAPORATOR SOLUTION HEADERS LIMITED THE BURNING OF HIGH SULFUR COKE DURING JANUARY.									
2/84	SYSTEM	97.6	97.6	97.6	97.6			696	696	679	

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING FEBRUARY.									
3/84	SYSTEM	84.5	84.5	84.5	84.5			744	744	629	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PRESATURATOR CLEANING ACCOUNTED FOR OUTAGE TIME DURING THE MONTH.									
		PRESATURATOR CIRCULATION PUMP REPAIRS WERE MADE DURING MARCH.									
		FGD SYSTEM OUTAGE TIME DURING MARCH WAS DUE IN PART TO THE REPAIR OF A BROKEN INSULATOR ON THE ESP.									
4/84	SYSTEM	89.0	79.9	87.1	74.0			720	667	533	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		LEAKS IN THE MIST ELIMINATOR SHELL WERE REPAIRED DURING APRIL.									
		LEAKS IN THE BOOSTER FAN DISCHARGE DUCTWORK WERE REPAIRED DURING APRIL.									
		THE FGD SYSTEM WAS DOWN DURING PART OF THE MONTH TO CLEAN THE PRESATURATOR									
		A BOILER TUBE LEAK ACCOUNTED FOR 108 HOURS OF DOWN TIME DURING APRIL.									
5/84	SYSTEM	86.8	86.8	86.8	86.8			744	744	646	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FAILURE OF A PRESATURATOR CIRCULATING PUMP MOTOR OCCURRED DURING MAY.									
		FAILURE OF A RUBBER LINED PIPE IN THE PRESATURATOR CIRCUIT RESULTED IN DOWN TIME DURING MARCH.									
		PRESATURATOR PLUGGING PROBLEMS WERE REPORTED DURING MAY.									
6/84	SYSTEM	96.0	96.0	96.0	96.0			720	720	691	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF JUNE.									
7/84	SYSTEM	86.0	86.0	86.0	86.0			744	744	630	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE FGD WAS DOWN PART OF JULY TO CLEAN THE PRESCRUBBER.									
8/84	SYSTEM	88.0	88.0	88.0	88.0			744	744	655	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD WAS SHUT DOWN PART OF AUGUST TO REPAIR ESP'S.									
9/84	SYSTEM	70.0	91.0	91.0	70.0			720	522	504	

DELMARVA POWER & LIGHT: DELAWARE CITY 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS SHUT DOWN PART OF SEPTEMBER TO REPAIR A BOILER TUBE LEAK.									
10/84	SYSTEM	26.0	76.0	76.0	26.0			744	251	193	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS SHUT DOWN MOST OF OCTOBER FOR AN ANNUAL OUTAGE.									
11/84	SYSTEM	49.0	64.0	64.0	49.0			720	552	353	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS DOWN IN NOVEMBER BECAUSE OF PROBLEMS WITH THE ACID PLANTS AND BECAUSE OF PROBLEMS WITH THE BOILER COKE FEED SYSTEM.									
12/84	SYSTEM	84.0	84.0	84.0	84.0			744	744	625	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED EXPERIENCING COKE FEEDER DUCT PROBLEMS WITH THE BOILER DURING THE MONTH OF DECEMBER.									
1/85	SYSTEM	75.8	74.1	74.1	69.4			744	696	516	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A BOILER SUPERHEATER LEAK AND ESP REPAIRS CAUSED THE FGD SYSTEM TO BE OUT OF SERVICE DURING PART OF THE MONTH.									
2/85	SYSTEM	88.1	88.1	88.1	88.1			672	672	592	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		LEAKS IN THE ESP'S CAUSED SOME FGD SYSTEM DOWNTIME IN FEBRUARY.									
3/85	SYSTEM	99.1	99.1	99.1	99.1			744	744	737	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED FOR THE MONTH OF MARCH.									
4/85	SYSTEM	79.3	79.3	90.3	79.3			720	720	571	
5/85	SYSTEM	38.6	98.6	98.6	38.6			744	291	287	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS TAKEN OUT OF SERVICE FOR A SCHEDULED ANNUAL OUTAGE IN APRIL. THE OUTAGE CONTINUED INTO MAY.									
6/85	SYSTEM	96.9	96.9	96.9	96.9			720	720	698	
7/85	SYSTEM	97.8	98.1	98.1	97.8			744	742	728	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF JUNE OR JULY.									
8/85	SYSTEM	90.5	90.5	90.5	90.5			744	744	673	

DELMARVA POWER & LIGHT: DELAWARE CITY 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MIST ELIMINATOR LEAK REPAIR WORK WAS THE SOURCE OF PART OF THE AUGUST FGD SYSTEM OUTAGE TIME.									
9/85	SYSTEM	97.5	97.5	97.5	97.5			720	720	702	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM PROBLEMS WERE REPORTED FOR THE MONTH OF SEPTEMBER.									
10/85	SYSTEM	76.6	89.3	76.6	76.6			744	638	570	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS OUT OF SERVICE FOR COKE MILL CONVEYING SYSTEM REPAIR WORK IN OCTOBER.									
11/85	SYSTEM	99.7	99.7	99.7	99.7			720	720	718	
12/85	SYSTEM	96.2	96.2	96.2	96.2			744	744	716	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF NOVEMBER AND DECEMBER.									
1/86	SYSTEM	98.0	98.0	98.0	98.0			744	744	729	
2/86	SYSTEM	99.0	99.0	99.0	99.0			672	672	665	
3/86	SYSTEM	98.0	98.0	98.0	98.0			744	744	729	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE FIRST QUARTER OF 1986.									
4/86	SYSTEM	33.0	100.0	100.0	33.0			720	236	238	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE ANNUAL UNIT 3 OUTAGE BEGAN IN APRIL.									
5/86	SYSTEM	81.0	99.0	99.0	81.0			744	609	603	
6/86	SYSTEM	95.0	95.0	95.0	95.0			720	720	684	
7/86	SYSTEM	94.0	94.0	94.0	94.0			744	744	699	
8/86	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
9/86	SYSTEM	94.0	96.0	96.0	94.0			720	706	677	
10/86	SYSTEM	94.0	99.0	99.0	94.0			744	704	699	
11/86	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	
12/86	SYSTEM	99.0	99.0	99.0	99.0			744	744	737	

DELMARVA POWER & LIGHT: DELAWARE CITY 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF APRIL THROUGH DECEMBER 1986.									
1/87	SYSTEM	98.5	98.5	98.5	98.5			744	744	733	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED NO MAJOR FGD SYSTEM-RELATED PROBLEMS FOR THE MONTH OF JANUARY.									
2/87	SYSTEM	42.6	99.3	99.3	42.6			672	288	286	
3/87	SYSTEM	67.3	93.5	93.5	67.3			744	536	501	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 3 WAS DOWN FOR A SCHEDULED OUTAGE DURING FEBRUARY AND MARCH 1987.									
4/87	SYSTEM	98.9	98.9	98.9	98.9			720	720	712	
5/87	SYSTEM	99.6	99.6	99.6	99.6			744	744	741	
6/87	SYSTEM	93.1	93.1	93.1	93.1			720	720	670	
7/87	SYSTEM	95.8	95.8	95.8	95.8			744	744	713	
8/87	SYSTEM	98.1	98.1	98.1	98.1			744	744	730	
9/87	SYSTEM	98.5	98.5	98.5	98.5			720	720	709	
10/87	SYSTEM	92.1	92.1	92.1	92.1			744	744	685	
11/87	SYSTEM	100.0	97.0	97.0	100.0			720	744	720	
12/87	SYSTEM	97.8	97.8	97.8	97.8			744	744	728	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE PERIOD OF APRIL THROUGH DECEMBER.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	DESERET GEN & TRANS	
PLANT NAME	BONANZA	
UNIT NUMBER	1	
CITY	VERNAL	
STATE	UTAH	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	800	
GROSS UNIT GENERATING CAPACITY - MW	427	
NET UNIT GENERATING CAPACITY W/FGD - MW	409	
NET UNIT GENERATING CAPACITY WO/FGD - MW	422	
EQUIVALENT SCRUBBED CAPACITY - MW	427	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	****	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	********	(******* ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	******	(**** FT)
STACK SHELL	NR	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	24423.	(10500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		****
AVERAGE ASH CONTENT - %	10.00	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	8.50	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	0.50	
RANGE SULFUR CONTENT - %	****	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** FABRIC FILTER		
NUMBER	1	
SUPPLIER	ECOLAIRE	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	COMBUSTION ENGINEERING	
A-E FIRM	BURNS & MCDONNELL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.60	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	95.00	
ENERGY CONSUMPTION - %	3.0	

DESERET GEN & TRANS: BONANZA 1 (CONT.)

CURRENT STATUS	1
COMMERCIAL START-UP	5/1986
INITIAL START-UP	12/1985
CONTRACT AWARDED	7/1980
** DESIGN AND OPERATING PARAMETERS	
DESIGN CHLORIDE CONTENT - %	********
** QUENCHER/PRESATURATOR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** ABSORBER	
GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
SHELL GENERIC MATERIAL	NR
SHELL SPECIFIC MATERIAL	NR
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR
LINER GENERIC MATERIAL	NR
LINER SPECIFIC MATERIAL	NR
LINER MATERIAL TRADE NAME/COMMON TYPE	NR
** MIST ELIMINATOR	
PRE-MIST ELIMINATOR/MIST ELIMINATOR	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** REHEATER	
GENERIC TYPE	NONE
SPECIFIC TYPE	N/A
TRADE NAME/COMMON TYPE	N/A
PERCENT GAS BYPASSED - AVG	0.0
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** FANS	
DESIGN	NR
FUNCTION	NA
APPLICATION	NR
SERVICE	NA
CONSTRUCTION MATERIAL GENERIC TYPE	NA
** DAMPERS	
FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NA
** TANKS	

SERVICE	NUMBER
NR	****

DESERET GEN & TRANS: BONANZA 1 (CONT.)

** PUMPS	
SERVICE	NUMBER
NR	****
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER	1
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	VACUUM FILTER
NUMBER	1
*** SALEABLE BYPRODUCTS	
NATURE	NONE
DISPOSITION	N/A
*** SLUDGE	
** TREATMENT	
METHOD	DEWATERED
DEVICE	NR
PROPRIETARY PROCESS	N/A
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TREATMENT	NONE
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
SOURCE OF MAKEUP WATER	COOLING TOWER BLOWDOWN

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY ANNOUNCED THAT INITIAL OPERATIONS OF THE BONANZA FGD SYSTEM BEGAN IN DECEMBER, 1985. THE PLANT IS EXPECTED TO GO COMMERCIAL SOME TIME IN THE SPRING OF 1986.

1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS DECLARED COMMERICAL MAY 1, 1986.

6/86	SYSTEM							720			
7/86	SYSTEM							774			

DESERET GEN & TRANS: BONANZA 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR UNIT/FGD OUTAGES WERE ENCOUNTERED DURING THE YEAR 1986.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE PERIOD JANUARY THROUGH JULY 1987.

8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FIRST MAJOR UNIT INSPECTION TOOK PLACE FROM MID-AUGUST THROUGH OCTOBER 12, 1987. DURING THIS 10-WEEK OUTAGE PERIOD, THE ABSORBER INLET DUCTWORK AT THE WET/DRY INTERFACE WAS RECLADDED WITH HASTELLOY C-22 (APPROXIMATELY 300 SQUARE FEET). THE ORIGINAL ALLOY 904L SHOWED SIGNS OF PITTING.

11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE MONTHS OF NOVEMBER OR DECEMBER 1987. THE NEXT UNIT OUTAGE IS SCHEDULED FOR THE FALL OF 1988.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	DUQUESNE LIGHT	
PLANT NAME	ELRAMA	
UNIT NUMBER	1-4	
CITY	ELRAMA	
STATE	PENNSYLVANIA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	34.	(0.080 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	258.	(0.600 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	487	
GROSS UNIT GENERATING CAPACITY - MW	510	
NET UNIT GENERATING CAPACITY W/FGD - MW	487	
NET UNIT GENERATING CAPACITY WO/FGD - MW	497	
EQUIVALENT SCRUBBED CAPACITY - MW	510	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	972.11	(2060000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	148.9	(300 F)
STACK HEIGHT - M	121.	(398 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	7.9	(26.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26907.	(11568 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		11500-12500
AVERAGE ASH CONTENT - %	16.80	
RANGE ASH CONTENT - %	14.0-18.3	
AVERAGE MOISTURE CONTENT - %	5.93	
RANGE MOISTURE CONTENT - %	4.30-7.06	
AVERAGE SULFUR CONTENT - %	2.05	
RANGE SULFUR CONTENT - %	1.49-2.91	
AVERAGE CHLORIDE CONTENT - %	0.04	
RANGE CHLORIDE CONTENT - %	0.03-0.05	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	4	
NUMBER OF SPARES	0	
TYPE	MULTICLONE	
SUPPLIER	RESEARCH-COTTRELL '1, 2, & 3!; JOY WESTERN '4!	
INLET FLUE GAS CAPACITY - CU.M/S	972.1	(2060000 ACFM)
INLET FLUE GAS TEMPERATURE - C	148.9	(300 F)
PRESSURE DROP - KPA	0.7	(3. IN-H2O)
PARTICLE REMOVAL EFFICENCY -%	95.0	
** ESP		
NUMBER	10	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	RESEARCH COTTRELL '1, 2, & 3!; JOY WESTERN '4!	
INLET FLUE GAS CAPACITY - CU.M/S	972.1	(2060000 ACFM)
INLET FLUE GAS TEMPERATURE - C	148.9	(300 F)
PRESSURE DROP - KPA	0.2	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	95.0	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	N/A	
SPECIFIC TYPE	N/A	
*** FGD SYSTEM		

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME	
PROCESS ADDITIVES	MAGNESIUM OXIDE; SODIUM	
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES	
A-E FIRM	GIBBS & HILL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.30	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	83.00	
ENERGY CONSUMPTION - %	2.0	
CURRENT STATUS	1	
COMMERCIAL START-UP	10/1975	
INITIAL START-UP	10/1975	
CONTRACT AWARDED	12/1970	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	2.20	
DESIGN COAL HEAT CONTENT - J/G	26749.0	(11500 BTU/LB)
DESIGN COAL ASH CONTENT - %	17.00	
DESIGN MOISTURE CONTENT - %	6.00	
DESIGN CHLORIDE CONTENT - %	0.03	
OPER. & MAINT. REQUIREMENT - MANHR/DAY	296.0	
** QUENCHER/PRESATURATOR		
NUMBER	0	
** ABSORBER		
NUMBER	5	
NUMBER OF SPARES	1	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/TOP-ENTRY PLUMB BOB	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	GE ENVIRONMENTAL SERVICES	
DIMENSIONS - FT	31.3 X 66.4	
SHELL GENERIC MATERIAL	CARBON STEEL; STAINLESS STEEL 'ABSORBER INTERNAL	
SHELL SPECIFIC MATERIAL	AISI 1110; AUSTENITIC	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A; TYPE 316L	
LINER GENERIC MATERIAL	ORGANIC; INORGANIC	
LINER SPECIFIC MATERIAL	MAT-REINFORCED POLYESTER; GLASS FLAKE-FILLED POL	
LINER MATERIAL TRADE NAME/COMMON TYPE	CEILCRETE 2500AR; FLAKELINE 103; ACID RESISTANT	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1071.	(17000 GPM)
L/G RATIO - L/CU.M	4.4	(33.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	2.0	(8.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	45.7	(150.0 FT/S)
INLET GAS FLOW - CU. M/S	243.03	(515000 ACFM)
INLET GAS TEMPERATURE - C	148.9	(300 F)
SO2 REMOVAL EFFICIENCY - %	83.0	
PARTICLE REMOVAL EFFICENCY - %	94.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR 'EXTERNAL!	
NUMBER PER SYSTEM	5	
NUMBER OF SPARES PER SYSTEM	1	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	OPEN VANE 'SLAT!	
MANUFACTURER	HEIL	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	4	
DISTANCE BETWEEN VANES - CM	7.6	(3.00 IN)
VANE ANGLES - DEGREES	90	
PRESSURE DROP - KPA	0.0	(0.2 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.4	(11.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

WASH WATER SOURCE	FRESH MAKEUP WATER OR THICKENER OVERFLOW
WASH FREQUENCY	TOP-MANUAL ONCE/WEEK
** FANS	
NUMBER	5
NUMBER OF SPARES	1
DESIGN	CENTRIFUGAL
SUPPLIER	GREEN FUEL ECONOMIZER
FUNCTION	BOOSTER
APPLICATION	INDUCED DRAFT
SERVICE	WET
FLUE GAS FLOW RATE - CU.M/S	259.54 (550000 ACFM)
FLUE GAS TEMPERATURE - C	54.4 (130 F)
PRESSURE DROP - KPA	7.0 (23.0 IN-H20)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL; HIGH ALLOY; HIGH ALLOY; STAINLESS
** DAMPERS	
NUMBER	5
FUNCTION	SHUT-OFF
GENERIC TYPE	BUTTERFLY
SPECIFIC TYPE	NR
MANUFACTURER	NR
MODULATION	OPEN/CLOSED
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
SERVICE CONDITIONS	300
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL/CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC; AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DAMPERS	
NUMBER	5
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	ALLIS-CHALMERS
MODULATION	OPEN/CLOSED
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
SERVICE CONDITIONS	NR
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL/CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC; AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER
** DAMPERS	
NUMBER	5
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	ALLIS-CHALMERS
MODULATION	OPEN/CLOSED
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
SERVICE CONDITIONS	NR
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL/CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC; AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER
** DUCTWORK	
LOCATION	ABSORBER INLET
CONFIGURATION	CIRCULAR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	ABSORBER OUTLET
CONFIGURATION	RECTANGULAR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER

** DUCTWORK

LOCATION	PRECOLLECTOR OUTLET
CONFIGURATION	CIRCULAR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER

** REAGENT PREPARATION EQUIPMENT

FUNCTION	SLAKER
DEVICE	PASTE
DEVICE TYPE	N/A
MANUFACTURER	WALLACE & TIERNAN
NUMBER	5
NUMBER OF SPARES	2
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	3.6 (4 TPH)
PRODUCT QUALITY - % SOLIDS	22.5

** TANKS

SERVICE	NUMBER
THICKENER OVERFLOW	1
LIME SLURRY DILUTION	1
ABSORBER EFFLUENT HOLD	5
THICKENER POLMER MIX	1
THICKENER DISTRIBUTION BOX	1
WATER STORAGE	2

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	10
LIME SLURRY FEED	5
THICKENER OVERFLOW	3
THICKENER UNDERFLOW	3

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	2
NUMBER OF SPARES	0
DIMENSIONS - FT	120 DIA X 8.5 HIGH
CAPACITY	229500
SHELL GENERIC MATERIAL TYPE	CARBON STEEL 'WALLS!; INORGANIC 'BOTTOM!
SHELL SPECIFIC MATERIAL TYPE	AISI 1110; HYDRAULICALLY-BONDED CONCRETE
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	BITUMINOUS BASE MODIFIED ASPHALT 'FLOOR!; MICA F
BELT GENERIC MATERIAL TYPE	RUBBER-CLAD CARBON STEEL
FEED STREAM SOURCE	ABSORBER BLEED STREAM
FEED STREAM CHARACTERISTICS	5% SOLIDS
OUTLET STREAM CHARACTERISTICS	35-40% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	0.1%
OUTLET STREAM DISPOSITION	TO VACUUM FILTER
OVERFLOW STREAM DISPOSITION	THICKENER OVERFLOW TANK

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	2
NUMBER OF SPARES	1
DIMENSIONS - FT	650 SQ FT & 750 SQ FT
CAPACITY	60 TONS/HR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
BELT GENERIC MATERIAL TYPE	ORGANIC
BELT SPECIFIC MATERIAL TYPE	NYLON
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	35-40% SOLIDS
OUTLET STREAM CHARACTERISTICS	50% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	0.1

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

OUTLET STREAM DISPOSITION	TO SLUDGE TREATMENT
OVERFLOW STREAM DISPOSITION	COLLECTED IN A DISTRIBUTION BOX & THEN TRANSFERR
*** SALEABLE BYPRODUCTS	
NATURE	NONE
DISPOSITION	N/A
*** SLUDGE	
% ASH - DRY	50.0
% OTHER COMPOUNDS - DRY	50.0
** TREATMENT	
METHOD	FIXATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!
INLET QUALITY - %	37.5
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
LOCATION	OFF-SITE
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	NONE
SITE SERVICE LIFE - YRS	10
** PROCESS CONTROL AND INSTRUMENTATION	
PROCESS STREAM	RECIRCULATING SLURRY
CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	FLOW
CONTROL LEVELS	PH 7.7
MONITOR TYPE	UNIVERSAL UNILOC
MONITOR LOCATION	INLET TANGENTIAL NOZZLE TO ABSORBER
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK
** WATER BALANCE	
WATER LOOP TYPE	OPEN
EFFLUENT WATER LOSS - LITERS/S	18.9 (300 GPM)
RECEIVING WATER STREAM	MONONGAHELA RIVER
SOURCE OF MAKEUP WATER	RIVER WATER
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	MAGNESIUM-MODIFIED LIME
PRINCIPAL CONSTITUENT	CAO, MGO
SOURCE/SUPPLIER	DRAVO
CONSUMPTION	175-200 TPD
UTILIZATION - %	90.0
POINT OF ADDITION	SLAKER
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	25.0
MIST ELIMINATOR - %	25.0
FAN - %	25.0
SLAKER - %	67.0
EFFLUENT HOLD TANK - %	25.0
RECIRCULATION PUMP - %	25.0
THICKENER - %	0.0
VACUUM FILTER - %	100.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	1.0
MIST ELIMINATOR	1.0
FAN	1.0
SLAKER	0.8
EFFLUENT HOLD TANK	1.0
RECIRCULATION PUMP	1.0

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

THICKENER	0.0
VACUUM FILTER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
0/75	SYSTEM										

** PROBLEMS/SOLUTIONS/COMMENTS

THE FIRST ELRAMA SCRUBBER WAS PLACED IN SERVICE ON OCTOBER 26, 1975. IT HAD BEEN SCHEDULED FOR AN EARLIER STARTUP DATE BUT BECAUSE OF THE SEVERIT AND NUMBER OF PROBLEMS ENCOUNTERED AT PHILLIPS, STARTUP WAS DELAYED UNTIL MANY OF THE PROBLEMS AT PHILLIPS WERE RESOLVED AND THE MODIFICATIONS COUL BE INCORPORATED AT BOTH STATIONS.

BOILER NO. 2 WAS INITIALLY CONNECTED TO THE FGD SYSTEM. THIS BOILER HAS AN EQUIVALENT CAPACITY OF APPROXIMATELY 100 MW AND THE EMISSIONS CAN BE HANDLED BY ONE SCRUBBER. HOWEVER, TO ENSURE RELIABILITY IN THE CASE OF A SCRUBBER MALFUNCTION, TWO SCRUBBERS ARE OPERATED AT PARTIAL LOAD TO PROTECT THE BOILER AND TURBINE GENERATOR AGAINST A TRIP-OFF.

THE BOILER OPERATED CONTINUOUSLY ON THE SCRUBBER SYSTEM THROUGH JANUARY 1976 WITH THE EXCEPTION OF TWO MINOR OUTAGES. ON FEBRUARY 4, 1976 A SECOND BOILER WAS COUPLED INTO THE SCRUBBER COMPLEX. PRESENTLY, TWO UNITS ARE THE MAXIMUM THAT CAN BE TIED INTO THE SCRUBBER PLANT. TO DATE, THE UTILITY HAS ENCOUNTERED THE USUAL MINOR STARTUP PROBLEMS AND SOME MAJOR PROBLEMS AS WELL. THE MAJOR PROBLEMS HAVE BEEN WITH FROZEN PIPES AND THICKENERS, THE LATTER INVOLVING HARDWARE AND DESIGN PROBLEMS ASSOCIATED WITH RECIRCULATION OF THE SLUDGE WITHIN THE THICKENERS TO ATTAIN 30 TO 40% SOLIDS CONCENTRATION.

10/75	SYSTEM							744	744		

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBING SYSTEM BEGAN OPERATIONS WITH ONE BOILER CONNECTED TO THE SYSTEM (100 MW) DURING THE MONTH. THE SCRUBBING SYSTEM IS CURRENTLY IN THE SHAKEDOWN PHASE OF OPERATION.

11/75	SYSTEM							720	720		
12/75	SYSTEM							744	744		

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM IS STILL OPERATING WITH ONE BOILER CONNECTED. THE UTILITY IS PLANNING TO CONNECT ONE OR TWO ADDITIONAL BOILERS TO THE SYSTEM IN LATE JANUARY.

1/76	SYSTEM							744	744		

** PROBLEMS/SOLUTIONS/COMMENTS

FOUR OF THE FIVE SCRUBBER VESSELS HAVE BEEN IN SERVICE IN VARIOUS COMBINATIONS, AND THE SERVICE HOURS THROUGH JANUARY 31, 1976 ARE:

NO. 1 - 69 HOURS
NO. 2 - 1508 HOURS
NO. 3 - 976 HOURS
NO. 4 - 838 HOURS

THE FIFTH VESSEL HAS NOT BEEN IN SERVICE BECAUSE IT IS BEING SERVICED FOR THE TRIAL INSTALLATION OF RUBBER LINED RECYCLE PUMPS.

2/76	SYSTEM							696	696		
3/76	SYSTEM							744	744		
4/76	SYSTEM							720	720		

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SYSTEM OPERATED DURING MARCH AND APRIL WITH TWO BOILERS COUPLED INTO THE SCRUBBING SYSTEM. REVISIONS TO THE FIFTH SCRUBBING VESSEL HAVE BEEN COMPLETED AND OPERATIONS ARE PROCEEDING WITH TWO RUBBER-LINED RECYCLE PUMPS.									
5/76	SYSTEM							744	744		
6/76	SYSTEM							720	720		
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SYSTEM IS STILL OPERATING WITH TWO BOILERS COUPLED INTO THE SCRUBBING SYSTEM. THE IUCS SLUDGE FIXATION SYSTEM IS CONTINUING TO OPERATE AT THIS STATION.									
		THE FIFTH SCRUBBING VESSEL WAS TAKEN OUT OF SERVICE FOR REPAIRS AND MODIFICATIONS REQUIRED FOR THE RUBBER-LINED RECYCLE PUMPS.									
		THE UTILITY IS CURRENTLY CONDUCTING A PERFORMANCE TEST ON THE SCRUBBING SYSTEM IN THE TWO BOILER OPERATION MODE.									
7/76	SYSTEM							744	744		
8/76	SYSTEM							744	744		
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FIFTH SCRUBBING VESSEL EMPLOYING TWO RUBBER-LINED RECYCLE PUMPS WAS OPERATIONAL FOR A SHORT PERIOD OF TIME DURING THE REPORTING MONTHS. TWO BOILERS REMAIN COUPLED INTO THE SCRUBBING SYSTEM. THE CONSTRUCTION OF AD DITIONAL LIME STORAGE SILOS AND A THICKENER WILL BE REQUIRED FOR FULL SCALE OPERATION. THE UTILITY HAS SIGNED A LETTER OF INTENT WITH IUCS FOR A LONG TERM SLUDGE FIXATION SYSTEM. HIGH CALCIUM LIME IS STILL BEING EMPLOYED IN THE SCRUBBING SYSTEM.									
9/76	SYSTEM							720	720		
10/76	SYSTEM							744	744		
	** PROBLEMS/SOLUTIONS/COMMENTS										
		OPERATIONS AT THIS STATION DURING THE REPORT PERIOD PROCEEDED WITH TWO BOILERS COUPLED INTO THE FIVE-MODULE SCRUBBING SYSTEM. THE FIFTH SCRUB-BING VESSEL WAS OPERATIONAL DURING THE REPORT PERIOD WITH THE RUBBER-LINE RECYCLE PUMPS IN SERVICE. OPERATIONS ARE STILL PROCEEDING ON AN OPEN WATER-LOOP BASIS. PART OF THE THICKENER OVERFLOW IS STILL BEING DIVERTED TO THE ASH POND AND NOT RECYCLED BACK TO THE PROCESS. BECAUSE BOTH BEAVER VALLEY AND BRUCE MANSFIELD STATIONS ARE FULLY OPERATIONAL, THIS STATION HAS BEEN RELEGATED TO PEAK LOAD OPERATIONS. GENERAL LOAD OPERA-TIONS ARE FULL CAPACITY IN THE DAYTIME AND 50 TO 60% REDUCTION AT NIGHT.									
		TESTS WERE CONDUCTED DURING THE PERIOD TO DETERMINE PARTICULATE AND SO2 REMOVAL EFFICIENCIES. SO2 REMOVAL EFFICIENCY WAS 50%. PARTICULATE EMISSIONS WERE BEING REDUCED WELL BELOW 0.1 LB/MM BTU STANDARD (ACTUAL RESULTS: 0.04 LB/MM BTU). THESE RESULTS WERE BASED ON TWO BOILERS COUPLED INTO THE FIVE SCRUBBING MODULES WHILE BURNING MEDIUM-SULFUR (1.0 TO 2.8%) COAL. THE MECHANICAL COLLECTORS AND ESP'S WERE IN SERVICE DURING THE TESTS.									
11/76	SYSTEM							720	720		
12/76	SYSTEM							744	744		

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER REMAINED IN SERVICE THROUGHOUT THE REPORT PERIOD WITH TWO BOILERS COUPLED INTO THE SCRUBBING SYSTEM. A RECYCLE PUMP EVALUATION IS BEING CONDUCTED BY THE UTILITY AT BOTH PHILLIPS AND ELRAMA STATIONS.

OBSERVATIONS OF THE RUBBER-LINED RECYCLE PUMPS INDICATE SOME SEVERE ABRAS ION AND GOUGING HAVE OCCURRED AFTER 1000 HOURS OF SERVICE TIME.

1/77	SYSTEM							744	744		
2/77	SYSTEM							672	672		
3/77	SYSTEM							744	744		

** PROBLEMS/SOLUTIONS/COMMENTS

TESTING WITH THIOSORBIC LIME WAS CONDUCTED DURING THE PERIOD.

THE SCRUBBER PLANT CONTINUED OPERATIONS DURING JANUARY AND FEBRUARY WITH TWO BOILERS COUPLED INTO THE SYSTEM. INSTALLATION OF THE ADDITIONAL THICKENER LIME FEEDERS AND SILOS IS STILL IN PROGRESS. FULL COMPLIANCE OPERATION FOR THIS STATION IS SCHEDULED FOR EARLY 1978. THE FULL COMPLI- ANCE STRATEGY WILL CONSIST OF THE FOLLOWING: 83% SO2 REMOVAL FOR 2% SULFU COAL UTILIZING THIOSORBIC LIME (6-12% MG), FIXATING THE SCRUBBER SLUDGE WITH THE IUCS POZ-O-TEC STABILIZATION METHOD AND HAULING THIS MATERIAL TO AN OFFSITE DISPOSAL/LANDFILL AREA. CURRENT SO2 AND PARTICULATE REMOVAL EFFICIENCIES ARE 50 AND 99+%, RESPECTIVELY. THE INTERIM IUCS UNIT NOW IN SERVICE CONSISTS OF THE OLD MOHAVE PROTOTYPE PLUS A VACUUM FILTER. THE STABILIZATION MATERIAL HAS BEEN UTILIZED IN A PARKING LOT CONSTRUCTION PROJECT. IUCS HAS BEEN AWARDED A 10-YEAR CONTRACT FOR THE CONTINUED USE OF THIS SYSTEM FOR FUTURE PLANT OPERATIONS.

4/77	SYSTEM							720	720		
5/77	SYSTEM							744	744		

** PROBLEMS/SOLUTIONS/COMMENTS

CONSTRUCTION OF TWO 120-FOOT DIAMETER THICKENERS IS CONTINUING. DUE TO THE GOUGING OF THE RUBBER-LINED RECYCLE PUMPS DURING THEIR TESTING, THEY HAVE BEEN REMOVED. THE UTILITY IS CONSIDERING TRYING ANOTHER SET OF RUBBER-LINED PUMPS. DUQUESNE LIGHT ALSO IS CONTINUING EFFORTS TO OBTAIN ALTERNATE LANDFILL AREAS FOR SLUDGE DISPOSAL.

6/77	SYSTEM							720	720		
7/77	SYSTEM							744	744		

** PROBLEMS/SOLUTIONS/COMMENTS

DUQUESNE LIGHT REPORTED THE FOLLOWING ITEMS FOR THE ELRAMA SCRUBBER PLANT DURING THE REPORT PERIOD:
-TWO BOILERS (200 MW) WERE COUPLED INTO THE SCRUBBER PLANT.
-THE INTERIM IUCS STABILIZATION UNIT (MOHAVE PROTOTYPE) CONTINUED TO FIX ATE SCRUBBER WASTES.
-CONSTRUCTION OF THE TWO ADDITIONAL THICKENERS CONTINUED (CONSTRUCTION I ON SCHEDULE).
-FULL PLANT COMPLIANCE IS PROJECTED FOR FEBRUARY 1978.
-SO2 REMOVAL EFFICIENCY IS APPROXIMATELY 50%.
-ELRAMA IS OPERATING IN A BASE/INTERMEDIATE LOAD MODE (FULL LOAD DAYTIME HALF LOAD NIGHT-TIME). 1976 CAPACITY FACTOR WAS 69.5%.

8/77	SYSTEM							744	744		

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/77	SYSTEM							720	720		

** PROBLEMS/SOLUTIONS/COMMENTS

THE TWO ADDITIONAL THICKENERS WERE COMPLETELY INSTALLED. THE IUCS SYSTEM WAS UPGRADED. CONSTRUCTION COMPLETION IS PROJECTED FOR FEBRUARY 1978. FULL PLANT COMPLIANCE IS PROJECTED FOR APRIL 1978.

10/77	SYSTEM							744	744		

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 101 WAS UNAVAILABLE ON OCTOBER 4 DUE TO A BLEED VALVE LEAK AND WAS TAKEN OUT OF SERVICE AT THE END OF THE MONTH FOR CLEANUP.

MODULE 201 WAS AVAILABLE FOR THE ENTIRE MONTH OF OCTOBER.

MODULE 301 AND 401 HAD OUTAGES IN OCTOBER RESULTING FROM A RUBBER LINING FAILURE ON AN ID FAN.

MODULE 501 EXPERIENCED RECYCLE PUMP OUTAGES IN LATE NOVEMBER.

NEW RUBBER LINED WORMEN RECYCLE PUMPS WERE INSTALLED. THE LIME HANDLING SYSTEM INSTALLATION WORK CONTINUED. THE LAST TWO BOILERS ARE EXPECTED TO BE TIED INTO THE FGD SYSTEM BY JANUARY 1978.

11/77	101					0.0	0.0				
	201					11.7	11.7				
	301					93.3	93.3				
	401					22.5	22.5				
	501					59.2	59.2				
	SYSTEM					46.7	46.7	720	720		336

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 101, 201 AND 401 HAVE LOW OPERATIONAL HOURS BECAUSE ONLY TWO BOILE ARE TIED INTO THE FGD SYSTEM TO DATE.

THE SLUDGE HANDLING SYSTEM IS FUNCTIONING PROPERLY AND IS NOW IN FULL SER VICE.

TUBE LEAKS FORCED A BOILER OUTAGE IN NOVEMBER.

12/77	SYSTEM							744	744		
1/78	101					94.1	94.1				
	201					90.5	90.5				
	301					5.1	5.1				
	401					24.3	24.3				
	501					3.5	3.5				
	SYSTEM					54.4	54.4	744	744		405

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE PERIOD THE UTILITY REPORTED THAT A NEW WORMEN RECYCLE PUMP INSTALLED IN NOVEMBER EXPERIENCED JACK SHAFT BEARING PROBLEMS RESULTING IN REMOVAL OF SCRUBBER TRAIN 501 FROM SERVICE.

BOILER NO. 4 WAS CONNECTED, ADDING AN ADDITIONAL 176 MW OF FLUE GAS LOAD TO THE FGD SYSTEM.

THE IUCS SLUDGE DISPOSAL FACILITY IS IN SERVICE PRODUCING GOOD PRODUCT. LOW LOAD AND A COAL STRIKE HAVE HAMPERED GOOD SCRUBBER OPERATIONS. SOME

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			OUTAGE TIME HAS BEEN SCHEDULED FOR MARCH.								
2/78	101		70.8		30.4						
	201		96.2		41.2						
	301		0.0		0.0						
	401		37.2		15.9						
	501		40.0		18.0						
	SYSTEM		61.1		26.4			672	288	177	
3/78	SYSTEM		0.0		0.0			744	216	141	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS SHUTDOWN ON FEBRUARY 11 AS A RESULT OF A COAL SHORTAGE. BOILERS 1, 2 AND 4 ARE NOW COMPLETELY CONNECTED TO THE FGD SYSTEM. BOILE 3 IS UNDERGOING AN EXTENSIVE OVERHAUL AND WILL BE CONNECTED TO THE SYSTEM IN LATE APRIL.

BOILER EXIT DAMPERS WERE LINED WITH 316 SS ON AREAS OF HIGH EROSION CAUSE BY FLYASH IMPINGEMENT DURING THE OUTAGE.

EXPANSION JOINTS IN THE UPSTREAM DUCTWORK WERE SHIELDED BY METAL PLATES WHICH WERE WELDED AT ONE END DURING THE FEBRUARY-MARCH PERIOD. EXPANSION JOINTS IN THE DOWNSTREAM DUCTWORK WERE COMPLETELY REPLACED. THE DOWNSTREAM DUCTWORK WAS RELINED WITH CEILCOTE.

ALSO DURING THE OUTAGE THE MODULE 401 INTERNALS WERE CLEANED AND SOME HOLES IN THE UPPER CONICAL REGION WERE REPAIRED.

THE SYSTEM CAME BACK ON LINE IN LATE MARCH, HOWEVER, BOILER NUMBER 3 WAS NOT IN SERVICE.

4/78	SYSTEM							720	720		
5/78	SYSTEM							744	744		

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE APRIL-MAY PERIOD BOILER NUMBER 3 WAS STILL BEING OVERHAULED. FGD SYSTEM CONSTRUCTION WAS COMPLETED AND PRELIMINARY TESTING WITH THIOSORBIC LIME VERIFIED A SYSTEM SO2 REMOVAL EFFICIENCY OF 83%.

6/78	SYSTEM							720	720		
7/78	101	59.9	59.9	59.9	59.9						
	201	100.0	100.0	100.0	100.0						
	301	66.5	66.5	66.5	66.5						
	401	100.0	98.9	100.0	98.9						
	501	77.1	77.1	77.1	77.1						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 301 WAS PULLED OFF FOR A MAJOR CLEANING DURING THE JUNE-JULY PERIOD.

MIST ELIMINATOR PLUGGING WAS EXPERIENCED AS A RESULT OF LOW PH.

THE CHRONIC INABILITY TO CONTROL CHEMISTRY (PH) IS DIRECTLY RELATED TO GRIT BUILD-UP IN THE LIME HANDLING AND SLURRY PREPARATION SYSTEM.

THE UTILITY IS CURRENTLY STUDYING WAYS TO TIGHTEN THE WATER BALANCE BY US ING THICKENER SUPERNATANT INTERMITTENTLY WITH CLEAR SERVICE WATER FOR THE MIST ELIMINATORS.

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/78	101	76.9	76.9	76.9	76.9						
	201	100.0	100.0	100.0	100.0						
	301	50.7	50.7	50.7	50.7						
	401	100.0	100.0	100.0	100.0						
	501	70.9	70.9	70.9	70.9						
	SYSTEM	99.6	100.0	99.6	99.6			744	744	741	
9/78	101	72.1	72.1	72.1	72.1						
	201	59.6	56.3	58.2	56.3						
	301	93.3	89.0	92.9	89.0						
	401	78.1	78.1	78.1	78.1						
	501	93.6	93.6	93.6	93.6						
	SYSTEM	99.2	100.0	98.7	97.3			720	720	700	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE AUGUST-SEPTEMBER PERIOD THE UTILITY REPORTED THAT MODULES 301 AND 501 WERE TAKEN OFF LINE FOR CLEANING.

THE RUBBER LINING ON THREE FAN HOUSINGS REQUIRED REPAIR DURING AUGUST AND SEPTEMBER.

IT WAS NECESSARY TO SHUT DOWN THE LIME MIXING BASIN IN ORDER TO CLEAN OUT EXCESSIVE GRIT AND SOLIDS BUILD UP.

A PARTICLE EMISSION COMPLIANCE TEST WAS RUN IN DECEMBER WHICH SHOWED THE UNIT TO BE IN COMPLIANCE.

10/78	101	100.0	76.6	100.0	76.6						
	201	98.9	98.9	98.9	98.9						
	301	100.0	100.0	100.0	100.0						
	401	80.5	80.5	80.5	80.5						
	501	78.6	78.6	78.6	78.6						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
11/78	101	100.0	100.0	100.0	100.0						
	201	100.0	78.4	100.0	78.4						
	301	100.0	84.2	100.0	84.2						
	401	100.0	86.8	100.0	86.8						
	501	81.1	62.5	76.8	62.5						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	

** PROBLEMS/SOLUTIONS/COMMENTS

THE PARTICLE EMISSION TEST RUN IN AUGUST SHOWED THAT THE UNIT MET STATE STANDARDS. THE SO2 TEST WILL HAVE TO BE RERUN BECAUSE OF SAMPLING ERRORS.

THE UTILITY REPORTED DURING THE OCTOBER-NOVEMBER PERIOD THAT IT HAS HAD SOME PROBLEMS WITH AN INSUFFICIENT LIME SUPPLY.

12/78	101	100.0	94.7	100.0	94.7						
	201	76.3	72.7	75.4	72.7						
	301	93.0	85.6	92.5	85.6						
	401	68.0	64.8	66.9	64.8						
	501	97.9	69.5	97.0	69.5						
	SYSTEM	100.0	100.0	100.0	96.8			744	744	720	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER A SO2 EMISSION COMPLIANCE TEST WAS RUN AND THE UNIT WAS FOUND TO BE WITHIN THE ALLOWABLE STANDARD OF 0.6 LB/MM BTU.

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/79	101	44.7	39.8	41.9	39.8						
	201	100.0	95.2	100.0	95.2						
	301	67.8	60.2	65.3	60.2						
	401	100.0	100.0	100.0	100.0						
	501	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	98.8			744	744	735	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY HAS STARTED HAULING SLUDGE OFF-SITE TO AN AREA ABOUT 10 MILES AWAY.									
2/79	101	100.0	100.0	100.0	100.0						
	201	90.2	90.2	90.2	90.2						
	301	14.1	14.1	14.1	14.1						
	401	97.8	97.3	97.8	97.3						
	501	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			672	672	672	
3/79	101	98.9	95.4	98.8	95.4						
	201	100.0	91.0	100.0	91.0						
	301	77.7	73.8	76.8	73.8						
	401	54.5	39.2	46.3	39.2						
	501	70.4	65.9	69.0	65.9						
	SYSTEM	100.0	100.0	97.7	91.4			744	744	680	
4/79	101	64.1	61.9	63.3	61.9						
	201	57.4	53.5	55.7	53.5						
	301	100.0	99.3	100.0	99.3						
	401	100.0	89.9	100.0	89.9						
	501	92.8	90.4	92.6	90.4						
	SYSTEM	100.0	95.6	100.0	95.6			720	720	688	
5/79	101	100.0	100.0	100.0	100.0						
	201	97.8	97.8	97.8	97.8						
	301	100.0	83.1	100.0	83.1						
	401	100.0	100.0	100.0	100.0						
	501	51.6	21.4	30.6	21.4						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
6/79	101	100.0	100.0	100.0	100.0						
	201	98.5	58.5	97.5	58.5						
	301	93.3	40.0	85.7	40.0						
	401	100.0	100.0	100.0	100.0						
	501	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	99.6			720	720	717	
7/79	101	100.0	81.0	100.0	81.0						
	201	100.0	94.8	100.0	94.8						
	301	86.0	86.0	86.0	86.0						
	401	100.0	99.3	100.0	99.3						
	501	40.7	40.7	40.7	40.7						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
8/79	101	100.0	98.7	100.0	98.7						
	201	100.0	100.0	100.0	100.0						
	301	100.0	96.5	100.0	96.5						
	401	41.2	33.3	36.2	33.3						
	501	72.8	72.8	72.8	72.8						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
9/79	101	44.0	35.0	38.4	35.0						

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	201	100.0	93.3	100.0	93.3						
	301	100.0	86.6	100.0	86.6						
	401	90.0	90.0	90.0	90.0						
	501	76.9	70.0	75.2	70.0						
	SYSTEM	100.0	93.8	100.0	93.8			720	720	675	
10/79	101	100.0	100.0	100.0	100.0						
	201	100.0	96.1	100.0	96.1						
	301	47.8	34.6	39.1	34.6						
	401	94.4	87.3	94.0	87.3						
	501	84.4	84.5	84.4	84.5						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
11/79	101	100.0	100.0	100.0	100.0						
	201	15.3	15.2	15.3	15.2						
	301	92.4	92.5	92.4	92.5						
	401	100.0	98.3	100.0	98.3						
	501	95.0	93.9	94.9	93.9						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	
12/79	101	100.0	51.6	100.0	48.5						
	201	100.0	90.9	100.0	85.5						
	301	100.0	100.0	96.1	100.0						
	401	88.1	68.6	84.4	64.5						
	501	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	98.7			744	700	734	

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE NO SCRUBBER-RELATED OUTAGES DURING THE SEPTEMBER THROUGH DECEMBER PERIOD.

A NEW SO2 MONITOR, WHICH WAS INSTALLED IN OCTOBER, HAS PLUGGED ONLY ONCE SINCE INSTALLATION AND HAS REQUIRED ONLY FOUR HOURS OF MAINTENANCE PER WEEK.

1/80	101	95.8	91.2	94.8	75.2						
	201	87.1	100.0	87.1	87.1						
	301	84.6	100.0	84.6	84.6						
	401	86.4	55.6	77.1	45.8						
	501	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	98.2			744	613	528	
2/80	101	100.0	85.4	100.0	60.5						
	201	100.0	100.0	100.0	96.6						
	301	100.0	100.0	100.0	100.0						
	401	100.0	100.0	100.0	70.7						
	501	77.6	56.8	64.0	40.2						
	SYSTEM	100.0	100.0	100.0	92.0			696	493	427	

** PROBLEMS/SOLUTIONS/COMMENTS

THE NEW SO2 MONITOR INSTALLED LAST OCTOBER IS STILL OPERATING WELL AND HAS LOGGED SIX MONTHS OF OPERATION.

THE HIGH AVAILABILITIES ARE DUE TO THE 5TH MODULE BEING A TRUE SPARE. AS OF FEBRUARY 1980 AND ARE STILL OPERATING WITHOUT ANY MAJOR PROBLEMS.

THE TWO RUBBER LINED WORMEN RECYCLE PUMPS HAVE NOW LOGGED 14,000 HOURS

3/80	101	100.0	100.0	100.0	100.0						
	201	100.0	100.0	100.0	100.0						
	301	73.7	73.7	73.7	73.7						

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	401	100.0	48.4	100.0	48.4						
	501	78.1	78.1	78.1	78.1						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	595	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS AVAILABLE FOR OPERATION THE ENTIRE MONTH OF MARCH.

4/80	101	40.3	38.1	40.0	40.0						
	201	72.3	72.3	72.3	72.3						
	301	87.3	87.3	87.3	87.3						
	401	100.0	100.0	100.0	100.0						
	501	100.0	100.0	100.0	100.0						
	SYSTEM	99.4	99.4	100.0	99.4			720	720	572	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE 101 AND 201 RECYCLE PUMP IMPELLERS HAD TO BE REPLACED. THIS CAUSED EIGHT HOURS OF OUTAGE TIME FOR THESE TWO MODULES. NO OTHER FG SYSTEM OUTAGES OCCURRED.

5/80	101	100.0	100.0	100.0	100.0						
	201	40.1	37.1	38.2	37.1						
	301	94.1	89.0	93.8	89.0						
	401	90.3	71.2	88.0	71.2						
	501	96.8	96.8	96.8	96.8						
	SYSTEM	100.0	98.5	100.0	98.5			744	744	586	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE FGD SYSTEM WAS AVAILABLE FOR OPERATION THE ENTIRE MONTH.

6/80	101	100.0	100.0	100.0	100.0						
	201	100.0	97.8	100.0	97.8						
	301	100.0	96.7	100.0	96.7						
	401	0.0	0.0	0.0	0.0						
	501	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	98.6	99.7	98.6			720	720	710	61.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE MODULE 401 WAS CLEANED AND THE CEILCOTE LINER WAS REPLACED. THIS IS THE FIRST TIME SINCE START UP (APPROXIMATELY 17,000 OPERATING HOURS) THAT ANY MODULE NEEDED RELINED.

DURING JUNE NO FGD-RELATED PROBLEMS OCCURRED ON MODULES 101, 201, 301 OR 501.

7/80	101	100.0	64.9	100.0	64.9						
	201	100.0	91.1	100.0	91.1						
	301	98.5	85.6	98.3	85.6						
	401	75.8	75.8	75.8	75.8						
	501	35.5	12.9	16.7	12.9						
	SYSTEM	100.0	82.6	97.7	82.6			744	744	615	66.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE RELINING OF MODULE 401 CONTINUED INTO PART OF JULY.

8/80	101	30.9	21.2	23.5	21.2
	201	100.0	94.8	100.0	94.8
	301	100.0	93.3	100.0	93.3
	401	99.1	99.1	99.1	99.1

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	501	83.9	82.5	83.7	82.5						
	SYSTEM	100.0	97.7	100.0	97.7			744	744	727	65.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE RELINING WITH CEILCOTE ON MODULE 501 COMMENCED IN JULY AND CONTINUED FOR APPROXIMATELY 120 HOURS IN AUGUST.

THE RELINING OF MODULE 101 WITH CEILCOTE STARTED IN AUGUST ACCOUNTING FOR THE LOW AVAILABILITY DURING THE MONTH.

9/80	101	59.7	59.7	59.7	59.7						
	201	39.0	22.8	27.2	22.8						
	301	100.0	100.0	100.0	96.0						
	401	100.0	100.0	100.0	100.0						
	501	100.0	99.2	100.0	99.2						
	SYSTEM	99.7	95.4	96.8	94.4			720	720	680	64.5
10/80	101	97.9	95.8	97.8	95.8						
	201	32.4	23.3	25.6	23.3						
	301	98.5	98.5	98.5	98.5						
	401	90.5	72.7	88.3	72.7						
	501	98.5	96.5	98.4	96.5						
	SYSTEM	100.0	96.8	100.0	96.8			744	744	720	75.1
11/80	101	68.8	68.8	68.8	68.8						
	201	96.4	96.4	96.4	96.4						
	301	62.6	59.3	61.4	59.3						
	401	93.8	93.8	93.8	93.8						
	501	77.2	77.2	77.2	77.2						
	SYSTEM	99.8	98.9	99.4	98.9			720	720	711	79.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER-NOVEMBER THE LINERS IN MODULES 101, 201 AND 301 WERE REPLACED.

DURING NOVEMBER THE RUBBER LINER IN THE FAN HOUSING OF MODULE 101 WAS COATED WITH URETHANE.

THE UTILITY REPORTED THAT THE WORMAN RECYCLE PUMPS HAVE NOW ATTAINED 20,000 HOURS OF OPERATION WITHOUT REPAIRS.

12/80	101	73.0	55.1	67.1	55.1						
	201	100.0	81.3	100.0	81.3						
	301	98.9	94.6	98.9	94.6						
	401	48.4	48.4	48.4	48.4						
	501	94.9	93.4	94.8	93.4						
	SYSTEM	100.0	93.3	100.0	93.3			744	744	694	54.8
1/81	101	100.0	100.0	100.0	100.0						
	201	92.5	51.1	87.1	51.1						
	301	100.0	96.6	100.0	96.6						
	401	32.2	0.0	0.0	0.0						
	501	88.2	51.1	81.2	51.1						
	SYSTEM	100.0	74.7	92.1	74.7			744	744	556	41.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER AND JANUARY.

2/81	101	92.1	51.6	73.5	51.6

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	201	99.1	86.5	88.2	86.5						
	301	98.9	93.2	98.9	93.2						
	401	3.6	3.6	3.6	3.6						
	501	95.2	93.6	95.2	93.6						
	SYSTEM	97.2	82.1	89.9	82.1			672	672	552	33.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE RUBBER LININGS ON THE FAN HOUSINGS OF MODULES 201 AND 301 WERE REPLACED WITH INCONEL 825.

3/81	101	59.8	38.7	49.1	38.7						
	201	59.1	59.1	59.1	59.1						
	301	53.6	53.6	53.6	53.6						
	401	21.1	21.1	21.1	21.1						
	501	59.9	58.9	59.5	58.9						
	SYSTEM	63.4	57.9	60.6	57.9			744	744	431	41.4

** PROBLEMS/SOLUTIONS/COMMENTS

UTILITY REPORTED THAT THE LOW BOILER CAPACITY FACTOR FOR THE MONTH OF MARC WAS DUE TO THE COAL STRIKE (BOILERS WERE RUN AT REDUCED LOAD TO CONSERVE FUEL). GENERAL CLEANING WAS PERFORMED ON BOTH BOILERS AND FGD SYSTEM DURING THE MONTH.

THE FGD SYSTEM WAS DOWN FOR 10 DAYS TO REPAIR THE DUCTWORK AND EXPANSION JOINT LOCATED AT THE STACK. DURING THE OUTAGE, THE STACK, DAMPERS, AND REMAINING EXPANSION JOINTS WERE INSPECTED. THE STACK INSPECTION SHOWED MINOR DETERIORATION OF THE STACK FLUE.

4/81	101	88.1	76.9	86.6	76.9						
	201	72.3	46.2	62.5	46.2						
	301	90.0	82.6	89.2	82.6						
	401	86.7	85.6	86.6	85.6						
	501	94.2	82.3	93.4	82.3						
	SYSTEM	100.0	93.4	100.0	93.4			720	719	672	68.6

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF APRIL.

THE RUBBER COATED FAN HOUSING ON NUMBER 401 ID FAN WAS SPRAYED WITH A POLYURETHANE COATING TO PROTECT AGAINST CORROSION/EROSION EFFECTS.

SODIUM THIOSULFATE ADDITION WAS INITIATED IN APRIL TO AID AGAINST SCALING (HIGH EXCESS AIR PROBLEMS WHEN BOILERS RUN AT REDUCED LOADS).

5/81	101	100.0	96.7	100.0	96.7						
	201	0.0	0.0	0.0	0.0						
	301	100.0	100.0	100.0	100.0						
	401	100.0	67.0	100.0	67.0						
	501	88.7	50.2	81.7	50.2						
	SYSTEM	97.2	78.5	95.4	78.5			744	744	584	46.7

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTH OF MAY THE INGERSOLL RAND RECYCLE PUMPS ON MODULE 201 WERE REPLACED WITH RUBBER LINED WORMAN PUMPS.

6/81	101	95.4	92.6	97.1	92.6						
	201	61.7	61.7	61.7	61.7						
	301	93.3	86.0	92.8	86.0						
	401	88.3	76.7	86.8	76.7						

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	501	63.9	41.5	53.5	41.5						
	SYSTEM	100.0	89.6	98.0	89.6			720	720	645	58.0
7/81	101	98.9	86.0	98.8	86.0						
	201	100.0	98.9	100.0	98.9						
	301	0.0	0.0	0.0	0.0						
	401	98.4	93.3	98.2	93.3						
	501	100.0	100.0	100.0	100.0						
	SYSTEM	99.3	94.6	99.3	94.6			744	744	704	67.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY, MODULE 301 WAS OUT OF SERVICE FOR GENERAL CLEANING AND FOR TH INSTALLATION OF POLYURETHANE IN THE FAN HOUSING.

8/81	101	97.3	90.5	97.3	90.5						
	201	98.9	58.5	98.2	58.5						
	301	0.0	0.0	0.0	0.0						
	401	97.7	95.6	97.5	95.6						
	501	97.4	80.9	96.9	80.9						
	SYSTEM	97.8	81.4	97.5	81.4			744	744	606	43.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 301 REMAINED DOWN DURING AUGUST FOR MAINTENANCE AND CLEANING.

9/81	101	100.0	68.2	100.0	68.2						
	201	100.0	98.3	100.0	98.3						
	301	0.0	0.0		0.0						
	401	100.0	87.2	100.0	87.2						
	501	100.0	51.0	100.0	51.0						
	SYSTEM	100.0	76.2	100.0	76.2			720	720	549	39.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER MODULE 301 WAS OUT OF SERVICE FOR CLEANING AND TO REPLACE THE RECYCLE PUMP.

10/81	101	85.6	62.1	81.2	62.1						
	201	100.0	95.3	100.0	95.3						
	301	0.0	0.0	0.0	0.0						
	401	96.0	94.0	95.8	94.0						
	501	100.0	57.6	100.0	57.6						
	SYSTEM	95.4	77.2	94.2	77.2			744	744	574	45.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER THE SO2 MONITORS WERE CERTIFIED. TO DATE, THE MONITORS HAVE AN EXCELLENT PERFORMANCE RECORD.

THE UTILITY CONTINUES TO ADD SODIUM THIOSULFATE TO CONTROL SCALE BELIEVED TO BE CAUSED BY LOAD FLUCTUATIONS.

11/81	101	100.0	69.0	100.0	69.0						
	201	100.0	100.0	100.0	100.0						
	301	0.0	0.0	0.0	0.0						
	401	100.0	84.8	100.0	84.8						
	501	100.0	55.0	100.0	55.0						
	SYSTEM	100.0	77.2	100.0	77.2			720	720	556	48.0

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER, THE MODULE 301 RECYCLE PUMPS WERE REPLACED WITH RUBBER LINED PUMPS.									
12/81	101	100.0	30.3	100.0	30.3						
	201	94.5	80.2	93.5	80.2						
	301	91.9	90.7	91.7	90.7						
	401	13.5	13.5	13.5	13.5						
	501	100.0	26.2	100.0	26.2						
	SYSTEM	99.9	60.2	99.7	60.2			744	744	448	46.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER, THE UTILITY REPORTED EXPERIENCING PROBLEMS WITH THE PROCESS CHEMISTRY DUE TO LOAD FLUCTUATIONS.									
1/82	101	60.0	43.2	51.9	43.2						
	201	96.6	94.0	96.5	94.0						
	301	100.0	94.4	79.3	94.4						
	401	90.8	90.8	90.8	90.8						
	501	53.7	49.6	51.7	49.6						
	SYSTEM	100.0	94.4	79.3	94.4			744	744	702	73.0
2/82	101	0.0	0.0	0.0	0.0						
	201	79.6	78.5	79.4	78.5						
	301	96.3	93.9	96.2	93.9						
	401	100.0	82.6	100.0	82.6						
	501	91.4	81.3	90.4	81.3						
	SYSTEM	91.8	84.1	71.7	84.1			672	672	565	59.0
3/82	101	0.0	0.0	0.0	0.0						
	201	98.2	97.1	98.2	97.1						
	301	95.8	85.2	95.4	85.2						
	401	91.6	90.8	91.5	90.8						
	501	100.0	98.3	100.0	98.3						
	SYSTEM	96.4	92.8	76.5	92.8			744	744	691	67.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE FIRST QUARTER OF 1982, THE MODULE 101 RECYCLE PUMPS WERE REPLACED WITH RUBBER LINED PUMPS.									
4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE SECOND QUARTER THE CONVERSION OF THE RECYCLE PUMPS TO RUBBER LINED PUMPS WAS COMPLETED.									
7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1982 THROUGH MARCH 1983									
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1982 THROUGH JUNE 1983.									
7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED COMPLIANCE WITH STACK EMISSION TESTS CONDUCTED IN JUL AND AUGUST 1983.									
10/83	SYSTEM							744			
11/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED A TWO WEEK ANNUAL OUTAGE IN NOVEMBER, DURING WHICH TIME DAMPER AND DUCTWORK SECTIONS WERE REPAIRED.									
12/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED INSTALLING A PILOT SCRUBBER MODULE AT THE ELRAMA STATION DURING THE FOURTH QUARTER. THE 750 ACFM MODULE WILL BE USED TO TEST THE USE OF ADDITIVES IN CONJUNCTION WITH THEIR LIME PROCESS.									
1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

OVERALL FGD SYSTEM AVAILABILITY FOR THE FIRST THREE QUARTERS OF 1984 WAS ESTIMATED AT 90%.

THE UTILITY REPORTED THAT DUE TO A TIGHTENING OF THE WATER LOOP, IT IS NO LONGER NECESSARY TO SPIKE THE THIOSORBIC LIME WITH DOLOMITIC LIME. THE MAGNESIUM OXIDE CONTENT OF THE THISORBIC LIME IS SUFFICENT FOR OPERATIONS.

THE UTILITY IS NOW DIVERTING INDUCED DRAFT FAN SPRAY WATER TO AN ASH POND INSTEAD OF RECYCLING TO THE ABSORBERS. LIME CONSMPTION HAS IMPROVED SINCE THE HIGHLY ACIDIC SPRAY WATER IS NO LONGER INTRODUCED IN THE SYSTEM.

THE UTILITY REPORTED A THREE WEEK SCHEDULED ANNUAL OUTAGE IN THE FIRST THREE QUARTERS OF 1984. DURING THIS TIME REPAIRS WERE MADE TO DUCTWORK AND DAMPERS. MIST ELIMINATOR TURN VANES WERE ALSO REPLACED.

THE 1000 CFM PILOT SCRUBBER LOANED TO THE UTILITY BY DRAVO IS NOW IN OPERATION. THIS PILOT SCRUBBER IS USED TO TEST VARIOUS ADDITIVES TO THE LIME PROCESS SUCH AS SODIUM THIOSULFATE AND OTHER ORGANIC ADDITIVES.

10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT DUE TO A SLOW DOWN IN THE STEEL INDUSTRY, UNIT LOAD HAS BEEN REDUCED.

TESTING OF THE 1000 CFM PILOT SCRUBBER IS NOW UNDERWAY. VARIOUS ADDITIVES FOR ENHANCING LIME UTILIZATION AND SO2 REMOVAL WILL BE INVESTIGATED.

WORK CONTINUED ON PRESSURIZING THE STACK ANNULUS TO CONTROL FLUE GAS LEAKAGE.

THE UTILITY REPORTED A FOURTH QUARTER AVAILABILITY OF 90% FOR THEIR CONTINUOUS EMISSION MONITORS(CEM). THE STATE OF PENNSYLVANIA HAS IMPLEMENTED NEW PENALTIES FOR CEM AVAILABILITY.

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER OF 1984.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT/FGD WERE OFF-LINE APPROXIMATELY 3 WEEKS DURING THE MONTH OF APRIL FOR A SCHEDULED MAINTENANCE OUTAGE. DURING THIS OUTAGE, THE STACK ANNULUS WORK WAS COMPLETED AND OUTLET DUCTWORK CEILCOTE LINER REPAIRS WERE MADE.

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT DUE TO CUTBACKS IN POWER DEMAND IN THE HEAVY METALS AND STEEL INDUSTRIES, THEY HAVE LOST APPROXIMATELY 40% OF THEIR MARKET OR APPROXIMATELY 400 MW OF CAPACITY. THE ELRAMA FACILITY IS CURRENTLY RUNNING AT 50% OF CAPACITY AND IS NOW CONSIDERED TO BE A CYCLIC LOADED UNIT.

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE YEAR 1985.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY IS CURRENTLY ACHIEVING 90% SO2 REMOVAL WITH THE FGD SYSTEM. THEY ALSO REPORTED USING 50 TONS/HR OF THE ANTI-SCALING AGENT SODIUM THIOSULFATE.

ELRAMA 1-4 OPERATED AT APPROXIMATELY 50% CAPACITY DURING 1986. THE UTILITY REPORTED THAT UNIT 4 MAY BE PUT ON COLD STANDBY IN 1987 DUE TO REDUCED LOAD CAPACITY AND THE STARTUP OF NUCLEAR UNITS. WITH THE EXCEPTION OF A SCHEDULED TWO WEEK OUTAGE IN SEPTEMBER, NO MAJOR UNIT OR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING 1986.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/87	SYSTEM							744			

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/87	SYSTEM							672			
3/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1987.

4/87	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNITS WERE OFF-LINE FOR 2 WEEKS DURING THE MONTH OF APRIL FOR A SCHEDULED SPRING MAINTENANCE OUTAGE. DURING THIS OUTAGE THE UTILITY INSPECTED AND REPAIRED THE ABSORBER OUTLET DUCTWORK AND LOUVRE DAMPERS. THE ACID RESISTANT STACK ALIGNMENT SHOWED NO SIGNS OF LEANING OR DETERIORATION. THIS IS A CONCERN SINCE THE UTILITY STOPPED USING ITS REHEATER.

5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT ALL OF THE RUBBER LINED WET ID FANS WERE RECLADDING WITH INCONEL 625. MOST OF THE WORK WAS COMPLETED DURING THE FIRST HALF OF THE YEAR DURING REDUCED UNIT LOADING WITH THE WORK BEING COMPLETED BY NOVEMBER 1987. THE UTILITY ALSO REPORTED THAT UNIT 2 WAS OFF-LINE THE MAJORITY OF THE FIRST HALF OF THE YEAR DUE TO TURBINE REPAIRS .

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE REST OF MAY THROUGH DECEMBER 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	DUQUESNE LIGHT	
PLANT NAME	PHILLIPS	
UNIT NUMBER	1-6	
CITY	SOUTH HEIGHTS	
STATE	PENNSYLVANIA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	34.	(0.080 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	258.	(0.600 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	387	
GROSS UNIT GENERATING CAPACITY - MW	408	
NET UNIT GENERATING CAPACITY W/FGD - MW	335	
NET UNIT GENERATING CAPACITY WO/FGD - MW	349	
EQUIVALENT SCRUBBED CAPACITY - MW	408	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	FOSTER WHEELER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	CYCLING	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1047.62	(2220000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	183.3	(362 F)
STACK HEIGHT - M	104.	(340 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	7.9	(26.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26907.	(11568 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		11500-12500
AVERAGE ASH CONTENT - %	16.80	
RANGE ASH CONTENT - %	14.0-18.3	
AVERAGE MOISTURE CONTENT - %	5.93	
RANGE MOISTURE CONTENT - %	4.3-7.1	
AVERAGE SULFUR CONTENT - %	2.05	
RANGE SULFUR CONTENT - %	1.5-2.9	
AVERAGE CHLORIDE CONTENT - %	0.04	
RANGE CHLORIDE CONTENT - %	.03-.05	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	6	
NUMBER OF SPARES	0	
TYPE	MULTICLONE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	174.6	(370000 ACFM)
INLET FLUE GAS TEMPERATURE - C	183.3	(362 F)
PRESSURE DROP - KPA	0.1	(1. IN-H2O)
** ESP		
NUMBER	6	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	174.6	(370000 ACFM)
INLET FLUE GAS TEMPERATURE - C	183.3	(362 F)
PRESSURE DROP - KPA	0.1	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	70.0	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
LINER GENERIC MATERIAL	ORGANIC	

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME	
PROCESS ADDITIVES	MAGNESIUM OXIDE; SODIUM	
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES	
A-E FIRM	GIBBS & HILL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.00	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	83.00	
ENERGY CONSUMPTION - %	3.4	
CURRENT STATUS	1	
COMMERCIAL START-UP	6/1974	
INITIAL START-UP	7/1973	
CONTRACT AWARDED	7/1971	

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	2.30	
DESIGN COAL HEAT CONTENT - J/G	25586.0	(11000 BTU/LB)
DESIGN COAL ASH CONTENT - %	21.00	
DESIGN MOISTURE CONTENT - %	7.00	
DESIGN CHLORIDE CONTENT - %	0.10	
SPACE REQUIREMENTS - SQ M	24246.9	(261000 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	140.0	

** QUENCHER/PRESATURATOR

TYPE	NONE

** ABSORBER

NUMBER	4	
NUMBER OF SPARES	0	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/SIDE-MOVABLE BLADES	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	GE ENVIRONMENTAL SERVICES	
DIMENSIONS - FT	40.0 X 66.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	MAT-REINFORCED EPOXY; GLASS FLAKE-FILLED POLYEST	
LINER MATERIAL TRADE NAME/COMMON TYPE	COROLINE 505AR; FLAKELINE 103	
GAS CONTACTING DEVICE TYPE	VARIABLE THROAT VENTURI	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1008.	(16000 GPM)
L/G RATIO - L/CU.M	3.9	(29.1 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	2.0	(8.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	45.7	(150.0 FT/S)
INLET GAS FLOW - CU. M/S	259.54	(550000 ACFM)
INLET GAS TEMPERATURE - C	183.3	(362 F)
SO2 REMOVAL EFFICIENCY - %	84.0	
PARTICLE REMOVAL EFFICENCY - %	99.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR 'EXTERNAL!	
NUMBER PER SYSTEM	3	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
MANUFACTURER	HEIL	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	4	
FREEBOARD DISTANCE - M	5.79	(19.0 FT)
DISTANCE BETWEEN VANES - CM	5.1	(2.00 IN)

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

VANE ANGLES - DEGREES	90
PRESSURE DROP - KPA	1.0 (4.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.0 (10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER
WASH WATER SOURCE	THICKENER OVERFLOW
WASH FREQUENCY	CONTINUOUS

** FANS

NUMBER	4
NUMBER OF SPARES	0
DESIGN	CENTRIFUGAL
SUPPLIER	GREEN FUEL ECONOMIZER
FUNCTION	BOOSTER
APPLICATION	INDUCED DRAFT
SERVICE	WET
FLUE GAS FLOW RATE - CU.M/S	188.76 (400000 ACFM)
FLUE GAS TEMPERATURE - C	51.7 (125 F)
PRESSURE DROP - KPA	5.2 (17.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL; HIGH ALLOY; HIGH ALLOY; STAINLESS

** DAMPERS

NUMBER	4
FUNCTION	SHUT-OFF
GENERIC TYPE	BUTTERFLY
SPECIFIC TYPE	N/A
MODULATION	OPEN/CLOSED
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	LINED CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	STAINLESS STEEL
LINER SPECIFIC MATERIAL TYPE	AUSTENITIC

** DAMPERS

NUMBER	4
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MODULATION	OPEN/CLOSED
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	STAINLESS STEEL
LINER SPECIFIC MATERIAL TYPE	AUSTENITIC

** DAMPERS

NUMBER	4
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MODULATION	OPEN/CLOSED
SEAL AIR FLOW - CU. M/S	0.00 (0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

LOCATION	SCRUBBER INLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	NA
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	SCRUBBER OUTLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	NA
SHELL GENERIC MATERIAL TYPE	CARBON STEEL

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER

** REAGENT PREPARATION EQUIPMENT

FUNCTION	SLAKER
DEVICE	SLAKER
DEVICE TYPE	PASTE
MANUFACTURER	WALLACE & TIERNAN
NUMBER	4
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	3.6 (4 TPH)
PRODUCT QUALITY - % SOLIDS	22.5

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	4
REAGENT PREP PRODUCT	1
THICKENER OVERFLOW	1
SLUDGE STABILIZATION	1

** PUMPS

SERVICE	NUMBER
SCRUBBER/ABSORBER RECIRCULATION	8
THICKENER OVERFLOW	6
THICKENER UNDERFLOW	1
SLURRY FEED	5
MAKEUP WATER	1

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	2
NUMBER OF SPARES	1
CONFIGURATION	CIRCULAR
DIMENSIONS - FT	12(DIA)X16
CAPACITY	150 LB/HR/SQ FT OF CLOTH
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	30-35% SOLIDS
OUTLET STREAM CHARACTERISTICS	50% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	<0.1% SOLIDS
OUTLET STREAM DISPOSITION	SLUDGE TREATMENT
OVERFLOW STREAM DISPOSITION	THICKENER UNDERFLOW TANK

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	3
NUMBER OF SPARES	1
CONFIGURATION	CIRCULAR
DIMENSIONS - FT	75.0 DIA
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER
FEED STREAM SOURCE	ABSORBER BLEED
FEED STREAM CHARACTERISTICS	5% SOLIDS
OUTLET STREAM CHARACTERISTICS	30-35% SOLIDS
OUTLET STREAM DISPOSITION	VACUUM FILTER
OVERFLOW STREAM DISPOSITION	ME WASH

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

MOISTURE CONTENT - % TOTAL FREE WATER	27.5

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

% CASO3 - DRY	4.0
% CASO4 - DRY	10.0
% ASH - DRY	50.0
** TREATMENT	
METHOD	FIXATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!
INLET FLOW RATE - LITER/S	34.7 (550 GPM)
INLET QUALITY - %	50.0
** DISPOSAL	
NATURE	INTERIM
TYPE	CONCRETE PAD FOR ON-SITE CURING
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	N/A
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
LOCATION	OFF-SITE
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	CLAY LINING
SITE SERVICE LIFE - YRS	10
** PROCESS CONTROL AND INSTRUMENTATION	
PROCESS STREAM	SLURRY RECIRCULATION STREAM
CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	FLOW
CONTROL LEVELS	PH SET 7.7
MONITOR TYPE	UNIVERSAL UNILOC
MONITOR LOCATION	TANGENTIAL NOZZLE AT INLET TO ABSORBER
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK
** WATER BALANCE	
WATER LOOP TYPE	OPEN
EVAPORATION WATER LOSS - LITER/S	13.9 (220 GPM)
SLUDGE HYDRATION WATER LOSS - LITER/S	1.9 (30 GPM)
SLUDGE INTERSTITIAL WATER LOSS - LITERS/S	3.2 (50 GPM)
POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	300
RECEIVING WATER STREAM	OHIO RIVER
MAKEUP WATER ADDITION - LITERS/S	22.1 (350 GPM)
SOURCE OF MAKEUP WATER	RIVER
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	MAGNESIUM-MODIFIED LIME
PRINCIPAL CONSTITUENT	CAO, MGO
SOURCE/SUPPLIER	DRAVO
CONSUMPTION	120 TPD
UTILIZATION - %	85.0
POINT OF ADDITION	SLAKER
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	0.0
MIST ELIMINATOR - %	0.0
FAN - %	0.0
SLAKER - %	0.0
EFFLUENT HOLD TANK - %	0.0
RECIRCULATION PUMP - %	0.0
THICKENER - %	50.0
VACUUM FILTER - %	100.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	0.0
MIST ELIMINATOR	0.0
FAN	0.0
SLAKER	0.0
EFFLUENT HOLD TANK	0.0

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

RECIRCULATION PUMP	0.0
THICKENER	0.5
VACUUM FILTER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
0/73	SYSTEM										

** PROBLEMS/SOLUTIONS/COMMENTS

DETERMINATION OF THE AVAILABILITY OF THE PHILLIPS SYSTEM HAS BEEN DIFFICULT. UNTIL ALL BOILERS WERE CONNECTED TO THE SCRUBBERS, THERE WAS AT LEAST ONE SPARE TRAIN AND AS MUCH AS 100% SPARE SCRUBBER CAPACITY. THEREFORE HAVING A TRAIN OUT OF SERVICE FOR MAINTENANCE DID NOT REDUCE THE CAPABILITY OF THE SCRUBBER SYSTEM. UNTIL ALL SIX BOILERS WERE CONNECTED, MEANINGFUL AVAILABILITY FACTORS COULD NOT BE COMPUTED. ON MARCH 17, 1975, THE SIXTH BOILER WAS CONNECTED, AND ALL FOUR SCRUBBER TRAINS WERE REQUIRED TO BE IN SERVICE. OPERATION IN THAT MODE CONTINUED UNTIL AUGUST 4, 1975, WHEN THE NO. 6 BOILER WAS REMOVED FROM THE SCRUBBER SYSTEM BECAUSE THE PH LEVEL COULD NOT BE MAINTAINED AND DEPOSITS BECAME UNMANAGEABLE TO THE POINT THAT SCRUBBER OUTAGES WERE REDUCING GENERATING CAPABILITY OF THE STATION.

7/73	SYSTEM		81.0		31.2			744		232	

** PROBLEMS/SOLUTIONS/COMMENTS

SCRUBBING OPERATIONS BEGAN DURING JULY.

8/73	SYSTEM							744			
9/73	SYSTEM							720			
10/73	SYSTEM							744			
11/73	SYSTEM							720			
12/73	SYSTEM							744			
1/74	SYSTEM							744			
2/74	SYSTEM							672			
3/74	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

STARTUP OF A PORTION OF THE PHILLIPS SCRUBBER SYSTEM BEGAN JULY 1973. SEVERAL PROBLEMS THEN DEVELOPED IN THE FORM OF EROSION OF FANS AND THE LIME FEED SYSTEM CAUSING OUTAGES OF THE SCRUBBER SYSTEM. AFTER AND EXTENDED OUTAGE, THE SCRUBBER SYSTEM WAS RETURNED TO SERVICE IN MARCH 1974. THE SYSTEM HAS BEEN OPERATING CONTINUOUSLY SINCE IT RETURNED TO SERVICE WITH VARIOUS NUMBERS OF BOILERS CONNECTED TO THE SCRUBBER SYSTEM AND SCRUBBER TRAINS IN SERVICE.

4/74	SYSTEM							720			
5/74	SYSTEM							744			
6/74	SYSTEM							720			
7/74	SYSTEM							744			

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM CONSISTS OF 1 TWO-STAGE AND 3 ONE-STAGE VENTURI SCRUBBERS. PRESENTLY ONLY THE TWO-STAGE AND 1 ONE-STAGE TRAIN ARE IN SERVICE TREATING FLUE GAS FROM BOILERS 2, 3,AND 4 (ABOUT 40% OF THE STATION CAPACITY). CHRONIC PROBLEMS INCLUDE PUMP EROSION AND FAN VIBRATION.									
8/74	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM EXPERIENCED PLUGGING PROBLEMS IN EARLY AUGUST. THE UTILITY IS CURRENTLY INVOLVED IN A RECYCLE PUMP STUDY. CONSIDERATIONS FOR PUMP DESIGN AND MATERIALS ARE BEING MADE TO IMPROVE PUMP LIVE.									
9/74	SYSTEM							720			
10/74	SYSTEM							744			
11/74	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SINCE STARTUP IN SEPTEMBER 1973 THE FGD SYSTEM HAS OPERATED AT REDUCED CAPACITY WITH ONLY 2 OR 3 OF THE 4 TRAINS OPERATING AT ANY TIME TREATING FLUE GAS FROM 4 BOILERS (ABOUT 40% OF THE STATION CAPACITY). THE TIE IN OF BOILER NO. 5 DURING NOVEMBER HAS BOOSTED THE FGD SYSTEMS LOAD TO ABOUT 62% OF THE STATION CAPACITY. OVERALL SO2 REMOVAL EFFICIENCY IS 60%. THE TWO-STAGE TRAIN ITSELF REMOVES 80% OF THE INLET SO2. TESTS WITH MAGNESIUM PROMOTED LIME INDICATE THAT SO2 REMOVAL EFFICIENCY CAN BE BOOSTED BY 60% OVER COMMERCIAL LIME.									
		DURING THE PERIOD REBRACING OF FAN BLADES WAS IN PROGRESS.									
12/74	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER REPAIRS WERE MADE TO HOLES IN THE MIST ELIMINATORS WITH CEILCOTE APPLICATIONS.									
		FOUR TONS OF SLUDGE WERE REMOVED FROM ONE SCRUBBER BASE. THE VENTURI DAMPERS WERE SEIZING AS A RESULT OF SOLIDS BUILDUP.									
		THE UTILITY IS AWAITING THE DELIVERY OF SPARE RECYCLE PUMPS.									
1/75	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THREE SCRUBBING TRAINS OPERATED ON TWO THIRDS OF THE BOILER FLUE GAS OUTPUT. THE SCRUBBING SYSTEM OPERATED ON FLUE GAS FROM FIVE BOILERS THROUGHOUT JANUARY WITH NEARLY 100% FGD SYSTEM AVAILABILITY. OVERALL SO2 REMOVAL EFFICIENCY WAS APPROXIMATELY 60%.									
		BECAUSE OF SOLIDS BUILDUP THE DAMPERS WERE SEIZING. THE UTILITY HAS BEEN EXERCISING THE DAMPERS MORE FREQUENTLY AS A RESULT AND THIS SEEMS TO HAVE IMPROVED DAMPER OPERATIONS.									
		DUE TO COLD WINTER WEATHER AND RELATED CONDITIONS THE SLUDGE STABILIZATION PROCESS REQUIRES A LONGER PERIOD OF TIME. THE SLUDGE PONDS HAVE BEEN FILLING IN 8 TO 9 DAYS. 6 TO 7 DAYS ARE REQUIRED TO EMPTY PONDS. THE CURRENT SLUDGE PRODUCT HAS BEEN A SOUPY CONSISTENCY REQUIRING A CLAMSHELL									

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA							

TYPE DREDGE FOR THE POND. PLUGGING IN THE STABILIZING AGENT INJECTION LINES IS THOUGHT TO HAVE CONTRIBUTED TO THE POOR SLUDGE QUALITY.

SOME WET SIDE SO2 MONITORS FAILED DURING THE PERIOD. THEY ARE CURRENTLY BEING MODIFIED BY THE MANUFACTURER.

THE REHEATERS HAVE NOT YET BEEN TESTED.

2/75 SYSTEM 672

3/75 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

THE FOURTH FGD TRAIN AND THE SIXTH BOILER WERE TIED IN ON MARCH 17, 1975. ONE OF THE BOILERS WAS DOWN FOR MAINTENANCE SO THE SCRUBBING SYSTEM DID NOT OPERATE ON FLUE GAS FROM ALL SIX BOILERS.

DURING MARCH THE PROGRAM TO IMPROVE SCRUBBER RECYCLE PUMP PERFORMANCE CONTINUED. FOUR OUT OF SIX NEW PUMPS HAVE BEEN INSTALLED.

THE CALCILOX INJECTION SYSTEM LINES HAVE BEEN PLUGGING FREQUENTLY. THE UTILITY IS CONSIDERING A NEW PNEUMATIC DELIVERY SYSTEM FOR CALCILOX.

THE UTILITY IS CURRENTLY LOOKING FOR NEW SLUDGE DISPOSAL SITES.

4/75 SYSTEM 720

** PROBLEMS/SOLUTIONS/COMMENTS

THE PRESSURE DROP INSTRUMENTATION AT THE VENTURIS HAS BEEN A PROBLEM AREA.

THE DAMPERS HAVE STILL BEEN SEIZING BECAUSE OF SOLIDS BUILDUP.

ALL SIX BOILERS AND FOUR SCRUBBING TRAINS OPERATED IN AN INTEGRATED MODE IN APRIL. SOME SOLIDS BUILDUP HAS BEEN DISCOVERED AGAIN IN THE SCRUBBING TRAINS.

BECAUSE OF EROSION AND PLUGGING PROBLEMS, A CONTINUOUS WASH IS NOW PERFORMED ON THE MIST ELIMINATORS.

5/75 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

PRELIMINARY PARTICULATE MATTER REMOVAL EFFICIENCY TESTS SHOWED THAT THE UNIT MEETS THE 0.8 LB/MM BTU ALLEGHENY COUNTY STANDARD. THE OUTLET LOADINGS IN MAY WERE IN THE 0.04 LB/MM BTU RANGE.

A HOLE WAS DISCOVERED IN A SCRUBBER LINER DURING MAY. A PREVIOUSLY PATCHED AREA HAD FAILED AGAIN.

6/75 SYSTEM 720

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM OPERATED ON FLUE GAS FROM ALL SIX BOILERS DURING JUNE. THE TWO-STAGE SCRUBBING TRAIN HAS BEEN OUT OF SERVICE FOR GENERAL MAINTENANCE AND A LINER LEAK REPAIR IN THE FIRST-STAGE SCRUBBER SINCE JUNE 19.

SOME RECYCLE PUMP REPLACEMENTS WERE REQUIRED DURING JUNE.

THE SLUDGE STABILIZATION FACILITY HAS BEEN EXPERIENCING PROBLEMS.

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			UNBURNED CARBON FINES ARE CAUSING PLUGGING IN THE SCRUBBING SYSTEMS. THE UTILITY HAS BEEN TRYING A WETTING AGENT TO MINIMIZE THE PROBLEM.								
			PROBLEMS WERE EXPERIENCED WITH THE LIME HANDLING SYSTEM DURING JUNE.								
7/75	101		79.1		53.8						
	201		35.5		24.2						
	301		100.0		71.4						
	401		100.0		97.2						
	SYSTEM		90.5		61.6			744	506	458	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			GENERAL MECHANICAL PROBLEMS WERE EXPERIENCED IN JULY.								
8/75	101		97.7		64.2						
	201		100.0		91.7						
	301		66.0		43.4						
	401		65.3		42.9						
	SYSTEM		82.3		60.5			744	489	453	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			SCRUBBER UNAVAILABILITY FORCED BOILER NO.6 TO BE RETURNED TO THE SCRUBBER BYPASS PATH IN ORDER TO PREVENT LOSS OF BOILER CAPACITY.								
			PLUGGING AND MAINTENANCE PROBLEMS HAVE BEEN ENCOUNTERED.								
			EVALUATION OF VARIOUS RECYCLE PUMPS CONTINUED IN AUGUST.								
9/75	101		8.5		7.9						
	201		83.5		77.9						
	301		100.0		95.1						
	401		79.8		74.4						
	SYSTEM		68.0		63.8			720	672	460	
10/75	101		88.4		81.6						
	201		30.1		27.8						
	301		73.5		67.9						
	401		70.9		65.5						
	SYSTEM		65.7		60.7			744	687	451	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			IN OCTOBER 1975, THIOSORBIC LIME SCRUBBING WAS INITIATED IN THE PHILLIPS SINGLE-STAGE SCRUBBING TRAINS ON AN EXPERIMENTAL BASIS. THE UTILITY IS STUDYING COMPLIANCE FEASIBILITY, SO2 REMOVAL EFFICIENCY, AND QUALITY OF THE SLUDGE GENERATED BY THE SINGLE-STAGE SCRUBBING TRAINS.								
			PRESENTLY ONLY 4 OF THE 6 BOILERS ARE TIED INTO THE FGD SYSTEM.								
11/75	101		86.9		86.9						
	201		100.0		100.0						
	301		0.0		0.0						
	401		10.4		10.4						
	SYSTEM		49.3		49.3			720	720	355	
12/75	101		50.8		48.4						
	201		93.2		88.8						
	301		25.7		24.5						
	401		54.4		51.9						
	SYSTEM		56.0		53.4			744	709	397	

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY CONCLUDED THE THIOSORBIC LIME TESTING PROGRAM IN MID-DECEMBER FOUR BOILERS WERE COUPLED TO THE SCRUBBING SYSTEM DURING THE RUN. THE UTILITY IS NOW ANALYZING THE DATA GENERATED DURING THE TEST PROGRAM. THE SCRUBBERS HAVE BEEN PUT BACK ON REGULAR LIME. NO UNUSUAL PROBLEMS WERE ENCOUNTERED DURING THE TEST RUN. THE UTILITY HAS STARTED CONSTRUCTION ON AN ADDITIONAL LIME SLAKER FOR FULL SCALE MAGNESIUM PROMOTED LIME OPERATION. THE THICKENER MAY REQUIRE REDESIGN TO ACCOMODATE INCREASED CAPACITY.								
1/76	101		38.4		37.2						
	201		74.2		72.0						
	301		14.0		13.6						
	401		97.9		95.0						
	SYSTEM		56.1		54.4			744	722	405	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE 2.5-MONTH TEST PROGRAM WITH THIOSORBIC LIME INCLUDED 1612 HOURS ON ON TRAIN AND 1309 HOURS ON ANOTHER TRAIN. RESULTS INDICATE THAT THE REQUIRE DEGREE OF SO2 REMOVAL (83%) CAN BE OBTAINED WITH AN MGO CONTENT OF 8-10% IN THE LIME WITH SINGLE-STAGE SCRUBBING.								
2/76	101		97.8		94.4						
	201		98.5		95.1						
	301		24.7		23.9						
	401		60.4		58.3						
	SYSTEM		70.4		67.9			696	672	472	
3/76	101				93.4						
	201				47.5						
	301				88.6						
	401				62.0						
	SYSTEM				72.9			744		542	
4/76	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY IS STILL EXPERIENCING PROBLEMS WITH SOLIDS DEPOSITION IN THE VENTURI THROAT OF THE SCRUBBING TRAINS, CAUSING MOVEMENT INHIBITION AND GREATER PRESSURE DROPS.									
		THE SLUDGE STABILIZATION PRACTICES ARE STILL CONTINUING AT THIS FACILITY.									
		PLANT OPERATION IS PROCEEDING WITH A TOTAL OF FOUR BOILERS COUPLED INTO THE SCRUBBING SYSTEM (EQUALING 336 MW, WHICH IS 87% OF THE TOTAL PLANT CAPACITY). THE FGD SYSTEM OPERATED ON HIGH CALCIUM LIME DURING THE REPOR PERIOD. THE GENERAL OPERATION MODE AT THIS FACILITY HAS ONE OF THE FOUR SCRUBBING TRAINS OUT CONTINUALLY FOR REPAIRS, CLEANING, AND PREVENTIVE MAINTENANCE. THE FGD SYSTEM AVAILABILITY FOR THE FIRST QUARTER OF 1976 WAS 72%.								
5/76	SYSTEM							744			
6/76	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		REDUCED LOAD OPERATIONS WERE REPORTED BY THE UTILITY FOR THE MAY-JUNE PERIOD BECAUSE OF A SCHEDULED TURBINE OVERHAUL ON BOILER NO. 6.									

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

THE UTILITY IS PROCEEDING WITH THE INSTALLATION OF THREE ADDITIONAL LIME STORAGE SILOS AND A THIRD THICKENER.

THE SCRUBBING SYSTEM WAS SHUT DOWN ON JUNE 27 FOR A SCHEDULED FOUR WEEK REPAIR PERIOD. THE MAJORITY OF THE WORK WILL BE CONCENTRATED ON THE STAC ASSOCIATED DUCTWORK AND BOILER DAMPERS. THE ACID BRICK FLUE HAS BEEN LEAKING PARTICULARLY IN THE MORTAR JOINTS AND STEEL BANDS SUPPORTING THE BRICK HAVE BEEN CORRODING. CORROSION HAS OCCURRED IN THE DUCTWORK IN THE EXPANSION JOINT AREA WHERE THE DUCT ENTERS THE STACK.

THE SLUDGE IS CURRENTLY BEING STABILIZED WITH A CALCILOX ADDITION AT A RATE OF APPROXIMATELY 10% BY WEIGHT OF SLUDGE. THE UTILITY IS PLANNING T CONTRACT IUCS FOR SLUDGE STABILIZATION IN APPROXIMATELY A YEAR.

7/76	SYSTEM							744			
8/76	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FOUR-WEEK SYSTEM OVERHAUL WAS COMPLETED JULY 25. THE THREE ADDITIONA LIME STORAGE SILOS AND THE FOUNDATION FOR THE ADDITIONAL 75-FOOT DIAMETER THICKENER HAVE BEEN INSTALLED. WHEN THE NEW EQUIPMENT IS INSTALLED THE UTILITY WILL SWITCH FROM LIME TO MAGNESIUM PROMOTED (THIOSORBIC) LIME. THE UTILITY HAS SIGNED A LETTER OF INTENT WITH IUCS FOR A LONG-TERM SLUDG TREATMENT SYSTEM.

REPAIRS WERE MADE ON THE TURNING VANES TO THE SCRUBBER MIST ELIMINATORS. THE CEILCOTE COATING ON MODULE 401 FAILED (ORIGINAL COAT ERODDED AWAY AND CORROSION HAD SET IN).

REPAIR WORK WAS COMPLETED ON THE EXPANSION JOINT SEAL WHERE THE DUCTWORK TIES INTO THE MAIN STACK.

THE STEEL BANDS AROUND THE INNER STACK STRUCTURE WERE REPAIRED.

THE SCRUBBERS ID FANS WERE OVERHAULED.

THE BOILER EXIT DAMPERS WERE REPAIRED.

REPAIRS WERE MADE TO STOP LEAKING IN THE ACID-BRICK FLUE OF THE MAIN STACK.

9/76	SYSTEM							720			
10/76	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER NUMBERS 2 THROUGH 6 WERE COUPLED INTO THE SCRUBBING SYSTEM. BOILE NO. 1 IS DOWN FOR OVERHAUL AND REPAIRS. THE IUCS INTERIM SLUDGE PROCESSING PLANT IS UNDER CONSTRUCTION AND WILL BE IN SERVICE BY DECEMBER 1976. THE TEMPORARY FACILITIES WILL PROCESS THE THICKENER UNDERFLOW AND PONDED SLUDGE UNTIL THE POND IS DEPLETED OF SLUDGE AND THE PERMANENT FACILITY HA BEEN INSTALLED. SCRUBBING OPERATIONS ARE STILL PROCEEDING IN AN OPEN WATER LOOP MODE WITH PART OF THE THICKENER OVERFLOW BEING DIVERTED TO THE ASH POND. BECAUSE BOTH THE BEAVER VALLEY AND BRUCE MANSFIELD STATIONS AR FULLY OPERATIONAL, THIS STATION HAS BEEN RELEGATED TO PEAK LOAD OPERATIONS. GENERAL LOAD OPERATIONS ARE FULL LOAD CAPACITY IN THE DAYTIME AND 50 TO 67% LOAD REDUCTION AT NIGHT.

TOTAL SCRUBBER HOURS: 23,274
TOTAL BOILER HOURS: 83,642
TOTAL SCRUBBER OUTAGE TIME: 5,500
TOTAL SCRUBBER AVAILABLE

THE FIGURES AT THE LEFT WERE COMPILE BY THE UTILITY FOR SYSTEM OPERATIONS FOR THE PERIOD FOLLOWING START-UP IN JULY 1973 INCLUSIVE TO OCTOBER 1976.

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERFORMANCE DATA									
PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER BOILER HOURS	FGD HOURS	CAP. FACTOR
					HOURS: 23,274	THE TOTAL SCRUBBER HOURS VALUE IN-				
					AVERAGE MW LOAD/SCRUBBER OPERATION HOUR: 243	CLUDES OPERATION TIME WHEN ONE OR MORE OF THE MODULES WERE IN SERVICE.				
					TOTAL OPERABILITY INDEX: 28%	TOTAL BOILER AND UNAVAILABILITY VAL-				
					TOTAL RELIABILITY INDEX: 81%	UES APPLY FOR ALL THE CORRESPONDING UNITS. THE TOTAL SCRUBBER AVAILABIL TY INDEX INCLUDES THE TIME WHEN ONE OR MORE MODULES WERE AVAILABLE FOR SERVICE.				
11/76	SYSTEM							720		
12/76	SYSTEM							744		

** PROBLEMS/SOLUTIONS/COMMENTS

THE IUCS SLUDGE STABILIZATION FACILITY AT PHILLIPS WAS INSTALLED AND STARTED UP IN DECEMBER. THE FACILITY INCLUDES EQUIPMENT FOR DEWATERING, ESP-COLLECTED FLYASH ADDITION AND TRANSPORT TO THE OFF-SITE LANDFILL.

THE RECYCLE PUMP EVALUATION IS CONTINUING. AFTER 2500 HOURS OF OPERATION THE PUMPS USING CARBORUNDUM WEAR RINGS AND CD4 MCU IMPELLERS WERE HOLDING UP WELL. THEY HAVE NOW ACCUMULATED 2800 HOURS OF OPERATION (THEY WERE INSPECTED AFTER 2500 HOURS). AFTER 2900 HOURS OF OPERATION PUMPS USING CARBORUNDUM WEAR RINGS AND TITANIUM IMPELLERS WERE PERFORMING WELL.

BOILERS 2 THROUGH 6 WERE COUPLED INTO THE SYSTEM THROUGHOUT THE PERIOD. BOILER 1 REMAINED SHUT DOWN.

THE FIRST NEW SLAKER (PASTE TYPE SLAKER), ONE OF FOUR NEW UNITS CAME ON LINE DURING THE PERIOD. HIGHER STOICHIOMETRIC RATIOS, HIGHER PH VALUES AND INCREASED SO2 REMOVAL EFFICIENCY RESULTED IN THE SYSTEMS.

IN ORDER TO ENHANCE SETTLING IN THE TWO 75-FOOT DIAMETER THICKENERS A POLYELECTROLYTE MATERIAL WILL BE ADDED ON A TEMPORARY BASIS. WHEN THE NEW 75-FOOT THICKENER IS BROUGHT ON LINE THE POLYELECTROLYTE ADDITION IS EXPECTED TO BE TERMINATED.

THE CONTRACT WITH DRAVO FOR THIOSORBIC LIME (MG-PROMOTED LIME) HAS BEEN FINALIZED. THE SWITCH TO MAGNESIUM PROMOTED LIME WILL TAKE PLACE WHEN THE LAST THICKENER IS COUPLED INTO THE SYSTEM.

THE VENTURIS ARE ENCOUNTERING A GREAT DEAL OF SCALING. PRESSURE DROPS ACROSS THE VENTURIS ARE REGISTERING TWICE THE NORMAL PRESSURE DROP AT 12 INCHES H2O(6 INCHES H2O IS DESIGN).

1/77	SYSTEM							744		
2/77	SYSTEM							672		

** PROBLEMS/SOLUTIONS/COMMENTS

1977 FULL COMPLIANCE OPERATIONS WILL INCLUDE 83% SO2 REMOVAL FOR 2% SULFU COAL UTILIZING THIOSORBIC LIME (6-12% MG) AND FIXATING THE SCRUBBER WASTE WITH THE IUCS POZ-O-TEC METHOD. THE FIXATED MATTER WILL BE HAULED AWAY T AN OFF-SITE DISPOSAL AND LANDFILL. IUCS HAS BEEN AWARDED A TEN YEAR CONTRACT FOR THE USE OF THIS METHOD.

3/77	SYSTEM							744		
4/77	SYSTEM							720		

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PERFORMANCE DATA PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

ALL SIX BOILERS ARE COUPLED INTO THE FGD SYSTEM.

THE RECYCLE PUMP EVALUATION IS CONTINUING. THE CARBORUNDUM IMPELLERS AND WEAR RINGS ARE PERFORMING WELL AFTER 4000 OPERATING HOURS.

CONSTRUCTION OF THE THICKENERS AND LIME FEEDERS IS STILL CONTINUING. FULL PLANT COMPLIANCE SHOULD OCCUR BY DECEMBER 1977 WHEN THE NEW THICKENERS AND SLAKERS COME ON LINE.

THE IUCS FACILITY IS JUST FILTERING OUT WATER. NO FIXATIVE IS BEING ADDED. THE WASTE ARE BEING HAULED AWAY TO AN OFF-SITE LANDFILL ONE MILE FROM THE STATION.

SO2 AND PARTICULATE MATTER REMOVAL EFFICIENCIES ARE 50 AND 99+% RESPECTIVELY.

1975 THIOSORBIC LIME TESTS SHOWS THAT 8% MGO IN THE LIME WAS OPTIMUM FOR SO2 REMOVAL BUT IT IS POSSIBLE TO GO AS HIGH AS 12% MGO. LIME ARRIVING AT PHILLIPS WILL HAVE A 6% MGO CONCENTRATION. IT WILL BE POSSIBLE TO BLEND THE LIME TO ACHIEVE HIGHER MGO AT THE STATION IF NECESSARY.

5/77	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DAMPER AND MIST ELIMINATOR REPAIRS WILL BE CORRECTED DURING THE NEXT SCHEDULED OUTAGE. OVERALL SCRUBBER OPERABILITY IS ABOUT 75%.

THIOSORBIC LIME TESTS BEGAN IN LATE MAY BUT LASTED ONLY ABOUT ONE WEEK.

THE SCRUBBER SYSTEM WAS SHUT DOWN FOR THREE TO FOUR DAYS IN MAY DUE TO LEAKING IN THE WET DUCT HEADER THAT LEADS TO THE STACK. WHEN THE LEAK WA REPAIRED SCRUBBING OPERATIONS BEGAN AGAIN ON FLUE GAS FROM FOUR BOILERS.

WHILE FIXING A DUCT LEAK INSPECTION OF OTHER COMPONENTS REVEALED THAT THE BOILER EXIT DAMPERS WERE ERODING.

ONE OF THE MODULE 201 EXTERNAL MIST ELIMINATORS WAS SEVERLY ERODED AND PLUGGED.

THE INTERIM SLUDGE DISPOSAL SYSTEM IS STILL OPERATIONAL. THE PERMANENT SLUDGE DISPOSAL FACILITY IS ON SCHEDULE FOR THE DECEMBER 1977 COMPLETION DATE.

THE CARBORUNDUM WEAR RINGS AND IMPELLERS WERE CONTINUING TO PERFORM WELL AFTER 5000 OPERATING HOURS.

6/77	SYSTEM							720			
7/77	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

ALL SIX BOILERS ARE COUPLED INTO THE SCRUBBER PLANT. FLUE GAS FROM FIVE OF THESE UNITS IS BEING TREATED BY THE SCRUBBERS. ONLY FOUR OF THE SIX BOILERS ARE ACTUALLY OPERATING BECAUSE OF THE CURRENT TURBINE REPAIR OUTAGE. OPERATIONS ARE PROCEEDING WITH ONE SCRUBBING TRAIN OUT OF SERVIC AT ALL TIMES FOR MAINTENANCE AND CLEANOUT. SO2 REMOVAL EFFICIENCY IS APPROXIMATELY 50%.

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

BOILER 6 HAS BEEN OUT OF SERVICE WHILE TURBINE REPAIRS ARE BEING MADE.

THE RECYCLE PUMP EVALUATION STUDY CONTINUED DURING THE PERIOD. COMPONENT BEING EVALUATED INCLUDE: CARBORUNDUM IMPELLERS, CARBORUNDUM WEAR RINGS, TITANIUM IMPELLERS, 317SS WEAR RINGS AND STELLITE TIPPED IMPELLERS.

A THIOSORBIC LIME TEST WAS PREMATURELY TERMINATED BECAUSE OF SOME MINOR SLAKER/FEEDER PROBLEMS. HIGH CALCIUM VIRGIN LIME WAS UTILIZED DURING THE MAJORITY OF OPERATIONS THROUGHOUT THE PERIOD.

8/77	SYSTEM							744			
9/77	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

LIME HANDLING AND SOLID WASTE DISPOSAL FACILITIES WERE BEING SCALED UP TO HANDLE FULL CAPACITY AND A THIRD THICKENER WAS INSTALLED AND BROUGHT INTO SERVICE DURING THIS REPORT PERIOD. THE IUCS SYSTEM IS STILL PERFORMING INTERIM PHASE OPERATIONS. WASTE WATER IS BEING MIXED WITH FLYASH AND DISPOSED WITHOUT FIXATIVE ADDITION. CURRENT CONSTRUCTION WORK IS EXPECTE TO BE COMPLETED BY THE END OF JANUARY WHEN ALL SIX BOILERS WILL BE BACK O LINE FOR A TWO MONTH TEST PERIOD. THIOSORBIC LIME IS STILL BEING TESTED. RESULTS ARE NOT YET AVAILABLE. THE FGD SYSTEM WILL BE DOWN FOR THE FIRST WEEKEND OF NOVEMBER. THE SYSTEM WILL ALSO BE CHECKED FOR MAIN DUCT LEAKS AT THIS TIME. THE SCRUBBER AND STACK LININGS AND RECYCLE PUMPS WILL BE THOROUGHLY CHECKED AS WELL. NECESSARY REPLACEMENTS AND REPAIRS WILL BE CARRIED OUT. CURRENT SO2 REMOVAL EFFICIENCY IS 50%. BY EARLY APRIL 1978 THE SYSTEM IS EXPECTED TO REACH COMPLIANCE WITH AN SO2 REMOVAL EFFICIENCY OF 83%.

10/77	101			92.6			92.6				
	201			4.0			4.0				
	301			88.3			88.3				
	401			87.7			87.7				
	SYSTEM							744	744	507	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 101 WAS DOWN A TOTAL OF 113 HOURS IN OCTOBER FOR REGULAR MAINTEN-_ ANCE AND REPAIRS.

MODULE 201 WAS PUT IN SERVICE ON OCTOBER 26 AFTER EXTENSIVE CLEAN UP. ALSO REPAIRS TO THE ID FAN HOUSING RUBBER LINING WERE MADE AND THE FAN WA BALANCED.

MODULE 301 WAS DOWN A TOTAL OF 57 HOURS IN OCTOBER FOR MAINTENANCE AND REPAIRS.

MODULE 401 WAS DOWN A TOTAL OF 36 HOURS IN OCTOBER FOR REPAIR OF HOLES IN THE ID FAN LINING AND FOR THE TIE-IN OF THE THICKENER BLEED LINE.

11/77	101			92.1			92.1				
	201			91.6			91.6				
	301			28.1			28.1				
	401			56.3			56.3				
	SYSTEM			67.0			67.0	720	720	483	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SHUTDOWN OUTLET DUCT LEAKS WERE REPAIRED.

BOILER EXIT DAMPERS WERE REPLACED. THE OLD DAMPERS FAILED DUE TO FLYASH EROSION.

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

CORROSION OF STEEL BANDS IN STACK WAS DISCOVERED DURING THE PERIOD. THE CORROSION IS A RESULT OF CONDENSED MOISTURE SEEPING THROUGH THE MORTAR.

SLUDGE HANDLING PROBLEMS HAVE OCCURRED BECAUSE DEWATERING OPERATIONS ARE NOT WORKING PROPERLY.

THE RESULTS FROM THIOSORBIC LIME USE CAN NOT YET BE QUANTIFIED DUE TO LIM FEED SYSTEM PROBLEMS.

LIME FEED SYSTEM PROBLEMS OCCURRED OVER THE PERIOD.

THE MIST ELIMINATORS WERE CLEANED DURING NOVEMBER.

12/77	SYSTEM							744			
1/78	101			84.3		84.3					
	201			77.2		77.2					
	301			0.0		0.0					
	401			65.1		65.1					
	SYSTEM			56.6		56.7		744	744	421	

** PROBLEMS/SOLUTIONS/COMMENTS

CUMULATIVE HOURS FOR JANUARY 1, 1977 THROUGH JANUARY 8, 1978 WERE 22391 FOR MODULE 101, 20998 FOR MODULE 201, 22229 FOR MODULE 301 AND 22259 FOR MODULE 401.

SCRUBBER TRAIN 301 WAS DOWN FOR AN OVERHAUL FROM NOVEMBER 17 TO FEBRUARY 6, 1978 WHEN IT WAS RETURNED TO SERVICE.

SCRUBBER TRAIN 401 WAS REMOVED FROM SERVICE ON FEBRUARY 6.

THE IUCS INTERIM SLUDGE TREATMENT SYSTEM HAS SOME DEWATERING PROBLEMS. DURING DECEMBER PHILLIPS EXPERIENCED POOR SLUDGE REMOVAL. THE IUCS PLANT IS WORKING ON A PART TIME BASIS. FULL OPERATIONS ARE EXPECTED LATE THIS SPRING. THE POOR QUALITY SLUDGE IS SENT TO AN EMERGENCY POND AND THEN RE CIRCULATED BACK TO THE THICKENER.

TESTING WITH THIOSORBIC LIME AT 5% MGO HAS SHOWN THAT THE MGO CONCENTRATION IS NOT GREAT ENOUGH TO EFFECT ADEQUATE SO2 REMOVAL ON A SINGLE STAGE SCRUBBER. THE UTILITY IS GOING TO TEST AT A GREATER MGO CONCENTRATION BY STARTING AT 10% AND THEN DROPPING BACK UNTIL THE CONCENTRATION IS SATISFACTORY. THIS TESTING, AS WELL AS SCRUBBER OPERATIONS, HAVE, HOWEVER, BEEN HAMPERED BY LOW LOADS AS A RESULT OF THE COAL STRIKE.

AN OUTAGE HAS BEEN SCHEDULED AT PHILLIPS TO REPLACE THE CARBON STEEL SUPPORT BANDS IN THE STACK WITH STAINLESS STEEL BANDS.

2/78	101			43.5		31.1					
	201			58.5		41.8					
	301			3.8		2.7					
	401			31.7		22.6					
	SYSTEM			34.4		24.6		672	480	167	
3/78	SYSTEM	0.0				0.0		744	0	0	

** PROBLEMS/SOLUTIONS/COMMENTS

AN OUTAGE OCCURRED BETWEEN JANUARY 6 AND JANUARY 8 WHEN THE STACK DRAIN LEAKS WERE REPAIRED BY SANDBLASTING THE OUTER WALL AND REPLACING THE CARBON STEEL BANDS WITH STAINLESS STEEL BANDS.

THE SYSTEM WAS SHUTDOWN ON FEBRUARY 11 DUE TO THE COAL SHORTAGE. THE OUTAGE CONTINUED THROUGH MARCH AND THE SYSTEM IS SCHEDULED TO BE ON LINE BY

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

APRIL 15. DURING THE OUTAGE A NUMBER OF REPAIRS AND MODIFICATIONS WERE MADE.

THE BOILER EXIT DAMPERS WERE LINED WITH 316 SS ON AREAS OF HIGH EROSION CAUSED BY FLYASH IMPINGEMENT.

EXPANSION JOINTS ON THE INLET DUCTWORK WERE SHIELED BY METAL PLATES WHICH WERE WELDED AT ONE END.

NUMEROUS HOLES IN THE WET GAS DUCT WORK WERE REPAIRED AND THE DUCTS WERE RELINED WITH CEILCOTE.

THE VENTURI THROAT DAMPERS WERE CLEANED ON ALL THE SCRUBBERS.

INTERNAL MIST ELIMINATORS WERE CLEANED. THE EXTERNAL MIST ELIMINATORS, WHICH ARE BADLY DETERIORATED, MAY BE REPLACED.

THE STACK ACID BRICK FLUE WAS INSPECTED AND SOME BRICKS WERE REPLACED AT THE TOP OF THE STACK.

CONSTRUCTION WORK ON ADDITIONAL EQUIPMENT SUCH AS THE THICKENER AND SILOS IS ALMOST COMPLETE. IT WAS NOTED THAT THE CEILCOTE LINER COROLINE 505AR HAS HELD UP WELL OVER THREE YEARS ON THE CONICAL APEX OF MODULE 401.

4/78	SYSTEM							720	528		
5/78	SYSTEM							744	744		

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM CAME BACK ON LINE AFTER THE COAL STRIKE IN LATE MARCH. IT IS NOT OPERATING AT FULL LOAD BECAUSE THE NO. 6 BOILER IS STILL OUT AND SHOULD BE BACK ON LINE IN MID-JULY. COMPLIANCE TESTS WILL TAKE PLACE IN JULY, AFTER BOILER 6 IS BACK ON LINE, TO SEE IF THE SYSTEM IS MEETING THE 83% SO2 REMOVAL REQUIREMENT FOR 2% SULFUR COAL. THERE WERE NO HOURS REPORTED FOR THIS PERIOD BECAUSE OF PRELIMINARY TESTING BEING CONDUCTING IN PREPARATION FOR THE COMPLIANCE TESTS. SO FAR, TESTS INDICATE THAT THE SYSTEM WILL COMPLY WITH THE REQUIRED STANDARDS. THE OPERABILITY FOR ALL FOUR TRAINS WAS BETWEEN 65 AND 75%.

6/78	SYSTEM							720	720		
7/78	101	48.3	48.3	48.3							
	201	43.9	43.9	43.9							
	301	85.7	78.7	78.7							
	401	82.5	76.0	76.0							
	SYSTEM	65.1	61.7	61.7				744	744	459	

** PROBLEMS/SOLUTIONS/COMMENTS

THE INTERNAL MIST ELIMINATOR ON MODULE 201 WAS REPLACED AND THE MODULE 30 MIST ELIMINATORS WERE CLEANED OVER THE PERIOD.

THE FGD SYSTEM HAS ACCUMULATED APPROXIMATELY 24000 HOURS OF OPERATION ON ALL FOUR MODULES SINCE START-UP.

WATER BALANCE PROBLEMS HAVE CONTRIBUTED TO THE OCCURRANCE OF LOW PH, RESULTING IN MIST ELIMINATOR PLUGGING.

THE MIST ELIMINATOR PLUGGING IS ALSO RELATED TO LOW PH RESULTING FROM LIM HANDLING AND SLURRY PREPARATION SYSTEM FAILURE.

THE UTILITY IS CURRENTLY STUDYING WAYS TO TIGHTEN THE WATER BALANCE BY USING THICKENER SUPERNATANT INTERMITTENTLY WITH CLEAR SERVICE WATER FOR

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

THE MIST ELIMINATORS.

THE LIME HANDLING FACILITY DOES NOT INCLUDE A GRIT REMOVAL STAGE. GRIT IS CAUSING PLUGGING IN THE SLURRY HANDLING SYSTEM AND MIXING EQUIPMENT.

PROCESS CHEMISTRY CONTROL IS A CHRONIC PROBLEM AT PHILLIPS DUE IN PART TO TO WATER BALANCE AND LIME HANDLING EQUIPMENT.

WHEN WATER BALANCE IS ACHIEVED THE FGD SYSTEM EXPERIENCES A BUILD UP OF SALTS.

8/78	101	100.0	97.3	97.3							
	201	73.2	71.9	71.9							
	301	100.0	88.8	88.8							
	401	92.4	85.0	85.0							
	SYSTEM	91.4	85.8	85.8				744	744	638	

** PROBLEMS/SOLUTIONS/COMMENTS

THE RUBBER LINING IN MODULE 101 WAS REPAIRED.

HIGH PRESSURE WATER CLEANING WAS PERFORMED ON MODULES 101 AND 401.

9/78	101	63.7	62.4	62.4							
	201	82.7	75.6	75.6							
	301	83.9	67.5	67.5							
	401	65.6	55.7	55.7							
	SYSTEM	74.0	65.3	65.3				720	720	470	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE AUGUST-SEPTEMBER PERIOD MIST ELIMINATOR CLEANING TOOK PLACE IN ORDER TO CORRECT THE PLUGGING PROBLEM.

IN AUGUST THE INTERNAL MIST ELIMINATOR ON MODULE 201 WAS REPLACED.

THE LIME MIXING BASIN HAD TO BE SHUT DOWN OVER A WEEKEND SO THAT EXCESSIVE GRIT AND SOLID PARTICLES THAT HAD BUILT UP COULD BE CLEANED OUT.

HIGH PRESSURE WATER CLEANING WAS PERFORMED ON MODULES 101 AND 401.

THE RUBBER LINING IN MODULE 101 WAS REPAIRED.

A MAJOR PROBLEM AREA DURING THE PERIOD WAS CAUSED BY INSUFFICIENT SUPPLIES OF DRY FLYASH TO MIX WITH THE SLUDGE. AS A RESULT THE SLUDGE HAS BEEN LEAKING OUT OF THE TRANSPORT TRUCKS WHILE IN TRANSIT TO THE FINAL DISPOSAL SITE. APPARENTLY NOT ENOUGH FLYASH IS BEING COLLECTED WITH THE PRESENT SYSTEM.

10/78	101	100.0	96.1	96.1							
	201	97.7	87.5	87.5							
	301	95.3	87.9	87.9							
	401	4.8	2.2	2.2							
	SYSTEM	74.5	68.4	68.4				744	744	509	
11/78	101	44.0	41.1	41.1							
	201	100.0	100.0	100.0							
	301	91.7	88.9	88.9							
	401	71.3	69.0	69.0							
	SYSTEM	76.8	74.8	74.8				720	720	538	

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			SO2 AND PARTICULATE MATTER REMOVAL EFFICIENCY TESTS INDICATE THAT THE STATION NOW MEETS STATE STANDARDS.								
			THE FGD SYSTEM IS EXPERIENCING A LARGE AMOUNT OF SCALING BECAUSE OF THE HIGH EXCESS AIR ENTERING THE SYSTEM FROM THE BOILERS OXIDIZING THE SOFT SULFITE TO SULFATE ON THE SCRUBBER INTERNALS.							
12/78	101	91.7	90.8		90.8						
	201	98.0	88.1		88.1						
	301	30.3	27.8		27.8						
	401	90.4	87.5		87.5						
	SYSTEM	77.6	73.6		73.6			744	744	547	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING THE PERIOD A LACK OF FLYASH FOR MIXING WITH SLUDGE RESULTED IN A WET SLUDGE PRODUCT THAT MUST BE LEFT ON SITE TO DRY BEFORE TRANSPORT TO THE LANDF\ILL.								
1/79	101	89.0	86.8		86.8						
	201	77.9	69.2		69.2						
	301	50.1	50.0		50.0						
	401	86.1	83.7		83.7						
	SYSTEM	75.8	72.4		72.4			744	744	539	
2/79	101	38.9	38.9		38.9						
	201	72.1	72.1		72.1						
	301	88.3	88.3		88.3						
	401	100.0	100.0		100.0						
	SYSTEM	74.8	74.8		74.8			672	672	503	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			EXCESSIVE SCALING IN THE MODULE 101 EXIT DUCT CAUSED SUPPORT COLUMNS TO COLLAPSE. THE SCALE WAS REMOVED AND THE SUPPORT COLUMNS WERE SHORED UP.								
3/79	101	0.0	0.0		0.0						
	201	96.6	96.3		96.3						
	301	97.6	88.0		88.0						
	401	100.0	100.0		100.0						
	SYSTEM	73.6	71.1		71.1			744	744	529	
4/79	101	89.9	86.8		86.8						
	201	5.9	5.9		5.9						
	301	97.6	85.0		85.0						
	401	89.0	84.9		84.9						
	SYSTEM	70.6	65.7		65.7			720	720	473	
5/79	101	100.0	100.0		100.0						
	201	0.0	0.0		0.0						
	301	99.3	96.6		96.6						
	401	99.4	99.2		99.2						
	SYSTEM	74.7	74.0		74.0			744	744	550	
6/79	101	70.8	70.5		70.5						
	201	28.8	22.2		22.2						
	301	85.6	83.7		83.7						
	401	85.5	77.2		77.2						
	SYSTEM	67.7	63.4		63.4			720	720	457	
7/79	101	100.0	98.6		98.6						

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	201	98.5	95.8		95.8						
	301	72.7	71.4		71.4						
	401	29.9	25.5		25.5						
	SYSTEM	75.3	72.8		72.8			744	744	542	
8/79	101	100.0	100.0		100.0						
	201	97.6	89.5		89.5						
	301	100.0	89.3		89.3						
	401	0.0	0.0		0.0						
	SYSTEM	74.4	69.7		69.7			744	744	519	
9/79	101	88.8	81.8	88.8	81.8						
	201	94.8	80.3	93.9	80.3						
	301	99.6	85.5	99.6	85.5						
	401	0.0	0.0	0.0	0.0						
	SYSTEM	70.8	61.9	70.4	61.9			720	720	446	
10/79	101	99.4	97.0	99.3	97.0						
	201	86.5	86.6	86.6	86.6						
	301	93.8	93.0	93.7	93.0						
	401	0.0	0.0	0.0	0.0						
	SYSTEM	69.9	69.2	69.9	69.2			744	696	515	
11/79	101	53.0	50.7	51.9	50.7						
	201	99.0	99.0	99.0	99.0						
	301	83.6	83.6	83.6	83.6						
	401	11.5	11.5	11.6	11.5						
	SYSTEM	61.8	61.2	61.5	61.2			720	720	441	
12/79	101	0.0	0.0	0.0	0.0						
	201	100.0	98.6	100.0	98.6						
	301	90.7	89.6	90.6	89.6						
	401	77.7	72.9	76.6	72.9						
	SYSTEM	67.1	65.3	66.8	65.3			744	744	486	

** PROBLEMS/SOLUTIONS/COMMENTS

PRESENTLY THE UTILITY HAS BEEN ADDING SODIUM THIOSULFATE TO THE LIME TO PREVENT SCALE FORMATION. THIS PROCESS HAS IMPROVED SO2 COLLECTION AS WELL.

THE SCRUBBER FAN HOUSING LINERS ARE BEING REPLACED.

THE MECHANICAL COLLECTORS ARE BEING UPGRADED TO IMPROVE THE QUALITY OF THE WET SLUDGE.

1/80	101	0.0	0.0	0.0	0.0						
	201	98.1	93.3	98.0	93.3						
	301	100.0	99.0	100.0	99.0						
	401	97.6	95.8	97.5	95.8						
	SYSTEM	73.9	72.0	73.9	72.0			744	744	536	
2/80	101	13.7	13.7	13.7	13.7						
	201	91.6	91.6	91.7	91.6						
	301	86.2	84.6	86.0	84.6						
	401	94.2	90.5	94.0	90.5						
	SYSTEM	71.4	70.1	71.4	70.1			696	696	488	

** PROBLEMS/SOLUTIONS/COMMENTS

SODIUM THIOSULFATE ADDITION CONTINUED THROUGH THE FIRST QUARTER RESULTING IN A INCIDENCE OF SIGNIFICANTLY REDUCED MIST ELIMINATOR SCALING. 2000-5000 HOURS OF OPERATION HAVE BEEN LOGGED WITHOUT MIST ELIMINATOR SCALE ACCUMULATION. THE UTILITY REPORTED THAT SO2 REMOVAL EFFICIENCY HAS

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

IMPROVED 3% DUE TO THE SODIUM THIOSULFATE ADDITION. THE UTILITY IS LOOKIN INTO SODIUM THIOSULFATE ADDITION AT ELRAMA.

THE FAN RUBBER LINERS HAVE BEEN A CONTINUAL PROBLEM. TWO FANS WILL BE REPLACED WITH INCONEL THE NEXT TIME THE RUBBER LINERS FAIL.

THE PHILLIPS FGD SYSTEM HAD A SYSTEM AVAILABILITY OF 71.8% FOR THE YEAR 1979.

3/80	101	94.7	84.0	94.0	84.0						
	201	59.0	53.9	56.8	53.9						
	301	48.4	40.3	43.8	40.3						
	401	95.4	95.3	99.8	95.3						
	SYSTEM	60.3	54.7	73.6	54.7			744	744	407	

** PROBLEMS/SOLUTIONS/COMMENTS

PROBLEMS WERE ENCOUNTERED WITH THE MODULE 101 ID FAN. THE MODULE WAS TAKEN OFF LINE SO THE ID FAN COULD BE BALANCED.

PROBLEMS WERE ENCOUNTERED WITH THE HUB BOLTS ON THE ID FAN OF MODULE 201, CAUSING THE MODULE TO COME OFF LINE FOR 11 DAYS.

THE RUBBER LINING ON THE ID FAN HOUSING OF MODULE 301 NEEDED REPAIR DURING MARCH.

MODULE 401 WAS TAKEN OFF LINE FOR APPROXIMATELY 2 HOURS SO REPAIRS COULD BE MADE ON THE SCRUBBER MAKE-UP VALVES.

4/80	101	92.6	89.4	92.4	89.4						
	201	14.2	10.0	10.5	10.0						
	301	99.2	99.0	99.8	99.0						
	401	95.8	94.6	98.6	94.6						
	SYSTEM	96.9	73.3	75.6	73.3			720	720	527	

** PROBLEMS/SOLUTIONS/COMMENTS

ON APRIL 5 MODULE 101 WAS TAKEN OFF LINE DUE TO ID FAN BEARING PROBLEMS. LATER IN THE MONTH THE MODULE WAS SHUTDOWN DUE TO AN ID FAN INSTRUMENTATIO PRESSURE SWITCH PROBLEM.

TOWARDS THE LATTER PART OF APRIL, MODULE 201 WAS SHUTDOWN DUE TO ID FAN BEARING PROBLEMS. THIS PROBLEM WAS CORRECTED BY BALANCING THE FAN.

MODULE 301 WAS REMOVED FROM OPERATION ON APRIL 11 DUE TO AN ID FAN MOTOR MALFUNCTION.

THE RECYCLE PUMP PACKING ON MODULE 401 NEEDED TO BE REPLACED DURING THE MONTH.

5/80	101	67.5	53.9	62.3	53.9						
	201	81.6	69.0	78.9	69.0						
	301	91.7	73.1	89.8	73.1						
	401	92.2	75.9	90.6	75.9						
	SYSTEM	83.2	68.0	80.2	68.0			744	744	506	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 101 CAME OFF LINE IN MAY SO REPAIRS COULD BE MADE ON THE CONTROL DAMPER AND TO INSTRUMENTATION.

DURING MAY MODULE 201 EXPERIENCED PROBLEMS WITH THE MIST ELIMINATOR AND THE ID FAN. THE MODULE WAS TAKEN OFF LINE FOR APPROXIMATELY TWO DAYS TO WASH THE MISTELIMINATOR INTERNALS AND ONE DAY TO REPAIR THE ID FAN BEARING

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
			MODULE 301 EXPERIENCED ID FAN PROBLEMS AND WAS TAKEN OFF LINE WHILE THE ID FAN WAS BALANCED.								
			MODULE 401 WAS SHUTDOWN APPROXIMATELY 58 HOURS SO THAT THE ID FAN CONTROL DAMPERS COULD BE INSPECTED.								
6/80	101	97.1	86.3	96.5	80.5						
	201	100.0	81.7	100.0	76.2						
	301	75.5	69.4	72.6	64.8						
	401	100.0	76.5	100.0	71.4						
	SYSTEM	93.2	78.5	91.5	73.2			720	672	527	55.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE MODULE 101 MIST ELIMINATOR WAS CLEANED DURING JUNE.								
			DURING JUNE MODULE 301 WAS DOWN FOR ID FAN HOUSING REPAIRS (RUBBER LINING) CAUSING APPROXIMATELY 176 HOURS DOWN TIME.								
7/80	101	94.0	86.2	93.5	86.2						
	201	100.0	94.7	100.0	94.7						
	301	94.7	84.1	94.0	84.1						
	401	91.1	83.5	90.3	83.5						
	SYSTEM	94.9	87.1	94.5	87.1			744	744	648	71.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING JULY THE RECYCLE PUMP IMPELLERS WERE REPLACED ON ALL THE MODULES EXCEPT FOR MODULE 201.								
8/80	101	91.1	72.9	90.6	72.9						
	201	96.9	85.8	96.5	85.8						
	301	87.6	85.3	89.6	85.3						
	401	92.3	86.1	91.8	86.1						
	SYSTEM	92.0	82.5	91.5	82.5			744	744	614	58.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING AUGUST MODULE 401 EXPERIENCED PACKING PROBLEMS WITH THE RECYCLE PUMP.								
			DURING THE PERIOD OF JUNE THROUGH AUGUST THE RUBBER LININGS ON THE FAN HOUSINGS WERE REPAIRED.								
9/80	101	55.8	55.8	60.9	55.8						
	201	46.1	41.7	43.6	41.7						
	301	54.9	46.2	50.6	46.2						
	401	60.6	32.9	45.5	32.9						
	SYSTEM	54.4	47.3	47.0	44.2			720	720	318	30.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
			ON SEPTEMBER 20 THE ENTIRE PLANT WAS SHUTDOWN FOR A SCRUBBER INSPECTION. THE INSPECTION REVEALED THAT THERE IS EXTENSIVE MORTAR DETERIORATION IN THE STACK AND THAT REPAIRS WILL BE NECESSARY WITHIN THE NEXT TWO YEARS.								
			THE INSPECTION LASTED UNTIL OCTOBER 1 DUE TO THE NECESSARY REPAIR OF A DUCT EXPANSION JOINT AND THE REPAIR OF THE UPPER PORTION OF THE STACK JOINTS.								
10/80	101	94.2	94.2	94.2	94.2						
	201	93.9	90.1	93.5	90.1						
	301	4.0	4.0	4.0	4.0						

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	401	93.8	92.6	93.6	92.6						
	SYSTEM	71.5	70.2	71.3	70.2			744	720	523	58.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER SCRUBBER MODULES 301 AND 401 WERE RELINED WITH CEILCOTE CORALINE 505 AR LINERS.									
11/80	101	51.5	50.8	51.2	50.8						
	201	100.0	99.9	99.9	99.9						
	301	95.3	93.5	95.2	93.5						
	401	92.3	91.6	92.2	91.6						
	SYSTEM	84.8	84.0	84.6	84.0			720	720	604	72.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER MODULE 101 WAS RELINED WITH CEILCOTE CORALINE 505 AR LINER									
12/80	101	100.0	99.9	100.0	99.9						
	201	1.3	0.0	0.0	0.0						
	301	100.0	98.8	100.0	98.8						
	401	100.0	88.1	100.0	88.1						
	SYSTEM	75.3	71.7	75.0	71.7			744	744	534	62.2
1/81	101	100.0	100.0	100.0	100.0						
	201	0.0	0.0	0.0	0.0						
	301	87.8	85.5	87.5	85.5						
	401	98.8	91.2	98.7	91.2						
	SYSTEM	71.7	69.2	71.6	69.2			744	744	533	56.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER AND JANUARY.									
2/81	101	95.3	86.6	94.8	86.6						
	201	74.9	73.6	74.6	73.6						
	301	28.4	23.8	24.9	23.8						
	401	100.0	93.1	100.0	93.1						
	SYSTEM	74.7	69.3	73.6	69.3			672	672	466	47.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY A ROUTINE INSPECTION OF THE STACK REVEALED DETERIORATION OF THE ACID-RESISTANT BRICK AND MORTAR, WHICH WILL NECESSITATE REPLACEMENT IN THE NEAR FUTURE.									
3/81	101	97.2	97.2	97.2	97.2						
	201	99.1	99.1	99.1	99.1						
	301	0.0	0.0	0.0	0.0						
	401	96.7	96.7	96.7	96.7						
	SYSTEM	73.3	73.3	73.3	73.3			744	744	545	72.8
4/81	101	93.9	81.0	92.9	81.0						
	201	98.5	97.2	98.5	97.2						
	301	18.5	18.5	18.5	18.5						
	401	82.3	82.3	82.3	82.3						
	SYSTEM	73.3	69.8	73.1	69.8			720	720	502	59.7
5/81	101	92.7	80.3	91.7	80.3						
	201	100.0	93.4	100.0	93.4						
	301	92.3	91.1	92.2	91.1						
	401	0.0	0.0	0.0	0.0						
	SYSTEM	71.3	66.2	71.0	66.2			744	744	493	60.0

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MARCH, APRIL, AND MAY.									
		DURING THE MONTH OF MAY, REPLACEMENT OF THE RUBBER-LINED CARBON STEEL HOUSING WITH INCOLEY 825 ON NUMBER 401 ID FAN WAS INITIATED. HOUSING REPLACEMENTS ON FANS 201 AND 301 HAVE BEEN COMPLETED.									
		SODIUM THIOSULFATE ADDITION WAS UTILIZED THROUGHOUT THE MONTHS OF MARCH, APRIL, AND MAY TO REDUCE SCALING ENHANCED BY HIGH EXCESS AIR REQUIREMENTS OF THE BOILERS.									
6/81	101	100.0	97.9	100.0	97.9						
	201	100.0	95.7	100.0	95.7						
	301	100.0	98.1	100.0	98.1						
	401	0.0	0.0	0.0	0.0						
	SYSTEM	75.0	72.9	75.0	72.9			720	720	525	68.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE 401 WAS OUT OF SERVICE DURING JUNE SO THAT THE FAN HOUSING COULD BE REPLACED WITH INCONEL.									
7/81	101	97.7	97.0	97.7	97.0						
	201	98.3	93.1	98.0	93.1						
	301	97.8	96.4	97.8	96.4						
	401	0.0	0.0	0.0	0.0						
	SYSTEM	73.5	71.6	73.4	71.6			744	744	533	69.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE 401 REMAINED OUT OF SERVICE DUE TO FAN REPAIRS AND GENERAL CLEANING									
8/81	101	87.0	75.0	83.9	67.7						
	201	90.2	74.1	87.1	66.9						
	301	87.0	87.9	85.9	79.4						
	401	35.5	18.9	20.9	17.1						
	SYSTEM	74.9	64.0	69.5	57.8			744	672	430	35.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PHILLIPS WAS SHUT DOWN FOR THREE DAYS IN AUGUST FOR A STACK AND FGD SYSTEM INSPECTION. THE PRELIMINARY REPORT INDICATED STACK DETERIORATION TO THE POINT OF DAMAGING THE STACK INTEGRITY. AS A RESULT, THE UTILITY PLANS TO PRESSURIZE THE ANNULUS.									
9/81	101	71.1	58.6	67.0	58.6						
	201	94.3	75.9	93.0	75.9						
	301	98.1	82.4	97.7	82.4						
	401	9.5	2.1	2.3	2.1						
	SYSTEM	68.2	54.7	65.0	54.7			720	720	394	30.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING SEPTEMBER MODULE 101 UNAVAILABLE TIME WAS DUE TO THE START OF AN OVERHAUL.									
		MODULE 401 WAS OUT OF SERVICE FOR MOST OF SEPTEMBER TO INSTALL A NEW EXTERNAL MIST ELIMINATOR (MUNTERS).									
10/81	101	51.6	51.6	51.6	51.6						

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	201	96.0	52.0	92.8	52.0						
	301	95.4	34.0	88.1	34.0						
	401	97.7	97.7	97.7	97.7						
	SYSTEM	85.2	58.8	82.6	58.8			744	744	440	26.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE CEILCOTE LINERS IN MODULES 101 AND 201 WERE REPLACED WITH COROLINE 505 DURING OCTOBER.

DURING OCTOBER THE UTILITY INSTALLED SO2 MONITORS. TO DATE, THE MONITORS HAVE AN EXCELLENT PERFORMANCE RECORD.

11/81	101	0.0	0.0	0.0	0.0						
	201	98.3	27.8	95.7	37.8						
	301	97.7	25.4	91.8	25.4						
	401	100.0	100.0	100.0	100.0						
	SYSTEM	74.0	40.8	71.9	40.8			720	720	294	25.8

** PROBLEMS/SOLUTIONS/COMMENTS

DUE TO LOAD FLUCTUATIONS, MODULES 201 AND 301 WERE DOWN APPROXIMATELY 12 HOURS TO UNPLUG THE TANGENTIAL NOZZLES.

12/81	101	0.0	0.0	0.0	0.0						
	201	100.0	64.6	100.0	64.6						
	301	100.0	37.7	100.0	37.7						
	401	93.6	93.6	93.6	93.6						
	SYSTEM	73.4	49.0	73.4	49.0			744	744	365	33.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 101 WAS OFF-LINE FOR THE ENTIRE PERIOD TO REPLACE THE RUBBER LINED FAN HOUSING WITH INCONEL 825 AND TO INSTALL NEW STUDS IN THE FAN ROTOR.

DURING NOVEMBER AND DECEMBER MODULE 101 WAS OFF-LINE FOR CLEANING. THE MODULE OPERATED 6,487 HOURS BEFORE BEING SHUT DOWN.

1/82	101	0.0	0.0	0.0	0.0						
	201	100.0	80.9	100.0	80.9						
	301	90.2	88.9	90.1	88.9						
	401	95.6	95.6	95.6	95.6						
	SYSTEM	71.5	66.3	69.9	66.3			744	744	494	64.0
2/82	101	0.0	0.0	0.0	0.0						
	201	99.2	64.0	98.8	64.0						
	301	100.0	80.4	100.0	80.4						
	401	100.0	100.0	100.0	100.0						
	SYSTEM	74.8	61.1	70.8	61.1			672	672	411	60.0
3/82	101	0.0	0.0	0.0	0.0						
	201	99.1	57.3	98.4	57.3						
	301	100.0	79.7	100.0	79.7						
	401	100.0	99.6	100.0	99.6						
	SYSTEM	74.8	59.1	70.1	59.1			744	744	440	46.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 101 WAS OFF-LINE THE ENTIRE FIRST QUARTER OF 1982 FOR REPAIRS.

NEW SO2 MONITORS, INSTALLED IN JANUARY, WERE REPORTED TO HAVE WORKED WELL THROUGHOUT THE FIRST QUARTER. THE UTILITY IS ALSO PRESENTLY REQUESTING/ EVALUATING BIDS TO PRESSURIZE THE STACK ANNULUS.

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER THE SO2 MONITORS WERE CERTIFIED.

THE MODULE 301 MIST ELIMINATOR WAS REPLACED DUE TO DETERIORATION.

THE MODULE 401 FAN HAD TO BE BALANCED DURING THE PERIOD CAUSING ADDITIONAL OUTAGE TIME.

DURING THE PERIOD THE UTILITY INITIATED ADDING THIOSULFATE WHEN THE EXCESS AIR RECORDED GREATER THAN 11. THIS HAS SOLVED SOME OF THERE PREVIOUS PROBLEMS.

7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF JULY 1982 THROUGH MARCH 1983

4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY INITIATED STACK PRESSURIZATION AT PHILLIPS DURING THE MONTH TO CONTROL SEEPAGE AND SUBSEQUENT CORROSION.

7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE THIRD QUARTER OF 1983.

10/83	SYSTEM							744			

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED INCREASING STACK PRESSURE BY TWO INCHES DURING THE MONTH FOR CONTROL OF SEEPAGE.

12/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT ALTHOUGH THE UNIT HAS BEEN DOWN MONTHS AT A TIME DURING MOST OF 1983, THE FGD SYSTEM HAS BEEN AVAILABLE.

STAINLESS STEEL BANDS AROUND THE ABSORBER LINER WERE REPLACED WITH NARCOLITE DURING THE FOURTH QUARTER.

INSPECTIONS INDICATE THAT THE CEILCOTE LINING IN THE WET DUCT WILL HAVE TO BE REPLACED OVER THE NEXT THREE YEARS.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT OVERALL FGD SYSTEM AVAILABILITY FOR THE FIRST THREE QUARTERS OF 1984 WAS ABOVE 90%.

IT WAS REPORTED THAT LESS DETERIORATION HAS OCCURRED IN THE STACK NOW THAT IT IS PRESSURIZED.

AFTER 11 YEARS OF USAGE, THE CEILCOTE LINER IN THE WET DUCT TO THE STACK DETERIORATED. THE LINER WILL BE REPLACED OVER THE NEXT THREE YEARS DURING ANNUAL OUTAGES.

THE UTILITY IS NOW DIVERTING INDUCED DRAFT FAN SPRAY WATER TO AN ASH POND INSTEAD OF RECYCLING TO THE ABSORBERS. LIME CONSUMPTION HAS IMPROVED SINCE THE HIGHLY ACIDIC SPRAY WATER IS NO LONGER INTRODUCED IN THE SYSTEM.

THE UTILITY REPORTED A THREE WEEK SCHEDULED ANNUAL OUTAGE IN THE FIRST THREE QUARTERS OF 1984. DURING THIS TIME REPAIRS WERE MADE TO DUCTWORK AND DAMPERS. MIST ELIMINATOR TURN VANES WERE ALSO REPLACED.

DUE TO LOW POWER DEMAND IN THE FIRST THREE QUARTERS OF 1984, PHILLIPS DID NOT OPERATE STEADILY. AS A RESULT, BRIEF EPISODES OF HIGH EMISSIONS WERE REPORTED. HOWEVER, THE SYSTEM OPERATED EFFICIENTLY OVER 24 HOUR PERIODS.

10/84	SYSTEM							744			

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT DUE TO A SLOW DOWN IN THE STEEL INDUSTRY, UNIT LOAD HAS BEEN REDUCED.

NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER.

THE UTILITY REPORTED A FOURTH QUARTER AVAILABILITY OF 90% FOR THEIR CONTINUOUS EMISSION MONITORS(CEM). THE STATE OF PENNSYLVANIA HAS IMPLEMENTED NEW PENALTIES FOR CEM AVAILABILITY.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST THREE QUARTERS OF 1985. THIS IS DUE IN PART TO THE FACT THAT THE COAL RECEIVED FROM THE MINE NOW CONTAINS 1.7% SULFUR VERSUS THE ORIGINAL AMOUNT OF 2.0%.

10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT DUE TO CUTBACKS IN POWER DEMAND IN THE HEAVY METALS AND STEEL INDUSTRY, THEY HAVE LOST APPROXIMATELY 40% OF THEIR MARKET, OR APPROXIMATELY 400 MW OF CAPACITY. THE PHILLIPS FACILITY IS CURRENTLY RUNNING AT 18% OF CAPACITY AND IS NOW CONSIDERED TO BE A PEAKING UNIT. THE UNIT IS OPERATED PRIMARILY ON WEEK DAYS WITH SHUTDOWNS OCCURRING ON WEEKENDS AND EVENINGS.

THE UTILITY REPORTED THAT THE UNIT/FGD SYSTEM WAS OFF-LINE THE END OF OCTOBER AND EARLY NOVEMBER FOR A SCHEDULED MAINTENANCE OUTAGE. INSPECTION OF THE WET STACK LINERS SHOWED NO INDICATIONS OF LEANING. THE UNIT/FGD OPERATED THE REMAINDER OF THE FOURTH QUARTER 1985 WITHOUT ANY MAJOR INCIDENCES.

1/86	SYSTEM							774			
2/86	SYSTEM							672			

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE PHILLIPS STATION HAD NO MAJOR SCHEDULED/FORCED OUTAGES IN 1986. DUE TO THE SHUTDOWN OF UNITS 1-5, THE UTILITY NOW ONLY NEEDS TO USE 2 OF THE SCRUBBER MODULES TO MEET COMPLIANCE.

THE UTILITY REPORTED THAT UNITS 1-5 HAVE BEEN PUT ON COLD STANDBY. UNIT 6 (145MW) IS CURRENTLY THE ONLY UNIT OPERATING. THE UTILITY COULD POSSIBLY BRING BACK THE OTHER BOILERS SOMETIME IN 1991 IF THERE ARE INCREASES IN PROJECTED CAPACITY. REDUCED LOAD AND THE STARTUP OF NUCLEAR CAPACITY ARE RESPONSIBLE FOR SHUTDOWN OF UNITS 1-5.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE PERIOD JANUARY THROUGH OCTOBER 1987. SCRUBBER OPERATIONS HAVE BEEN SCALED DOWN TO MEET REDUCED UNIT LOAD.

11/87	SYSTEM							720			
12/87	SYSTEM							744			

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT AS OF NOVEMBER 1987 ALL 6 UNITS WERE SHUT DOWN AND PUT INTO COLD RESERVE FOR 5 YEARS BECAUSE OF THE STARTUP OF NUCLEAR UNITS AND BECAUSE OF REDUCED LOAD. UNIT 6 WAS THE LAST OF THE RETROFITTED UNITS TO BE SHUT DOWN AND WAS THE PRIMARY UNIT IN OPERATION DURING 1986 AND 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	EAST KENTUCKY POWER	
PLANT NAME	SPURLOCK	
UNIT NUMBER	2	
CITY	MAYSVILLE	
STATE	KENTUCKY	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	800	
GROSS UNIT GENERATING CAPACITY - MW	550	
NET UNIT GENERATING CAPACITY W/FGD - MW	485	
NET UNIT GENERATING CAPACITY WO/FGD - MW	500	
EQUIVALENT SCRUBBED CAPACITY - MW	550	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	********	(******* ACFM)
BOILER FLUE GAS TEMPERATURE - C	148.9	(300 F)
STACK HEIGHT - M	244.	(802 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	9.1	(30.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	****	
AVERAGE HEAT CONTENT - J/G	25586.	(11000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		****
AVERAGE ASH CONTENT - %	16.00	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	8.00	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	3.50	
RANGE SULFUR CONTENT - %	****	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	0.02-0.11	
*** PARTICLE CONTROL		
** ESP		
TYPE	HOT SIDE	
SUPPLIER	AMERICAN AIR FILTER	
PARTICLE REMOVAL EFFICENCY - %	99.5	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME	
SYSTEM SUPPLIER	THYSSEN/CEA	
A-E FIRM	BLACK & VEATCH	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	79.40	

EAST KENTUCKY POWER: SPURLOCK 2 (CONT.)

ENERGY CONSUMPTION - %	2.7	
CURRENT STATUS	1	
COMMERCIAL START-UP	4/1983	
INITIAL START-UP	12/1982	
CONTRACT AWARDED	0/1979	
** DESIGN AND OPERATING PARAMETERS		
DESIGN CHLORIDE CONTENT - %	********	
OPER. & MAINT. REQUIREMENT - MANHR/DAY	120.0	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	4	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SHELL GENERIC MATERIAL	NR	
SHELL SPECIFIC MATERIAL	NR	
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR	
LINER GENERIC MATERIAL	NR	
LINER SPECIFIC MATERIAL	NR	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
L/G RATIO - L/CU.M	1.3	(10.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.4	(5.8 IN-H2O)
SO2 REMOVAL EFFICIENCY - %	90.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	4	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
NUMBER OF PASSES PER STAGE	4	
PRESSURE DROP - KPA	0.0	(0.1 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	0.3	(1.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH FREQUENCY	CONTINUOUS	
** FANS		
NUMBER	2	
DESIGN	CENTRIFUGAL	
FUNCTION	NR	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
** FANS		
NUMBER	6	
DESIGN	CENTRIFUGAL	
FUNCTION	NR	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
** DAMPERS		
FUNCTION	NR	
GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	

EAST KENTUCKY POWER: SPURLOCK 2 (CONT.)

** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
** TANKS	
SERVICE	NUMBER
ABSORBER RECYCLE	****
REAGENT PREP PRODUCT	****
** PUMPS	
SERVICE	NUMBER
SLURRY TRANSFER	2
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER	2
DIMENSIONS - FT	115.0 DIA
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
OUTLET STREAM CHARACTERISTICS	30% SOLIDS
*** SALEABLE BYPRODUCTS	
NATURE	NONE
DISPOSITION	N/A
*** SLUDGE	
** TREATMENT	
METHOD	FIXATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
SITE TRANSPORTATION METHOD	RAIL
SITE TREATMENT	NR
** WATER BALANCE	
WATER LOOP TYPE	CLOSED

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT INITIAL START-UP OCCURRED IN DECEMBER, 1982.

1/83	SYSTEM							744			
2/83	SYSTEM							672			

EAST KENTUCKY POWER: SPURLOCK 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
3/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT SO FAR THE FGD SYSTEM IS OPERATING AT ABOUT 90% EFFICIENCY WITH NO MAJOR PROBLEMS.									
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY ANNOUNCED THAT THE SPURLOCK 2 FGD SYSTEM INITIATED COMMERICAL OPERATION IN APRIL. PEFORMANCE DATA FOR THE PERIOD OF APRIL THROUGH JUNE 1983, ARE NOT AVAILABLE AT THIS TIME.									
7/83	SYSTEM	0.0			0.0			744		0	
8/83	SYSTEM	0.0			0.0			744		0	
9/83	SYSTEM	0.0			0.0			720		0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE FGD SYSTEM WAS OUT OF SERVICE DURING THE THIRD QUARTER DUE TO DUCTWORK PROBLEMS.									
		STACK-RELATED PROBLEMS WERE ALSO REPORTED DURING THE PERIOD.									
		THE UTILITY HOPES TO RESUME OPERATION OF THE SPURLOCK 2 FGD SYSTEM DURING THE FIRST QUARTER OF 1984.									
10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS REPORTED APPROXIMATELY 90 PERCENT AVAILABLE THROUGHOUT THE FOURTH QUARTER OF 1983.									
		THE UTILITY REPORTED THAT THE UNIT WAS DOWN FROM MID-NOVEMBER TO LATE DECEMBER DUE TO STACK AND DUCTWORK-RELATED PROBLEMS.									
1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			

EAST KENTUCKY POWER: SPURLOCK 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS OUT OF SERVICE DURING THE FIRST THREE QUARTERS OF 1984 AND IS SCHEDULED TO GO BACK ON LINE BY LATE DECEMBER 1984. THE SYSTEM WAS DOWN DUE TO STACK LINER REPLACEMENT AND ABSORBER DUCTWORK REPAIRS.

10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS BROUGHT BACK ON LINE THE END OF NOVEMBER. ABSORBER WAS ORIGINALLY DOWN TO REPLACE STACK LINER AND REPAIR ABSORBER OUTLET DUCT. THE FAILED FIBERGLASS STACK LINER WAS REPLACED WITH AN ACID RESISTANT BRICK MATERIAL. THE ABSORBER OUTLET DUCT REPAIRS INCLUDED DESIGN MODIFICATIONS (SPURLOCK BYPASS REHEAT DUCT FROM UNIT 1 TO UNIT 2 WAS REMOVED ALONG WITH SOME TURNING VANES) AND WAS RELINED WITH STEBBINS TILES.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM ONLY OPERATED THE FIRST HALF OF 1985. DURING THE REMAINDER OF THE YEAR THE UNIT BURNED LOW SULFUR COMPLIANCE COAL. DUE TO A DECREASE IN ELECTRIC DEMAND AND COAL CONSUMPTION, THE UTILITY WAS ABLE TO PURCHASE LOW PRICED LOW SULFUR COAL ON THE SPOT MARKET. THE SULFUR CONTENT OF THE SPOT MARKET COAL IS LESS THAN 0.7% VERSUS THE 1.7% SULFUR COAL THAT THEY NORMALLY USE.
THE UTILITY EXPECTS TO BEGIN OPERATING THE FGD SYSTEM MID-1986 WHEN THE CHEAP LOW SULFUR COAL SPOT MARKET IS DEPLETED. NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST HALF OF 1985.

1/86	SYSTEM							774			
2/86	SYSTEM							672			

EAST KENTUCKY POWER: SPURLOCK 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT SPURLOCK 2 BURNED COMPLIANCE COAL ALL OF 1986 AND WILL PROBABLY DO SO FOR ALL OF 1987. THE UNIT WAS TAKEN OFF-LINE IN APRIL AND OCTOBER FOR SCHEDULED BOILER/TURBINE OUTAGES. THE UTILITY IS ONLY PERIODICALLY OPERATING ROTATING TYPE FGD EQUIPMENT SUCH AS PUMPS TO MAINTAIN THEM IN WORKING ORDER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT BURNED COMPLIANCE COAL ALL OF 1987. THE UNIT IS EXPECTED TO OPERATE IN THIS MANNER UNTIL AT LEAST JULY 1989.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	GRAND HAVEN BRD OF LIGHT & PWR	
PLANT NAME	J.B. SIMS	
UNIT NUMBER	3	
CITY	GRAND HAVEN	
STATE	MICHIGAN	
REGULATORY CLASSIFICATION	B	
PARTICULATE EMISSION LIMITATION - NG/J	13.	(0.030 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	78	
GROSS UNIT GENERATING CAPACITY - MW	65	
NET UNIT GENERATING CAPACITY W/FGD - MW	58	
NET UNIT GENERATING CAPACITY WO/FGD - MW	61	
EQUIVALENT SCRUBBED CAPACITY - MW	65	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	122.69	(260000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	142.8	(289 F)
STACK HEIGHT - M	110.	(360 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	2.6	(8.5 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25586.	(11000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10700-12265
AVERAGE ASH CONTENT - %	11.20	
RANGE ASH CONTENT - %	9.5-15.8	
AVERAGE MOISTURE CONTENT - %	9.60	
RANGE MOISTURE CONTENT - %	3.3-15.5	
AVERAGE SULFUR CONTENT - %	2.75	
RANGE SULFUR CONTENT - %	1.2-4.5	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** ESP		
NUMBER	1	
TYPE	COLD SIDE	
SUPPLIER	BABCOCK & WILCOX	
INLET FLUE GAS CAPACITY - CU.M/S	127.4	(270000 ACFM)
INLET FLUE GAS TEMPERATURE - C	140.6	(285 F)
PRESSURE DROP - KPA	0.1	(0. IN-H20)
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME	
SYSTEM SUPPLIER	BABCOCK & WILCOX	
A-E FIRM	BLACK & VEATCH	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	

GRAND HAVEN BRD OF LIGHT & PWR: J.B. SIMS 3 (CONT.)

UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	4.6	
CURRENT STATUS	1	
COMMERCIAL START-UP	8/1983	
INITIAL START-UP	5/1983	
CONTRACT AWARDED	12/1979	
** DESIGN AND OPERATING PARAMETERS		
DESIGN CHLORIDE CONTENT - %	********	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	2	
NUMBER OF SPARES	1	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	BABCOCK & WILCOX	
DIMENSIONS - FT	25.0 DIA X 95.0	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 316L	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
NUMBER OF CONTACTING ZONES	4	
LIQUID RECIRCULATION RATE - LITER/S	1180.	(18737 GPM)
L/G RATIO - L/CU.M	11.8	(88.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.4	(5.4 IN-H2O)
INLET GAS FLOW - CU. M/S	122.69	(260000 ACFM)
INLET GAS TEMPERATURE - C	140.6	(285 F)
SO2 REMOVAL EFFICIENCY - %	90.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	VERTICAL	
NUMBER OF STAGES	2	
NUMBER OF PASSES PER STAGE	3	
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	BLENDED	
WASH RATE - L/S	6.6	(104 GAL/MIN)
** REHEATER		
NUMBER	1	
GENERIC TYPE	IN-LINE	
SPECIFIC TYPE	HOT WATER	
TRADE NAME/COMMON TYPE	NR	
PERCENT GAS BYPASSED - AVG	0.0	
TEMPERATURE INCREASE - C	27.8	(50 F)
INLET FLUE GAS FLOW RATE - CU. M/S	122.69	(260000 ACFM)
INLET FLUE GAS TEMPERATURE - C	50.6	(123 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** FANS		
NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	NR	
FUNCTION	BALANCED DRAFT	
APPLICATION	INDUCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	69.37	(147000 ACFM)
FLUE GAS TEMPERATURE - C	140.6	(285 F)

GRAND HAVEN BRD OF LIGHT & PWR: J.B. SIMS 3 (CONT.)

CONSTRUCTION MATERIAL GENERIC TYPE	NR
** FANS	
NUMBER	2
NUMBER OF SPARES	0
DESIGN	NR
FUNCTION	BALANCED DRAFT
APPLICATION	FORCED DRAFT
SERVICE	DRY
FLUE GAS FLOW RATE - CU.M/S	49.08 (104000 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
** DAMPERS	
FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
NUMBER	2

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	1
REAGENT PREP PRODUCT	1
SPARGER/OXIDIZER	1

** PUMPS

SERVICE	NUMBER
LIME SLURRY TRANSFER	2
SCRUBBER RECIRCULATION	6
RECYCLE WATER	2

** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
CONFIGURATION	CIRCULAR
DIMENSIONS - FT	70.0 DIA X 14.0
FEED STREAM CHARACTERISTICS	18% SOLIDS
OUTLET STREAM CHARACTERISTICS	35% SOLIDS
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	VACUUM FILTER
NUMBER	2
NUMBER OF SPARES	1
FEED STREAM CHARACTERISTICS	35% SOLIDS
OUTLET STREAM CHARACTERISTICS	63% SOLIDS
*** SALEABLE BYPRODUCTS	
NATURE	GYPSUM
DISPOSITION	MARKETED

GRAND HAVEN BRD OF LIGHT & PWR: J.B. SIMS 3 (CONT.)

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	N/A
INLET FLOW RATE - LITER/S	1.0 (16 GPM)

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	OFF-SITE

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH, SLURRY DENSITY
PROCESS CHEMISTRY MODE	FEED FORWARD

** WATER BALANCE

WATER LOOP TYPE	CLOSED

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL START-UP AND SHAKEDOWN PROCEDURES OF THE FGD SYSTEM COMMENCED IN MAY. THE UNIT IS SCHEDULED TO BEGIN COMMERCIAL OPERATIONS BY JULY, 1983.

THE UTILITY REPORTED THAT NO MAJOR PROBLEMS WERE ENCOUNTERED DURING STARTU WITH EITHER THE TURBINE OR FGD SYSTEM. INITIAL FGD PERFORMANCE TESTING SHOWED A 98 PERCENT SO2 REMOVAL EFFICIENCY.

SINCE STARTUP, THE UTILITY REPORTED THAT IT HAS ENCOUNTERD PROBLEMS WITH PROPER BOILER COMBUSTION.

7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM BEGAN COMMERCIAL OPERATIONS ON AUGUST 8, 1983. THE FGD SYSTEM HAS CONTINUED TO ACHIEVE HIGH SO2 REMOVAL EFFICIENCIES IN THE RANGE OF 90 TO 95%.
ALTHOUGH GAS SIDE OPERATION HAS BEEN EXCELLENT, THE UTILITY REPORTED THAT IT EXPERIENCED MINOR PROBLEMS WITH SYSTEM CHEMISTRY AND WASTE HANDLING.

THE FORCED OXIDATION SYSTEM HAS NOT OPERATED TO ITS DESIGNED CAPACITY. AL THOUGH DESIGNED TO ACHIEVE BETWEEN 80 TO 90% OXIDATION, ACTUAL RATES HAVE BEEN IN THE RANGE OF 10 TO 35%. PLUGGED SPARGERS AND LOOSE DOWNCOMERS IN THE OXIDATION TANK ARE REPORTED TO BE THE CAUSE.

THE UTILITY REPORTED THAT THE SLUDGE HANDLING CONVEYORS WERE UNDERDESIGNED THE UTILITY SOLVED THE PROBLEM BY INCREASING THE SPEED OF THE CONVEYORS.

MODULE A EXPERIENCED PLUGGED SPRAY NOZZLES DURING THE THIRD QUARTER. THE UTILITY REPORTED THAT MAINTENANCE WORKERS REMOVED HARD SCALE FROM THE INLE OF THE ABSORBER, AND CHUNKS OF SCALE DROPPED INTO THE

GRAND HAVEN BRD OF LIGHT & PWR: J.B. SIMS 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	BOILER HOURS	FGD HOURS	CAP. FACTOR

ABSORBER SUMP. SUBSEQUENTLY, THE PUMPS PICKED UP THE SCALE AND FED IT TO THE NOZZLES CAUSING THEM TO PLUG.

PUMP ALIGNMENT PROBLEMS HAVE CAUSED SEVERAL BEARING FAILURES ON THE MODULE B ABSORBER.

MINOR PLUGGING PROBLEMS WERE ENCOUNTERED WITH THE PUG MILL DURING THE THIRD QUARTER.

10/83	SYSTEM							744		

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS FORCED OFF-LINE FOR 1.5 WEEKS IN OCTOBER TO MAKE REPAIRS TO THE FORCED OXIDATION TANK. A LOOSE DOWN-COMER IN THE TANK CAUSED DAMAGE TO THE STIR PADDLE AND RUBBER LINING.

11/83	SYSTEM							720		
12/83	SYSTEM							744		

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE MONTHS OF NOVEMBE AND DECEMBER. FGD SYSTEM AVAILABILITY DURING THESE TWO MONTHS WAS APPROXI MATELY 99 PERCENT. THE SYSTEM WAS REPORTED TO BE ACHIEVING SO2 REMOVAL EFFICIENCIES IN THE RANGE OF 95 TO 98 PERCENT.

1/84	SYSTEM							744		
2/84	SYSTEM							696		
3/84	SYSTEM							744		
4/84	SYSTEM							720		
5/84	SYSTEM							744		
6/84	SYSTEM							720		
7/84	SYSTEM							744		
8/84	SYSTEM							744		
9/84	SYSTEM							720		

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT A SECTION OF MIST ELIMINATOR CHEVRON BAFFLES FELL DURING THE THIRD QUARTER 1984.

THIOSORBIC LIME TESTING WAS CONDUCTED DURING THE FIRST THREE QUARTERS OF 1984.

FGD SYSTEM AVAILABILITY DURING THE FIRST THREE QUARTERS OF 1984 WAS ESTIMATED AT 99%.

THE UTILITY REPORTED THAT SO2 REMOVAL EFFICIENCIES DURING THE FIRST THREE QUARTERS OF 1984 WERE APPROXIMATELY 92 TO 97 PERCENT.

BABCOCK AND WILCOX IS INSTALLING A DUST COLLECTION SYSTEM AT THE SLUDGE-FLYASH MIXING AREA. EXCESSIVE DUST LEVELS FROM THE PUG MILLS WARRANTED THE DECISION TO INSTALL THIS EQUIPMENT.

10/84	SYSTEM							744		

GRAND HAVEN BRD OF LIGHT & PWR: J.B. SIMS 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE USE OF THIOSORBIC LIME ONLY SLIGHTLY IMPROVED THE SO2 REMOVAL EFFICIENCY. ALTHOUGH THEY FOUND THEY COULD SHUT DOWN ONE RECYCLE PUMP, IT WAS NOT GREAT ENOUGH TO JUSTIFY THE ADDED REAGENT COST. NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE QUARTER.

THE NEW FORCED OXIDATION SYSTEM PRODUCED SUCH HIGH QUANTITIES OF HEAVY SLUDGE MATERIAL THAT IT PLUGGED THE THICKENER. THE UTILITY PLANS TO MAKE MODIFICATIONS TO THE SLURRY DISTRIBUTION FEED SYSTEM AND RAKE. THE OXIDATION RATE IS NOW REPORTED TO BE APPROXIMATELY 99.8%.

THE UTILITY ALSO REPORTED THAT THE MIST ELIMINATORS MUST BE MANUALLY CLEANED EVERY TWO MONTHS. B & W IS PRESENTLY INVESTIGATING THIS PROBLEM.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT DURING 1985 THERE WERE NO FORCED OUTAGES DUE TO THE FGD SYSTEM. THE SYSTEM WAS 100% AVAILABLE DURING THE ENTIRE YEAR AND MAINTAINED SO2 REMOVAL EFFICIENCIES IN THE RANGE OF 99.5% TO 99.8% BASED ON A ROLLING 30 DAY AVERAGE.

THE UTILITY REPORTED HAVING GREAT SUCCESS IN PRODUCING A HIGH QUALITY GYPSUM MATERIAL WHICH IS BEING PURCHASED BY A MAJOR U.S. WALLBOARD PRODUCER LOCATED APPROXIMATELY 50 MILES FROM THE PLANT. CURRENTLY, THE WALLBOARD COMPANY IS PURCHASING THE MATERIAL FASTER THAN THE UTILITY CAN PRODUCE IT, STATING THAT THEY PREFERRED THE UTILITY-PRODUCED MATERIAL OVER NATURALLY MINED GYPSUM. THE UTILITY AND WALLBOARD COMPANY ARE CURRENTLY TRYING TO NEGOTIATE A LONG TERM CONTRACT.

1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			

GRAND HAVEN BRD OF LIGHT & PWR: J.B. SIMS 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR UNIT OR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1986.									
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED A FORCED UNIT OUTAGE BEGINNING APRIL 23 DUE TO A FAILED GENERATOR. THE UNIT WAS DOWN APPROXIMATELY 5 MONTHS.									
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT CAME BACK ON-LINE BY THE BEGINNING OF THE FOURTH QUARTER AND OPERATED FOR THE REMAINDER OF THE YEAR WITHOUT INCIDENT. THE FGD SYSTEM CONTINUED TO OPERATE FLAWLESSLY HAVING NEARLY A 100% SYSTEM AVAILABILITY AND A SO2 REMOVAL EFFICIENCY OF GREATER THAN 95%.									
1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

GRAND HAVEN BRD OF LIGHT & PWR: J.B. SIMS 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES OR SCHEDULED UNIT OUTAGES WERE ENCOUNTERED DURING THE YEAR 1987. THE NEXT SCHEDULED UNIT OUTAGE WILL OCCUR IN THE SPRING OF 1988.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	GRAND RIVER DAM AUTHORITY	
PLANT NAME	GRDA	
UNIT NUMBER	2	
CITY	PRYOR	
STATE	OKLAHOMA	
REGULATORY CLASSIFICATION	B	
PARTICULATE EMISSION LIMITATION - NG/J	13.	(0.030 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	258.	(0.600 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	215.	(0.500 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	*****	
GROSS UNIT GENERATING CAPACITY - MW	575	
NET UNIT GENERATING CAPACITY W/FGD - MW	520	
NET UNIT GENERATING CAPACITY WO/FGD - MW	540	
EQUIVALENT SCRUBBED CAPACITY - MW	520	

** UNIT DATA - BOILER AND STACK

BOILER SUPPLIER	FLAKT, INC.	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	873.01	(1850000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	135.0	(275 F)
STACK HEIGHT - M	154.	(505 FT)
STACK SHELL	****	
STACK TOP DIAMETER - M	*******	(***** FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20469.	(8800 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8000-12000
AVERAGE ASH CONTENT - %	7.00	
RANGE ASH CONTENT - %	5.0-15.0	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	7.7-31	
AVERAGE SULFUR CONTENT - %	0.95	
RANGE SULFUR CONTENT - %	.4-1.5	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	****	

*** PARTICLE CONTROL

** ESP

NUMBER	2	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	FLAKT	
INLET FLUE GAS CAPACITY - CU.M/S	855.1	(1812000 ACFM)
INLET FLUE GAS TEMPERATURE - C	69.4	(157 F)
PARTICLE REMOVAL EFFICENCY - %	99.8	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	SPRAY DRYING
PROCESS TYPE	LIME/SPRAY DRYING
SYSTEM SUPPLIER	FLAKT
A-E FIRM	FLAKT
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	85.00
ENERGY CONSUMPTION - %	3.5
CURRENT STATUS	1
COMMERCIAL START-UP	10/1985
INITIAL START-UP	3/1985
CONTRACT AWARDED	5/1982

GRAND RIVER DAM AUTHORITY: GRDA 2 (CONT.)

** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	1.50	
DESIGN CHLORIDE CONTENT - %	********	
** ABSORBER		
NUMBER	4	
NUMBER OF SPARES	1	
GENERIC TYPE	SPRAY DRYER	
SPECIFIC TYPE	MIXED FLOW	
SUPPLIER	FLAKT	
SHELL GENERIC MATERIAL	CARBON STEEL	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
INLET GAS FLOW - CU. M/S	873.01	(1850000 ACFM)
INLET GAS TEMPERATURE - C	148.9	(300 F)
SO2 REMOVAL EFFICIENCY - %	8.5	
** REHEATER		
NUMBER	0	
GENERIC TYPE	NONE	
** REAGENT PREPARATION EQUIPMENT		
FUNCTION	SLAKER	
DEVICE	BALL MILL	
DEVICE TYPE	AGITATED TANK	
NUMBER	2	
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	9.1	(10 TPH)
PRODUCT QUALITY - % SOLIDS	2.0	
*** SALEABLE BYPRODUCTS		
*** SLUDGE		
** DISPOSAL		
NATURE	FINAL	
TYPE	LANDFILL	
LOCATION	ON-SITE	
SITE TRANSPORTATION METHOD	TRUCK	
SITE SERVICE LIFE - YRS	25	
** CHEMICALS AND CONSUMPTION		
FUNCTION	ABSORBENT	
NAME	PEBBLE LIME	
CONSUMPTION	6.0 TPH	

----------PERFORMANCE DATA----------

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT INITIAL STARTUP OF THE FGD SYSTEM OCCURRED IN OCTOBER, 1985. THE ENTIRE PLANT IS SCHEDULED TO BE COMMERCIAL BY EARLY SPRING NEXT YEAR.

1/86	SYSTEM							774			

GRAND RIVER DAM AUTHORITY: GRDA 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE ENTIRE PLANT WAS DECLARED COMMERCIAL IN APRIL 1986.

5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTHS OF MAY THROUGH SEPTEMBER, NO MAJOR FGD-RELATED OR UNIT OUTAGES WERE ENCOUNTERED

10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

ON OCTOBER 1, THE UNIT AND FGD SYSTEM WERE SHUTDOWN FOR SCHEDULED MAINTENANCE. THE UNIT WAS TO COME BACK ON-LINE NOVEMBER 20 BUT WAS FORCED OFF-LINE DUE TO THE FGD SYSTEM. SINCE STARTUP, THE UTILITY HAS HAD PROBLEMS WITH GEAR BOX THRUST BEARING FAILURES ON THE ROTARY ATOMIZERS. TWO OUT OF FOURTEEN HAVE FAILED. THE SUPPLIER INSTRUCTED THE UTILITY TO KEEP THE SCRUBBERS OFF-LINE UNTIL THEY CAN SERVICE THE ATOMIZERS. CURRENTLY THE UTILITY IS BYPASSING THE SCRUBBERS AND IS NEGOTIATING A VARIANCE.

1/87	SYSTEM							744			
2/87	SYSTEM							672			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM REMAINED DOWN THE FIRST 2 MONTHS OF 1987 DUE TO ROTARY ATOMIZERS GEAR BOX BEARING PROBLEMS. THE UNIT CONTINUED TO OPERATE WITHOUT FGD UNTIL FEBRUARY 20 WHEN THE FGD SYSTEM WAS BROUGHT BACK ON-LINE. BEARINGS WERE REPLACED ON ALL 14 ATOMIZERS.

3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			

GRAND RIVER DAM AUTHORITY: GRDA 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT AND FGD SYSTEM OPERATED SUCCESSFULLY DURING THE PERIOD MARCH THROUGH OCTOBER 1987. DURING THE MONTH OF OCTOBER, THE ENTIRE PLANT WAS OFF-LINE FOR 3 WEEKS FOR SCHEDULED MAINTENANCE.

11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR UNIT OR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE MONTHS OF NOVEMBER OR DECEMBER 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	HOOSIER ENERGY	
PLANT NAME	MEROM	
UNIT NUMBER	1	
CITY	MEROM	
STATE	INDIANA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	*****	
GROSS UNIT GENERATING CAPACITY - MW	490	
NET UNIT GENERATING CAPACITY W/FGD - MW	460	
NET UNIT GENERATING CAPACITY WO/FGD - MW	466	
EQUIVALENT SCRUBBED CAPACITY - MW	441	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	817.33	(1732000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	214.	(702 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	5.8	(19.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	******	(****** BTU/LB)
RANGE HEAT CONTENT - BTU/LB		****
AVERAGE ASH CONTENT - %	********	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	3.50	
RANGE SULFUR CONTENT - %	****	
AVERAGE CHLORIDE CONTENT - %	0.20	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** FABRIC FILTER		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	BUELL DIVISION, ENVIROTECH	
INLET FLUE GAS CAPACITY - CU.M/S	873.0	(1850000 ACFM)
INLET FLUE GAS TEMPERATURE - C	137.8	(280 F)
PARTICLE REMOVAL EFFICENCY - %	99.4	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	

HOOSIER ENERGY: MEROM 1 (CONT.)

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	MITSUBISHI HEAVY INDUSTRIES	
A-E FIRM	UNITED ENGINEERS & CONSTRUCTORS	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.40	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	1.2	
CURRENT STATUS	1	
COMMERCIAL START-UP	8/1982	
INITIAL START-UP	8/1982	
CONTRACT AWARDED	3/1978	

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	4.20	
DESIGN COAL HEAT CONTENT - J/G	24423.0	(10500 BTU/LB)
DESIGN COAL ASH CONTENT - %	16.00	
DESIGN CHLORIDE CONTENT - %	********	

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** ABSORBER

NUMBER	4	
NUMBER OF SPARES	0	
GENERIC TYPE	PACKED TOWER	
SPECIFIC TYPE	GRID PACKING	
TRADE NAME/COMMON TYPE	COCURRENT	
SUPPLIER	MITSUBISHI	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	NR	
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR	
LINER GENERIC MATERIAL	NR	
LINER SPECIFIC MATERIAL	NR	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR	
GAS CONTACTING DEVICE TYPE	FIXED GRIDS	
LIQUID RECIRCULATION RATE - LITER/S	1333.	(21160 GPM)
L/G RATIO - L/CU.M	5.7	(42.3 GAL/1000 ACF)
INLET GAS FLOW - CU. M/S	235.95	(500000 ACFM)
INLET GAS TEMPERATURE - C	137.8	(280 F)
SO2 REMOVAL EFFICIENCY - %	90.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	MIST ELININATOR	
NUMBER PER SYSTEM	4	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	NR	
CONFIGURATION	HORIZONTAL	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	WESTINGHOUSE	
FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

HOOSIER ENERGY: MEROM 1 (CONT.)

** FANS	
NUMBER	2
NUMBER OF SPARES	0
DESIGN	AXIAL
SUPPLIER	NOVENCO
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
** DAMPERS	
NUMBER	4
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR; SEAL AIR
MANUFACTURER	MOSSER
MODULATION	OPEN
** DAMPERS	
NUMBER	4
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR; SEAL AIR
MANUFACTURER	MOSSER
MODULATION	OPEN
** DAMPERS	
NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	NR
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
MODULATION	CLOSED
** DAMPERS	
NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	NR
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
MODULATION	OPEN
** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	TOWER MILL
DEVICE	N/A
DEVICE TYPE	N/A
MANUFACTURER	JAPAN TOWER MILL CO.
NUMBER	2
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	25.4 (28 TPH)
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	LIMESTONE PRECRUSHER
DEVICE	N/A
DEVICE TYPE	N/A
MANUFACTURER	PENNSYLVANIA CRUSHER CORP.
NUMBER	1
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	25.4 (28 TPH)

** TANKS

SERVICE	NUMBER
PROCESS SURGE	1
INTERMEDIATE	1

HOOSIER ENERGY: MEROM 1 (CONT.)

** PUMPS

SERVICE	NUMBER
ABSORBER	12
ABSORBER COOLING	8
OXIDIZER FEED	2
THICKENER OVERFLOW	2
THICKENER UNDERFLOW	2
SURGE-TANK	3
SEED SLURRY	2
LIMESTONE SLURRY FEED 'LOW HEAD!	2
LIMESTONE SLURRY FEED 'HIGH HEAD!	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
DIMENSIONS - FT	140 DIA
CAPACITY	1116000 GAL
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	NR
FEED STREAM SOURCE	ABSORBER BLOWDOWN & SEED CYCLONE OVERFLOW
FEED STREAM CHARACTERISTICS	18 % SOLIDS
OUTLET STREAM CHARACTERISTICS	35% SOLIDS
OUTLET STREAM DISPOSITION	VACUUM FILTERS
OVERFLOW STREAM DISPOSITION	FGD SYSTEM

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	2
NUMBER OF SPARES	0
DIMENSIONS - FT	12.0 DIA X 24
FEED STREAM SOURCE	THICKENER
FEED STREAM CHARACTERISTICS	35 % SOLIDS
OUTLET STREAM CHARACTERISTICS	55 % SOLIDS
OUTLET STREAM DISPOSITION	IUCS

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION/FIXATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!
INLET QUALITY - %	15.0

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	NONE
SITE DIMENSIONS	250 ACRES X 50 FT
SITE CAPACITY - CU.M	15360880 (12560.0 ACRE-FT)
SITE SERVICE LIFE - YRS	30

** WATER BALANCE

WATER LOOP TYPE	CLOSED

HOOSIER ENERGY: MEROM 1 (CONT.)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	CACO3
POINT OF ADDITION	PRECRUSHER

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM COMMENCED OPERATION IN AUGUST AND IS CURRENTLY IN THE STARTUP PHASE OF OPERATION. TESTING FOR NSPS COMPLIANCE IS SCHEDULED FOR MARCH.

9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	A	53.1	54.1	54.1	51.3						
	B	53.1	56.0	56.0	53.1						
	C	53.1	54.2	54.2	51.4						
	D	53.1	43.6	43.6	41.4						
	SYSTEM	53.1	52.0	52.0	49.3			744	706	367	58.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM COMPLETED COMPLIANCE TESTING DURING THE MONTH OF MARCH.

4/83	A	100.0	74.4	100.0	3.1						
	B	100.0	74.4	100.0	3.1						
	C	100.0	0.0		0.0						
	D	100.0	74.4	100.0	3.1						
	SYSTEM	100.0	55.8	75.0	2.3			720	30	23	35.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS TAKEN OUT OF SERVICE ON APRIL 2 FOR STACK REPAIRS.

5/83	A	0.0			0.0						
	B	0.0			0.0						
	C	0.0			0.0						
	D	0.0			0.0						
	SYSTEM	0.0			0.0			744	0	0	
6/83	A	0.0			0.0						
	B	0.0			0.0						
	C	0.0			0.0						
	D	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT REMAINED OUT OF SERVICE DURING MAY AND JUNE FOR CONTINUED STACK REPAIRS.

HOOSIER ENERGY: MEROM 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/83	A	0.0			0.0						
	B	0.0			0.0						
	C	0.0			0.0						
	D	0.0			0.0						
	SYSTEM	0.0			0.0			744	0	0	
8/83	A	0.0			0.0						
	B	0.0			0.0						
	C	0.0			0.0						
	D	0.0			0.0						
	SYSTEM	0.0			0.0			744	0	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OUT OF SERVICE DURING JULY AND AUGUST FOR STACK LINER REPAIRS

9/83	A	15.6	16.9	17.8	12.2						
	B	45.1	56.7	59.5	40.7						
	C	45.1	58.1	61.0	41.7						
	D	45.1	55.6	58.4	39.9						
	SYSTEM	37.8	46.8	49.2	33.6			720	517	242	44.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED EXPERIENCING COMPUTER PROBLEMS DURING THE MONTH. THE PROBLEMS WERE RESOLVED, HOWEVER, BY REPLACING VARIOUS COMPUTER CONTROL CARDS.

THE UTILITY ATTRIBUTED START-UP PROBLEMS DURING SEPTEMBER TO THE PREVIOUS EXTENDED OUTAGE.

10/83	A	99.2	93.6	100.0	93.4						
	B	99.2	94.6	100.0	94.4						
	C	99.2	86.1	100.0	85.8						
	D	99.2	86.2	100.0	86.0						
	SYSTEM	99.2	90.1	100.0	89.9			744	742	669	75.3
11/83	A	98.3	98.3	98.3	98.3						
	B	98.3	98.3	98.3	98.3						
	C	98.3	98.3	98.3	98.3						
	D	98.3	98.3	98.3	98.3						
	SYSTEM	98.3	98.3	98.3	98.3			720	720	708	77.6

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING OCTOBER AND NOVEMBER 1983.

12/83	A	57.2	54.9	55.0	54.0						
	B	57.2	54.1	54.2	53.3						
	C	57.2	54.9	55.0	54.0						
	D	57.2	44.8	44.9	44.2						
	SYSTEM	57.2	52.2	52.3	51.4			744	733	382	80.3

** PROBLEMS/SOLUTIONS/COMMENTS

EXTREME COLD WEATHER CONDITIONS DURING DECEMBER RESULTED IN TORN EXPANSION JOINTS.

A MALFUNCTION ON THE SLUDGE STABILIZATION SYSTEM OCCURRED DURING DECEMBER RESULTING FROM EXTREME COLD WEATHER CONDITIONS.

1/84	A	75.3	63.0	63.0	63.0						

HOOSIER ENERGY: MEROM 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	68.8	68.8	68.8						
	C	100.0	66.6	66.6	66.6						
	D	100.0	66.6	66.6	66.6						
	SYSTEM	93.8	66.2	66.2	66.2			744	744	493	74.0

** PROBLEMS/SOLUTIONS/COMMENTS

A MALFUNCTION IN THE SLUDGE HANDLING SYSTEM ACCOUNTED FOR A SYSTEM OUTAGE DURING JANUARY.

COMPUTER-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH.

FROZEN LIMESTONE ACCOUNTED FOR ADDITIONAL DOWN TIME IN JANUARY.

ADDITIONAL PROBLEMS DUE TO FREEZING WERE ENCOUNTERED DURING THE MONTH.

2/84	A	90.2	88.4	91.9	85.6						
	B	89.9	88.0	91.5	85.3						
	C	90.6	88.8	92.4	86.0						
	D	90.1	88.3	91.8	85.5						
	SYSTEM	90.2	88.4	91.9	85.6			696	674	596	70.3
3/84	A	96.7	86.8	92.8	85.0						
	B	94.3	85.8	91.7	84.0						
	C	96.7	89.3	95.5	87.5						
	D	96.7	87.3	93.3	85.5						
	SYSTEM	96.1	87.3	93.3	85.5			744	729	636	80.0

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING FEBRUARY AND MARCH.

4/84	A	68.2	49.3	49.9	48.8						
	B	66.9	48.0	48.6	47.5						
	C	67.6	48.7	49.3	48.2						
	D	69.6	50.7	51.3	50.2						
	SYSTEM	68.1	49.2	49.8	48.7			720	712	350	69.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT A PUMP FAILURE AND BUCKET ELEVATOR FAILURES LED TO PROBLEMS IN THE LIMESTONE PREPARATION SYSTEM.

5/84	A	11.7	72.2	90.4	9.6						
	B	11.7	72.2	90.4	9.6						
	C	7.8	42.5	53.3	5.7						
	D	3.4	9.7	12.1	1.3						
	SYSTEM	8.6	49.1	61.5	6.6			744	99	49	6.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT AND FGD WERE DOWN MOST OF MAY DUE TO AN ANNUAL SCHEDULED OUTAGE.

6/84	A	81.6	77.2	77.6	76.7						
	B	87.6	83.2	83.6	82.7						
	C	94.4	90.0	90.5	89.5						
	D	96.8	92.4	92.9	91.9						
	SYSTEM	90.1	85.7	86.2	85.2			720	716	613	83.4

HOOSIER ENERGY: MEROM 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE MONTH OF JUNE, THE UTILITY REPORTED EXPERIENCING BREAKDOWNS AND MALFUNCTIONS IN THE LIMESTONE SLURRY PREPARATION SYSTEM AND SLUDGE STABILIZATION SYSTEM.									
7/84	A	95.4	92.8	94.7	87.2						
	B	95.2	92.6	94.5	87.1						
	C	78.5	74.8	76.3	70.3						
	D	99.1	96.7	98.7	90.9						
	SYSTEM	92.1	89.2	91.1	83.9			744	699	624	63.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF JULY THROUGH NOVEMBER, 1984.									
8/84	A	91.0	94.0	94.8	90.1						
	B	92.1	95.1	96.0	91.2						
	C	93.0	96.1	96.9	92.1						
	D	94.1	97.2	98.0	93.2						
	SYSTEM	92.5	95.6	96.4	91.7			744	713	682	71.8
9/84	A	60.3	63.5	97.4	59.3						
	B	74.7	78.8	97.9	73.6						
	C	74.2	78.4	97.9	73.2						
	D	57.3	60.3	97.4	56.3						
	SYSTEM	66.6	70.3	97.7	65.6			720	672	472	63.8
10/84	A	13.2	15.2	100.0	13.2						
	B	99.9	98.7	99.7	85.7						
	C	93.5	80.3	87.7	69.7						
	D	25.6	29.5	100.0	25.6						
	SYSTEM	58.1	55.9	96.8	48.6			744	646	361	45.0
11/84	A	100.0	99.1	99.8	98.5						
	B	100.0	91.1	99.8	90.5						
	C	100.0	89.3	99.3	88.8						
	D	100.0	99.2	99.8	98.5						
	SYSTEM	100.0	94.7	99.7	94.1			720	715	677	73.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF JULY THROUGH NOVEMBER, 1984.									
12/84	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO INFORMATION WAS AVAILABLE FOR THE MONTH OF DECEMBER.									
1/85	A	99.9	98.3	99.9	91.9						
	B	99.9	98.1	99.9	91.8						
	C	99.7	89.6	99.7	83.8						
	SYSTEM	99.8	95.4	99.8	89.2			744	696	664	68.0
2/85	A	99.2	96.3	99.1	89.3						
	B	99.2	96.7	99.1	89.7						
	C	98.5	95.8	98.4	88.8						
	D	98.5	95.9	98.4	88.9						
	SYSTEM	98.9	96.2	98.7	89.2			672	623	599	68.0

HOOSIER ENERGY: MEROM 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF JANUARY THROUGH FEBRUARY.									
3/85	A	100.0	95.6	99.6	63.2						
	B	100.0	96.4	99.6	63.8						
	C	100.0	96.1	99.6	63.6						
	D	100.0	97.3	99.6	64.4						
	SYSTEM	100.0	96.3	99.6	63.7			744	492	474	44.1
4/85	A	0.0			0.0						
	B	0.0			0.0						
	C	0.0			0.0						
	D	0.0			0.0						
	SYSTEM	0.0			0.0			720	0	0	0.0
5/85	A	0.0			0.0						
	B	0.0			0.0						
	C	0.0			0.0						
	D	0.0			0.0						
	SYSTEM	0.0			0.0			744	0	0	0.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A SCHEDULED UNIT OUTAGE BEGAN IN MARCH AND CONTINUED THROUGH MAY.									
6/85	A	100.0	96.3	99.0	91.9						
	B	100.0	98.2	99.0	93.8						
	C	100.0	97.4	99.0	93.0						
	D	100.0	84.1	98.9	80.3						
	SYSTEM	100.0	94.0	99.0	89.7			720	687	646	62.5
7/85	A	99.4	99.6	100.0	99.4						
	B	99.4	99.6	100.0	99.4						
	C	99.4	99.3	99.7	99.1						
	D	99.4	99.6	100.0	99.4						
	SYSTEM	99.4	99.5	99.9	99.3			744	743	739	59.4
8/85	A	99.4	99.4	99.4	92.2						
	B	99.4	93.8	93.8	87.0						
	C	99.4	96.6	96.6	89.6						
	D	99.4	99.2	99.2	92.1						
	SYSTEM	99.4	97.3	97.3	90.2			744	690	671	54.5
9/85	A	99.5	97.1	97.1	94.4						
	B	99.5	99.5	99.5	96.7						
	C	99.5	99.5	99.5	96.7						
	D	99.5	99.4	99.4	96.7						
	SYSTEM	99.5	98.8	98.8	96.1			720	700	692	57.1
10/85	A	80.5	80.5	80.5	80.5						
	B	87.1	87.1	87.1	87.1						
	C	100.0	99.7	99.7	99.7						
	D	100.0	100.0	100.0	100.0						
	SYSTEM	91.9	91.8	91.8	91.8			744	744	683	54.2
11/85	A	87.9	99.2	100.0	87.8						
	B	87.9	99.2	100.0	87.8						
	C	87.9	99.2	99.9	87.8						
	D	87.9	84.8	100.0	75.1						
	SYSTEM	87.9	95.6	100.0	84.6			720	637	609	52.6

HOOSIER ENERGY: MEROM 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/85	A	81.2	85.1	86.1	81.2						
	B	95.4	98.7	99.8	94.2						
	C	95.4	97.6	98.7	93.1						
	D	95.4	98.7	99.8	94.2						
	SYSTEM	91.9	95.0	96.1	90.7			744	710	675	51.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF JUNE THROUGH DECEMBER.									
1/86	A	99.9	99.1	99.5	91.0						
	B	99.9	99.5	99.9	91.3						
	C	99.9	75.4	75.7	69.2						
	D	99.9	99.5	99.9	91.3						
	SYSTEM	99.9	93.4	93.8	85.7			744	683	638	50.8
2/86	A	99.7	98.7	99.9	81.5						
	B	99.7	98.6	99.9	81.5						
	C	99.7	98.7	99.9	81.5						
	D	99.7	98.5	99.7	81.4						
	SYSTEM	99.7	98.6	99.9	81.5			672	555	548	50.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE JANUARY-FEBRUARY 1986 PERIOD.									
3/86	A	14.3	20.2	100.0	14.3						
	B	70.9	95.2	95.3	67.5						
	C	70.9	99.9	100.0	70.9						
	D	70.9	99.9	100.0	70.9						
	SYSTEM	56.8	78.8	98.8	55.9			744	528	416	35.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS TAKEN OFF-LINE PRIOR TO THE SCHEDULED UNIT OUTAGE TO REMOVE GRID PACKING.									
4/86	A		45.7	95.4	21.1						
	B		96.0	99.5	44.4						
	C		96.0	99.5	44.4						
	D		95.3	98.8	44.1						
	SYSTEM		83.2	98.3	38.5			720	333	277	22.8
5/86	A		77.7	78.5	75.5						
	B		91.4	92.4	88.8						
	C		90.3	91.3	87.8						
	D		88.8	89.7	86.3						
	SYSTEM		87.1	88.0	84.6			744	723	629	55.6
6/86	A		89.5	96.7	87.8						
	B		99.2	99.5	97.3						
	C		99.5	99.8	97.5						
	D		98.6	99.0	96.7						
	SYSTEM		96.7	98.7	94.8			720	706	683	53.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SCHEDULED UNIT OUTAGE CONTINUED INTO THE FIRST PART OF THE APRIL PERIOD.									
		MODULE A WAS OUT OF SERVICE BEYOND THE SCHEDULED UNIT OUTAGE PERIOD									

HOOSIER ENERGY: MEROM 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			WHILE GRID PACKING REPLACEMENT CONTINUED.								
7/86	A		99.2	99.2	99.2						
	B		99.4	99.4	99.4						
	C		99.4	99.4	99.4						
	D		97.2	97.2	97.2						
	SYSTEM		98.8	98.8	98.8			744	744	735	55.4
8/86	A		99.0	99.1	98.8						
	B		91.1	98.8	90.9						
	C		97.1	97.2	96.9						
	D		97.8	97.9	97.6						
	SYSTEM		96.2	98.3	96.0			744	743	715	50.4
9/86	A		54.9	58.3	16.2						
	B		35.1	37.3	10.4						
	C		94.4	100.0	27.9						
	D		93.8	99.7	27.7						
	SYSTEM		69.5	73.9	20.6			720	213	148	13.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
			A SCHEDULED UNIT OUTAGE TOOK PLACE ON 9/5/86 THROUGH 9/27/86. NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE THIRD QUARTER OF 1986.								
10/86	A		78.8	99.5	78.5						
	B		94.0	99.6	93.7						
	C		99.4	99.4	99.0						
	D		99.4	99.4	99.0						
	SYSTEM		92.9	99.5	92.5			744	741	688	50.1
11/86	A		99.1	100.0	99.1						
	B		97.6	100.0	97.6						
	C		99.1	100.0	99.1						
	D		98.5	100.0	98.5						
	SYSTEM		98.6	100.0	98.6			720	720	710	48.3
12/86	A		98.8	100.0	81.4						
	B		98.8	100.0	81.4						
	C		98.8	100.0	81.4						
	D		98.5	99.7	81.1						
	SYSTEM		98.8	99.9	81.3			744	613	605	39.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
			NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED BY THE UTILITY FOR THE FOURTH QUARTER OF 1986.								
1/87	A	100.0	100.0	100.0	100.0						
	B	100.0	100.0	100.0	100.0						
	C	100.0	100.0	100.0	100.0						
	D	98.9	98.9	100.0	98.9						
	SYSTEM	99.7	99.7	100.0	99.7			744	744	742	51.6
2/87	A	99.6	99.3	99.5	99.0						
	B	99.6	99.2	99.4	98.9						
	C	99.6	99.3	99.5	99.0						
	D	98.9	98.5	99.4	98.2						
	SYSTEM	99.5	99.1	99.5	98.8			672	670	664	50.0
3/87	A	100.0	96.9	96.9	96.9						
	B	100.0	96.6	96.6	96.6						
	C	100.0	99.7	99.7	99.7						

HOOSIER ENERGY: MEROM 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	D	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	98.3	98.3	98.3			744	744	731	49.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE FIRST QUARTER OF 1987.									
4/87	A	43.1	96.6	99.5	36.3						
	B	43.1	96.7	99.6	36.4						
	C	11.4	30.3	100.0	11.4						
	D	40.5	89.7	92.4	33.7						
	SYSTEM	34.5	78.3	97.9	29.5			720	271	212	17.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 1 WAS OUT OF SERVICE FOR 449.3 HOURS FOR A SCHEDULED OUTAGE IN APRIL.									
5/87	A	90.4	89.6	89.6	89.6						
	B	90.4	88.9	88.9	88.9						
	C	80.7	79.9	79.9	79.9						
	D	90.4	84.2	84.2	84.2						
	SYSTEM	88.0	85.6	85.6	85.6			744	744	637	52.0
6/87	A	100.0	100.0	100.0	100.0						
	B	95.8	95.8	95.8	95.8						
	C	99.8	99.8	99.8	99.8						
	D	100.0	100.0	100.0	100.0						
	SYSTEM	98.9	98.9	98.9	98.9			720	720	712	51.9
7/87	A	97.9	98.3	100.0	97.9						
	B	99.3	99.7	100.0	99.3						
	C	97.7	98.1	100.0	97.7						
	D	98.7	99.1	100.0	98.7						
	SYSTEM	98.4	98.8	100.0	98.4			744	741	732	53.5
8/87	A	98.3	98.6	98.6	98.2						
	B	98.9	99.1	99.1	98.7						
	C	99.2	99.4	99.5	99.0						
	D	99.1	99.3	99.4	98.9						
	SYSTEM	98.9	99.1	99.1	98.7			744	741	734	50.1
9/87	A	55.5	95.7	100.0	46.6						
	B	55.5	95.7	100.0	46.6						
	C	55.5	95.7	100.0	46.6						
	D	5.1	10.4	100.0	5.1						
	SYSTEM	42.9	74.4	100.0	36.2			720	351	261	23.1
10/87	A	98.3	98.3	98.5	95.2						
	B	99.3	99.3	99.5	96.2						
	C	99.3	99.3	99.5	96.2						
	D	91.0	90.7	90.9	87.8						
	SYSTEM	97.0	96.9	97.1	93.8			744	721	698	64.3
11/87	A	99.0	97.8	100.0	93.7						
	B	100.0	99.0	100.0	94.8						
	C	97.8	96.5	100.0	92.5						
	D	100.0	99.0	100.0	94.9						
	SYSTEM	99.2	98.1	100.0	94.0			720	690	677	50.3
12/87	A	98.8	98.2	99.9	93.8						
	B	99.9	99.4	100.0	94.9						
	C	99.9	99.2	99.8	94.7						

HOOSIER ENERGY: MEROM 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	D	98.8	98.1	100.0	93.7						
	SYSTEM	99.4	98.8	99.9	94.3			744	710	701	50.2

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE PERIOD MAY THROUGH DECEMBER 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	HOOSIER ENERGY	
PLANT NAME	MEROM	
UNIT NUMBER	2	
CITY	MEROM	
STATE	INDIANA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(0.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	*****	
GROSS UNIT GENERATING CAPACITY - MW	490	
NET UNIT GENERATING CAPACITY W/FGD - MW	460	
NET UNIT GENERATING CAPACITY WO/FGD - MW	466	
EQUIVALENT SCRUBBED CAPACITY - MW	441	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	RILEY STOKER	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	817.33	(1732000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	214.	(702 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	5.8	(19.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	******	(****** BTU/LB)
RANGE HEAT CONTENT - BTU/LB		****
AVERAGE ASH CONTENT - %	********	
RANGE ASH CONTENT - %	****	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	****	
AVERAGE SULFUR CONTENT - %	3.50	
RANGE SULFUR CONTENT - %	****	
AVERAGE CHLORIDE CONTENT - %	0.20	
RANGE CHLORIDE CONTENT - %	****	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** FABRIC FILTER		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	BUELL DIVISION, ENVIROTECH	
INLET FLUE GAS CAPACITY - CU.M/S	873.0	(1850000 ACFM)
INLET FLUE GAS TEMPERATURE - C	137.8	(280 F)
PARTICLE REMOVAL EFFICENCY - %	99.4	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	

HOOSIER ENERGY: MEROM 2 (CONT.)

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	MITSUBISHI HEAVY INDUSTRIES	
A-E FIRM	UNITED ENGINEERS & CONSTRUCTORS	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.40	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	1.2	
CURRENT STATUS	1	
COMMERCIAL START-UP	2/1982	
INITIAL START-UP	12/1981	
CONTRACT AWARDED	3/1978	

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	4.20	
DESIGN COAL HEAT CONTENT - J/G	24423.0	(10500 BTU/LB)
DESIGN COAL ASH CONTENT - %	16.00	
DESIGN CHLORIDE CONTENT - %	********	

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** ABSORBER

NUMBER	4	
NUMBER OF SPARES	0	
GENERIC TYPE	PACKED TOWER	
SPECIFIC TYPE	GRID PACKING	
TRADE NAME/COMMON TYPE	COCURRENT	
SUPPLIER	MITSUBISHI	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	NR	
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR	
LINER GENERIC MATERIAL	NR	
LINER SPECIFIC MATERIAL	NR	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR	
GAS CONTACTING DEVICE TYPE	FIXED GRIDS	
LIQUID RECIRCULATION RATE - LITER/S	1333.	(21160 GPM)
L/G RATIO - L/CU.M	5.7	(42.3 GAL/1000 ACF)
INLET GAS FLOW - CU. M/S	235.95	(500000 ACFM)
INLET GAS TEMPERATURE - C	137.8	(280 F)
SO2 REMOVAL EFFICIENCY - %	90.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	MIST ELININATOR	
NUMBER PER SYSTEM	4	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	NR	
CONFIGURATION	HORIZONTAL	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	WESTINGHOUSE	
FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

HOOSIER ENERGY: MEROM 2 (CONT.)

** FANS	
NUMBER	2
NUMBER OF SPARES	0
DESIGN	AXIAL
SUPPLIER	NOVENCO
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
** DAMPERS	
NUMBER	4
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR; SEAL AIR
MANUFACTURER	MOSSER
MODULATION	OPEN
** DAMPERS	
NUMBER	4
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR; SEAL AIR
MANUFACTURER	MOSSER
MODULATION	OPEN
** DAMPERS	
NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	NR
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
MODULATION	CLOSED
** DAMPERS	
NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	NR
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
MODULATION	OPEN
** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	TOWER MILL
DEVICE	N/A
DEVICE TYPE	N/A
MANUFACTURER	JAPAN TOWER MILL CO.
NUMBER	2
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	25.4 (28 TPH)
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	LIMESTONE PRECRUSHER
DEVICE	N/A
DEVICE TYPE	N/A
MANUFACTURER	PENNSYLVANIA CRUSHER CORP.
NUMBER	1
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	25.4 (28 TPH)

** TANKS

SERVICE	NUMBER
PROCESS SURGE	1
INTERMEDIATE	1

HOOSIER ENERGY: MEROM 2 (CONT.)

** PUMPS

SERVICE	NUMBER
ABSORBER	12
ABSORBER COOLING	8
OXIDIZER FEED	2
THICKENER OVERFLOW	2
THICKENER UNDERFLOW	2
SURGE-TANK	3
SEED SLURRY	2
LIMESTONE SLURRY FEED 'LOW HEAD!	2
LIMESTONE SLURRY FEED 'HIGH HEAD!	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
DIMENSIONS - FT	140 DIA
CAPACITY	1116000 GAL
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	NR
FEED STREAM SOURCE	ABSORBER BLOWDOWN & SEED CYCLONE OVERFLOW
FEED STREAM CHARACTERISTICS	18 % SOLIDS
OUTLET STREAM CHARACTERISTICS	35% SOLIDS
OUTLET STREAM DISPOSITION	VACUUM FILTERS
OVERFLOW STREAM DISPOSITION	FGD SYSTEM

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	2
NUMBER OF SPARES	0
DIMENSIONS - FT	12.0 DIA X 24
FEED STREAM SOURCE	THICKENER
FEED STREAM CHARACTERISTICS	35 % SOLIDS
OUTLET STREAM CHARACTERISTICS	55 % SOLIDS
OUTLET STREAM DISPOSITION	IUCS

*** SALEABLE BYPRODUCTS

NATURE	NONE
DISPOSITION	N/A

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION/FIXATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	CONVERSION SYSTEMS 'POZ-O-TEC!
INLET QUALITY - %	15.0

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	NONE
SITE DIMENSIONS	250 ACRES X 50 FT
SITE CAPACITY - CU.M	15360880 (12560.0 ACRE-FT)
SITE SERVICE LIFE - YRS	30

** WATER BALANCE

WATER LOOP TYPE	CLOSED

HOOSIER ENERGY: MEROM 2 (CONT.)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	CACO3
POINT OF ADDITION	PRECRUSHER

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

ON DECEMBER 30, 1981 OPERATION OF THE FGD SYSTEM INSTALLED ON MEROM 2 COMMENCED. THE SYSTEM IS PRESENTLY IN THE START UP PHASE WITH COMMERCIAL OPERATION SCHEDULED FOR FEBRUARY.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT COMMERCIAL OPERATION WAS INITIATED ON THE FIRST OF FEBRUARY. EXCEPT FOR SOME MINOR FREEZING PROBLEMS, NO MAJOR FGD-RELATE PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER PERIOD.

HOWEVER, THE UTILITY DID REPORT THAT HIGH FLYASH LOADINGS TO THE ABSORBER WERE ENCOUNTERED DUE TO ESP INABILITY TO REMOVE FLYASH FROM ITS HOPPERS. THE PROBLEM WAS PARTIALLY DUE TO THE HIGH MOISTURE CONTENT OF THE COAL (FL ASH STICKS IN THE HOPPERS AND EVENTUALLY TRIPS ESP) IN ADDITION TO FIRING WITH OIL DURING STARTUP (FLYASH STICKS TO OIL RESIDUE LEFT ON PLATES).

4/82	SYSTEM					19.8		720			
5/82	SYSTEM					48.3		744			
6/82	SYSTEM					30.0		720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED EXPERIENCING PROBLEMS WITH THE LINER CRACKING IN THE THICKENERS AND SETTLING IN THE SURGE TANKS DOWNSTREAM OF THE THICKENERS. FGD AVAILABILITY FOR THE FIRST SIX MONTHS OF OPERATION WAS APPROXIMATELY 25 PERCENT.

7/82	A	80.5	77.3	77.3	66.4						
	B	80.5	77.3	77.3	66.4						
	C	80.5	77.3	77.3	66.4						
	D	80.5	77.3	77.3	66.4						
	SYSTEM	80.5	77.3	77.3	66.4			744	640	494	48.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM EXPERIENCED A TOTAL OUTAGE TIME OF 145.2 HOURS DURING JULY. 104.5 HOURS OF THAT PERIOD WAS DUE TO A UNIT OUTAGE.

PART OF THE FGD SYSTEM OUTAGE WAS DUE TO AN INSPECTION OF THE PROCESS TANKS.

A THICKENER LINER FAILURE ALSO CONTRIBUTED TO THE OUTAGE DURING JULY.

A 13 HOUR OUTAGE DURING JULY WAS THE RESULT OF AN EFFORT TO UNPLUG THE THICKENER UNDERFLOW LINES.

HOOSIER ENERGY: MEROM 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PROBLEMS WITH A PRECIPITATOR LED TO A 13.5 HOUR OUTAGE DURING THE MONTH.								
			A 74 HOUR OUTAGE OCCURRED DURING THE MONTH DUE TO EXTENDED FGD MAINTENANCE FOLLOWING THE UNIT OUTAGE.								
8/82	A	55.0	54.1	54.1	53.0						
	B	55.0	54.1	54.1	53.0						
	C	55.0	54.1	54.1	53.0						
	D	55.0	54.1	54.1	53.0						
	SYSTEM	55.0	54.1	54.1	53.0			744	729	394	46.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			A BREAKDOWN OF THE LIMESTONE PREPARATION SYSTEM LED TO A 334 HOUR OUTAGE DURING AUGUST. THE BUCKET ELEVATOR CHAINS HAD TO BE REPLACED DUE TO CRACKED LINKS IN THE CHAINS. THE UTILITY REPORTED THAT DUE TO THE NATURE OF THE FAILURE, IT APPEARED THAT THE LINKS WERE DEFECTIVE.								
9/82	A	76.4	22.9	22.9	7.0						
	B	76.4	22.9	22.9	7.0						
	C	76.4	22.9	22.9	7.0						
	D	76.4	22.9	22.9	7.0						
	SYSTEM	76.4	22.9	22.9	7.0			720	221	51	46.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			A FAILURE OF THE LIMESTONE PREPARATION SYSTEM RESULTED FROM A PLUGGING PROBLEM AND CAUSED A 6.5 HOUR OUTAGE DURING SEPTEMBER.								
			A 163.5 HOUR OUTAGE DURING THE MONTH WAS DUE TO PLUGGED WALL WASH LINES IN THE QUENCHER SECTION. ALL LINES IN ALL FOUR MODULES WERE PLUGGED AND THE CAUSE WAS SUSPECTED OF BEING A DESIGN DEFICIENCY IN THE SYSTEM. THE LINES WERE UNPLUGGED WITHIN A MATTER OF DAYS AND THE SYSTEM WAS ALLOWED TO CONTINUE OPERATING WITHOUT THE WALL WASH.								
10/82	A	87.3	49.7	52.4	49.3						
	B	87.3	57.3	60.5	56.9						
	C	87.3	65.7	69.4	65.2						
	D	87.3	76.4	80.7	75.8						
	SYSTEM	87.3	62.3	65.8	61.8			744	738	460	47.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING OCTOBER PROBLEMS WITH A PRECIPITATOR LED TO A 39 HOUR OUTAGE.								
			A 21 HOUR OUTAGE OCCURRED DURING THE MONTH AS A RESULT OF A COMPUTER MALFUNCTION.								
			A FAILURE IN THE LIMESTONE SLURRY PREPARATION SYSTEM PRODUCED A 19.5 HOUR OUTAGE DURING OCTOBER.								
			DURING THE MONTH THE UNIT OPERATED TYPICALLY WITH THREE MODULES ONLY DUE T LOW BOILER LOADS.								
11/82	A	47.4	46.2	46.3	45.6						
	B	47.4	46.2	46.3	45.6						
	C	47.4	37.3	37.3	36.8						
	D	47.4	13.6	13.6	13.4						
	SYSTEM	47.4	35.8	35.9	35.3			720	711	254	48.4

HOOSIER ENERGY: MEROM 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER PROBLEMS WITH A PRECIPITATOR LED TO A 13 HOUR OUTAGE.									
		A FAILURE IN THE LIMESTONE SLURRY PREPARATION SYSTEM PRODUCED A 51.5 HOUR OUTAGE DURING NOVEMBER.									
		BYPASS DAMPER PROBLEMS CREATED A BRIEF 1 HOUR OUTAGE DURING THE MONTH.									
		A TOTAL FAILURE OF THE EXPANSION JOINTS THROUGHOUT THE FGD SYSTEM RESULTED IN A 326.5 HOUR OUTAGE DURING NOVEMBER.									
		THE UNIT CONTINUED OPERATING WITH THREE MODULES ONLY DURING THE MONTH DUE TO LOW LOADS.									
12/82	A	0.0	0.0	0.0	0.0						
	B	0.0	0.0	0.0	0.0						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	0.0	0.0	0.0	0.0			744	269	0	44.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE EXPANSION JOINT FAILURE PROBLEM WITHIN THE FGD SYSTEM CONTINUED DURING DECEMBER. REPLACEMENT OF THE JOINTS WAS IN PROGRESS.									
1/83	A	0.0	0.0	0.0	0.0						
	B	0.0	0.0	0.0	0.0						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	0.0	0.0	0.0	0.0			744	744	0	47.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE EXPANSION JOINT FAILURE PROBLEM CONTINUED DURING JANUARY AND REPLACEMENT OF THE JOINTS WAS STILL IN PROGRESS.									
2/83	A	0.0	0.0	0.0	0.0						
	B	0.0	0.0	0.0	0.0						
	C	0.0	0.0	0.0	0.0						
	D	0.0	0.0	0.0	0.0						
	SYSTEM	0.0	0.0	0.0	0.0			672	667		50.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE EXPANSION JOINT FAILURE PROBLEM CONTINUED DURING FEBRUARY AND REPLACEMENT OF THE JOINTS WAS STILL IN PROGRESS.									
3/83	A	64.5	0.0		0.0						
	B	64.5	0.0		0.0						
	C	64.5	0.0		0.0						
	D	64.5	0.0		0.0						
	SYSTEM	64.5	0.0		0.0			744	40	0	44.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE CONTINUATION OF EXPANSION JOINT REPAIRS OCCURRED DURING MARCH.									
4/83	A	59.0	35.4	37.9	29.4						
	B	75.7	84.7	90.7	70.3						
	C	75.7	74.7	79.9	62.0						
	D	67.8	45.9	49.2	38.1						
	SYSTEM	69.5	60.2	64.4	49.9			720	597	360	57.8

HOOSIER ENERGY: MEROM 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT MODIFICATIONS WERE MADE TO MODULES A AND D DURIN APRIL.									
		COMPUTER MALFUNCTIONS WERE ATTRIBUTED TO PART OF THE 175 HOUR OUTAGES DURING THE MONTH.									
		PLUGGED SPRAY HEADER LINES ALSO CONTRIBUTED TO THE 175 HOUR OUTAGES IN APR									
		ESP MALFUNCTIONS CONTRIBUTED TO 39 HOURS OF FGD OUTAGE IN APRIL.									
5/83	A	95.8	88.6	88.6	88.6						
	B	95.8	85.0	85.0	85.0						
	C	76.4	61.2	61.2	61.2						
	D	95.8	95.5	95.5	95.5						
	SYSTEM	90.9	82.6	82.6	82.6			744	744	614	60.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MAY.									
6/83	A	21.9	86.9	86.9	21.9						
	B	1.3	5.2	5.2	1.3						
	C	21.9	82.0	82.0	20.7						
	D	21.9	86.2	86.2	21.7						
	SYSTEM	16.8	65.1	65.1	16.4			720	182	118	53.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		EXTENSIVE SCHEDULED MAINTENANCE WAS PERFORMED ON THE FGD SYSTEM DURING A BOILER OUTAGE IN JUNE.									
7/83	A	100.0	73.2	72.9	72.6						
	B	100.0	99.9	99.5	99.1						
	C	100.0	100.0	100.0	99.6						
	D	100.0	61.0	60.7	60.5						
	SYSTEM	100.0	83.5	83.3	82.9			744	738	617	71.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS PARTIALLY BYPASSED DURING JULY TO MINIMIZE STACK LINER CRACKING BY MAINTAINING A SPECIFIC TEMPERATURE RANGE WITHIN THE STACK. TH UTILITY ATTRIBUTED LOWER SO2 REMOVAL EFFICIENCIES TO THE BYPASS INCIDENT.									
		LINER REPAIRS ARE SCHEDULED FOR THE FALL OF 1983.									
		THE UNIT EXPERIENCED AN AIR HEATER FAILURE DURING JULY AND THE FGD SYSTEM WAS CONSEQUENTLY USED TO COOL GAS, PROTECTING THE STACK LINER.									
8/83	A	99.7	98.8	99.5	85.8						
	B	99.7	98.9	99.6	85.9						
	C	99.7	99.2	100.0	86.2						
	D	99.7	97.9	98.6	85.0						
	SYSTEM	99.7	98.7	99.4	85.7			744	646	638	65.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS AGAIN PARTIALLY BYPASSED DURING AUGUST TO MINIMIZE STAC LINER CRACKING BY MAINTAINING A SPECIFIC TEMPERATURE WITHIN THE STACK.									
9/83	A	97.2	88.3	90.4	38.1						

HOOSIER ENERGY: MEROM 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	97.9	90.0	92.2	38.9						
	C	97.9	90.0	92.2	38.9						
	D	98.6	90.0	92.2	38.9						
	SYSTEM	97.9	89.6	91.7	38.7			720	311	278	28.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE FALL SCHEDULED OUTAGE FOR STACK LINER REPAIRS COMMENCED IN SEPTEMBER.

10/83	A	100.0			0.0						
	B	100.0			0.0						
	C	100.0			0.0						
	D	100.0			0.0						
	SYSTEM	100.0			0.0			744	0	0	
11/83	A	100.0			0.0						
	B	100.0			0.0						
	C	100.0			0.0						
	D	100.0			0.0						
	SYSTEM	100.0			0.0			720	0	0	0.0
12/83	A										
	B										
	C										
	D										
	SYSTEM							744	0		

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS OUT OF SERVICE DURING THE FOURTH QUARTER OF 1983.

1/84	A	0.0			0.0						
	B	0.0			0.0						
	C	0.0			0.0						
	D	0.0			0.0						
	SYSTEM	0.0			0.0			744	0	0	0.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OUT OF SERVICE THROUGHOUT JANUARY.

2/84	A	0.0	0.0		0.0						
	B	0.0	0.0		0.0						
	C	0.0	0.0		0.0						
	D	0.0	0.0		0.0						
	SYSTEM	0.0	0.0		0.0			696	54	0	2.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT STACKLINER REPAIR WAS COMPLETED AND THE UNIT WAS IN INITIAL START UP AT THE END OF THE MONTH.

3/84	A	0.0	0.0		0.0						
	B	0.0	0.0		0.0						
	C	0.0	0.0		0.0						
	D	0.0	0.0		0.0						
	SYSTEM	0.0	0.0		0.0			744	66	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS SHUT DOWN ON MARCH 3 FOR TURBINE REPAIRS. THE REPAIRS WERE COMPLETED ON MARCH 31.

HOOSIER ENERGY: MEROM 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/84	A	82.3	74.5	74.9	74.1						
	B	81.8	74.1	74.5	73.7						
	C	83.0	75.2	75.6	74.9						
	D	75.1	67.3	67.6	67.0						
	SYSTEM	80.5	72.8	73.1	72.4			720	717	522	77.6

** PROBLEMS/SOLUTIONS/COMMENTS

A BUCKET ELEVATOR FAILURE LED TO PROBLEMS IN THE LIMESTONE PREPARATION SYSTEM.

5/84	A	34.9	35.3	36.1	34.9						
	B	34.9	35.3	36.1	34.9						
	C	34.9	35.3	36.1	34.9						
	D	34.9	34.1	34.9	33.7						
	SYSTEM	34.9	35.0	35.8	34.6			744	735	257	79.8

** PROBLEMS/SOLUTIONS/COMMENTS

FGD SYSTEM WAS OUT OF SERVICE MOST OF MAY TO REPAIR COMMON SURGE TANK. TANK DAMAGE WAS DUE TO REAGENT DEPOSITION.

6/84	A	61.6	45.6	52.9	45.5						
	B	63.8	47.8	55.4	47.6						
	C	56.7	40.7	47.2	40.6						
	D	62.3	46.3	53.7	46.2						
	SYSTEM	61.1	45.1	52.3	45.0			720	718	324	79.4

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTH OF JUNE, THE UTILITY REPORTED EXPERIENCING BREAKDOWNS AND MALFUNCTIONS IN THE LIMESTONE SLURRY PREPARATION SYSTEM AND SLUDGE STABILIZATION SYSTEM.

7/84	A	97.2	94.1	97.4	88.3						
	B	55.5	49.7	79.9	46.6						
	C	96.8	93.7	97.0	87.9						
	D	99.5	96.6	100.0	90.6						
	SYSTEM	87.2	83.5	93.6	78.3			744	698	583	68.4
8/84	A	99.7	97.3	97.7	99.2						
	B	41.4	40.2	96.0	40.9						
	C	61.1	59.5	100.0	60.7						
	D	100.0	98.0	98.4	99.9						
	SYSTEM	75.6	73.7	98.0	75.2			720	734	541	64.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF JULY AND AUGUST, 1984.

9/84	A	13.6	80.9	98.8	11.0						
	B	13.6	80.4	98.2	10.9						
	C	7.6	36.4	44.4	4.9						
	D	3.7	27.0	100.0	3.7						
	SYSTEM	9.6	56.1	85.4	7.6			744	101	57	52.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT AND FGD WERE DOWN MOST OF SEPTEMBER DUE TO AN ANNUAL SCHEDULED OUTAGE.

10/84	A	99.9	97.4	98.0	96.9						

HOOSIER ENERGY: MEROM 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA: AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	99.9	88.2	95.0	87.7						
	C	99.9	97.9	98.6	97.4						
	D	99.9	86.0	96.6	85.6						
	SYSTEM	99.9	92.4	97.0	91.9			744	740	684	75.0
11/84	A	99.8	98.3	99.1	83.4						
	B	99.8	97.5	99.1	82.8						
	C	99.8	96.7	99.0	82.1						
	D	99.8	87.8	98.9	74.5						
	SYSTEM	99.8	95.1	99.0	80.7			720	611	581	57.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING OCTOBER AND NOVEMBER, 1984.

12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO INFORMATION WAS AVAILABLE FOR THE MONTH OF DECEMBER.

1/85	A	99.1	94.1	98.9	82.3						
	B	99.7	96.0	99.6	83.9						
	C	99.6	94.9	99.5	82.9						
	D	99.7	88.6	99.6	77.4						
	SYSTEM	99.5	93.4	99.4	81.6			744	650	607	63.0
2/85	A	99.3	93.7	99.1	77.8						
	B	99.3	94.8	99.2	78.7						
	C	99.3	93.5	99.1	77.7						
	D	99.3	93.6	99.1	77.7						
	SYSTEM	99.3	93.9	99.1	78.0			672	558	524	57.0
3/85	A	100.0	86.6	99.9	85.1						
	B	100.0	92.1	99.9	90.6						
	C	100.0	82.6	99.9	81.2						
	D	99.7	95.6	99.6	94.0						
	SYSTEM	99.9	89.2	99.9	87.7			744	731	653	67.4

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF JANUARY THROUGH MARCH.

4/85	A	85.4	95.1	96.4	84.2						
	B	84.0	93.6	96.3	82.9						
	C	85.3	95.0	96.4	84.1						
	D	85.5	95.2	96.4	84.4						
	SYSTEM	85.1	94.7	96.4	83.9			720	638	604	64.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT A FALSE TRIP OF THE FGD OVERPRESSURIZED SYSTEM OCCURRED WHEN A BY-PASS DAMPER JAMMED. SEVEN EXPANSION JOINTS WERE DAMAGED. THE FGD SYSTEM WAS OUT OF SERVICE FOR A TOTAL OF 94.4 HOURS FOR EXPANSION JOINT REPLACEMENT. THE BOILER WAS TAKEN OUT OF SERVICE FOR 74.8 HOURS WHILE THESE REPAIRS WERE BEING MADE.

5/85	A	99.7	99.6	99.6	99.6						
	B	99.7	99.4	99.7	99.4						
	C	99.7	99.7	99.7	99.7						
	D	99.7	94.7	99.7	94.7						
	SYSTEM	99.7	98.4	99.7	98.4			744	744	732	77.8

HOOSIER ENERGY: MEROM 2 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/85	A	99.1	94.9	97.7	75.2						
	B	99.1	95.6	97.7	75.8						
	C	99.1	72.8	97.1	57.7						
	D	99.1	79.8	100.0	63.3						
	SYSTEM	99.1	85.8	100.0	68.0			720	571	490	50.1
7/85	A	100.0	99.1	99.1	99.1						
	B	100.0	100.0	100.0	100.0						
	C	100.0	99.7	99.7	99.7						
	D	100.0	74.9	74.9	74.9						
	SYSTEM	100.0	93.4	93.4	93.4			744	744	695	59.6
8/85	A	97.8	97.8	97.8	97.4						
	B	99.5	99.5	99.5	99.1						
	C	99.0	99.0	99.0	98.6						
	D	99.5	99.5	99.5	99.1						
	SYSTEM	99.0	99.0	99.0	98.5			744	741	733	55.6

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF MAY THROUGH AUGUST.

9/85	A	23.0	92.5	92.5	21.3						
	B	23.0	99.8	99.8	23.0						
	C	23.0	99.9	99.9	23.0						
	D	23.0	99.9	99.9	23.0						
	SYSTEM	23.0	98.0	98.0	22.6			720	166	162	13.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT A SCHEDULED ANNUAL UNIT OUTAGE BEGAN ON SEPTEMBER 7 AND CONTINUED THROUGH THE END OF THE MONTH.

10/85	A	82.0	98.1	99.2	81.4						
	B	82.0	98.1	99.3	81.4						
	C	82.0	98.1	99.2	81.4						
	D	82.0	98.2	99.3	81.5						
	SYSTEM	82.0	98.1	99.3	81.4			744	618	606	47.0
11/85	A	99.3	99.5	99.8	98.8						
	B	99.3	99.5	99.8	98.8						
	C	99.3	99.5	99.9	98.8						
	D	99.3	99.5	99.9	98.9						
	SYSTEM	99.3	99.5	99.8	98.8			720	715	712	56.0
12/85	A	99.7	99.6	100.0	99.3						
	B	99.7	99.6	100.0	99.3						
	C	99.7	99.6	100.0	99.3						
	D	99.7	99.4	99.8	99.1						
	SYSTEM	99.7	99.6	99.9	99.3			744	742	739	70.3

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF OCTOBER THROUGH DECEMBER.

1/86	A	99.7	99.7	99.7	99.7						
	B	99.7	99.7	99.7	99.7						
	C	99.7	99.7	99.7	99.7						
	D	99.7	99.7	99.7	99.7						
	SYSTEM	99.7	99.7	99.7	99.7			744	744	742	64.5

HOOSIER ENERGY: MEROM 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/86	A	89.0	90.5	91.3	89.0						
	B	91.8	93.4	94.2	91.8						
	C	90.6	92.1	93.0	90.6						
	D	95.2	96.9	97.8	95.2						
	SYSTEM	91.6	93.2	94.1	91.6			672	661	616	62.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULAR AVAILABILITIES WERE LOWER DURING FEBRUARY AS INDIVIDUAL MODULE SHUT DOWNS WERE INVOKED ON A ROTATING BASIS FOR A PRE-OUTAGE INSPECTION									
3/86	A	99.7	99.6	100.0	99.0						
	B	99.7	99.5	100.0	99.0						
	C	99.7	99.5	100.0	99.0						
	D	93.7	93.5	94.0	93.1						
	SYSTEM	98.2	98.0	98.5	97.5			744	740	726	54.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE D MODULE WAS INSPECTED DURING THE MONTH IN ANTICIPATION OF THE UPCOMING SCHEDULED UNIT OUTAGE.									
4/86	A		99.0	99.5	98.6						
	B		68.1	97.4	67.8						
	C		98.9	99.4	98.5						
	D		98.9	99.4	98.5						
	SYSTEM		91.2	98.9	90.8			720	717	654	56.4
5/86	A		91.7	100.0	3.4						
	B										
	C		92.1	100.0	3.4						
	D		92.4	100.0	3.4						
	SYSTEM		92.1	100.0	3.4			744	27	25	1.8
6/86	A		95.8	97.6	90.1						
	B		61.8	87.1	58.1						
	C		85.9	100.0	80.8						
	D		97.2	99.0	91.4						
	SYSTEM		85.2	95.9	80.1			720	677	577	51.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE B MODULE WAS OUT OF SERVICE FOR GRID PACKING REPLACEMENT. THE REDUCED AVAILABILITY FOR THE SYSTEM AS A WHOLE OVER THE APRIL-JUNE PERIOD WAS PARTLY ATTRIBUTED TO A PLANNED UNIT OUTAGE.									
7/86	A		68.3	98.7	68.3						
	B		97.6	99.1	97.6						
	C		99.1	99.1	99.1						
	D		97.4	99.1	97.4						
	SYSTEM		90.6	99.0	90.6			744	744	674	58.9
8/86	A		97.4	97.4	97.4						
	B		98.3	98.3	98.3						
	C		98.5	98.5	98.5						
	D		98.2	98.2	98.2						
	SYSTEM		98.1	98.1	98.1			744	744	730	48.8
9/86	A		92.2	92.5	92.2						
	B		88.4	88.4	88.4						
	C		92.9	92.9	92.9						
	D		92.6	92.6	92.6						
	SYSTEM		91.5	91.6	91.5			720	720	659	52.3

HOOSIER ENERGY: MEROM 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
10/86	A		32.7	97.8	17.9						
	B		99.8	100.0	54.7						
	C		99.7	100.0	54.6						
	D		99.0	99.2	54.2						
	SYSTEM		82.8	99.2	45.4			744	408	338	28.1
11/86	A		95.7	100.0	74.9						
	B		94.6	100.0	74.0						
	C		2.9	100.0	2.2						
	D		97.4	100.0	76.3						
	SYSTEM		72.7	100.0	56.9			720	564	409	36.2
12/86	A		98.4	99.7	94.1						
	B		97.1	98.4	92.8						
	C		96.2	97.5	92.0						
	D		98.5	99.8	94.2						
	SYSTEM		97.5	98.9	93.3			744	712	694	46.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
	A THREE WEEK SCHEDULED UNIT OUTAGE OCCURRED DURING THE FOURTH QUART0000402 DURING WHICH TIME WORK ON THE FGD SYSTEM WAS PERFORMED. THIS ACCOUNTED PERIOD. PERIOD. 0000408										
1/87	A	95.6	95.6	95.6	95.6						
	B	96.1	96.1	96.1	96.1						
	C	71.9	72.0	72.0	72.0						
	D	100.0	100.0	100.0	100.0						
	SYSTEM	90.9	90.9	90.9	90.9			744	744	676	49.0
2/87	A	99.5	99.0	99.5	87.6						
	B	99.5	98.9	99.5	87.6						
	C	21.5	24.3	24.5	21.5						
	D	99.5	98.9	99.5	87.6						
	SYSTEM	80.0	80.3	80.7	71.1			672	595	478	41.7
3/87	A	97.7	97.1	97.6	95.9						
	B	99.5	98.9	99.5	97.7						
	C	100.0	99.4	99.9	98.1						
	D	100.0	99.5	100.0	98.2						
	SYSTEM	99.3	98.7	99.3	97.5			744	735	725	47.2
4/87	A	97.0	97.0	97.0	97.0						
	B	97.0	97.0	97.0	97.0						
	C	97.2	97.2	97.2	97.2						
	D	96.1	96.1	96.1	96.1						
	SYSTEM	96.8	96.8	96.8	96.8			720	720	697	49.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE PERIOD JANUARY THROUGH APRIL 1987.										
5/87	A	43.1	94.5	100.0	31.7						
	B	43.1	94.6	100.0	31.8						
	C	43.1	94.7	100.0	31.8						
	D	2.2	6.6	100.0	2.2						
	SYSTEM	32.9	72.6	100.0	24.4			744	250	181	16.2

HOOSIER ENERGY: MEROM 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		UNIT 2 WAS OUT OF SERVICE FOR 494.2 HOURS FOR A SCHEDULED OUTAGE IN MAY.									
6/87	A	99.6	99.6	99.6	99.6						
	B	97.4	97.4	97.4	97.4						
	C	98.8	98.8	98.8	98.8						
	D	77.6	77.6	77.6	77.6						
	SYSTEM	93.4	93.4	93.4	93.4			720	720	672	52.8
7/87	A	97.6	97.5	98.8	97.4						
	B	98.5	98.4	99.2	98.3						
	C	96.8	96.8	99.2	96.6						
	D	93.4	93.4	99.2	93.3						
	SYSTEM	96.6	96.5	99.1	96.4			744	743	717	52.6
8/87	A	98.8	98.8	99.0	97.6						
	B	93.3	93.2	93.5	92.1						
	C	99.4	99.4	99.7	98.2						
	D	99.4	99.4	99.6	98.2						
	SYSTEM	97.7	97.7	98.0	96.5			744	735	718	47.5
9/87	A	99.9	99.7	99.9	94.0						
	B	99.9	99.4	100.0	93.7						
	C	99.9	99.8	100.0	94.1						
	D	99.9	100.0	100.0	94.3						
	SYSTEM	99.9	99.7	100.0	94.0			720	679	677	54.2
10/87	A	55.9	99.9	100.0	51.3						
	B	43.7	85.0	100.0	43.7						
	C	55.9	99.9	100.0	51.3						
	D	55.9	99.9	100.0	51.3						
	SYSTEM	52.9	96.1	100.0	49.4			744	382	368	27.3
11/87	A	99.9	98.7	100.0	97.6						
	B	99.9	98.7	100.0	97.5						
	C	99.9	98.6	100.0	97.5						
	D	97.1	97.3	100.0	96.3						
	SYSTEM	99.2	98.3	100.0	97.2			720	712	700	57.1
12/87	A	97.8	97.6	99.7	97.5						
	B	98.7	98.6	99.7	98.4						
	C	98.7	98.5	99.7	98.3						
	D	97.8	97.6	99.7	97.4						
	SYSTEM	98.2	98.1	99.7	97.9			744	743	728	54.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD SYSTEM-RELATED PROBLEMS WERE REPORTED FOR THE PERIOD JUNE THROUGH DECEMBER 1987.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	HOUSTON LIGHTING & POWER	
PLANT NAME	LIMESTONE	
UNIT NUMBER	1	
CITY	JEWITT	
STATE	TEXAS	
REGULATORY CLASSIFICATION	B	
PARTICULATE EMISSION LIMITATION - NG/J	13.	(0.030 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	353.	(0.820 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	258.	(0.600 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	*****	
GROSS UNIT GENERATING CAPACITY - MW	780	
NET UNIT GENERATING CAPACITY W/FGD - MW	720	
NET UNIT GENERATING CAPACITY WO/FGD - MW	736	
EQUIVALENT SCRUBBED CAPACITY - MW	780	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1604.46	(3400000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	146.1	(295 F)
STACK HEIGHT - M	172.	(563 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	0.8	(2.7 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	14368.	(6177 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		4500-7250
AVERAGE ASH CONTENT - %	18.54	
RANGE ASH CONTENT - %	10.0-37.0	
AVERAGE MOISTURE CONTENT - %	31.95	
RANGE MOISTURE CONTENT - %	25.0-38.0	
AVERAGE SULFUR CONTENT - %	1.08	
RANGE SULFUR CONTENT - %	0.3-3.1	
AVERAGE CHLORIDE CONTENT - %	0.03	
RANGE CHLORIDE CONTENT - %	0.00-0.06	
*** PARTICLE CONTROL		
** ESP		
NUMBER	4	
TYPE	COLD SIDE	
SUPPLIER	LODGE-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	1604.5	(3400000 ACFM)
INLET FLUE GAS TEMPERATURE - C	146.1	(295 F)
PARTICLE REMOVAL EFFICENCY - %	99.9	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	MAGNESIUM OXIDE; DIBASIC	
SYSTEM SUPPLIER	COMBUSTION ENGINEERING	
A-E FIRM	EBASCO	

HOUSTON LIGHTING & POWER: LIMESTONE 1 (CONT.)

DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	2.1	
CURRENT STATUS	1	
COMMERCIAL START-UP	12/1986	
INITIAL START-UP	10/1985	
CONTRACT AWARDED	10/1980	
** DESIGN AND OPERATING PARAMETERS		
DESIGN CHLORIDE CONTENT - %	********	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	5	
NUMBER OF SPARES	1	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SHELL GENERIC MATERIAL	HIGH ALLOY	
SHELL SPECIFIC MATERIAL	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM	
SHELL MATERIAL TRADE NAME/COMMON TYPE	HASTELLOY G	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
GAS CONTACTING DEVICE TYPE	NONE	
L/G RATIO - L/CU.M	12.7	(95.0 GAL/1000 ACF)
INLET GAS FLOW - CU. M/S	1604.46	(3400000 ACFM)
INLET GAS TEMPERATURE - C	146.1	(295 F)
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VALVE	
CONFIGURATION	HORIZONTAL	
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	RECLAIM/MAKEUP	
** REHEATER		
GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	
** FANS		
NUMBER	8	
DESIGN	CENTRIFUGAL	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
** DAMPERS		
FUNCTION	NR	
GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	
** DUCTWORK		
SHELL GENERIC MATERIAL TYPE	NR	
SHELL SPECIFIC MATERIAL TYPE	NR	

HOUSTON LIGHTING & POWER: LIMESTONE 1 (CONT.)

LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
NUMBER	3
** PUMPS	
SERVICE	NUMBER
NR	****
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER	3
NUMBER OF SPARES	1
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	VACUUM FILTER
*** SALEABLE BYPRODUCTS	
NATURE	NONE
DISPOSITION	N/A
*** SLUDGE	
** TREATMENT	
METHOD	FIXATION
DEVICE	NR
PROPRIETARY PROCESS	NR
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	TRUCK/RAIL
SITE TREATMENT	NONE
** PROCESS CONTROL AND INSTRUMENTATION	
CHEMICAL PARAMETERS	INLET SO2, PH
MONITOR LOCATION	ABSORBER INLET, OUTLET & STACK
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEED FORWARD
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
SOURCE OF MAKEUP WATER	COOLING TOWER BLOWDOWN

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

HOUSTON LIGHTING & POWER: LIMESTONE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT INITIAL STARTUP OF THE FGD SYSTEM OCCURRED IN OCTOBER, 1985.									
1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY HAS HAD TO ADD DIBASIC ACID IN ORDER TO MEET SO2 COMPLIANCE. THE SYSTEM IS CURRENTLY ACHIEVING 93% REMOVAL WITH THE ADDITIVE. THE ACID IS PURCHASED IN HEATED TANK TRUCKS WHICH ALSO ACT AS THE STORAGE FACILITY.									
		THE UTILITY REPORTED THAT THE UNIT WAS DECLARED COMMERCIAL IN DECEMBER. NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE YEAR.									
1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS OFF-LINE FROM MID-MARCH UNTIL MID-MAY FOR A SCHEDULED SPRING BOILER/TURBINE OUTAGE. NO FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE PERIOD.									
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			

HOUSTON LIGHTING & POWER: LIMESTONE 1 (CONT.)

PERIOD	MODULE	PERFORMANCE DATA AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED TANK LINER FAILURES ON BOTH LIMESTONE 1 AND 2. THE FAILURES HAVE NOT CAUSED ANY UNIT DOWNTIME BUT HAVE BEEN A CONSTANT MAINTENANCE PROBLEM. THE LINER FALLS AWAY FROM THE WALLS OF THE TANKS AND IS PUMPED THROUGHOUT THE SLURRY CIRCUIT. THIS HAS RESULTED IN NOZZLE PLUGGING AND EVENTUALLY SOME ABSORBER VESSEL DOWNTIME FOR NOZZLE CLEANING AND TANK REPAIRS. MIST ELIMINATOR PLUGGING WAS ANOTHER MAINTENANCE PROBLEM REPORTED BY THE UTILITY.

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE PERIOD JUNE THROUGH DECEMBER 1987. THE HOURS THE UNIT OPERATED IN 1987 WERE APPROXIMATELY 6540.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	HOUSTON LIGHTING & POWER	
PLANT NAME	LIMESTONE	
UNIT NUMBER	2	
CITY	JEWITT	
STATE	TEXAS	
REGULATORY CLASSIFICATION	B	
PARTICULATE EMISSION LIMITATION - NG/J	13.	(0.030 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	353.	(0.820 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	258.	(0.600 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	*****	
GROSS UNIT GENERATING CAPACITY - MW	780	
NET UNIT GENERATING CAPACITY W/FGD - MW	720	
NET UNIT GENERATING CAPACITY WO/FGD - MW	736	
EQUIVALENT SCRUBBED CAPACITY - MW	780	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1604.46	(3400000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	146.1	(295 F)
STACK HEIGHT - M	172.	(563 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	8.2	(27.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	****	
AVERAGE HEAT CONTENT - J/G	14368.	(6177 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		4500-7250
AVERAGE ASH CONTENT - %	18.54	
RANGE ASH CONTENT - %	10.0-37.0	
AVERAGE MOISTURE CONTENT - %	31.95	
RANGE MOISTURE CONTENT - %	25.0-38.0	
AVERAGE SULFUR CONTENT - %	1.08	
RANGE SULFUR CONTENT - %	0.3-3.1	
AVERAGE CHLORIDE CONTENT - %	0.03	
RANGE CHLORIDE CONTENT - %	0.00-0.06	
*** PARTICLE CONTROL		
** ESP		
NUMBER	4	
TYPE	COLD SIDE	
SUPPLIER	LODGE-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	1604.5	(3400000 ACFM)
INLET FLUE GAS TEMPERATURE - C	146.1	(295 F)
PARTICLE REMOVAL EFFICENCY - %	99.9	
** PARTICLE SCRUBBER		
NUMBER	0	
GENERIC TYPE	NONE	
SPECIFIC TYPE	N/A	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	N/A	
SHELL SPECIFIC MATERIAL	N/A	
LINER GENERIC MATERIAL	N/A	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	MAGNESIUM OXIDE; DIBASIC	
SYSTEM SUPPLIER	COMBUSTION ENGINEERING	
A-E FIRM	EBASCO	

HOUSTON LIGHTING & POWER: LIMESTONE 2 (CONT.)

DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	2.1	
CURRENT STATUS	1	
COMMERCIAL START-UP	12/1986	
INITIAL START-UP	10/1986	
CONTRACT AWARDED	10/1980	
** DESIGN AND OPERATING PARAMETERS		
DESIGN CHLORIDE CONTENT - %	********	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	5	
NUMBER OF SPARES	1	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SHELL GENERIC MATERIAL	HIGH ALLOY	
SHELL SPECIFIC MATERIAL	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM	
SHELL MATERIAL TRADE NAME/COMMON TYPE	HASTELLOY G	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
GAS CONTACTING DEVICE TYPE	NONE	
L/G RATIO - L/CU.M	12.7	(95.0 GAL/1000 ACF)
INLET GAS FLOW - CU. M/S	1604.46	(3400000 ACFM)
INLET GAS TEMPERATURE - C	146.1	(295 F)
SO2 REMOVAL EFFICIENCY - %	90.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VALVE	
CONFIGURATION	HORIZONTAL	
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	RECLAIM/MAKEUP	
** REHEATER		
GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	
** FANS		
NUMBER	8	
DESIGN	CENTRIFUGAL	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
** DAMPERS		
FUNCTION	NR	
GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	

HOUSTON LIGHTING & POWER: LIMESTONE 2 (CONT.)

** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
NUMBER	3
** PUMPS	
SERVICE	NUMBER
-------	------
NR	****
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER OF SPARES	1
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	VACUUM FILTER
NUMBER	4
*** SALEABLE BYPRODUCTS	
NATURE	NONE
DISPOSITION	N/A
*** SLUDGE	
** TREATMENT	
METHOD	FIXATION
DEVICE	NR
PROPRIETARY PROCESS	NR
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	TRUCK/RAIL
SITE TREATMENT	NONE
** PROCESS CONTROL AND INSTRUMENTATION	
CHEMICAL PARAMETERS	INLET SO2,PH
MONITOR LOCATION	ABSORBER INLET, OUTLET & STACK
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEED FORWARD
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
SOURCE OF MAKEUP WATER	COOLING TOWER BLOWDOWN

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

HOUSTON LIGHTING & POWER: LIMESTONE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY HAS HAD TO ADD DIBASIC ACID IN ORDER TO MEET SO2 COMPLIANCE. THE SYSTEM IS CURRENTLY ACHIEVING 93% REMOVAL WITH THE ADDITIVE. THE ACID IS PURCHASED IN HEATED TANK TRUCKS WHICH ALSO ACT AS THE STORAGE FACILITY.

INITIAL START-UP AND DEBUGGING OPERATIONS OF THE FGD SYSTEM ON LIMESTONE 2 BEGAN IN OCTOBER 1986 WITH THE ENTIRE PLANT BEING DECLARED COMMERICAL IN DECEMBER 1986.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			
10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED TANK LINER FAILURES ON BOTH LIMESTONE 1 AND 2. THE FAILURES HAVE NOT CAUSED ANY UNIT DOWNTIME BUT HAVE BEEN A CONSTANT MAINTENANCE PROBLEM. THE LINER FALLS AWAY FROM THE WALLS OF THE TANKS AND IS PUMPED THROUGHOUT THE SLURRY CIRCUIT. THIS HAS RESULTED IN NOZZLE PLUGGING AND EVENTUALLY ABSORBER VESSEL DOWNTIME FOR NOZZLE CLEANING AND TANK REPAIRS. MIST ELIMINATOR PLUGGING WAS ANOTHER MAINTENANCE PROBLEM REPORTED BY THE UTITLITY.

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED OR SCHEDULED UNIT OUTAGES WERE ENCOUNTERED DURING THE YEAR. THE UNIT OPERATED APPROXIMATELY 8077 HOURS IN 1987.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	HOUSTON LIGHTING & POWER	
PLANT NAME	W.A. PARISH	
UNIT NUMBER	8	
CITY	THOMPSONS	
STATE	TEXAS	
REGULATORY CLASSIFICATION	B	
PARTICULATE EMISSION LIMITATION - NG/J	13.	(0.030 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	155.	(0.360 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	215.	(0.500 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	3670	
GROSS UNIT GENERATING CAPACITY - MW	570	
NET UNIT GENERATING CAPACITY W/FGD - MW	535	
NET UNIT GENERATING CAPACITY WO/FGD - MW	541	
EQUIVALENT SCRUBBED CAPACITY - MW	467	

** UNIT DATA - BOILER AND STACK

BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1038.18	(2200000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	148.9	(300 F)
STACK HEIGHT - M	152.	(500 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	6.7	(22.0 FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20799.	(8942 BTU/LB)
RANGE HEAT CONTENT - BTU/LB	8000-8785/8800-9636	
AVERAGE ASH CONTENT - %	4.75	
RANGE ASH CONTENT - %	4.77-10.00/2.26-6.00	
AVERAGE MOISTURE CONTENT - %	26.69	
RANGE MOISTURE CONTENT - %	25.98-31.30/21.17-27.67	
AVERAGE SULFUR CONTENT - %	0.41	
RANGE SULFUR CONTENT - %	.34-.79/.08-.60	
AVERAGE CHLORIDE CONTENT - %	0.01	
RANGE CHLORIDE CONTENT - %	.01	

*** PARTICLE CONTROL

** FABRIC FILTER

NUMBER	4	
TYPE	REVERSE FLOW	
SUPPLIER	RESEARCH-COTTRELL	
NUMBER OF COMPARTMENTS	40	
NUMBER OF SPARE COMPARTMENTS	4	
INLET FLUE GAS CAPACITY - CU.M/S	259.5	(550000 ACFM)
INLET FLUE GAS TEMPERATURE - C	148.9	(300 F)
PRESSURE DROP - KPA	1.9	(7.5 IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.8	
TYPICAL GAS/CLOTH RATIO - M/MIN	0.6	(1.9 FT/MIN)

** PARTICLE SCRUBBER

NUMBER	0
GENERIC TYPE	NONE
SPECIFIC TYPE	N/A
TRADE NAME/COMMON NAME	N/A
SHELL GENERIC MATERIAL	N/A
SHELL SPECIFIC MATERIAL	N/A
LINER GENERIC MATERIAL	N/A
LINER SPECIFIC MATERIAL	N/A
GAS CONTACTING DEVICE TYPE	N/A

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING

HOUSTON LIGHTING & POWER: W.A. PARISH 8 (CONT.)

PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES	
A-E FIRM	BECHTEL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	70.00	
ENERGY CONSUMPTION - %	1.1	
CURRENT STATUS	1	
COMMERCIAL START-UP	12/1982	
INITIAL START-UP	10/1982	
CONTRACT AWARDED	8/1979	
** DESIGN AND OPERATING PARAMETERS		
DESIGN COAL SULFER CONTENT - %	0.44	
DESIGN COAL HEAT CONTENT - J/G	20510.7	(8818 BTU/LB)
DESIGN COAL ASH CONTENT - %	6.13	
DESIGN MOISTURE CONTENT - %	26.24	
DESIGN CHLORIDE CONTENT - %	0.02	
SPACE REQUIREMENTS - SQ M	9673.2	(104125 SQ FT)
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL; INORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; HYDRAULICALLY-BONDED MORTAR	
** ABSORBER		
NUMBER	3	
NUMBER OF SPARES	1	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	GE ENVIRONMENTAL SERVICES	
DIMENSIONS - FT	40.0 DIA X 90.3	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 316L	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	FIBERGLASS REINFORCED	
LINER MATERIAL TRADE NAME/COMMON TYPE	CEILCOTE 2500AR	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	3	
DISTANCE BETWEEN GAS CONTACTING ZONES - CM	152.4	(60.0IN)
LIQUID RECIRCULATION RATE - LITER/S	2142.	(34000 GPM)
L/G RATIO - L/CU.M	5.6	(42.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	0.7	(2.7 IN-H20)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(9.9 FT/S)
INLET GAS FLOW - CU. M/S	422.03	(894328 ACFM)
INLET GAS TEMPERATURE - C	148.9	(300 F)
SO2 REMOVAL EFFICIENCY - %	85.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	3	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
MANUFACTURER	GE ENVIRONMENTAL SERVICES	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	4	
FREEBOARD DISTANCE - M	3.66	(12.0 FT)
DISTANCE BETWEEN STAGES - CM	0.51	(0.2 IN)
DISTANCE BETWEEN VANES - CM	7.6	(3.00 IN)
VANE ANGLES - DEGREES	56	
PRESSURE DROP - KPA	0.1	(0.3 IN-H20)
SUPERFICAL GAS VELOCITY - M/S	3.0	(9.9 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPROPYLENE	

HOUSTON LIGHTING & POWER: W.A. PARISH 8 (CONT.)

WASH WATER SOURCE	FRESH	
WASH RATE - L/S	12.6	(200 GAL/MIN)
** REHEATER		
NUMBER	0	
GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	18.0	
TEMPERATURE INCREASE - C	17.8	(32 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** FANS		
NUMBER	4	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FAN	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	259.54	(550000 ACFM)
FLUE GAS TEMPERATURE - C	148.9	(300 F)
PRESSURE DROP - KPA	13.4	(44.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
** DAMPERS		
NUMBER	1	
FUNCTION	CONTROL	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	OPPOSED BLADE	
MANUFACTURER	ANDCO	
MODULATION	NR	
SEAL AIR FLOW - CU. M/S	1.51	(3200 ACFM)
SERVICE CONDITIONS	300	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	CORTEN	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	
** DAMPERS		
NUMBER	1	
FUNCTION	SHUT-OFF	
GENERIC TYPE	GUILLOTINE	
SPECIFIC TYPE	SINGLE BLADE	
MANUFACTURER	ANDCO	
MODULATION	NR	
SEAL AIR FLOW - CU. M/S	1.51	(3200 ACFM)
SERVICE CONDITIONS	300	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	CORTEN	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	
** DAMPERS		
NUMBER	1	
FUNCTION	SHUT-OFF	
GENERIC TYPE	GUILLOTINE	
SPECIFIC TYPE	SINGLE BLADE	
MANUFACTURER	ANDCO	
MODULATION	NR	
SEAL AIR FLOW - CU. M/S	1.51	(3200 ACFM)
SERVICE CONDITIONS	300	
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	317L	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	
** DUCTWORK		
LOCATION	UPSTREAM	
CONFIGURATION	RECTANGULAR	

HOUSTON LIGHTING & POWER: W.A. PARISH 8 (CONT.)

DIMENSIONS	22X15.6
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-36
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	NONE

** DUCTWORK

LOCATION	DOWNSTREAM
CONFIGURATION	RECTANGULAR
DIMENSIONS	16.1X16.1
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-36
LINER GENERIC MATERIAL TYPE	INORGANIC
LINER SPECIFIC MATERIAL TYPE	HYDRAULICALLY-BONDED MORTAR

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	K.V.S.
NUMBER	2
NUMBER OF SPARES	1
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	3.6 (4 TPH)
PRODUCT QUALITY - % SOLIDS	40.0

** TANKS

SERVICE	NUMBER
REAGENT PREP PRODUCT	1
THICKENER OVERFLOW	1
THICKENER UNDERFLOW	1
THICKENER	1

** PUMPS

SERVICE	NUMBER
LIMESTONE SLURRY	1
OVERFLOW	2
THICKENER UNDERFLOW	2
ABSORBER BLEED	2
THICKENER TUNNEL SUMP	2
LIMESTONE AREA SUMP	2
ABSORBER RECIRCULATION	9

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	2
NUMBER OF SPARES	0
CONFIGURATION	PARALLEL
DIMENSIONS - FT	12X20
CAPACITY	63 TON/HOUR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	NATURAL RUBBER
BELT GENERIC MATERIAL TYPE	CLOTH
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	600 GPM, 25% SOLIDS
OUTLET STREAM CHARACTERISTICS	60% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	400 GPM, 0% SOLIDS
OVERFLOW STREAM DISPOSITION	MAKEUP

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
CONFIGURATION	ROUND
DIMENSIONS - FT	60.0 DIA X 15.0
CAPACITY	416300
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-283
LINER GENERIC MATERIAL TYPE	ASPHALTIC MEMBRANE

HOUSTON LIGHTING & POWER: W.A. PARISH 8 (CONT.)

LINER SPECIFIC MATERIAL TYPE	FABRIC REINFORCED	
FEED STREAM SOURCE	ABSORBER BLEED	
FEED STREAM CHARACTERISTICS	328 GPM, 7% SOLIDS	
OUTLET STREAM CHARACTERISTICS	66 GPM, 30% SOLIDS	
OVERFLOW STREAM CHARACTERISTICS	298 GPM, 2.5% SOLIDS	
OUTLET STREAM DISPOSITION	FILTRATION	
OVERFLOW STREAM DISPOSITION	MAKEUP	
*** SALEABLE BYPRODUCTS		
NATURE	NONE	
DISPOSITION	N/A	
*** SLUDGE		
FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	39.9	(44.0 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	70.0	
** TREATMENT		
METHOD	STABILIZATION	
DEVICE	PUG MILL	
PROPRIETARY PROCESS	RESEARCH-COTTRELL	
INLET QUALITY - %	60.0	
** DISPOSAL		
NATURE	FINAL	
TYPE	LANDFILL	
LOCATION	ON-SITE	
SITE TRANSPORTATION METHOD	TRUCK	
SITE TREATMENT	CLAY LINING	
SITE DIMENSIONS	25 ACRES	
SITE SERVICE LIFE - YRS	3	
** PROCESS CONTROL AND INSTRUMENTATION		
CHEMICAL PARAMETERS	PH	
PHYSICAL VARIABLES	FLOW, DENSITY	
PROCESS CONTROL MANNER	AUTOMATIC	
PROCESS CHEMISTRY MODE	FEED FORWARD	
** WATER BALANCE		
WATER LOOP TYPE	CLOSED	
** CHEMICALS AND CONSUMPTION		
FUNCTION	ABSORBENT	
NAME	LIMESTONE	
PRINCIPAL CONSTITUENT	CALCIUM	
CONSUMPTION	130 TON/DAY	
POINT OF ADDITION	BALL MILL	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	50.0	
MIST ELIMINATOR - %	0.0	
FAN - %	50.0	
BALL MILL - %	100.0	
RECIRCULATION PUMP - %	50.0	
THICKENER - %	0.0	
VACUUM FILTER - %	0.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	1.0	
MIST ELIMINATOR	0.0	
FAN	0.0	
BALL MILL	1.0	
RECIRCULATION PUMP	1.0	
THICKENER	0.0	
VACUUM FILTER	0.0	

HOUSTON LIGHTING & POWER: W.A. PARISH 8 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
10/82	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT INITIAL START-UP OF THE FGD SYSTEM OCCURRED DURING OCTOBER, 1982.										
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UNIT IS PRESENTLY IN THE SHAKEDOWN/DEBUGGING PHASE OF OPERATION.										
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER OF 1983.										
7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1983.										
10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER OF 1983.										
1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			

HOUSTON LIGHTING & POWER: W.A. PARISH 8 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT DURING THE PERIOD OF JANUARY THROUGH SEPTEMBER 1984, EIGHT MIST ELIMINATORS WERE REPLACED. A UNIT TRIP OCCURRED CAUSING A LOSS OF AUXILIARY POWER AND A SUBSEQUENT INABILITY TO BYPASS THE FGD SYSTEM. AS A RESULT, THE EXTREME HIGH TEMPERATURE FLUE GAS ENTERED THE MIST ELIMINATORS AND BURNED THEM OUT. NO DAMAGE WAS REPORTED TO OTHER EQUIPMENT DOWSTREAM.

10/84	SYSTEM							744			
11/84	SYSTEM							720			
12/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM NOVEMBER 1 THRU THE END OF THE QUARTER FOR AN ANNUAL SCHEDULED MAINTAINENCE. UTILITY REPORTED HAVING NO PROBLEMS MEETING FGD PERFORMANCE REQUIREMENTS.

1/85	SYSTEM							744			
2/85	SYSTEM							672			
3/85	SYSTEM							744			
4/85	SYSTEM							720			
5/85	SYSTEM							744			
6/85	SYSTEM							720			
7/85	SYSTEM							744			
8/85	SYSTEM							744			
9/85	SYSTEM							720			
10/85	SYSTEM							744			
11/85	SYSTEM							720			
12/85	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THERE WERE NO MAJOR UNIT OR FGD-RELATED OUTAGES DURING THE YEAR 1985.

1/86	SYSTEM							774			
2/86	SYSTEM							672			
3/86	SYSTEM							774			

HOUSTON LIGHTING & POWER: W.A. PARISH 8 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
4/86	SYSTEM							720			
5/86	SYSTEM							774			
6/86	SYSTEM							720			
7/86	SYSTEM							774			
8/86	SYSTEM							774			
9/86	SYSTEM							720			
10/86	SYSTEM							774			
11/86	SYSTEM							720			
12/86	SYSTEM							774			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THERE WERE NO MAJOR FGD-RELATED PROBLEMS DURING THE YEAR 1986.

1/87	SYSTEM							744			
2/87	SYSTEM							672			
3/87	SYSTEM							744			
4/87	SYSTEM							720			
5/87	SYSTEM							744			
6/87	SYSTEM							720			
7/87	SYSTEM							744			
8/87	SYSTEM							744			
9/87	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR OUTAGES EITHER FORCED OR SCHEDULED WERE ENCOUNTERED DURING THE FIRST THREE QUARTERS OF 1987.

10/87	SYSTEM							744			
11/87	SYSTEM							720			
12/87	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS OFF-LINE FROM OCTOBER 16 THROUGH DECEMBER 11 FOR A SCHEDULED MAJOR BOILER/TURBINE OUTAGE. NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED. THE UNIT OPERATED APPROXIMATELY 6460 HOURS IN 1987.