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Utility FGD Survey October 1983-September 1984

Volume 2: Design Performance Data For Operating FGD Systems (Part 2)

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Utility FGD Survey
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Montana Power, Colstrip 3 through
West Penn Power, Mitchell 33

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U.S. ENVIRONMENTAL PROTECTION AGENCY
Stationary Source Compliance Division
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DISCLAIMER

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 Stationary Source Control Division of EPA or the designated contractor. Portions of the work upon which this publication is based were performed pursuant to Contract Nos. RP982-32 (Electric Power Research Institute) and 68-02-3173 (Environmental Protection Agency).

A project summary will be distributed to organizations and individuals indicating a specific interest in the field of FGD technology. Interested parties can be added to the Project Summary mailing list by contacting Carolyn Fowler at the Industrial Environmental Research Laboratory (919/541-2915) or the secretary of the Emission and Effluent Technology Branch of the EPA (919/541-2578). Copies of preceding issues of this report through December 1981 can be purchased from the National Technical Information Service, Springfield, Virginia 22161, (703) 487-4650. Succeeding issues of this report can be purchased from the Electric Power Research Institute Research Reports Center, P.O. Box 50490, Palo Alto, California 94303, (415) 965-4081.

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 the National Technical Information Service (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 and periodic FGDIS training seminars 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 July 1982-March 1983 issue released in April 1984, which contains more complete design and performance data since the FGS system startup dates. This report supersedes all previous issues. Volume 1 includes several categorical summaries of key data and the appendix sections. Volume 2, Parts 1 and 2 contain all available 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 1984, future (December 1993) 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.

ABSTRACT

The Utility FGD Survey report, which is generated by a computerized data base system, represents a survey of operational and planned domestic utility flue gas desulfurization (FGD) systems. The three volume set 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 124 systems in operation, 25 systems under construction, and 68 systems planned. The current FGD-controlled capacity in the United States is 47,255 MW.

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SECTION 13

DESIGN AND PERFORMANCE FOR OPERATIONAL DOMESTIC FGD SYSTEMS

MONTANA POWER, COLSTRIP 3
THROUGH
WEST PENN POWER, MITCHELL 33

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	MONTANA POWER	
PLANT NAME	COLSTRIP	
UNIT NUMBER	3	
CITY	COLSTRIP	
STATE	MONTANA	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	21.	(.050 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	77.	(.180 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	778	
GROSS UNIT GENERATING CAPACITY - MW	778	
NET UNIT GENERATING CAPACITY W/FGD - MW	700	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	778	

** 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	211.	(692 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	7.3	(24.0 FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	19771.	(8500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8140-8800
AVERAGE ASH CONTENT - %	8.50	
RANGE ASH CONTENT - %	7-11	
AVERAGE MOISTURE CONTENT - %	25.00	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	.70	
RANGE SULFUR CONTENT - %	.4-1.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	

*** PARTICLE CONTROL

** 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/ALKALINE FLYASH
SYSTEM SUPPLIER	BECHTEL/MONTANA POWER
A-E FIRM	BECHTEL
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.60
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	95.00
CURRENT STATUS	1
COMMERCIAL START-UP	1/84
INITIAL START-UP	10/83
CONTRACT AWARDED	0/79

MONTANA POWER: COLSTRIP 3 (CONT.)

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	8
NUMBER OF SPARES	1
GENERIC TYPE	COMBINATION TOWER
SPECIFIC TYPE	VENTURI/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	VALVE TRAYS
L/G RATIO - L/CU.M	4.7 (35.0 GAL/1000 ACF)
SO2 REMOVAL EFFICIENCY - %	95.7
PARTICLE REMOVAL EFFICENCY - %	99.5

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
NUMBER PER SYSTEM	1
GENERIC TYPE	IMPINGEMENT
SPECIFIC TYPE	MESH
TRADE NAME/COMMON TYPE	KNITTED WIRE MESH PAD
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** REHEATER

GENERIC TYPE	IN-LINE
SPECIFIC TYPE	STEAM
TRADE NAME/COMMON TYPE	NR
TEMPERATURE INCREASE - C	27.8 (50 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

DESIGN	CENTRIFUGAL
FUNCTION	UNIT
APPLICATION	INDUCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL; ORGANIC

** 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

MONTANA POWER: COLSTRIP 3 (CONT.)

** PUMPS

SERVICE	NUMBER
NA	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NA

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION
DEVICE	OXIDATION TANK
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TREATMENT	CLAY LINING

** WATER BALANCE

WATER LOOP TYPE	CLOSED

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	DOLOMITIC PROMOTED LIME
PRINCIPAL CONSTITUENT	40% MGCO3, 60% CACO3

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT INITIAL START-UP OF THE FGD SYSTEM AT COLSTRIP 3 OCCURRED DURING OCTOBER 1983. COMMERCIAL START-UP IS SCHEDULED FOR JANUARY 1, 1984.

11/83	SYSTEM							720			
12/83	SYSTEM							744			
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			

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED FOR JANUARY THROUGH JULY 1984.

8/84	SYSTEM							744			
9/84	SYSTEM							720			

MONTANA POWER: COLSTRIP 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

INFORMATION WAS UNAVAILABLE FOR AUGUST AND SEPTEMBER 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	MONTANA-DAKOTA UTILITIES	
PLANT NAME	COYOTE	
UNIT NUMBER	1	
CITY	BEULAH	
STATE	NORTH DAKOTA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.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	440	
NET UNIT GENERATING CAPACITY W/FGD - MW	400	
NET UNIT GENERATING CAPACITY WO/FGD - MW	405	
EQUIVALENT SCRUBBED CAPACITY - MW	440	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	CYCLONE	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	891.89	(1890000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	140.6	(285 F)
STACK HEIGHT - M	******	(**** FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	16398.	(7050 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	6.50	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	35.00	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	.87	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** FABRIC FILTER		
NUMBER	1	
TYPE	SHAKE/DEFLATE	
SUPPLIER	WHEELABRATOR-FRYE	
NUMBER OF COMPARTMENTS	38	
PRESSURE DROP - KPA	.7	(3.0 IN-H2O)
TYPICAL GAS/CLOTH RATIO - M/MIN	.9	(2.8 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	SODIUM CARBONATE/SPRAY DRYING	
SYSTEM SUPPLIER	WHEELABRATOR-FRYE/R.I.	
A-E FIRM	BECHTEL	
DEVELOPMENT LEVEL	FULL SCALE	

MONTANA-DAKOTA UTILITIES: COYOTE 1 (CONT.)

NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	70.00
ENERGY CONSUMPTION - %	1.1
CURRENT STATUS	1
COMMERCIAL START-UP	5/81
INITIAL START-UP	4/81
CONTRACT AWARDED	12/77

** DESIGN AND OPERATING PARAMETERS

SPACE REQUIREMENTS - SQ M	3437.3	(37000 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	72.0	

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	4
NUMBER OF SPARES	0
GENERIC TYPE	SPRAY DRYER
SPECIFIC TYPE	COCURRENT
TRADE NAME/COMMON TYPE	ROTARY ATOMIZER
SUPPLIER	ATOMICS INTERNATIONAL
DIMENSIONS - FT	46 FT DIAMETER
SHELL GENERIC MATERIAL	CARBON STEEL
SHELL SPECIFIC MATERIAL	NA
SHELL MATERIAL TRADE NAME/COMMON TYPE	NA
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	3
INLET GAS TEMPERATURE - C	140.6 (285 F)
SO2 REMOVAL EFFICIENCY - %	75.0
PARTICLE REMOVAL EFFICENCY - %	99.0

** 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
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

** DUCTWORK

SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR

MONTANA-DAKOTA UTILITIES: COYOTE 1 (CONT.)

LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK
** PUMPS	
SERVICE	NUMBER
---	---
NR	****
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	NONE
*** SLUDGE	
** TREATMENT	
METHOD	N/A
DEVICE	N/A
PROPRIETARY PROCESS	N/A
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
SITE TREATMENT	CLAY LINED

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL START-UP AND SHAKEDOWN PROCEDURES OF THE DRY SCRUBBING FGD SYSTEM COMMENCED IN APRIL.

5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER 1981 THE UNIT WAS FOR MOST PART OFF-LINE DUE TO BOILER TUBE LEAKS, VARIOUS EQUIPMENT TRIPS, CIRCUIT BREAKER WAS HIT BY LIGHTNING, AND SCHEDULED OUTAGE FOR A BOILER/TURBINE INSPECTION.

SINCE START-UP, HIGH TEMPERATURE AND PLUGGING HAVE BEEN ENCOUNTERED WITH THE DRY SCRUBBER. PRESENTLY, VARIOUS MODIFICATIONS ARE BEING TESTED TO REMEDY THESE PROBLEMS. THESE VARIOUS PROBLEMS CONTRIBUTED TO THE DOWNTIME OF THE SYSTEM.

UTILITY ALSO REPORTED HAVING PROBLEMS WITH FAN BLADE EROSION.

7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

MONTANA-DAKOTA UTILITIES: COYOTE 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 THE THIRD QUARTER 1981, THIS SPRAY DRYER FGD SYSTEM OPERATED ON A LIMITED BASIS ONLY, PRIMARILY AS A RESULT OF EXCESSIVE ASH BUILDUP IN THE SPRAY DRYER COMPARTMENT. OTHER PROBLEMS REPORTED DURING THE QUARTER INCLUDED FAILURE OF THE GEAR REDUCER ON THE ROTARY ATOMIZER AND POOR GAS DISTRIBUTION AND RETENTION IN THE SPRAY DRYER COMPARTMENT. AS OF YET, THE UTILITY HAS BEEN UNABLE TO OPERATE THE SYSTEM AT A LEVEL SUFFICIENT TO ACHIEVE THE DESIGN SO2 REMOVAL EFFICIENCY.									
10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODIFICATIONS AND TESTING CONTINUED BY WHEELABRATOR-FRYE TO REMEDY INABILITY OF SYSTEM TO ACHIEVE THE DESIGN SO2 REMOVAL EFFICIENCY.									
1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODIFICATION AND TESTING OF THE FGD SYSTEM NEARED COMPLETION WITH THE SUPPLIER REPORTING TO HAVE SOLVED MOST PROBLEMS.									
4/82	SYSTEM							720	0		
5/82	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS DOWN ALL OF APRIL AND MOST OF MAY FOR A SCHEDULED BOILER/TURBINE WARRANTY INSPECTION. NO FGD-RELATED OUTAGES WERE ENCOUNTERED.									
6/82	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE MONTH OF JUNE, A NUMBER OF OUTAGES WERE ENCOUNTERED DUE TO THE UNIT. ONE SUCH OUTAGE WAS FOR THREE DAYS TO REPLACE SEALS IN THE AIR PREHEATER. NO FGD RELATED OUTAGES WERE ENCOUNTERED. THE FGD SYSTEM PERFORMANCE TEST IS SCHEDULED FOR THE END OF JULY.									
7/82	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A PERFORMANCE TEST WAS CONDUCTED ON THE FGD SYSTEM DURING THE MONTH OF JULY. THE UTILITY REPORTED THAT THE SYSTEM MET ALL CONTRACTUAL SUPPLIER SPECIFICATIONS.									
8/82	SYSTEM							744			
9/82	SYSTEM							720			

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 REMAINDER OF THE THIRD QUARTER 1982.

10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER 1982.

1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER 1983. THE FGD SYSTEM IS REPORTED TO HAVE AN AVAILABILITY OF BETTER THAN 90%.

4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS SHUT DOWN ALL OF APRIL DUE TO A SCHEDULED BOILER/TURBINE OVERHAUL. DURING THE OUTAGE, A LEAKY METAL EXPANSION JOINT LOCATED BETWEEN THE BOILER OUTLET DUCT AND THE ABSORBER INLET WAS REPAIRED.

THE CONTRACT WITH WHEELABRATOR-FRYE WAS OFFICIALLY CLOSED OUT DURING THE MONTH OF MAY.

THE UTILITY REPORTED THAT COYOTE 1 IS RUNNING AT FULL CAPACITY AND IS ITS CHEAPEST UNIT TO OPERATE.

7/83	SYSTEM							744			
8/83	SYSTEM							744			
9/83	SYSTEM				.0			720	0	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER. FGD SYSTEM AVAILABILITY FOR THE PERIOD WAS APPROXIMATELY 95%.

THE UNIT WAS DOWN ALL OF SEPTEMBER FOR SCHEDULED FALL MAINTENANCE. THE UNIT WAS ALSO DOWN 2 ADDITIONAL DAYS EARLIER IN THE PERIOD DUE TO BOILER TUBE REPAIRS.

10/83	SYSTEM							744			

MONTANA-DAKOTA UTILITIES: COYOTE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
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 FGD SYSTEM WAS AVAILABLE 100 PERCENT DURING THE ENTIRE PERIOD.

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 NO MAJOR FGD RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST, SECOND AND THIRD QUARTERS OF 1984. FGD SYSTEM AVAILABILITY WAS REPORTED AS 100% DURING THIS PERIOD.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	MUSCATINE POWER & WATER	
PLANT NAME	MUSCATINE	
UNIT NUMBER	9	
CITY	MUSCATINE	
STATE	IOWA	
REGULATORY CLASSIFICATION	B	
PARTICULATE EMISSION LIMITATION - NG/J	13.	(.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	160	
GROSS UNIT GENERATING CAPACITY - MW	166	
NET UNIT GENERATING CAPACITY W/FGD - MW	150	
NET UNIT GENERATING CAPACITY WO/FGD - MW	158	
EQUIVALENT SCRUBBED CAPACITY - MW	166	
** 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	131.85	(279400 ACFM)
BOILER FLUE GAS TEMPERATURE - C	148.9	(300 F)
STACK HEIGHT - M	91.	(300 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	3.5	(11.5 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26098.	(11220 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		11000-11500
AVERAGE ASH CONTENT - %	6.70	
RANGE ASH CONTENT - %	5.0-7.0	
AVERAGE MOISTURE CONTENT - %	16.50	
RANGE MOISTURE CONTENT - %	14.0-17.0	
AVERAGE SULFUR CONTENT - %	3.21	
RANGE SULFUR CONTENT - %	2.5-3.5	
AVERAGE CHLORIDE CONTENT - %	.03	
RANGE CHLORIDE CONTENT - %	0.02-0.13	
*** PARTICLE CONTROL		
** ESP		
NUMBER	1	
TYPE	COLD SIDE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	268.9	(569800 ACFM)
INLET FLUE GAS TEMPERATURE - C	158.9	(318 F)
PRESSURE DROP - KPA	.1	(0. 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		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	SALEABLE PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	RESEARCH-COTTRELL	

MUSCATINE POWER & WATER: MUSCATINE 9 (CONT.)

A-E FIRM	STANLEY CONSULTANTS
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.70
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	94.00
ENERGY CONSUMPTION - %	4.8
CURRENT STATUS	1
COMMERCIAL START-UP	8/83
INITIAL START-UP	4/83
CONTRACT AWARDED	1/80

** DESIGN AND OPERATING PARAMETERS

SPACE REQUIREMENTS - SQ M	6688.8	(72000 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	48.0	

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** 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	34.0 DIA X 92.0	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 317L	
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	
INLET GAS FLOW - CU. M/S	254.97	(540300 ACFM)
INLET GAS TEMPERATURE - C	162.8	(325 F)
SO2 REMOVAL EFFICIENCY - %	94.0	

** 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	HORIZONTAL	
NUMBER OF STAGES	2	
PRESSURE DROP - KPA	.0	(.2 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPROPYLENE	
WASH WATER SOURCE	FRESH	
WASH FREQUENCY	INTERMITTENT OVERSPRAY; CONTINUOUS UNDERSPRAY	

** REHEATER

GENERIC TYPE	IN-LINE	
SPECIFIC TYPE	STEAM	
TRADE NAME/COMMON TYPE	NR	
PERCENT GAS BYPASSED - AVG	.0	
TEMPERATURE INCREASE - C	27.8	(50 F)
INLET FLUE GAS FLOW RATE - CU. M/S	5.43	(11500 ACFM)
INLET FLUE GAS TEMPERATURE - C	185.6	(366 F)
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM	

** FANS

NUMBER	2
NUMBER OF SPARES	0
DESIGN	NR
SUPPLIER	AMERICAN STANDARD
FUNCTION	BOOSTER
APPLICATION	FORCED DRAFT

MUSCATINE POWER & WATER: MUSCATINE 9 (CONT.)

SERVICE	WET	
FLUE GAS FLOW RATE - CU.M/S	281.96	(597500 ACFM)
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	
** 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	
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	13.6	(15 TPH)
** PUMPS		
SERVICE	NUMBER	
---	---	
NA	****	
** SOLIDS CONCENTRATING/DEWATERING		
DEVICE	VACUUM FILTER	
NUMBER	2	
NUMBER OF SPARES	1	
FEED STREAM CHARACTERISTICS	50% SOLIDS	
OUTLET STREAM CHARACTERISTICS	90% SOLIDS	
** SOLIDS CONCENTRATING/DEWATERING		
DEVICE	THICKENER	
OUTLET STREAM CHARACTERISTICS	50% SOLIDS	
*** SALEABLE BYPRODUCTS		
NATURE	GYPSUM	
FULL LOAD QUANTITY - M T/H	9.80	(10.80 TPH)
DISPOSITION	MARKETED	
NATURE OF END PRODUCT	WALLBOARD	
*** SLUDGE		
** TREATMENT		
METHOD	FORCED OXIDATION	
DEVICE	NR	
PROPRIETARY PROCESS	N/A	
** DISPOSAL		
NATURE	FINAL	
TYPE	LANDFILL	
SITE TREATMENT	NONE	
** WATER BALANCE		
WATER LOOP TYPE	CLOSED	

MUSCATINE POWER & WATER: MUSCATINE 9 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
4/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM COMMENCED OPERATIONS IN APRIL AND IS CURRENTLY IN THE START-UP PHASE OF OPERATION.

5/83	SYSTEM							744			
6/83	901	97.8	80.1	95.5	47.5						
	902	.0	.0		.0						
	SYSTEM	97.8	80.1	95.5	47.5			720	427	342	38.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY HAS OPERATED ONLY ONE OF THE TWO 100 % CAPACITY ABSORBER TOWERS. THE TOWER OPERATED FOR APPROXIMATELY 14 DAYS IN JUNE. SEVERAL OUTAGES OCCURRED DUE TO ELECTRICAL PROBLEMS. PERFORMANCE TESTING IS SCHEDULED TO TAKE PLACE SOMETIME IN AUGUST.

7/83	T-901	37.4	48.9	100.0	31.0						
	T-902	.0	.0		.0						
	SYSTEM	37.4	48.9	100.0	31.0			744	472	231	
8/83	T-901	37.4	48.9	100.0	31.0						
	T-902	.0	.0		.0						
	SYSTEM	100.0	48.9	100.0	31.0			744	472	231	
9/83	T-901	37.4	48.9	100.0	31.0						
	T-902	.0	.0		.0						
	SYSTEM	37.4	48.9	100.0	31.0			720	457	224	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1983.

10/83	T-901	57.0	69.4	76.5	48.0						
	T-902	58.3	6.3	7.5	4.4						
	SYSTEM	100.0	75.7	84.0	52.4			744	515	390	
11/83	T-901	57.0	69.4	76.5	48.0						
	T-902	58.3	6.3	7.5	4.4						
	SYSTEM	100.0	75.7	84.0	52.4			48	498	377	
12/83	T-901	57.0	69.4	76.5	48.0						
	T-902	58.3	6.3	7.5	4.4						
	SYSTEM	100.0	75.7	84.0	52.4			744	515	390	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED WETTED FILM CONTACTOR PLUGGING IN MODULE T-901 DURING THE FOURTH QUARTER 1983.

1/84	T-901	10.9	8.7	79.9	8.0						
	T-902	61.2	40.0	100.0	36.6						
	SYSTEM	72.1	48.8	100.0	44.6			744	681	332	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE T-902 WAS OUT OF SERVICE 288.5 HOURS DURING THE MONTH FOR A SCHEDULED MAINTENANCE OUTAGE.

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		THE UTILITY REPORTED THAT 663 HOURS OF FORCED OUTAGE TIME DURING JANUARY WAS DUE TO THE CHANGING OF ABSORBER PACKING AT MODULE T-901.									
2/84	T-901	76.6		90.6	69.4						
	T-902	27.6		12.5	3.4						
	SYSTEM	100.0		100.0	72.8			696		507	
3/84	T-901	.0			.0						
	T-902	.0									
	SYSTEM	.0			.0			744		0	
4/84	T-901	.0			.0						
	T-902	24.9		100.0	23.2						
	SYSTEM	24.9		100.0	23.2			720		167	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TURBINE PROBLEMS WERE ENCOUNTERED DURING THE MONTH AND FGD SYSTEM MAINTENANCE WAS CONDUCTED DURING THIS TIME.									
5/84	T-901	100.0		100.0	62.1						
	T-902	37.0		100.0	28.2						
	SYSTEM	100.0		100.0	90.3			744		672	
6/84	T-901	100.0		92.8	92.8						
	T-902	6.7			.0						
	SYSTEM	100.0		92.8	92.8			720		668	
7/84	T-901	67.7		100.0	54.3						
	T-902	.0			.0						
	SYSTEM	67.7		100.0	54.3			744		404	
8/84	T-901	54.3		100.0	54.3						
	T-902	36.0		100.0	18.5						
	SYSTEM	90.3		100.0	72.8			744		542	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF FEBRUARY THROUGH AUGUST, 1984.									
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR SEPTEMBER 1984.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NEVADA POWER	
PLANT NAME	REID GARDNER	
UNIT NUMBER	1	
CITY	MOAPA	
STATE	NEVADA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.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	111	
GROSS UNIT GENERATING CAPACITY - MW	125	
NET UNIT GENERATING CAPACITY W/FGD - MW	110	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	125	
** 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	223.21	(473000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	176.7	(350 F)
STACK HEIGHT - M	61.	(200 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	3.8	(12.6 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	28959.	(12450 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		11500-12500
AVERAGE ASH CONTENT - %	8.00	
RANGE ASH CONTENT - %	8.0-10.0	
AVERAGE MOISTURE CONTENT - %	5.50	
RANGE MOISTURE CONTENT - %	5.5-6.0	
AVERAGE SULFUR CONTENT - %	.50	
RANGE SULFUR CONTENT - %	0.5-1.0	
AVERAGE CHLORIDE CONTENT - %	.05	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
TYPE	MULTICLONE	
SUPPLIER	RESEARCH-COTTRELL	
PARTICLE REMOVAL EFFICENCY -%	75.0	
** PARTICLE SCRUBBER		
NUMBER	1	
INITIAL START-UP DATE	4/74	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	FIXED THROAT	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	THYSSEN/CEA	
DIMENSIONS - FT	1.5 DIA X 18.0	
SHELL GENERIC MATERIAL	CARBON STEEL; HIGH ALLOY	
SHELL SPECIFIC MATERIAL	AISI 1110; NICKEL BASE/CHROMIUM-IRON-COPPER-MOLY	
LINER GENERIC MATERIAL	NONE; ORGANIC	
LINER SPECIFIC MATERIAL	N/A; NATURAL RUBBER	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	157.5	(2500 GPM)
L/G RATIO - LITER/CU.M	1.3	(10.0 GAL/1000ACF)
PRESSURE DROP - KPA	4.6	(18.5 IN-H2O)
SUPERFICIAL GAS VELOCITY - M/S	50.3	(165.0 FT/S)
INLET GAS FLOW RATE - CU.M/S	223.2	(473000 ACFM)
INLET GAS TEMPERATURE - C	176.7	(350 F)
PARTICLE REMOVAL EFFICIENCY - %	97.0	

NEVADA POWER: REID GARDNER 1 (CONT.)

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	SODIUM CARBONATE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	THYSSEN/CEA
A-E FIRM	BECHTEL
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	RETROFIT
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	97.00
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00
CURRENT STATUS	1
COMMERCIAL START-UP	4/74
INITIAL START-UP	3/74
CONTRACT AWARDED	7/71

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	1	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	SIEVE TRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	THYSSEN/CEA	
DIMENSIONS - FT	30.0 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	NATURAL RUBBER	
LINER MATERIAL TRADE NAME/COMMON TYPE	BLACK NATURAL RUBBER	
GAS CONTACTING DEVICE TYPE	PERFORATED TRAYS	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	38.	(600 GPM)
L/G RATIO - L/CU.M	.2	(1.6 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.7	(3.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.4	(11.0 FT/S)

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	1	
GENERIC TYPE	CENTRIFUGAL	
SPECIFIC TYPE	RADIAL VANE	
TRADE NAME/COMMON TYPE	NR	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	1	
PRESSURE DROP - KPA	.1	(.5 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	

** REHEATER

GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER	
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE	
TEMPERATURE INCREASE - C	27.8	(50 F)
INLET FLUE GAS TEMPERATURE - C	48.3	(119 F)
NUMBER OF TUBES PER BUNDLE	24	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** FANS

NUMBER	1
DESIGN	CENTRIFUGAL

NEVADA POWER: REID GARDNER 1 (CONT.)

SUPPLIER	BUFFALO FORGE
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY
FLUE GAS FLOW RATE - CU.M/S	223.21 (473000 ACFM)
FLUE GAS TEMPERATURE - C	176.7 (350 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

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
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	INERT FLAKE-FILLED VINYL ESTER

** REAGENT PREPARATION EQUIPMENT

FUNCTION	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK

** TANKS

SERVICE	NUMBER
SCRUBBER RECYCLE	1

** PUMPS

SERVICE	NUMBER
SCRUBBER RECIRCULATION	3
ABSORBER RECIRCULATION	3

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SLUDGE

** TREATMENT

METHOD	BLEED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	INTERIM
TYPE	POND
LOCATION	ON-SITE
SITE TREATMENT	CLAY LINING

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	GRAVITY FLOW FROM INTERIM SLUDGE POND
SITE TREATMENT	CLAY LINING

NEVADA POWER: REID GARDNER 1 (CONT.)

** WATER BALANCE

WATER LOOP TYPE	CLOSED	
MAKEUP WATER ADDITION - LITERS/S	9.8	(155 GPM)

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/74	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS FIRST PLACED IN SERVICE IN APRIL 1974. THE SCRUBBING UNIT DESIGN WAS BASED ON INFORMATION AND DATA OBTAINED FROM AN 8000-ACFM PILOT PLANT PROGRAM CONDUCTED AT REID GARDNER STATION IN 1971 AND 1972.

5/74	SYSTEM							744			
6/74	SYSTEM							720			
7/74	SYSTEM							744			
8/74	SYSTEM							744			
9/74	SYSTEM							720			
10/74	SYSTEM							744			
11/74	SYSTEM							720			
12/74	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM HAS PERFORMED ACCEPTABLY SINCE START UP IN APRIL 1974. SYSTEM AVAILABILITY HAS BEEN GREATER THAN 90% AND OPERATIONS HAVE ONLY BEEN INTERRUPTED BY LACK OF TRONA. SO2 REMOVAL EFFICIENCY HAS BEEN APPROXIMATELY 85%. BECAUSE OF A COAL STRIKE THE BOILER ONLY OPERATED ABOUT TWO WEEKS IN NOVEMBER AND DURING THOSE TWO WEEKS IT OPERATED AT LOW LOAD. DELIVERY OF TRONA WAS SUFFICIENT TO MAINTAIN FGD SYSTEM OPERATION. THERE ARE NO OUTSTANDING MECHANICAL OR PROCESS PROBLEMS.

1/75	SYSTEM		65.0					744			

** PROBLEMS/SOLUTIONS/COMMENTS

FROZEN SODIUM CARBONATE FEED LINES ACCOUNTED FOR MOST OF THE JANUARY OUTAGE TIME. THE FGD SYSTEM HAS BEEN OPERATING WITH TRONA SUPPLEMENTED BY SODIUM CARBONATE BRINE.

2/75	SYSTEM		95.0					672			

** PROBLEMS/SOLUTIONS/COMMENTS

A 2-DAY LACK OF CHEMICALS RESULTED IN OUTAGE TIME DURING FEBRUARY.

3/75	SYSTEM	100.0	100.0					744			
4/75	SYSTEM	100.0	100.0					720			

NEVADA POWER: REID GARDNER 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 BOILER WAS SHUT DOWN APRIL 13 FOR ROUTINE MAINTENANCE. THE UNIT IS SCHEDULED TO BE BACK IN SERVICE IN EARLY MAY.

5/75	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER AND FGD SYSTEM WERE PLACED BACK IN SERVICE ON MAY 12.

THE UTILITY REPORTED THAT A HIGH ASH CONTENT OF UP TO 20% BY WEIGHT OF THE COAL BURNED RECENTLY HAD NO EFFECT ON EMISSIONS.

THE UTILITY REPORTED PROBLEMS WITH ABRASION OF THE PIPING RUBBER LINING AND ROUTINE MECHANICAL PROBLEMS.

INSTRUMENTATION PROBLEMS WERE ENCOUNTERED OVER THE APRIL-MAY PERIOD.

6/75	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

ROUTINE MECHANICAL PROBLEMS CONTINUED THROUGH JUNE.

MINOR INSTRUMENTATION PROBLEMS CONTINUED THROUGH JUNE.

THE UTILITY HAS REPORTED THAT A SECOND PERFORMANCE TEST WAS RECENTLY COMPLETED AND PASSED.

7/75	SYSTEM		85.0					744			
8/75	SYSTEM							744			
9/75	SYSTEM		78.1		77.6			720	716	559	

** PROBLEMS/SOLUTIONS/COMMENTS

FOUR FORCED OUTAGES OCCURED DURING SEPTEMBER. THREE OF THE FOUR WERE SCRUBBER-RELATED. DETAILS WERE NOT AVAILABLE FROM THE UTILITY.

10/75	SYSTEM		35.0		14.0			744	303	106	

** PROBLEMS/SOLUTIONS/COMMENTS

LOW OPERATING TIME DURING OCTOBER WAS DUE TO SCHEDULED BOILER MAINTENANCE.

ONE OUTAGE WAS DUE TO THE MALFUNCTION OF A SODA ASH BLOWER.

11/75	SYSTEM		60.3		54.7			720	654	394	

** PROBLEMS/SOLUTIONS/COMMENTS

OPERABILITY WAS LOW FOR THE MONTH OF NOVEMBER BECAUSE OF DELAYS IN THE DELIVERY OF REPAIR MATERIALS.

12/75	SYSTEM							744			
1/76	SYSTEM	26.7	30.6	30.6	26.7			744	647	198	

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE COLLAPSE OF A VENTURI STRAINER RESULTED IN FGD SYSTEM OUTAGE DURING JANUARY.

REHEATER STEAM LEAKS CAUSED AN OUTAGE DURING JANUARY. REPAIRS COULD NOT BE MADE WITH THE BOILER IN SERVICE.

A FROZEN CARBONATE LINE RESULTED IN AN FGD SYSTEM OUTAGE DURING JANUARY.

THE SYSTEM WAS SHUT DOWN FOR 16 DAYS IN JANUARY FOR COMPLETION OF PIPING CONVERSION. THIS OUTAGE WAS NOT DUE TO A SCRUBBER MALFUNCTION.

2/76	SYSTEM	89.3	74.6	80.7	71.2			696	664	496

** PROBLEMS/SOLUTIONS/COMMENTS

A DEPLETION OF CHEMICALS DURING FEBRUARY ACCOUNTED FOR NEARLY 44 HOURS OF SCRUBBER OUTAGE TIME.

FIVE SCRUBBER INOPERATIVE PERIODS WERE REPORTED DURING FEBRUARY. THREE OF THESE OUTAGES WERE NOT RELATED TO THE FGD SYSTEM.

SEAL WATER PROBLEMS WERE REPORTED DURING FEBRUARY.

CHEMICAL LINE PLUGGING PROBLEMS WERE NOTED DURING FEBRUARY.

3/76	SYSTEM	99.2	71.9	99.2	38.5			744	398	287

** PROBLEMS/SOLUTIONS/COMMENTS

ONE FORCED SCRUBBER OUTAGE WAS CAUSED BY A VENTURI LEAK.

4/76	SYSTEM	100.0	91.1	100.0	13.4			720	106	97

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS TAKEN OUT OF SERVICE IN APRIL FOR INSPECTION OF VALVES AND COAL CONDUITS.

5/76	SYSTEM	100.0			.0			744	0	0
6/76	SYSTEM	100.0			.0			720	0	0
7/76	SYSTEM	100.0			.0			744	0	0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS SHUT DOWN FOR A SCHEDULED TURBINE OVERHAUL AND BURNER LINE CONDUIT REPLACMENT THROUGH MAY, JUNE, AND JULY.

8/76	SYSTEM	96.6	65.7	93.3	46.9			744	531	349

** PROBLEMS/SOLUTIONS/COMMENTS

TURBINE VIBRATION CHECKS CONTINUED THROUGH AUGUST 8. THE SCRUBBER WAS NOT OPERATED UNTIL AUGUST 12.

PLUGGING IN THE THICKNER CAUSED AN OUTAGE DURING AUGUST.

PLUGGING IN THE TRAY RECYCLE TANK DURING AUGUST RESULTED IN AN FGD OUTAGE.

9/76	SYSTEM	96.6	96.4	96.4	91.1			720	681	656

NEVADA POWER: REID GARDNER 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

BOILER-RELATED PROBLEMS ACCOUNTED FOR APPROXIMATELY 40 HOURS OF THE FGD SYSTEM DOWNTIME IN SEPTEMBER.

PLUGGING IN THE VENTURI SPRAY HEADERS CAUSED A SCRUBBER OUTAGE.

AN ID FAN MALFUNCTION RESULTED IN SCRUBBER OUTAGE DURING SEPTEMBER.

10/76	SYSTEM	97.9	96.5	97.7	87.9			744	678	654	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE FOR 75 HOURS IN OCTOBER TO REPLACE A BURNER.

SCRUBBER OUTAGE TIME WAS REQUIRED FOR INSTALLATION OF A NEW CARBONATE FEED LINE.

A MINOR SCRUBBER TRIP WAS CAUSED BY PLUGGING IN THE SCRUBBER EFFLUENT SUCTION LINE.

11/76	SYSTEM	86.5	84.2	84.8	75.3			720	644	542	

** PROBLEMS/SOLUTIONS/COMMENTS

ONE 97 HOUR SCRUBBER OUTAGE OCCURED BECAUSE OF A SCREW CONVEYOR FAILURE, RESULTING IN AN INABILITY TO MIX THE CHEMICAL ABSORBENT.

12/76	SYSTEM	92.8	90.6	91.9	82.1			744	675	611	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER RELATED PROBLEMS ACCOUNTED FOR 79 HOURS OF THE DECEMBER OUTAGE TIME.

A FORCED FGD OUTAGE RESULTED FROM CHEMICAL DEPLETION.

A PLUGGED SENSING LINE FORCED AN FGD OUTAGE DURING DECEMBER.

1/77	SYSTEM	68.4	62.8	63.9	56.0			744	663	416	

** PROBLEMS/SOLUTIONS/COMMENTS

RUBBER LINING REPAIRS WERE INITIATED IN THE SEPARATOR SECTION OF THE SCRUBBING MODULE ON JANUARY 22. THE LINING WAS DAMAGED BY A HIGH TEMPERATURE EXCURSION RESULTING FROM A MALFUNCTION IN THE BOILER AIR PREHEATER.

2/77	SYSTEM	.0	.0	.0	.0			672	599	0	

** PROBLEMS/SOLUTIONS/COMMENTS

RUBBER LINING WORK CONTINUED ON THE SCRUBBER DURING FEBRUARY. THE BOILER WAS DOWN PART OF THE PERIOD BECAUSE OF A STRIKE.

3/77	SYSTEM	.0	.0	.0	.0			744	669	0	

** PROBLEMS/SOLUTIONS/COMMENTS

SCRUBBER RUBBER LINING REPAIRS CONTINUED.

4/77	SYSTEM	.0	.0	.0	.0			720	400	0	

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
			SCRUBBER RUBBER LINING REPAIRS CONTINUED.								
5/77	SYSTEM	.0	.0	.0	.0			744	705	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			SCRUBBER RUBBER LINING REPAIRS CONTINUED.								
6/77	SYSTEM	47.1	48.4	48.4	47.1			720	701	339	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			REPAIRS ON THE DAMAGED RUBBER LINING WERE COMPLETED BY MID-JUNE AND THE SYSTEM REMAINED IN SERVICE THROUGHOUT THE MAJORITY OF THE MONTH.								
			A MINOR FORCED OUTAGE RESULTED FROM A HIGH-LOW PRESSURE TRIP CAUSED BY A PLUGGED SENSING LINE.								
7/77	SYSTEM	99.5	99.5	99.5	99.5			744	744	740	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE SYSTEM WAS TAKEN OUT OF THE GAS PATH ONLY ONCE DURING THE MONTH BECAUSE OF A SCHEDULED INSPECTION OF THE NEWLY REPLACED RUBBER LINER IN THE SCRUBBER SEPARATOR SECTION.								
8/77	SYSTEM	13.8	15.5	15.5	13.8			744	662	102	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE SCRUBBER WAS OUT OF SERVICE MOST OF AUGUST FOR ID FAN VIBRATION PROBLEMS.								
			INSTALLATION OF ID FAN RELAYS ACCOUNTED FOR SOME DOWNTIME DURING AUGUST.								
9/77	SYSTEM	84.4	73.4	69.3	35.0			720	344	252	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE BOILER WAS OUT OF SERVICE FOR MOST OF SEPTEMBER FOR NON-SCRUBBER RELATED PROBLEMS.								
			THE SCRUBBER HAD LIMIT SWITCH PROBLEMS WITH 14 A & B GULLOTINE DAMPERS.								
10/77	SYSTEM	99.3	94.4	99.2	84.7			744	668	630	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UNIT WAS DOWN FOR FIVE HOURS DURING OCTOBER TO REPAIR AN ID FAN LEAK.								
11/77	SYSTEM	78.7	81.5	81.5	78.1			720	690	562	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			SCREEN PLUGGING IN THE RECYCLE TANK WAS A PROBLEM DURING NOVEMBER.								
			SCRUBBER INSTRUMENTATION DIFFICULTY WAS EXPERIENCED DURING NOVEMBER.								
			THE SYSTEM WAS DOWN FOR THE INSTALLATION OF AN OUTLET NOZZLE IN THE BOOSTER TANK.								
12/77	SYSTEM	85.4	80.6	82.8	70.2			744	648	522	

NEVADA POWER: REID GARDNER 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 SCRUBBER WAS OFF-LINE FOR APPROXIMATELY 109 HOURS DUE TO HIGH TRAY DIFFERENTIAL PRESSURE AND SOME PLUGGING IN THE ID FAN SENSING LINE.									
		THE BOILER WAS DOWN ABOUT 113 HOURS IN DECEMBER FOR NON-SCRUBBER RELATED PROBLEMS.									
1/78	SYSTEM	67.7	67.5	67.5	55.9			744	616	416	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TWO OUTAGES WERE CAUSED BY PROBLEMS RELATED TO HIGH TRAY DIFFERENTIAL PRESSURES.									
		ELECTRICAL PROBLEMS IN THE 1A FORCED DRAFT FAN CAUSED AN FGD SYSTEM OUTAGE.									
		AIR PRESSURE FAILURE TO AN ID FAN DAMPER ACCOUNTED FOR SOME JANUARY DOWNTIME.									
2/78	SYSTEM	97.4	74.9	94.3	43.4			672	389	292	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A DUCT HI-LO PRESSURE TRIP CONTRIBUTED TO THE FEBRUARY OUTAGE TIME.									
		THE BOILER WENT OUT OF SERVICE ON FEBRUARY 17 FOR A THREE WEEK OUTAGE.									
		PLUGGED SENSING LINES CONTRIBUTED TO THE OUTAGE TIME DURING FEBRUARY.									
3/78	SYSTEM	76.2	58.3	58.3	27.8			744	355	207	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS OFF LINE UNTIL MARCH 16.									
		A PROBLEM WAS ENCOUNTERED WITH THE REHEAT STEAM REGULATOR DURING MARCH.									
		PROBLEMS WITH THE GUILLOTINE SWITCHES DELAYED START-UP OF THE FGD SYSTEM UNTIL MARCH 22.									
4/78	SYSTEM	100.0	96.7	100.0	75.2			720	560	541	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THERE WERE NO FGD SYSTEM FORCED OUTAGES. ALL DOWNTIME WAS BOILER RELATED (179 HOURS).									
5/78	SYSTEM	97.0	92.4	96.3	78.2			744	630	582	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE REPAIRS TO THE CONDENSER AND PRODUCTION CONTROL CONTRIBUTED TO THE BOILER OUTAGES.									
		HIGH TEMPERATURE ON AN ID FAN BEARING CAUSED AN OUTAGE.									
6/78	SYSTEM	91.8	91.8	91.8	91.8			720	720	661	

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

** PROBLEMS/SOLUTIONS/COMMENTS

A 31 HOUR OUTAGE WAS REQUIRED TO CHANGE THE OIL ON THE ID FAN.

A HIGH DUCT PRESSURE TRIP OCCURED DURING JUNE ACCOUNTING FOR SOME DOWNTIME.

OUTAGE TIME WAS REQUIRED TO CLEAN AN ABSORBER TRAY.

7/78	SYSTEM	99.0	99.0	99.0	99.0			744	744	736

** PROBLEMS/SOLUTIONS/COMMENTS

FGD OUTAGE TIME WAS REQUIRED TO RECTIFY A HIGH TRAY DIFFERENTIAL PRESSURE PROBLEM. THE TRAY WAS CLEANED OUT DURING THE OUTAGE.

8/78	SYSTEM	94.5	93.6	94.2	88.8			744	706	661

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER WAS FORCED OFF LINE ON AUGUST 5 BECAUSE OF A LOSS OF THE ASH PANEL CONTROL POWER. THIS LEFT THE UNIT WITHOUT EMERGENCY SPRAY TO THE SCRUBBERS.

A FORCED OUTAGE OCCURED ON AUGUST 20 WHEN THERE WAS A SCRUBBER VENTURI HIGH TEMPERATURE ALARM. THE EXACT CAUSE WAS NOT KNOWN BUT A BOILER TUBE LEAK WAS SUSPECTED.

THERE WAS ONE SCHEDULED OUTAGE DURING THE MONTH TO CLEAN AN ABSORBER TRAY.

9/78	SYSTEM	99.3	97.2	99.2	86.9			720	644	626

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE THREE BOILER RELATED OUTAGES DURING SEPTEMBER. A BOILER TUBE LEAK AND BOILER BURNER WERE REPAIRED.

DURING THE MONTH A BOILER TRIP OCCURRED WHICH WAS CAUSED BY SCRUBBER HIGH DUCT PRESSURE. SCRUBBER PRESSURE SENSING LINES WERE CLEANED.

10/78	SYSTEM	100.0	99.8	100.0	89.6			744	668	667

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OFF LINE FOR ABOUT 77 HOURS FOR REMOVAL OF AN ASH CLINKER.

11/78	SYSTEM	90.4	88.9	89.9	84.7			720	686	610

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN FOR 9 HOURS TO REPAIR SCRUBBER OUTLET TEMPERATURE PROBES.

OUTAGE TIME RESULTED FROM BOILER BOTTOM HOPPER PROBLEMS. A HIGH TEMPERATURE TRIP AT THE VENTURI GAS OUTLET OCCURRED BECAUSE OF THE BOILER PROBLEMS.

SOME OUTAGE TIME RESULTED FROM A HIGH SCRUBBER EFFLUENT SOLIDS LEVEL.

12/78	SYSTEM	95.6	92.8	95.4	92.0			744	738	685

NEVADA POWER: REID GARDNER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
1/79	SYSTEM	83.9	73.7	80.8	67.5			744	682	502	73.7
2/79	SYSTEM	85.6	85.9	85.9	85.6			672	670	575	79.7
3/79	SYSTEM	97.9	96.5	97.4	78.3			744	604	583	84.9
4/79	SYSTEM	100.0	98.6	100.0	25.7			720	188	185	86.1
5/79	SYSTEM	99.8	74.4	99.4	27.5			744	275	204	84.8
6/79	SYSTEM	97.9	95.2	97.6	84.7			720	641	610	86.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBING SYSTEM WAS OUT OF SERVICE TO REPAIR A LEAK IN A VENTURI LINE.

THE FGD SYSTEM WAS DOWN TO CLEAN THE VENTURI SPRAY COLLAR (RACE TRACK) AND CLEAN PRESSURE SENSING LINES.

THE BOILER WAS OFF LINE APPROXIMATELY ONE DAY FOR PULVERIZER REPAIRS.

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS DOWN ABOUT FIVE DAYS TO REMOVE A CLINKER FROM THE BOTTOM HOPPER.

A 58 HOUR SCRUBBER OUTAGE WAS CAUSED WHEN A SCRUBBER POWER CIRCUIT TRIPPED RESULTING IN LOSS OF POWER TO TRAY SPRAY PUMP. REPAIRS WERE MADE ON THE TRAY AND SPRAY SYSTEMS.

THE FGD SYSTEM WAS DOWN FOR A SHORT PERIOD TO INSPECT THE ID FAN BEARINGS.

THE FGD SYSTEM WAS DOWN FOR 48 HOURS TO REPAIR A LEAK IN THE VENTURI LINE.

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN TO CLEAN THE VENTURI SPRAY COLLAR (RACE TRACK) NOZZLES, CLEAN THE EFFLUENT LINE AND REPAIR A LEAK IN THE VENTURI LINE.

A BREAK IN THE BOTTOM ASH CIRCULATING WATER LINE RESULTING IN LOSS OF EMERGENCY COOLING WATER FORCED THE FGD SYSTEM OFF LINE.

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OFF TO UNPLUG VENTURI NOZZLES AND TO CLEAN SENSING LINES. THE DOWNTIME WAS ABOUT 15 HOURS.

THE FGD SYSTEM WAS OFF FOR ABOUT 146 HOURS FOR REPAIR OF BOILER TUBE LEAKS.

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER AND FGD SYSTEM WERE OFF FOR APPROXIMATELY 535 HOURS FOR SCHEDULED MAINTENANCE.

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER AND SCRUBBER WERE RETURNED TO SERVICE MAY 22 AFTER COMPLETING SCHEDULED MAINTENANCE.

THE BOILER WAS FORCED OUT OF SERVICE TO REPAIR A COAL LEAK ON THE #8 BURNER LINE.

THE SCRUBBER WAS OFF LINE APPROXIMATELY ONE HOUR TO CLEAN A RECYCLE TANK RETURN LINE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A 94 HOUR OUTAGE WAS REQUIRED TO REPAIR A BOILER TUBE LEAK.									
		OUTAGE TIME WAS REQUIRED TO UNPLUG A VENTURI LINE.									
		TRAY SPRAY VALVES WERE REPLACED DURING JUNE.									
7/79	SYSTEM	82.1	80.5	81.0	80.3			744	742	597	85.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER AND FGD SYSTEM WAS FORCED OFF LINE DURING A TURBINE OVERSPEED GOVERNOR TEST. THE DOWNTIME WAS ABOUT SEVEN HOURS.									
		THE SCRUBBER WAS OFF ABOUT 67 HOURS TO CLEAN THE SCRUBBER TRAYS.									
		THE LOSS OF INSTRUMENT AIR TO THE SCRUBBER CONTROLS RESULTED FROM A SCRUBBER AIR COMPRESSOR POWER FAILURE. THE SCRUBBER WAS OFF-LINE FOR ABOUT 74 HOURS.									
8/79	SYSTEM	96.9	96.9	96.9	96.9			744	744	721	87.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SCRUBBER WAS REMOVED FROM SERVICE TO CLEAN THE SCRUBBER PRESSURE SENSING LINES. THE SCRUBBER WAS DOWN FOR ABOUT 11 HOURS.									
		THE SCRUBBER WAS DOWN AT THE END OF THE MONTH AGAIN TO CLEAN THE PRESSURE SENSING LINE ON THE SCRUBBER. THE SCRUBBER WAS OFF LINE FOR ABOUT THREE HOURS.									
9/79	SYSTEM	100.0	100.0	100.0	53.2			720	383	383	88.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER, TURBINE, AND SCRUBBER WERE SHUT DOWN FOR SCHEDULED MAINTENANCE ON SEPTEMBER 16.									
10/79	SYSTEM	79.6	68.2	71.0	49.9			744	545	372	85.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SCRUBBER WAS OFF LINE WITH THE BOILER AND TURBINE FOR SCHEDULED MAINTENANCE THROUGH OCTOBER 8.									
		PLUGGING OF THE VENTURI AND EFFLUENT LINE CAUSED THREE OUTAGES DURING THE MONTH.									
		THE SCRUBBER WAS SHUT DOWN SO THAT REPAIRS COULD BE MADE TO THE ID FAN DAMPER.									
		THE SCRUBBER WAS SHUT DOWN BECAUSE OF A BOILER TURBINE PROBLEM.									
11/79	SYSTEM	99.4	96.8	99.4	88.2			720	656	635	87.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SCRUBBER WENT OFF-LINE WITH THE BOILER TO REPAIR TURBINE POWER SWITCHES.									
		TWO OUTAGES DURING NOVEMBER WERE CAUSED BY A BOILER TUBE LEAK.									

NEVADA POWER: REID GARDNER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
				THE SCRUBBER WAS SHUT DOWN SO THAT THE VENTURI SPRAY COLLECTOR (RACE TRACK) NOZZLES COULD BE CLEANED. TWICE DURING THE MONTH THE TURBINE TRIPPED CAUSING THE SECTION 1B BREAKER TO BE LOST. ON THE SECOND TRIP A COOLING TOWER FAN MOTOR SHORTED TO GROUND.							
12/79	SYSTEM	98.5	98.5	98.5	98.5			744	744	733	88.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
				DURING DECEMBER THE SCRUBBER WAS TAKEN OFF LINE TO REPAIR A MALFUNCTIONING VALVE ON THE EMERGENCY SPRAY SYSTEM.							
1/80	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	100.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
				THE BOILER AND FGD SYSTEM OPERATED THE ENTIRE MONTH OF JANUARY WITH NO OUTAGES.							
2/80	SYSTEM	100.0	100.0	100.0	100.0			696	696	696	100.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
				THE BOILER AND FGD SYSTEM OPERATED THE ENTIRE MONTH OF FEBRUARY WITH NO OUTAGES.							
3/80	SYSTEM	93.8	83.3	84.4	33.6			744	300	250	97.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
				DURING THE FIRST OF MARCH THE FGD SYSTEM WAS OFF LINE FOR A SCHEDULED OVERHAUL. THE FGD UNIT WAS FORCED DOWN ONCE TO REPAIR A VENTURI PUMP AND SIX OTHER TIMES DUE TO RESTRICTED VENTURI GAS FLOW.							
4/80	SYSTEM	97.3	96.4	96.8	82.7			720	618	596	97.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
				LEAKS IN THE VENTURI LINE FORCED THE FGD SYSTEM OUT OF SERICE TWICE DURING APRIL. A THERMOCOUPLE SHORTED OUT DUE TO HIGH VENTURI GAS OUTLET TEMPERATURES. THIS FORCED THE FGD SYSTEM OUT OF SERVICE FOR SEVERAL HOURS. THE BOILER WAS OUT OF SERVICE FOR 117 HOURS DUE TO BOILER TUBE LEAKS.							
5/80	SYSTEM	97.7	93.9	97.4	84.7			744	672	630	96.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
				THE FGD SYSTEM WAS DOWN THREE TIMES IN MAY BECAUSE OF LOW FLOW THROUGH THE VENTURI. A BOILER TRIP CAUSED THE FGD SYSTEM TO BE OUT APPROXIMATELY 97 HOURS.							
6/80	SYSTEM	92.1	92.7	92.7	88.3			720	686	636	95.9

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE NOZZLES IN THE VENTURI RACE TRACK HAD TO BE CLEANED SEVERAL TIMES THIS MONTH. TOTAL OUTAGE FOR THIS WAS APPROXIMATELY 48 HOURS.

THE FGD SYSTEM WAS FORCED OUT OF SERVICE WHEN THE EMERGENCY SPRAY SYSTEM FAILED.

THE FGD SYSTEM WAS OUT OF SERVICE TWICE DURING JUNE DUE TO BOILER OUTAGES.

7/80	SYSTEM	87.1	94.9	86.7	84.0			744	658	625	95.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS RETURNED TO SERVICE ON JULY 3, 1980 AFTER THE BOILER TRIPPED THE SYSTEM OFF LINE. THE GUILLOTINE DAMPER HAD TO BE REPAIRED BEFORE THE FGD SYSTEM COULD RETURN TO SERVICE.

THE FGD SYSTEM WAS OFF LINE FOR SEVERAL HOURS TO UNPLUG THE VENTURI TRAY AND RACETRACK. MAINTENANCE WORK WAS ALSO DONE ON THE VENTURI LINE.

A SCHEDULED BOILER OUTAGE CAUSED THE FGD SYSTEM TO BE OFF LINE FOR ONE DAY.

THE FGD SYSTEM WAS FORCED OUT OF SERVICE WHEN THE EMERGENCY SPRAY SYSTEM FAILED. THE ASH SLUICE PUMP SHAFT WAS REPAIRED DURING THIS TIME.

8/80	SYSTEM	86.1	85.5	83.7	71.5			744	622	532	94.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OUT OF SERVICE FOR ALMOST 60 HOURS FOR ROUTINE CLEANING AND MAINTENANCE.

LOSS OF EMERGENCY SPRAY KEPT THE FGD SYSTEM OFF LINE FOR SEVERAL HOURS.

BOILER RELATED OUTAGES CAUSED THE FGD SYSTEM NOT TO OPERATE FOR OVER 100 HOURS.

THE TRAY SPRAY PUMP BELTS WERE REPAIRED.

A DAMPER THAT FAILED TO CLOSE TRIPPED THE FGD SYSTEM OFF LINE DURING THE MONTH.

9/80	SYSTEM	91.3	91.0	91.1	89.6			720	709	645	93.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WENT OFF LINE SEVERAL TIMES IN SEPTEMBER FOR ROUTINE CLEANING AND MAINTENANCE. THIS ROUTINE WORK INCLUDED CLEANING THE TRAYS AND REPAIRING VENTURI, ASH, AND EFFLUENT LINES.

A BOILER OUTAGE KEPT THE FGD SYSTEM OFF LINE FOR SEVERAL HOURS.

10/80	SYSTEM	98.2	97.6	97.9	93.0			744	708	692	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS FORCED OUT OF SERVICE DUE TO A FAILURE OF THE ASH SLUICE SYSTEM WHICH LEAVES THE SYSTEM WITH NO FIRE PROTECTION.

REPAIRS TO THE ID FAN EXPANSION JOINT CAUSED APPROXIMATELY SEVEN HOURS OF OUTAGE TIME.

NEVADA POWER: REID GARDNER 1 (CONT.)

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

PERFORMANCE DATA

THE UNIT WAS FORCED OFF-LINE ONCE DURING THE MONTH FOR APPROXIMATELY TWO HOURS.

11/80	SYSTEM	100.0	100.0	100.0	36.3			720	262	262

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM AND THE BOILER WERE SHUTDOWN ON NOVEMBER 11 FOR A SCHEDULED OVERHAUL.

DURING NOVEMBER THE FGD SYSTEM WAS SHUT DOWN WITH THE BOILER FOR A SCHEDULED OUTAGE THAT LASTED SIX HOURS.

12/80	SYSTEM	80.7	77.4	74.8	52.5			744	505	391

** PROBLEMS/SOLUTIONS/COMMENTS

FORCED OUTAGE TIME DURING DECEMBER WAS CAUSED BY A VENTURI LINE LEAK, AND A POWER INTERRUPTION.

A SCHEDULED OUTAGE KEPT THE UNIT OFF LINE UNTIL DECEMBER 9. ANOTHER OUTAGE WAS SCHEDULED TO RESET THE ID FAN WHICH LASTED APPROXIMATELY TWO HOURS.

1/81	SYSTEM	85.1	85.5	85.5	85.1			744	741	633

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE FGD SYSTEM WAS REMOVED FROM SERVICE TO REPAIR LEAKS ENCOUNTERED IN THE VENTURI.

2/81	SYSTEM	42.8	54.3	54.2	42.7			672	528	287

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE FGD SYSTEM WAS DOWN FOR APPROXIMATELY 384 HOURS DUE TO SCHEDULED MAINTENANCE ON THE VENTURI TANK.

3/81	SYSTEM	76.2	73.1	73.1	60.6			744	617	451

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE BOILER WAS OUT OF SERVICE APPROXIMATELY 91 HOURS DUE TO A TUBE LEAK.

ADDITIONAL UNIT OUTAGE TIME WAS DUE TO THE FAILURE OF THE AIR PREHEATER DRIVE.

THE FGD SYSTEM WAS OUT OF SERVICE APPROXIMATELY 177 HOURS DUE TO REPAIRS TO THE VENTURI TANK.

4/81	SYSTEM	96.2	99.4	99.4	96.2			720	697	693

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL PROBLEMS WERE ENCOUNTERED WITH THE BYPASS SYSTEM CAUSING APPROXIMATELY 18 HOURS OF OUTAGE TIME.

ADDITIONAL OUTAGE TIME WAS DUE TO THE HIGH EXHAUST LOAD TEMPERATURE.

5/81	SYSTEM	87.9	66.9	67.1	26.7			744	296	198

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
6/81	SYSTEM	94.2	89.9	93.4	81.2			720	650	584	
7/81	SYSTEM	100.0	99.0	100.0	95.2			744	714	708	
8/81	SYSTEM	98.7	98.5	98.7	92.9			744	702	691	
9/81	SYSTEM	96.0	90.5	95.0	76.9			720	612	554	
10/81	SYSTEM	.0			.0			744	0	0	.0
11/81	SYSTEM	94.7	78.4	61.3	8.5			720	79	62	
12/81	SYSTEM	100.0	96.3	95.8	99.6			744	554	533	
1/82	SYSTEM	96.5	96.0	93.0	92.1			744	714	685	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE UNIT WAS DOWN PART OF THE TIME FOR A SCHEDULED OVERHAUL.

DURING MAY, LOW VENTURI FLOW CAUSED THE SYSTEM TO SHUT DOWN FOR 97 HOURS.

** PROBLEMS/SOLUTIONS/COMMENTS

THE EFFLUENT LINES WERE CLEANED DURING JUNE ACCOUNTING FOR 42 HOURS OF OUTAGE TIME.

THE BOILER WAS SCHEDULED TO BE OFF-LINE PART OF JUNE TO REPAIR FEEDWATER HEATERS.

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO FGD-RELATED OUTAGES FOR THE MONTH OF JULY.

** PROBLEMS/SOLUTIONS/COMMENTS

DOWN TIME WAS REQUIRED TO REPLACE A VALVE IN THE EMERGENCY SPRAY SYSTEM.

THE SYSTEM WAS FORCED OUT OF SERVICE 4 HOURS WITH HIGH DUCT PRESSURE PROBLEMS.

** PROBLEMS/SOLUTIONS/COMMENTS

SCRUBBER OUTAGE TIME WAS ATTRIBUTED TO INSTRUMENTATION PROBLEMS AND BOILER-RELATED PROBLEMS. THE INSTRUMENTATION REPAIRS REQUIRED 29 HOURS.

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER THE FGD SYSTEM WAS DOWN WITH THE BOILER FOR A SCHEDULED OVERHAUL.

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCHEDULED OVERHAUL CONTINUED UNTIL NOVEMBER 26.

HIGH PRESSURE IN THE DUCTWORK TRIPPED THE SYSTEM CAUSING TWO OUTAGES DURING THE MONTH.

** PROBLEMS/SOLUTIONS/COMMENTS

LOW UTILIZATION OF THE FGD SYSTEM DURING DECEMBER WAS DUE TO BOILER-RELATED PROBLEMS.

NEVADA POWER: REID GARDNER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
2/82	SYSTEM	91.8	64.5	64.5	51.7			672	538	347	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE VENTURI PUMP PLUGGED CAUSING SYSTEM DOWN TIME.

THE VENTURI PUMP DISC VALVE WAS REPLACED DURING THE MONTH.

THE SYSTEM WAS FORCED OFF-LINE FOR APPROXIMATELY FIVE HOURS DUE TO A HIGH VENTURI OUTLET TEMPERATURE.

3/82	SYSTEM	91.1	91.0	91.1	90.8			744	742	675	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE FGD SYSTEM WAS DOWN FOR APPROXIMATELY 52 HOURS FOR GENERAL MAINTENANCE AND REPAIRS.

4/82	SYSTEM	98.8	98.6	98.5	78.5			720	573	565	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH APPROXIMATELY 65 HOURS OF SYSTEM DOWN TIME WAS DUE TO A HOLE IN THE VENTURI LINE.

5/82	SYSTEM	95.8	90.4	92.6	92.6			744	425	384	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE FGD SYSTEM WAS OFF-LINE PART OF THE TIME TO CLEAN THE ABSORBER TRAYS.

THE UNIT WAS SHUT DOWN ON APRIL 24 FOR A SCHEDULED MAINTENANCE OUTAGE.

6/82	SYSTEM	50.2	77.2	77.2	50.2			720	469	362	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE SYSTEM WAS FORCED OFF-LINE TWICE DUE TO HIGH PRESSURE IN THE ABSORBER DUCT.

7/82	SYSTEM	90.1	93.2	89.5	84.4			744	673	628	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE THE SYSTEM WAS FORCED OFF-LINE FOR APPROXIMATELY 1 DAY DUE TO A PRESSURE TRIP IN THE ABSORBER DUCT.

THE FGD SYSTEM WAS TAKEN OFF-LINE ON JUNE 17 FOR GENERAL MAINTENANCE. THE OUTAGE LASTED THROUGH THE REST OF THE MONTH.

8/82	SYSTEM	90.1	93.2	89.5	84.4			744	673	628	

** PROBLEMS/SOLUTIONS/COMMENTS

THREE BOILER TRIPS OCCURRED DURING JULY DUE TO HIGH PRESSURE IN THE SCRUBBER DUCT.

THE REPAIR OF VENTURI PUMPS ACCOUNTED FOR OUTAGE TIME DURING JULY.

AN OUTAGE LASTING 25 HOURS OCCURRED DURING THE MONTH. DURING THE OUTAGE, THE ABSORBER TRAYS REQUIRED CLEANING.

REPAIRS ON A COAL PULVERIZER RESULTED IN APPROXIMATELY 39 HOURS OF OUTAGE TIME FOR THE UNIT.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
8/82	SYSTEM	97.3	96.2	96.7	78.2			744	605	581	

** PROBLEMS/SOLUTIONS/COMMENTS

A BOILER TUBE LEAK OCCURRED DURING AUGUST CAUSING A 121 HOUR OUTAGE.

A LEAK IN THE SPRAY NOZZLE RACE TRACK FLANGE PRODUCED A 20 HOUR OUTAGE DURING THE MONTH.

REPAIR OF A BOILER DOOR CAUSED SOME DOWN TIME FOR THE UNIT DURING AUGUST.

A BOILER TRIP OCCURRED DURING THE MONTH DUE TO HIGH DUCT PRESSURE.

9/82	SYSTEM	93.1	90.8	91.3	71.8			720	570	517	

** PROBLEMS/SOLUTIONS/COMMENTS

HIGH DUCT PRESSURE FORCED A UNIT OUTAGE DURING SEPTEMBER.

THE UNIT WAS DOWN 150 HOURS DURING SEPTEMBER FOR AN ACID CLEANING.

THE UNIT WAS DOWN APPROXIMATELY 3 HOURS DURING THE MONTH DUE TO HIGH HOOD TEMPERATURES.

THE FGD SYSTEM WAS DOWN FOR APPROXIMATELY 50 HOURS DUE IN PART TO AN INSPECTION OF THE ABSORBER TRAYS.

PART OF THE 50 HOUR OUTAGE DURING SEPTEMBER WAS ALSO DUE TO REPAIRS BEING MADE ON THE RUBBER ABSORBER LINER.

10/82	SYSTEM	99.5	99.0	99.4	92.1			744	692	685	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER TUBE LEAKS ACCOUNTED FOR APPROXIMATELY 55 HOURS OF DOWN TIME DURING OCTOBER.

A CLEANING OF THE ABSORBER TRAYS FORCED AN OUTAGE LASTING 4 HOURS.

11/82	SYSTEM	96.8	93.8	96.5	86.9			720	668	626	

** PROBLEMS/SOLUTIONS/COMMENTS

A REHEATER TUBE LEAK FORCED AN OUTAGE OF APPROXIMATELY 47 HOURS DURING NOVEMBER.

ELECTRICAL PROBLEMS WITH A FAN ACCOUNTED FOR 24 HOURS OF DOWN TIME DURING THE MONTH.

A PLUGGED EFFLUENT SYSTEM RESULTED IN APPROXIMATELY 23 HOURS OF DOWN TIME DURING NOVEMBER.

12/82	SYSTEM	100.0	99.3	100.0	97.3			744	729	724	

** PROBLEMS/SOLUTIONS/COMMENTS

APPROXIMATELY 20 HOURS OF DOWN TIME DURING DECEMBER RESULTED FROM BOILER-RELATED PROBLEMS.

1/83	SYSTEM	82.0	96.3	82.0	82.0			744	633	610	

NEVADA POWER: REID GARDNER 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 SYSTEM WAS DOWN FOR ABOUT SIX DAYS DURING JANUARY TO CHANGE THE OIL IN AN ID FAN.									
2/83	SYSTEM	93.2	93.2	92.6	85.7			672	618	576	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY A VENTURI PUMP MOTOR SHORTED CAUSING A 46 HOUR OUTAGE.									
		BOILER-RELATED PROBLEMS RESULTED IN A 2 HOUR OUTAGE DURING THE MONTH.									
		THE UNIT WAS OUT OF SERVICE 48 HOURS DURING FEBRUARY FOR A SCHEDULED OVERHAUL.									
3/83	SYSTEM	100.0	90.5	100.0	27.2			744	223	202	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OUT OF SERVICE APPROXIMATELY 23 DAYS DURING MARCH FOR A SCHEDULED OVERHAUL.									
4/83	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 APRIL.									
5/83	SYSTEM	99.0	99.6	99.0	99.0			744	739	736	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		HIGH PRESSURE IN THE SCRUBBER DUCTWORK FORCED AN OUTAGE IN APRIL LASTING APPROXIMATELY 8 HOURS.									
6/83	SYSTEM	91.7	96.2	88.3	62.4			720	467	449	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A SIX-HOUR OUTAGE DURING JUNE WAS REQUIRED TO CLEAN THE ABSORBER TRAYS.									
		A BOILER OUTAGE LASTING 35 HOURS WAS REQUIRED TO REPAIR A BURNER.									
		A WATER LEAK IN THE SCRUBBER VENTURI THROAT SPRAY SYSTEM ACCOUNTED FOR APPROXIMATELY 53 HOURS OF DOWN TIME DURING JUNE.									
		A BOILER TUBE LEAK ACCOUNTED FOR APPROXIMATELY 12 HOURS OF OUTAGE TIME DURING JUNE.									
		THE UNIT WAS OUT OF SERVICE APPROXIMATELY 165 HOURS DURING JUNE DUE TO A LACK OF POWER DEMAND.									
7/83	SYSTEM	79.6	73.2	74.6	59.9			744	609	445	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN APPROXIMATELY 70 HOURS DURING JULY BECAUSE OF LOW POWER DEMAND.									
		THE UNIT WAS DOWN APPROXIMATELY 77 HOURS DURING THE MONTH DUE TO MISCELLANEOUS BOILER-RELATED PROBLEMS.									

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

APPROXIMATELY ONE HOUR OF OUTAGE TIME DURING JULY WAS CAUSED BY ABSORBER DUCT PRESSURE PROBLEMS.

APPROXIMATELY 151 HOURS DURING THE MONTH WERE REQUIRED TO CLEAN THE ABSORBER TRAYS.

8/83	SYSTEM	95.9	94.6	94.9	75.8			744	596	564

** PROBLEMS/SOLUTIONS/COMMENTS

APPROXIMATELY 48 HOURS OF DOWN TIME DURING AUGUST WAS DUE TO A LACK OF POWER DEMAND.

BOILER-RELATED FORCED OUTAGES ACCOUNTED FOR APPROXIMATELY 102 HOURS OF DOWN TIME DURING THE MONTH.

AN ABSORBER TRAY LEAK CAUSED A FORCED OUTAGE LASTING APPROXIMATELY 2 HOURS.

A LEAK IN THE VENTURI THROAT SPRAY SYSTEM (RACE TRACK) RESULTED IN APPROXIMATELY 2 HOURS OF DOWN TIME DURING AUGUST.

A VENTURI THROAT LEAK FORCED AN OUTAGE DURING THE MONTH LASTING APPROXIMATELY 26 HOURS.

9/83	SYSTEM	100.0	99.3	100.0	88.1			720	639	634

** PROBLEMS/SOLUTIONS/COMMENTS

A 6 HOUR OUTAGE OCCURRED DURING THE MONTH DUE TO A LACK OF POWER DEMAND.

APPROXIMATELY 80 HOURS OF OUTAGE TIME DURING SEPTEMBER WAS DUE TO BOILER-RELATED PROBLEMS SUCH AS TUBE LEAKS, UNIT TRIPS AND BURNER PROBLEMS.

10/83	SYSTEM	100.0	92.5	100.0	17.2			744	138	128

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER RELATED PROBLEMS ACCOUNTED FOR OUTAGE TIME DURING OCTOBER.

11/83	SYSTEM	95.2	95.2	95.2	95.2			720	720	685

** PROBLEMS/SOLUTIONS/COMMENTS

THE ABSORBER WAS DOWN APPROXIMATELY 11 HOURS DURING THE MONTH TO INSPECT THE TRAYS.

PLUGGED ABSORBER TRAYS ACCOUNTED FOR APPROXIMATELY 19 HOURS OF FGD SYSTEM OUTAGE TIME DURING THE MONTH.

A PLUGGED EFFLUENT LINE ACCOUNTED FOR APPROXIMATELY 4 HOURS OF OUTAGE TIME DURING NOVEMBER.

12/83	SYSTEM	98.5	97.3	98.3	87.8			744	671	653

** PROBLEMS/SOLUTIONS/COMMENTS

EXCESS VIBRATION PROBLEMS WITH AN I.D. FAN FORCED AN OUTAGE LASTING APPROXIMATELY 12 HOURS.

BOILER RELATED PROBLEMS ACCOUNTED FOR APPROXIMATELY 79 HOURS OF OUTAGE TIME DURING DECEMBER.

1/84	SYSTEM	100.0	98.4	100.0	94.7			744	716	704

NEVADA POWER: REID GARDNER 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 UNIT WAS DOWN APPROXIMATELY 40 HOURS DURING JANUARY DUE TO BOILER-RELATED PROBLEMS.

2/84	SYSTEM	96.3	95.3	95.8	84.9			696	620	591	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT DURING FEBRUARY, THE FGD SYSTEM WAS OFF LINE 5.5 HOURS DUE TO THE CLEANING OF AN ABSORBER TRAY.

THE UNIT WAS DOWN APPROXIMATELY 79 HOURS DUE TO BOILER OUTAGES IN FEBRUARY.

THE FGD SYSTEM WAS DOWN 12.5 HOURS DURING FEBRUARY FOR DEFUSER CLEANING.

THE FGD SYSTEM WAS DOWN EIGHT HOURS DUE TO HIGH OUTLET DUCT PRESSURE.

3/84	SYSTEM	96.7	96.6	96.6	93.8			744	723	698	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF LINE 21.4 HOURS IN MARCH DUE TO A BOILER OUTAGE.

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS OFF LINE 8.3 HOURS TO CLEAN AN ABSORBER TRAY.

DUE TO A PROBLEM WITH THE REHEAT FAN, THE FGD SYSTEM WAS SHUT DOWN APPROXIMATELY 6 HOURS DURING MARCH.

4/84	SYSTEM	91.6	88.6	88.6	64.7			720	526	466	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN 3.3 HOURS DURING APRIL TO REPAIR A VENTURI LINE.

ON APRIL 2ND, 13TH, 18TH AND 19TH THE FGD SYSTEM WAS DOWN A TOTAL OF 37.2 HOURS DUE TO PLUGGED ABSORBER TRAYS.

THE FGD SYSTEM WAS DOWN APPROXIMATELY 13 HOURS DURING APRIL TO REPAIR AN EFFLUENT LINE.

THE FGD SYSTEM WAS OFF LINE 2.4 HOURS DURING APRIL DUE TO A LEAK IN A VENTURI LINE.

DURING APRIL THE FGD SYSTEM WAS DOWN 8 HOURS TO MAKE REPAIRS ON THE VENTURI THROAT SPRAY SYSTEM.

DUE TO A BOILER OUTAGE, THE UNIT WAS SHUT DOWN APPROXIMATELY 194 HOURS IN APRIL.

5/84	SYSTEM	100.0	100.0	100.0	49.3			744	343	367	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN APPROXIMATELY 377 HOURS IN MAY DUE TO BOILER PROBLEMS.

6/84	SYSTEM	100.0	99.8	100.0	93.9			720	677	676	

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF LINE APPROXIMATELY 44 HOURS IN JUNE DUE TO BOILER RELATED PROBLEMS.

7/84	SYSTEM	98.9	97.1	98.7	86.1			744	660	641	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OFF LINE APPROXIMATELY 1 HOUR IN JUNE DUE TO HIGH DUCT PRESSURE.

THE UNIT WAS DOWN FOR APPROXIMATELY 36 HOURS DURING JULY DUE TO BOILER-RELATED PROBLEMS.

THE FGD SYSTEM WAS OFF LINE FOR 7.5 HOURS DURING JULY IN ORDER TO CLEAN THE ABSORBER TRAY.

8/84	SYSTEM	100.0	99.9	100.0	94.8			744	706	706	

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 1 WAS DOWN FOR 38.5 HOURS IN AUGUST DUE TO BOILER RELATED PROBLEMS.

9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR SEPTEMBER 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NEVADA POWER	
PLANT NAME	REID GARDNER	
UNIT NUMBER	2	
CITY	MOAPA	
STATE	NEVADA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.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	331	
GROSS UNIT GENERATING CAPACITY - MW	125	
NET UNIT GENERATING CAPACITY W/FGD - MW	110	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	125	
** 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	223.21	(473000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	176.7	(350 F)
STACK HEIGHT - M	61.	(200 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	3.8	(12.6 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	28959.	(12450 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	8.00	
RANGE ASH CONTENT - %	8.0-10.0	
AVERAGE MOISTURE CONTENT - %	5.50	
RANGE MOISTURE CONTENT - %	5.0-6.0	
AVERAGE SULFUR CONTENT - %	.50	
RANGE SULFUR CONTENT - %	0.5-1.0	
AVERAGE CHLORIDE CONTENT - %	.05	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
TYPE	MULTICLONE	
SUPPLIER	RESEARCH-COTTRELL	
PARTICLE REMOVAL EFFICENCY -%	75.0	
** PARTICLE SCRUBBER		
NUMBER	1	
INITIAL START-UP DATE	4/74	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	FIXED THROAT	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	THYSSEN/CEA	
DIMENSIONS - FT	1.5 DIA X 18.0	
SHELL GENERIC MATERIAL	CARBON STEEL; HIGH ALLOY	
SHELL SPECIFIC MATERIAL	AISI 1110; NICKEL BASE/CHROMIUM-IRON-COPPER-MOLY	
LINER GENERIC MATERIAL	NONE; ORGANIC	
LINER SPECIFIC MATERIAL	N/A; NATURAL RUBBER	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	157.5	(2500 GPM)
L/G RATIO - LITER/CU.M	1.3	(10.0 GAL/1000ACF)
PRESSURE DROP - KPA	4.6	(18.5 IN-H2O)
SUPERFICIAL GAS VELOCITY - M/S	50.3	(165.0 FT/S)
INLET GAS FLOW RATE - CU.M/S	223.2	(473000 ACFM)
INLET GAS TEMPERATURE - C	176.7	(350 F)
PARTICLE REMOVAL EFFICIENCY - %	97.0	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	SODIUM CARBONATE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	THYSSEN/CEA
A-E FIRM	BECHTEL
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	RETROFIT
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	97.00
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00
CURRENT STATUS	1
COMMERCIAL START-UP	4/74
INITIAL START-UP	4/74
CONTRACT AWARDED	9/71

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	1	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	SIEVE TRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	THYSSEN/CEA	
DIMENSIONS - FT	30.0 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	NATURAL RUBBER	
LINER MATERIAL TRADE NAME/COMMON TYPE	BLACK NATURAL RUBBER	
GAS CONTACTING DEVICE TYPE	PERFORATED TRAYS	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	38.	(600 GPM)
L/G RATIO - L/CU.M	.2	(1.6 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.7	(3.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.4	(11.0 FT/S)
SO2 REMOVAL EFFICIENCY - %	91.2	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	1	
GENERIC TYPE	CENTRIFUGAL	
SPECIFIC TYPE	RADIAL VANE	
TRADE NAME/COMMON TYPE	NR	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	1	
PRESSURE DROP - KPA	.1	(.5 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	

** REHEATER

GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER	
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE	
TEMPERATURE INCREASE - C	27.8	(50 F)
INLET FLUE GAS TEMPERATURE - C	48.3	(119 F)
NUMBER OF TUBES PER BUNDLE	24	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

NEVADA POWER: REID GARDNER 2 (CONT.)

** FANS

NUMBER	1
DESIGN	CENTRIFUGAL
SUPPLIER	BUFFALO FORGE
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY
FLUE GAS FLOW RATE - CU.M/S	223.21 (473000 ACFM)
FLUE GAS TEMPERATURE - C	176.7 (350 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

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
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	INERT FLAKE-FILLED VINYL ESTER

** REAGENT PREPARATION EQUIPMENT

FUNCTION	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK

** TANKS

SERVICE	NUMBER
SCRUBBER RECYCLE	1

** PUMPS

SERVICE	NUMBER
SCRUBBER RECIRCULATION	3
ABSORBER RECIRCULATION	3

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SLUDGE

** TREATMENT

METHOD	BLEED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	GRAVITY FLOW FROM INTERIM SLUDGE POND
SITE TREATMENT	CLAY LINING

NEVADA POWER: REID GARDNER 2 (CONT.)

** DISPOSAL

NATURE	INTERIM
TYPE	POND
LOCATION	ON-SITE
SITE TREATMENT	CLAY LINING

** WATER BALANCE

WATER LOOP TYPE	CLOSED	
MAKEUP WATER ADDITION - LITERS/S	9.8	(155 GPM)

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/74	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS PLACED IN SERVICE IN APRIL 1974. THE SCRUBBING SYSTEM DESIGN WAS BASED ON INFORMATION AND DATA OBTAINED FROM AN 8000-ACPM PILOT PLANT PROGRAM CONDUCTED AT REID GARDNER IN 1971 AND 1972.

5/74	SYSTEM							744			
6/74	SYSTEM							720			
7/74	SYSTEM							744			
8/74	SYSTEM							744			
9/74	SYSTEM							720			
10/74	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR PROBLEMS OCCURED SINCE STARTUP IN APRIL. CURRENT OPERABILITIES ARE GREATER THAN 90% WHEN TRONA IS AVAILABLE. WHEN THE TRONA SUPPLY IS EXHAUSTED THE SCRUBBER IS SHUT DOWN.

11/74	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

FGD SYSTEM OPERATIONS HAVE ONLY BEEN INTERRUPTED BY INSUFFICIENT TRONA SUPPLIES. SO2 REMOVAL EFFICENCIES HAVE BEEN IN THE 85% RANGE. BECAUSE OF A COAL STRIKE THE BOILER ONLY OPERATED TWO WEEKS IN NOVEMBER AND THEN AT REDUCED LOAD. THERE ARE NO OUTSTANDING MECHANICAL OR PROCESS PROBLEMS.

12/74	SYSTEM							744			
1/75	SYSTEM		94.0					744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE FGD SYSTEM OPERATED WITH A 94% OPERABILITY ON TRONA SUPPLEMENTED WITH SODIUM CARBONATE-BRINE. THE UTILITY REPORTED NO MAJOR PROBLEMS FOR THE DECEMBER-JANUARY PERIOD. THERE WAS, HOWEVER, A MINOR PROBLEM WITH FREEZING SODIUM CARBONATE FEED LINES.

2/75	SYSTEM		90.0					672			

NEVADA POWER: REID GARDNER 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

ROUTINE MECHANICAL PROBLEMS WERE ENCOUNTERED DURING FEBRUARY.

ROUTINE INSTRUMENTAL PROBLEMS WERE EXPERIENCED.

ABRASION OF RUBBER-LINED PIPES ACCOUNTED FOR SOME DOWNTIME.

THE FGD SYSTEM PASSED A SECOND PERFORMANCE TEST DURING THE PERIOD.

SEAL WATER FILTERS WERE REPLACED IN FEBRUARY.

BOILER CONTROLS ACCOUNTED FOR SOME DOWNTIME IN FEBRUARY.

RECYCLE LINE STRAINER PLUGGING WAS A PROBLEM DURING THE PERIOD.

3/75	SYSTEM	100.0				.0			744	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE THROUGHOUT MARCH FOR A TURBINE OVERHAUL.

4/75	SYSTEM	100.0				.0			720	0	
5/75	SYSTEM	100.0				.0			744	0	
6/75	SYSTEM	100.0							720		

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER AND SCRUBBER WERE PLACED BACK IN SERVICE IN LATE JUNE AFTER THE TURBINE OVERHAUL. THE FGD SYSTEM ACCEPTANCE TEST HAS BEEN SCHEDULED FOR JULY.

7/75	SYSTEM			85.0					744		
8/75	SYSTEM								744		

** PROBLEMS/SOLUTIONS/COMMENTS

A BROKEN BUCKET ELEVATOR CAUSED A FORCED FGD OUTAGE.

WORN RECIRCULATION PIPING CONTRIBUTED TO THE FORCED FGD OUTAGE TIME.

A FORCED FGD OUTAGE WAS CAUSED BY A PUMP RUBBER LINER FAILURE.

STRAINER PLUGGING CONTRIBUTED TO THE FORCED FGD OUTAGE TIME.

9/75	SYSTEM			76.9		69.0			720	645	496
10/75	SYSTEM			87.4		62.0			744	531	464

** PROBLEMS/SOLUTIONS/COMMENTS

THREE FORCED OUTAGES OCCURED DURING SEPTEMBER AND OCTOBER.

A NECESSARY PUMP REPAIR FORCED THE FGD SYSTEM OUT OF SERVICE DURING THE OCTOBER - NOVEMBER PERIOD.

INSTRUMENT PLUGGING CAUSED AN FGD OUTAGE.

REPAIR OF PIPING LEAKAGE NECESSITATED AN FGD OUTAGE.

NEVADA POWER: REID GARDNER 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/75	SYSTEM		98.8		82.7			720	603	596	
12/75	SYSTEM							744			
1/76	SYSTEM	68.7	66.3	66.3	61.6			744	691	458	

** PROBLEMS/SOLUTIONS/COMMENTS

FROZEN CARBONATE LINES CONTRIBUTED TO FGD OUTAGE TIME.

A FGD OUTAGE WAS CAUSED BY A PLUGGED PRESSURE-SENSING LINES.

DUCT PRESSURE TRIPS CONTRIBUTED TO FGD OUTAGE TIME.

AN OVERHAUL OF A TRAY RECYCLE PUMP WAS NECESSARY DURING DECEMBER.

2/76	SYSTEM	90.4	85.6	85.6	83.1			696	675	578	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED FOUR SCRUBBER INACTIVE PERIODS DURING FEBRUARY, THREE OF WHICH WERE SCRUBBER-RELATED OUTAGES.

34 HOURS OF OUTAGE TIME WERE REQUIRED TO UNPLUG A VENTURI PUMP.

CHEMICAL DEPLETION CONTRIBUTED TO FGD OUTAGE TIME.

SEAL WATER PROBLEMS WERE ENCOUNTERED DURING FEBRUARY.

3/76	SYSTEM	68.1	59.9	62.5	53.1			744	660	395	

** PROBLEMS/SOLUTIONS/COMMENTS

TWO FGD FORCED OUTAGES OCCURED DURING MARCH.

AN ELECTRICAL FAILURE RESULTED IN A 16 HOUR FGD SYSTEM OUTAGE.

PLUGGING IN THE TRAY SYSTEM RESULTED IN A SUBSEQUENT OVERHAUL OF THE TRAY CYCLE PUMPS, REQUIRING 221 HOURS OF DOWNTIME.

4/76	SYSTEM	86.6	77.5	83.4	67.7			720	630	488	

** PROBLEMS/SOLUTIONS/COMMENTS

FOUR FORCED SCRUBBER OUTAGES WERE REPORTED BY THE UTILITY FOR APRIL.

PLUGGED SENSING LINES RESULTED IN FGD OUTAGE TIME.

A REHEATER LEAK DURING APRIL CAUSED DOWN TIME FOR REPAIRS.

A VENTURI RECYCLE PUMP SPOOL REPLACEMENT REQUIRED FGD OUTAGE TIME.

A VENTURI RECYCLE TANK NEEDED PATCHING DURING THE MONTH.

5/76	SYSTEM	99.0	83.0	98.0	79.0			744			
6/76	SYSTEM	95.3	86.8	87.0	82.2			720	682	592	

** PROBLEMS/SOLUTIONS/COMMENTS

PLUGGED VENTURI LINES ACCOUNTED FOR 6 HOURS DURING MAY.

A 6 HOUR OUTAGE RESULTED FROM PLUGGED SENSING LINES.

NEVADA POWER: REID GARDNER 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
			THE SCRUBBING SYSTEM WAS SHUTDOWN FOR 54 HOURS WHILE CEMENT WAS BEING POURED IN THE SCRUBBER AREA.								
7/76	SYSTEM	94.2	82.3	91.2	59.9			744	542	446	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			A PROBLEM WITH A HIGH SOLIDS CONCENTRATION IN THE VENTURI SCRUBBING CYCLE CONTRIBUTED TO FGD OUTAGE TIME.								
			THE REPLACMENT OF A RUBBER-LINED PIPE IN THE VENTURI SCRUBBER WAS NECESSARY DURING JULY.								
			BOILER RELATED OUTAGES ACCOUNTED FOR 256 HOURS OF FGD SYSTEM DOWNTIME.								
8/76	SYSTEM	91.7	69.1	70.8	65.8			744	709	490	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DEPLETION OF CHEMICAL ABSORBENT (TRONA) CONTRIBUTED TO FGD OUTAGE TIME (141 HOURS).								
			THE FGD SYSTEM WAS OUT OF SERVICE 52 HOURS FOR BOILER RELATED PROBLEMS.								
			VENTURI RECYCLE LINE LEAKING ACCOUNTED FOR 27 HOURS OF SCRUBBER OUTAGE TIME.								
			THE THICKENER PLUGGED CAUSING 34 HOURS OF FGD SYSTEM DOWN TIME.								
9/76	SYSTEM	92.4	90.2	91.9	85.2			720	681	614	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			PLUGGING IN THE ID FAN REFERENCE LINES RESULTED IN 36 HOURS OF OUTAGE TIME.								
			A 19 HOUR FGD SYSTEM SHUTDOWN WAS CAUSED BY A FALSE HIGH TEMPERATURE READING IN THE VENTURI DUE TO WATER IN THE INSTRUMENT.								
10/76	SYSTEM	95.2	92.6	94.7	86.4			744	694	643	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			FIVE HOURS OF SCRUBBER OUTAGE TIME WAS CAUSED BY VENTURI GAS DAMPER PROBLEMS.								
			REPLACEMENT OF THE CARBONATE FEED LINE ACCOUNTED FOR 16 HOURS OF FGD SYSTEM OUTAGE.								
			PLUGGING IN THE SCRUBBER EFFLUENT LINE CONTRIBUTED TO FGD SYSTEM DOWN TIME.								
			SCRUBBER OUTAGE TIME DUE TO BOILER-RELATED PROBLEMS AMOUNTED TO APPROXIMATELY 66 HOURS.								
11/76	SYSTEM	51.9	60.1	60.1	51.9			720	621	374	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE BOILER WAS DOWN FOR REPAIR OF A CONDENSER TUBE LEAK AND BOTTOM ASH NOZZLE.								
			DURING THE BOILER OUTAGE THE SCRUBBER GUILLOTINE DAMPERS WERE BADLY DAMAGED WHEN LIMIT SWITCH ADJUSTMENTS WERE BEING MADE. THE SCRUBBER REMAINED OUT OF SERVICE FROM NOVEMBER 16 THROUGH THE END OF THE MONTH.								

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
12/76	SYSTEM	.0			.0			744	275	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS DOWN THE ENTIRE MONTH OF DECEMBER FOR A SCHEDULED OVERHAUL.

THE FGD SYSTEM WAS UNAVAILABLE THROUGH DECEMBER AS DAMPER REPAIRS HAD NOT YET BEEN MADE. FGD SYSTEM SERVICES WERE NOT REQUIRED DURING THE PERIOD.

1/77	SYSTEM	100.0			.0			744	0	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCHEDULED BOILER OVERHAUL CONTINUED THROUGH JANUARY.

2/77	SYSTEM	92.7	79.0	89.3	60.8			672	517	409	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS PUT BACK IN SERVICE ON FEBRUARY 7 AFTER COMPLETION OF THE SCHEDULED BOILER OVERHAUL.

A MINOR SCRUBBER OUTAGE RESULTED FROM A VENTURI PIPING LEAK.

DURING THE LAST TWO DAYS OF FEBRUARY SOME FGD SYSTEM ELECTRICAL PROBLEMS OCCURRED.

A MINOR SCRUBBER OUTAGE WAS REQUIRED TO CLEAN THE RECYCLE TANK WASH TRAY.

3/77	SYSTEM	88.5	86.3	86.9	76.4			744	659	569	

** PROBLEMS/SOLUTIONS/COMMENTS

A PLUGGED ABSORBER TRAY CONTRIBUTED TO THE FGD SYSTEM OUTAGE TIME.

ELECTRICAL PROBLEMS IN THE FGD SYSTEM WERE EXPERIENCED DURING MARCH.

DUCT HI/LO PRESSURE SENSORS TRIGGERED A NINE HOUR FGD SYSTEM SHUTDOWN.

ID FAN PRESSURE SENSORS FORCED THE FGD SYSTEM OFF LINE FOR 28 HOURS IN MARCH.

4/77	SYSTEM	94.8	94.8	94.8	94.8			720	720	683	

** PROBLEMS/SOLUTIONS/COMMENTS

37 HOURS OF FORCED FGD SYSTEM OUTAGE TIME RESULTED FROM A LEAK IN THE VENTURI DISCHARGE LINE.

5/77	SYSTEM	98.7	89.8	96.1	63.2			744	524	470	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER-RELATED OUTAGES ACCOUNTED FOR 255 HOURS OF FGD SYSTEM DOWNTIME IN MAY.

BOILER ASH SLUICE PUMPS WERE OUT OF SERVICE FOR APPROXIMATELY 10 HOURS IN MAY. BECAUSE THE EMERGENCY SPRAY SYSTEM WAS UNAVAILABLE THE FGD SYSTEM WAS FORCED OUT OF SERVICE.

6/77	SYSTEM	95.1	93.3	94.4	82.8			720	639	596	

NEVADA POWER: REID GARDNER 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

ID FAN SENSING LINE PLUGGING FORCED THE SYSTEM OUT OF SERVICE FOR SEVEN HOURS IN JUNE.

A BREAKER TRIP RESULTED IN A LOSS OF BOILER CONTROL POWER FOR FIVE HOURS.

THE SPRAY NOZZLES IN THE VENTURI PLUGGED CAUSING 28 HOURS OF FGD SYSTEM OUTAGE.

7/77	SYSTEM	40.0	41.6	40.6	40.0			744	733	298	

** PROBLEMS/SOLUTIONS/COMMENTS

SEVEN FORCED FGD OUTAGES WERE DUE TO SCRUBBER DUCT HI/LO PRESSURE TRIPS DURING JULY.

ONE TWO HOUR OUTAGE WAS REQUIRED TO CORRECT A PLUGGING PROBLEM IN THE VENTURI SPRAY NOZZLES DURING JULY.

8/77	SYSTEM	88.0	91.3	86.8	79.4			744	646	591	

** PROBLEMS/SOLUTIONS/COMMENTS

A LEAK IN THE VENTURI RECYCLE HEADER RESULTED IN AN FGD SYSTEM OUTAGE.

A SCRUBBER DUCT HIGH/LOW BOILER TRIP OCCURRED RESULTING IN 35 HOURS OF SCRUBBER OUTAGE TIME.

THERE WAS ONE 64 HOUR BOILER-RELATED OUTAGE DURING AUGUST.

9/77	SYSTEM	67.7	64.4	66.5	64.1			720	716	461	

** PROBLEMS/SOLUTIONS/COMMENTS

A LEAK IN THE VENTURI RECYCLE LINES RESULTED IN FORCED FGD SYSTEM OUTAGE TIME.

TRAY RECYCLE PUMP REPAIR NECESSITATED NEARLY SIX HOURS OF FGD SYSTEM OUTAGE TIME.

DUCT HI/LO PRESSURE SENSOR LINE PLUGGING PROBLEMS ACCOUNTED FOR 58 HOURS OF FORCED FGD SYSTEM OUTAGE.

26 HOURS OF OUTAGE TIME OCCURRED WHEN THE ASH SLUICE SYSTEM WENT OUT OF SERVICE. THE FGD SYSTEM IS LEFT WITHOUT EMERGENCY SPRAYS WHEN THIS OCCURRS SINCE THEY ARE INTEGRATED SYSTEMS.

TRAY PLUGGING RESULTED IN 96 HOURS OF FGD SYSTEM OUTAGE WHICH BEGAN ON SEPTEMBER 27 AND CONTINUED THROUGH THE END OF THE MONTH.

THE FGD SYSTEM WAS TAKEN OFF-LINE TO ALLOW CLEANING OF A SUCTION SCREEN IN THE TRAY RECYCLE TANK.

10/77	SYSTEM	79.2	83.2	79.1	78.8			744	704	586	

** PROBLEMS/SOLUTIONS/COMMENTS

FGD SYSTEM OUTAGE TIME WAS NEEDED TO CLEAN A PLUGGED ABSORBER RECYCLE TANK SCREEN.

A VENTURI TANK SEPARATOR REQUIRED CLEANING CAUSING FGD SYSTEM DOWN TIME.

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

A HIGH SOLIDS LEVEL IN THE VENTURI RECYCLE SYSTEM REQUIRED THREE HOURS OF DOWNTIME TO MAKE CORRECTIONS.

A SCRUBBER DUCT HIGH/LOW PRESSURE TRIP FORCED THE BOILER AND SCRUBBER OUT OF SERVICE FOR 42 HOURS.

ID FAN LEAKS WERE PATCHED DURING OCTOBER.

11/77	SYSTEM	80.7	.0	.0	.0			720	98	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE FROM OCTOBER 31 UNTIL NOVEMBER 26 TO INSTALL A NEW PRIMARY AIR FAN.

THE SCRUBBER WAS OUT OF SERVICE FOR AN ID FAN ROTOR REPAIR.

12/77	SYSTEM	.0	.0	.0	.0			744	742	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER MODULE WAS OUT OF SERVICE TO INSTALL NEW WEAR PLATES ON AN ID FAN ROTOR.

1/78	SYSTEM	71.7	73.9	73.9	67.0			744	675	499	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER WENT BACK ON LINE JANUARY 4 AFTER THE INSTALLATION OF WEAR PLATES ON AN ID FAN ROTOR.

REPAIRS ON THE THICKNER OVERFLOW PUMP CONTRIBUTED TO FGD SYSTEM OUTAGE TIME.

SOME SOLIDS BUILD UP IN THE VENTURI WAS ENCOUNTERED DURING JANUARY.

2/78	SYSTEM	92.9	91.9	92.5	87.0			672	636	585	

** PROBLEMS/SOLUTIONS/COMMENTS

A DUCT HIGH/LOW PRESSURE TRIP CONTRIBUTED TO THE FGD SYSTEM OUTAGE TIME.

THE BOILER WAS OUT OF SERVICE FOR 40 HOURS DURING FEBRUARY.

3/78	SYSTEM	100.0	88.7	100.0	80.2			744	672	596	

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE NO FORCED FGD SYSTEM OUTAGES DURING MARCH HOWEVER, THE SYSTEM WAS SHUTDOWN FOR 18 HOURS WHEN THE BOILER OPERATED AT LOW LOAD AND STABLE FGD SYSTEM OPERATIONS WERE NOT ATTAINABLE.

4/78	SYSTEM	100.0	98.7	100.0	44.1			720	321	317	

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE NO FGD SYSTEM RELATED OUTAGES DURING APRIL. THE BOILER WAS OUT OF SERVICE FOR 403 HOURS IN APRIL.

5/78	SYSTEM	99.8	99.7	99.8	97.4			744	727	724	

NEVADA POWER: REID GARDNER 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 BOILER WAS OFF FOR APPROXIMATELY 18 HOURS FOR REPAIRS ON THE COAL MILL SPOKES.

A SCRUBBER CIRCUIT BREAKER TRIPPED AND CAUSED AN FGD SYSTEM OUTAGE OF ABOUT ONE HOUR.

6/78	SYSTEM	89.4	89.4	89.4	89.4		720	720	644

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OUT OF SERVICE FOR 76 HOURS FOR REPAIR OF A VENTURI WATER BOX LEAK.

7/78	SYSTEM	80.1	81.8	78.9	74.3		744	676	553

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE FOR 43 HOURS DUE TO A BOILER TUBE LEAK.

HIGH DUCT PRESSURE WAS THE CAUSE OF A BOILER TRIP. THE HIGH DUCT PRESSURE WAS CAUSED BY A FAULTY POSITIONER ON THE ID FAN CONTROLLER.

THE ID FAN EXPANSION JOINT ON THE SCRUBBER SIDE WAS REPLACED.

AN FGD OUTAGE OCCURRED WHEN A BOLT, WHICH FELL FROM THE FAN, CAUSED VIBRATIONS.

A SECOND BOILER TRIP DURING JULY WAS CAUSED BY AN UNDETERMINED SOURCE.

THE SUCTION LINE FROM THE VENTURI DISCHARGE LINE TO THE EFFLUENT PUMPS HAD TO BE CLEANED BECAUSE OF PLUGGING.

8/78	SYSTEM	81.4	82.2	82.4	81.1		744	733	403

** PROBLEMS/SOLUTIONS/COMMENTS

TWO SCHEDULED OUTAGES DURING AUGUST WERE NECESSARY TO CLEAN THE SCRUBBER TRAY.

A SCHEDULED OUTAGE WAS NECESSARY TO CLEAN THE NOZZLES ON THE SCRUBBER SPRAY RACK. THE STAINLESS STEEL PIPE TO THE TRAY SPRAY NOZZLES WAS ALSO REPLACED.

ON AUGUST 1 THE SCRUBBER EXPERIENCED HIGH DUCT PRESSURE. DURING THE SUBSEQUENT OUTAGE A CLINKER WAS REMOVED FROM THE BOILER BOTTOM HOPPER.

ON AUGUST 3 IT WAS NECESSARY TO TAKE THE SCRUBBER OFF LINE TO REPACK THE VENTURI PUMPS.

A THIRD OUTAGE IN AUGUST WAS CAUSED BY A LOSS OF THE BOILER ASH PANEL CONTROL POWER. THIS LEFT THE SCRUBBER WITHOUT EMERGENCY SPRAY.

9/78	SYSTEM	98.5	97.4	98.4	93.8		720	693	675

** PROBLEMS/SOLUTIONS/COMMENTS

A SCRUBBER OUTAGE WAS NECESSARY DURING SEPTEMBER IN ORDER TO CLEAN THE TRAY RECYCLE TANK AS WELL AS THE TRAY AND SOME OF THE LINES.

THREE BOILER RELATED OUTAGES WERE CAUSED BY PROBLEMS WITH A 10-KW GENERATOR. CONTROL POWER SURGES WERE BEING CAUSED BY OVERVOLTAGE

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

MOTOR TRIPS.

10/78	SYSTEM	96.2	95.0	96.0	92.1			744	722	685	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER SCRUBBER INSTRUMENTATION REPAIRS WERE PERFORMED.

THE BOILER WAS FORCED OUT OF SERVICE FOR ABOUT 28 HOURS BECAUSE OF BOILER DRUM WATER LEVEL PROBLEMS.

11/78	SYSTEM	97.5	93.2	93.6	35.9			720	277	259	

** PROBLEMS/SOLUTIONS/COMMENTS

A FORCED FGD SYSTEM OUTAGE OCCURRED DUE TO HIGH DUCT PRESSURE.

WORK WAS DONE ON ID FAN CONTROLS DURING NOVEMBER.

THE UNIT WAS SHUTDOWN ON NOVEMBER 12 FOR SCHEDULED BOILER MAINTENANCE. THE UNIT REMAINED OUT OF SERVICE THROUGH THE END OF THE MONTH.

12/78	SYSTEM	95.9	44.9	100.0	13.3			744	221	99	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OFF LINE UNTIL DECEMBER 26 WHEN A SCHEDULED MAINTENANCE OUTAGE WAS COMPLETED.

THE SCRUBBER WAS TAKEN OUT OF SERVICE FOR 30 HOURS TO UNPLUG AN EFFLUENT LINE.

WHILE THE SCRUBBER WAS DOWN THE BOILER WAS OUT OF SERVICE SO THAT PULVERIZER REPAIRS COULD BE MADE.

1/79	SYSTEM	82.9	81.3	81.3	73.9			744	676	550	81.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS TAKEN OUT OF SERVICE TO CLEAN A TRAY SCREEN.

THE FGD SYSTEM WAS TAKEN OUT OF SERVICE TO REPAIR A LEAK IN THE VENTURI RECYCLE LINE.

THE BOILER WAS DOWN 67 HOURS FOR TUBE LEAK REPAIRS.

REPAIRS WERE MADE ON THE TRAY AND SPRAY PUMP SYSTEMS.

A HIGH DUCT PRESSURE TRIP WAS RESPONSIBLE FOR A SIX HOUR OUTAGE. THE PRESSURE SENSING LINES WERE CLEANED.

THE SCRUBBER TRAY PUMP MOTOR SHORTED TO GROUND. THE 2C LOAD TRIPPED AND POWER TO THE VENTURI RECYCLE PUMP WAS LOST. THERE WAS AN ADDITIONAL SCRUBBER TRIP DUE TO HIGH DUCT PRESSURE DURING THIS SAME PERIOD.

2/79	SYSTEM	96.2	93.1	93.2	87.9			672	634	591	87.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS TAKEN OUT OF SERVICE TO REPAIR A LEAK IN THE VENTURI LINE.

THE FGD SYSTEM WAS FORCED OUT OF SERVICE BY A SCRUBBER POWER FAILURE.

NEVADA POWER: REID GARDNER 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/79	SYSTEM	97.9	96.7	100.0	89.4			744	688	665	90.3
4/79	SYSTEM	89.1	96.0	98.9	88.8			720	666	639	91.0
5/79	SYSTEM	99.8	99.5	99.7	83.9			744	627	624	93.2
6/79	SYSTEM	91.1	87.1	89.2	73.5			720	607	529	92.2
7/79	SYSTEM	84.3	90.0	93.4	77.6			744	642	578	92.0

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER WAS TAKEN OUT OF SERVICE BECAUSE A BREAK IN THE ASH WATER CIRCULATING WATER LINE RESULTED IN A LOSS OF EMERGENCY COOLING WATER.

THE FGD SYSTEM WAS FORCED OUT OF SERVICE BY A LEAK ON THE VENTURI RACE TRACK SPRAY SECTION. THE VENTURI RACE TRACK NOZZLES WERE CLEANED DURING THE OUTAGE.

THE BOILER WAS OUT OF SERVICE 38 HOURS FOR TUBE LEAK REPAIRS.

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER WAS OUT OF SERVICE 63 HOURS WHILE BOILER TUBE LEAK REPAIRS WERE MADE.

THE BOILER WAS FORCED OUT BY A HIGH FURNACE PRESSURE TRIP. WHILE THE BOILER WAS DOWN, SENSING LINES WERE CLEANED ON THE SCRUBBER.

** PROBLEMS/SOLUTIONS/COMMENTS

A HIGH PRESSURE ALARM ON THE SCRUBBER DUCT TRIPPED THE SCRUBBER OFF LINE. THE SCRUBBER PRESSURE SENSING LINES WERE CLEANED. THIS OCCURRED TWICE DURING THE MONTH OF APRIL AND ACCOUNTED FOR 79 HOURS OF OUTAGE TIME.

A BOILER FURNACE BURNER WAS CLEANED DURING A 71 HOUR SCRUBBER OUTAGE RESULTING FROM A HIGH PRESSURE ALARM.

A CONTROL POWER FAILURE OCCURRED CAUSING A SCRUBBER TRIP WHEN A 10 KW GENERATOR WAS PUT BACK IN SERVICE.

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE FOR ABOUT FIVE DAYS TO REPAIR TUBE LEAKS.

PRESSURE SENSING LINES ON THE SCRUBBER CONTROLS WERE CLEANED DURING A TWO HOUR OUTAGE AFTER THE SCRUBBER BEGAN HAVING CONTROL PROBLEMS.

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER WAS FORCED OUT OF SERVICE DUE TO A VENTURI PUMP POWER LOSS.

20 HOURS OF SCRUBBER OUTAGE TIME WAS REQUIRED TO REPAIR VENTURI PUMP DISCHARGE VALVES.

THE BOILER WAS OUT OF SERVICE 127 HOURS DURING JUNE TO REPAIR HIGH PRESSURE HEATER TUBE LEAKS, TO WELD A CAP ON THE HIGH PRESSURE HEATER, TO WORK ON PRIMARY AIR FANS, AND TO REPAIR A BOILER TUBE LEAK.

SCRUBBER OUTAGE TIME WAS REQUIRED TO CLEAN PRESSURE SENSING LINES.

THE SCRUBBER WAS FORCED OUT OF SERVICE JUNE 30 BY A HIGH VENTURI OUTLET TEMPERATURE TRIP.

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 OUTAGE WHICH BEGAN JUNE 30 CONTINUED UNTIL JULY 4. DURING THE OUTAGE A BAD VENTURI TEMPERATURE PROBE WAS REPLACED. SOME BOILER TUBE REPAIRS WERE MADE AT THIS TIME.

THE BOILER AND SCRUBBER WERE OFF FOR 50 HOURS TO REPAIR A BOILER TUBE LEAK.

SCRUBBER AND BOILER TRIPPED OFF FOR ABOUT 50 HOURS. THIS OUTAGE WAS CAUSED BY A LOSS OF CONTROL AIR TO THE SCRUBBER AND A POWER LOSS TO THE SCRUBBER AIR COMPRESSOR.

THE SENSING LINES ON THE SCRUBBER WERE CLEANED TO PREVENT HIGH SCRUBBER DUCT PRESSURE. THE SYSTEM WAS OUT FOR ABOUT 33 HOURS.

8/79	SYSTEM	98.5	98.9	98.4	93.2			744	701	693	92.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS SHUTDOWN FOR ABOUT 40 HOURS TO REPAIR A BOILER TUBE LEAK.

THE SCRUBBER WAS OFF TO REPAIR A LEAK IN A VENTURI PUMP DISCHARGE BODY. THE REPAIR REQUIRED ABOUT 9 HOURS.

HIGH PRESSURE IN SCRUBBER DUCT FORCED THE SCRUBBER OUT OF SERVICE. THE SCRUBBER PRESSURE SENSING LINES WERE CLEANED.

9/79	SYSTEM	86.0	83.8	82.5	66.2			720	569	477	92.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER THE SCRUBBER WENT OFF LINE WITH THE BOILER TO REPAIR BOILER TUBE LEAKS. THIS OCCURRED TWICE CAUSING A TOTAL OF 126 HOURS OF DOWN TIME.

SOME OUTAGE TIME WAS REQUIRED TO UNPLUG EFFLUENT AND VENTURI LINES AND TO CLEAN THE VENTURI RACE TRACK SPRAY SECTIONS.

HIGH PRESSURE WAS ENCOUNTERED TWICE IN THE SCRUBBER DUCT AND ONCE IN THE BOILER FURNACE. THIS CAUSED SOME OUTAGE TIME TO CLEAN THE SCRUBBER PRESSURE SENSING LINES.

THE SCRUBBER WAS DOWN WITH THE BOILER SO REPAIRS TO THE MAIN STEAM DRAIN LINE COULD BE CONDUCTED.

THE SCRUBBER WAS DOWN FOR APPROXIMATELY SEVEN HOURS TO MAKE REPAIRS ON THE CONTROL SYSTEM.

10/79	SYSTEM	100.0	88.3	100.0	31.3			744	263	233	91.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER WAS DOWN FOR 13 HOURS WITH THE BOILER DUE TO A MASTER FUEL TRIP ON THE BOILER AND LATER FOR 41 HOURS FOR BOILER TUBE REPAIRS.

A BOILER TRIP OCCURRED ON OCTOBER 12 BECAUSE OF HIGH FURNACE PRESSURE. AN EXPLOSION BLEW AN EXPANSION JOINT ON THE DISCHARGE OF A PRIMARY AIR FAN. THE BOILER OUTAGE CONTINUED THROUGH THE END OF THE MONTH AS GENERAL MAINTENANCE WAS PERFORMED.

11/79	SYSTEM	98.8	96.0	97.3	43.3			720	325	312	92.0

NEVADA POWER: REID GARDNER 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 SCRUBBER AND BOILER DID NOT OPERATE UNTIL NOVEMBER 17 WHEN THE SCHEDULED MAINTENANCE WAS COMPLETED.

THE SCRUBBER WAS FORCED OUT OF SERVICE FOR APPROXIMATELY THREE HOURS TO RECTIFY A VIBRATIONS PROBLEM IN THE REHEATER FAN.

THE SCRUBBER WENT OFF LINE WHEN A TRAY SPRAY PUMP SHORTED TO GROUND TRIPPING A SCRUBBER POWER LOAD CENTER.

12/79	SYSTEM	97.9	97.7	97.9	97.7			744	744	727	92.6

** PROBLEMS/SOLUTIONS/COMMENTS

A BOILER/SCRUBBER HIGH DUCT PRESSURE TRIP OCCURRED. THE SCRUBBER PRESSURE SENSING LINES WERE CLEANED. THE TRIP ACCOUNTED FOR A LITTLE OVER AN HOUR OF OUTAGE TIME.

THE CONTROL SYSTEM ON THE VENTURI DAMPER REQUIRED REPAIRS WHICH RESULTED IN APPROXIMATELY THREE HOURS OF DOWN TIME.

THE SCRUBBER WAS SHUT DOWN TO MAKE REPAIRS ON THE EMERGENCY SPRAY SYSTEM AND A REHEATER FAN BEARING.

DURING A MAINTENANCE CHECK FOR D. C. GROUNDING THE BOILER AND SCRUBBER WERE FORCED OUT OF SERVICE FOR TWO HOURS.

1/80	SYSTEM	97.4	94.5	96.9	81.6			744	642	607	94.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE SCRUBBER WAS TAKEN OFF LINE WITH THE BOILER TO REPLACE THE REBUILT BOILER HIGH PRESSURE HEATER. THIS OUTAGE LASTED APPROXIMATELY 112 HOURS.

REPAIRS WERE NEEDED ON THE LEFT HAND INTERCEPT VALVE ON THE TURBINE CAUSING THE SCRUBBER TO BE TAKEN OFF LINE ONCE AGAIN WITH THE BOILER.

THE CLEANING OF THE VENTURI RACE TRACK NOZZLES ACCOUNTED FOR TWO SCRUBBER OUTAGES TOTALLING 15 HOURS.

THE SCRUBBER WAS TAKEN OFF LINE FOR FOUR HOURS SO MAINTENANCE COULD BE PERFORMED ON THE ID FAN DAMPER CONTROLS.

2/80	SYSTEM	96.9	96.9	96.9	96.9			696	696	675	95.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER WAS TAKEN OFF-LINE TWICE DURING FEBRUARY DUE TO A MALFUNCTION OF THE ID FAN CONTROLS. THE PRESSURE SENSING LINES WERE CLEANED DURING THE OUTAGE.

THE SCRUBBER RACE TRACK NOZZLES HAD TO BE CLEANED TWICE, REQUIRING APPROXIMATELY FOUR HOURS OF OUTAGE TIME.

THE DISCHARGE VALVE ON THE VENTURI RECYCLE PUMP WAS REPLACED DURING FEBRUARY.

REPAIRS WERE MADE ON THE SCRUBBER EMERGENCY SPRAY LINE RESULTING IN ABOUT FOUR HOURS OF OUTAGE TIME.

THE SCRUBBER HAD TO BE SHUT DOWN SO REPAIRS ON THE ID FAN DAMPER CONTROLS

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

COULD BE MADE.

3/80	SYSTEM	98.4	97.5	97.5	97.5			744	744	725	96.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE SCRUBBER WAS TAKEN OFF LINE DUE TO THE UNAVAILABILITY OF THE EMERGENCY SPRAY SYSTEM. DURING THIS TIME MAINTENANCE WAS DONE ON THE A AND B ASH SLUICE PUMPS.

LATER IN THE MONTH AN OUTAGE WAS CAUSED BY A LEAK IN THE EMERGENCY SPRAY LINE.

PROBLEMS RELATED TO A LOW VENTURI FLOW CAUSED FOUR HOURS OF OUTAGE TIME IN MARCH. NO CAUSE FOR THE FLOW PROBLEM WAS REPORTED.

4/80	SYSTEM	99.0	99.0	99.0	93.5			720	680	673	97.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS UNAVAILABLE FOR 7 HOURS TO UNPLUG THE VENTURI RACE TRACK.

THE BOILER WAS OUT OF SERVICE FOR 40 HOURS DUE TO BOILER TUBE LEAKS.

5/80	SYSTEM	100.0	86.3	100.0	14.3			744	124	107	96.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD OVERHAUL WAS COMPLETED EARLY IN MAY.

A BOILER OVERHAUL WAS STARTED AND COMPLETED DURING MAY. THIS OUTAGE LASTED ALMOST 23 DAYS.

6/80	SYSTEM	99.6	97.5	99.5	73.4			720	541	528	96.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE SEVERAL TIMES DURING JUNE. THIS CAUSED THE FGD SYSTEM TO BE OUT APPROXIMATELY 80 HOURS.

VENTURI RACE TRACK NOZZLES NEEDED TO BE UNPLUGGED CAUSING THE FGD SYSTEM OUT OF SERVICE FOR SEVERAL HOURS.

7/80	SYSTEM	88.1	77.2	86.2	74.5			744	718	554	93.3

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER RELATED OUTAGES KEPT THE FGD SYSTEM OUT OF SERVICE FOR OVER 100 HOURS DURING JUNE. OVER HALF OF THIS OUTAGE TIME WAS A RESULT OF CONTROL PROBLEMS WITH THE BOILER AND FGD SYSTEM. THE BOILER WAS RUN WITHOUT THE FGD SYSTEM IN ORDER TO DETERMINE IF THE CONTROL PROBLEMS WERE FGD OR BOILER RELATED. PROBLEMS WERE REPAIRED IN BOTH CONTROL SYSTEMS. THIS ALSO CAUSED OVER 60 HOURS OF FGD SYSTEM RELATED DOWN TIME.

PROBLEMS WITH THE BOTTOM HOPPER SEALS CAUSED THE FGD SYSTEM TO GO DOWN.

THE FGD SYSTEM NEEDED TO BE OFF LINE FOR 13 HOURS FOR INSTRUMENT CHECKS AND MAINTENANCE.

THE FGD SYSTEM WAS FORCED OUT OF SERVICE WHEN THE EMERGENCY SPRAY SYSTEM FAILED. THE ASH SLUICE PUMP SHAFT WAS REPAIRED DURING THIS TIME.

8/80	SYSTEM	97.0	96.3	96.4	79.7			744	613	591	93.9

NEVADA POWER: REID GARDNER 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

LOSS OF EMERGENCY SPRAY KEPT THE FGD SYSTEM OFF LINE FOR ALMOST 20 HOURS.

BOILER RELATED OUTAGES CAUSED THE FGD SYSTEM NOT TO OPERATE FOR OVER 130 HOURS.

9/80	SYSTEM	100.0			.0			720	0	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS 100% AVAILABLE DURING A SCHEDULED BOILER OVERHAUL IN SEPTEMBER.

10/80	SYSTEM	100.0	.0		.0			744	0	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT OVERHAUL CONTINUED THROUGH THE MONTH OF OCTOBER.

11/80	SYSTEM	94.5	93.6	91.9	62.0			720	273	447	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCHEDULED OUTAGE CONTINUED UNTIL NOVEMBER 10. THE UNIT WAS BROUGHT ON LINE AND REMAINED ON LINE UNTIL NOVEMBER 26 WHEN THE BOILER AND FGD SYSTEM WERE FORCED OUT OF SERVICE TWICE.

12/80	SYSTEM	99.5	99.2	99.5	97.8			744	733	728	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER THE SYSTEM WAS SHUTDOWN APPROXIMATELY 12 HOURS FOR SCHEDULED OUTAGES.

TWO FORCED OUTAGES OCCURRED DURING THE MONTH WHICH CAUSED THE SYSTEM TO SHUT DOWN FOR APPROXIMATELY FOUR HOURS.

1/81	SYSTEM	97.1	96.4	96.7	84.2			744	649	626	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY A REHEATER FAN TRIPPED CAUSING ABOUT SIX HOURS OF DOWN TIME.

THE SYSTEM WAS TAKEN OFF LINE PART OF THE MONTH TO REPAIR A VENTURI LINE LEAK.

THE UNIT WAS TAKEN OFF LINE THREE TIMES IN JANUARY TO WORK ON THE GENERATOR.

2/81	SYSTEM	93.0	90.4	89.3	74.7			672	555	502	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY APPROXIMATELY 96 HOURS OF OUTAGE TIME WAS DUE TO SCHEDULED TESTING.

REPAIR OF A BOILER TUBE LEAK CAUSED AN ADDITIONAL 39 HOURS OF OUTAGE TIME.

3/81	SYSTEM	99.5	98.1	98.1	54.8			744	416	408	

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

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE BOILER WAS OUT OF SERVICE APPROXIMATELY 57 HOURS DUE TO A TUBE LEAK.

THE BOILER WAS TAKEN OFF LINE ON MARCH 22 FOR A SCHEDULED MAINTENANCE OVERHAUL. THE UNIT REMAINED OFF LINE THROUGHOUT THE MONTH.

SEVERAL BOILER TRIPS CAUSED AN ADDITIONAL 56 HOURS OF OUTAGE TIME.

4/81	SYSTEM	100.0	94.6	94.6	7.4			720	56	53	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOILER WAS OUT OF SERVICE APPROXIMATELY 664 HOURS DUE TO A SCHEDULED MAINTENANCE OVERHAUL.

5/81	SYSTEM	96.3	96.1	96.2	93.5			744	724	696	

** PROBLEMS/SOLUTIONS/COMMENTS

A LEAK IN THE VENTURI DISCHARGE LINE CAUSED ABOUT A DAY OUTAGE DURING MAY.

THE BOILER WAS TAKEN OFF-LINE PART OF THE MONTH TO REMOVE ASH.

6/81	SYSTEM	90.7	88.5	89.2	75.8			720	616	546	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE A VENTURI BOX LEAK CAUSED THE SYSTEM TO BE OFF-LINE FOR ABOUT 55 HOURS.

THE UNIT WAS OFF LINE THREE DIFFERENT TIMES TO REMOVE ASH.

THE SYSTEM WAS TAKE OFF-LINE FOR 12 HOURS DUE TO EMERGENCY SPRAY PROBLEMS.

7/81	SYSTEM	98.8	97.4	98.5	78.4			744	599	584	

** PROBLEMS/SOLUTIONS/COMMENTS

APPROXIMATELY 9 HOURS OF OUTAGE TIME WERE REQUIRED DURING THE MONTH TO CLEAN THE TRAY SCREEN AND RECTIFY A SCRUBBER DUCT PRESSURE PROBLEM.

A STACK INSPECTION WAS CONDUCTED DURING THE MONTH.

8/81	SYSTEM	98.4	98.1	98.3	95.5			744	724	710	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS OUT OF SERVICE 6 HOURS TO REPLACE A VALVE IN THE EMERGENCY SPRAY SYSTEM DURING AUGUST.

6 HOURS OF OUTAGE TIME WERE REQUIRED TO REPLACE A VALVE ON A VENTURI PUMP AND TO CLEAN THE VENTURI THROAT SPRAY (RACE TRACK).

9/81	SYSTEM	99.5	99.4	99.5	99.3			720	719	715	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBING SYSTEM WAS SHUT DOWN FOR 3 HOURS TO REPAIR THE ID FAN ACCESS DOOR.

10/81	SYSTEM	99.8	99.1	99.1	85.7			744	643	638	

NEVADA POWER: REID GARDNER 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 ID FAN PROBLEMS WERE ENCOUNTERED DURING OCTOBER. LOW UTILIZATION WAS DUE TO PROBLEMS WITH THE BOILER.

11/81	SYSTEM	100.0	99.9	99.9	46.7			720	336	336	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING NOVEMBER. LOW UTILIZATION WAS CAUSED BY BOILER PROBLEMS.

12/81	SYSTEM	94.8	74.0	69.3	56.4			744	567	419	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER RETURNED TO SERVICE ON DECEMBER 10 FOLLOWING THE OVERHAUL.

DURING DECEMBER TWO OUTAGES OCCURRED DUE TO PROBLEMS WITH THE EMERGENCY SPRAY.

1/82	SYSTEM	54.0	57.9	52.2	50.3			744	647	374	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE SYSTEM WAS OFF-LINE APPROXIMATELY 272 HOURS DUE TO A VENTURI BOX LEAK.

THE REHEATER FAN BLOWER REQUIRED REPAIR DURING THE MONTH.

THE BOILER TRIPPED TWICE DURING THE MONTH BECAUSE OF HIGH SCRUBBER DUCT PRESSURE.

2/82	SYSTEM	49.9	48.3	48.3	47.1			672	654	316	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE BOILER WAS TRIPPED DUE TO HIGH PRESSURE IN THE SCRUBBER DUCT.

3/82	SYSTEM	100.0	100.0	100.0	67.7			744	503	503	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER AND FGD SYSTEM WERE TAKEN OFF-LINE ON MARCH 21 FOR A SCHEDULED OUTAGE. THE UNIT REMAINED OFF-LINE THROUGHOUT THE REST OF THE MONTH.

4/82	SYSTEM	99.4	96.5	55.3	47.0			720	350	338	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS OFF-LINE UNTIL APRIL 12 DUE TO THE SCHEDULED OVERHAUL.

FGD OUTAGE TIME DURING THE MONTH WAS DUE TO REPAIRS BEING PERFORMED ON THE ABSORBER TRAY LINE.

5/82	SYSTEM	99.8	98.4	98.4	86.5			744	654	644	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE SYSTEM WAS FORCED DOWN FOR APPROXIMATELY TWO HOURS TO CLEAN THE SENSING LINES.

6/82	SYSTEM	94.4	97.5	91.8	80.6			720	596	580	

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/82	SYSTEM	94.5	71.7	92.1	63.4			744	658	472	
8/82	SYSTEM	100.0	99.5	100.0	83.3			744	622	619	
9/82	SYSTEM	99.1	85.3	98.8	74.4			720	628	536	
10/82	SYSTEM	98.8	96.4	98.6	81.2			744	626	604	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS SHUT DOWN FOR APPROXIMATELY 38 HOURS DUE TO A BLOWN GASKET IN THE DISCHARGE PUMP VALVE.

THE SYSTEM WAS TAKEN OFF-LINE FOR APPROXIMATELY SIX HOURS TO CONNECT THE NEW EMERGENCY SPRAY SYSTEM.

THE UNIT WAS FORCED OFF-LINE APPROXIMATELY 86 HOURS DUE TO TUBE LEAKS.

** PROBLEMS/SOLUTIONS/COMMENTS

A BOILER TUBE LEAK RESULTED IN APPROXIMATELY 62 HOURS OF OUTAGE TIME DURING JULY.

OTHER BOILER-RELATED PROBLEMS ACCOUNTED FOR APPROXIMATELY 52 HOURS OF DOWN TIME DURING THE MONTH.

APPROXIMATELY 41 HOURS OF OUTAGE TIME RESULTED FROM REPAIRS ON THE ABSORBER TRAY TOWER SPRAY MECHANISM.

** PROBLEMS/SOLUTIONS/COMMENTS

A BOILER TUBE LEAK OCCURRED DURING AUGUST CAUSING A 97 HOUR OUTAGE.

HIGH DUCT PRESSURE FORCED A BOILER TRIP DURING AUGUST THAT RESULTED IN APPROXIMATELY 2 HOURS OF DOWN TIME.

A HIGH PRESSURE HEATER LEAK ACCOUNTED FOR ABOUT 26 HOURS OF OUTAGE TIME DURING THE MONTH.

** PROBLEMS/SOLUTIONS/COMMENTS

A HIGH PRESSURE HEATER LEAK CAUSED AN OUTAGE LASTING 4 HOURS.

TWO OUTAGES DURING SEPTEMBER WERE DUE TO BOILER TUBE LEAKS AND TOTALLED APPROXIMATELY 174 HOURS.

HIGH DUCT PRESSURE ACCOUNTED FOR AN OUTAGE DURING THE MONTH THAT LASTED A LITTLE OVER ONE HOUR.

A VENTURI LINE LEAK RESULTED IN APPROXIMATELY 5 HOURS OF DOWN TIME DURING SEPTEMBER.

** PROBLEMS/SOLUTIONS/COMMENTS

A FIVE HOUR OUTAGE DURING OCTOBER RESULTED FROM THE LOSS OF AN AIR PREHEATER.

A HIGH PRESSURE HEATER LEAK CAUSED AN OUTAGE LASTING APPROXIMATELY 76 HOURS.

APPROXIMATELY 9 HOURS OF OUTAGE TIME RESULTED FROM A LEAKING ID FAN EXPANSION JOINT.

NEVADA POWER: REID GARDNER 2 (CONT.)

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

ADDITIONAL BOILER-RELATED PROBLEMS ALSO CONTRIBUTED TO DOWN TIME DURING OCTOBER.

11/82	SYSTEM	100.0	95.9	100.0	10.4			720	78	75	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OUT OF SERVICE FROM NOVEMBER 1 TO NOVEMBER 28 FOR A SCHEDULED OVERHAUL.

A BOILER TRIP OCCURRED DURING NOVEMBER DUE TO HIGH DUCT PRESSURE.

12/82	SYSTEM	98.8	97.0	98.6	82.9			744	636	617	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER TUBE LEAKS ACCOUNTED FOR APPROXIMATELY 118 HOURS OF DOWN TIME DURING DECEMBER.

A 9 HOUR OUTAGE RESULTED FROM ID FAN CONTROL PROBLEMS.

1/83	SYSTEM	89.8	84.8	89.3	84.8			744	744	631	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER PROBLEMS DUE TO HIGH DUCT PRESSURE ACCOUNTED FOR APPROXIMATELY 37 HOURS OF DOWN TIME DURING JANUARY.

ELECTRICAL PROBLEMS WITH A REHEATER FAN FORCED AN OUTAGE LASTING ABOUT 14 HOURS.

THE REPAIR OF A LEAK IN AN ID FAN RESULTED IN APPROXIMATELY 62 HOURS OF OUTAGE TIME DURING JANUARY.

2/83	SYSTEM	41.8	33.5	31.8	27.2			672	545	183	

** PROBLEMS/SOLUTIONS/COMMENTS

A 98 HOUR OUTAGE OCCURRED DURING FEBRUARY AS A RESULT OF BOILER TUBE LEAKS.

AN OVERLOADED ID FAN MOTOR RESULTED IN APPROXIMATELY 16 DAYS OF OUTAGE TIME DURING FEBRUARY.

3/83	SYSTEM	79.6	78.7	78.4	74.1			744	701	551	

** PROBLEMS/SOLUTIONS/COMMENTS

LOW FLOW THROUGH THE VENTURI RESULTED IN APPROXIMATELY 4 HOURS OF DOWN TIME DURING THE MONTH.

THE UNIT WAS DOWN APPROXIMATELY 37 HOURS DURING MARCH FOR REPAIR WORK ON BURNERS.

REPAIRS ON AN ID FAN CONTINUED THROUGH MARCH CAUSING AN ADDITIONAL 131 HOURS OF DOWN TIME.

REPAIRS ON A BYPASS DAMPER ACCOUNTED FOR 17 HOURS OF OUTAGE TIME DURING MARCH.

HIGH DUCT PRESSURE ACCOUNTED FOR APPROXIMATELY 3 HOURS OF DOWN TIME FOR THE UNIT.

AN ADDITIONAL HOUR OF DOWN TIME WAS ATTRIBUTED TO OTHER BOILER-RELATED PROBLEMS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
4/83	SYSTEM	99.7	98.4	99.6	72.0			720	527	518	

** PROBLEMS/SOLUTIONS/COMMENTS

A FORCED OUTAGE LASTING APPROXIMATELY 2 HOURS OCCURRED DURING APRIL AND WAS DUE TO HIGH SCRUBBER DUCT PRESSURE.

THE UNIT WAS DOWN FOR APPROXIMATELY 15 HOURS DURING THE MONTH FOR A SCHEDULED OUTAGE TO REPAIR BURNERS.

A BOILER TRIP CAUSED A BRIEF 1-HOUR OUTAGE IN APRIL.

THE UNIT WAS OUT OF SERVICE FOR APPROXIMATELY 184 HOURS DURING APRIL FOR A SCHEDULED OVERHAUL.

5/83	SYSTEM	97.1	74.9	89.1	23.4			744	233	174	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCHEDULED OVERHAUL WHICH BEGAN IN APRIL CONTINUED UNTIL MAY 23.

A HOT BEARING IN THE SCRUBBER I.D. FAN MOTOR FORCED AN OUTAGE IN MAY LASTING ABOUT 18 HOURS.

A BRIEF TWO-HOUR OUTAGE OCCURRED DURING MAY DUE TO A BOILER TRIP.

6/83	SYSTEM	100.0	94.0	100.0	77.0			720	590	555	

** PROBLEMS/SOLUTIONS/COMMENTS

A TURBINE TRIP FORCED AN OUTAGE IN JUNE LASTING APPROXIMATELY 10 HOURS.

A BOILER TUBE LEAK RESULTED IN ABOUT 70 HOURS OF DOWN TIME DURING THE MONTH.

THE UNIT WAS OUT OF SERVICE APPROXIMATELY 85 HOURS DURING JUNE DUE TO A LACK OF POWER DEMAND.

A ONE HOUR BOILER-RELATED OUTAGE OCCURRED DURING JUNE.

7/83	SYSTEM	98.6	96.5	98.4	84.2			744	649	627	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN APPROXIMATELY 53 HOURS DURING JULY DUE TO LACK OF POWER DEMAND.

APPROXIMATELY 55 HOURS OF DOWN TIME DURING THE MONTH RESULTED FROM BOILER-RELATED PROBLEMS.

AN INSPECTION OF THE VENTURI THROAT SPRAY SYSTEM (RACE TRACK) RESULTED IN APPROXIMATELY 8 HOURS OF OUTAGE TIME.

A LOSS OF VENTURI FLOW RESULTED IN APPROXIMATELY 3 HOURS OF DOWN TIME DURING THE MONTH.

8/83	SYSTEM	96.5	97.0	96.0	83.0			744	637	618	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OUT OF SERVICE APPROXIMATELY 100 HOURS DURING AUGUST DUE TO A LACK OF POWER DEMAND.

NEVADA POWER: REID GARDNER 2 (CONT.)

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-------------------------------------------PERFORMANCE DATA-----------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------
                         REPAIRS ON A STOP-VALVE FORCED AN OUTAGE LASTING 10 HOURS.

                         ABSORBER DUCT PRESSURE PROBLEMS ACCOUNTED FOR APPROXIMATELY 8 HOURS OF DOWN
                         TIME DURING THE MONTH.

                         VENTURI PUMP REPAIRS FORCED AN OUTAGE DURING AUGUST LASTING APPROXIMATELY
                         9 HOURS.

 9/83  SYSTEM    100.0        99.8       100.0        87.8                     720   634   632

       ** PROBLEMS/SOLUTIONS/COMMENTS

                         A BOILER TUBE LEAK AND UNIT TRIP ACCOUNTED FOR APPROXIMATELY 88 HOURS OF
                         OUTAGE TIME DURING SEPTEMBER.

10/83  SYSTEM    100.0        99.4       100.0        85.0                     744   636   632

       ** PROBLEMS/SOLUTIONS/COMMENTS

                         BOILER RELATED PROBLEMS AND A SCHEDULED OUTAGE ACCOUNTED FOR OUTAGE TIME
                         DURING OCTOBER.

11/83  SYSTEM     98.6        97.4        97.7        60.0                     720   443   432

       ** PROBLEMS/SOLUTIONS/COMMENTS

                         THE UNIT WAS OFF LINE APPROXIMATELY 273 HOURS DURING NOVEMBER FOR A SCHED-
                         ULED OUTAGE.

                         HIGH ABSORBER DUCT PRESSURE ACCOUNTED FOR 6 HOURS OF FGD SYSTEM OUTAGE TIME
                         DURING THE MONTH.

                         BOILER RELATED PROBLEMS ACCOUNTED FOR APPROXIMATELY 5 HOURS OF OUTAGE TIME
                         DURING NOVEMBER.

                         APPROXIMATELY 4 HOURS OF OUTAGE TIME WAS REQUIRED TO REPAIR A VENTURI PUMP
                         MOTOR.

12/83  SYSTEM     97.5        96.9        97.3        90.9                     744   697   676

       ** PROBLEMS/SOLUTIONS/COMMENTS

                         THE UNIT WAS DOWN APPROXIMATELY 49 HOURS DURING THE MONTH DUE TO BOILER
                         RELATED PROBLEMS.

                         A BADLY VIBRATING REHEAT BLOWER FORCED AN OUTAGE LASTING APPROXIMATELY 19
                         HOURS DURING DECEMBER.

 1/84  SYSTEM    100.0        96.6       100.0        92.8                     744   715   690

       ** PROBLEMS/SOLUTIONS/COMMENTS

                         THE UTILITY REPORTED THAT THE UNIT WAS DOWN APPROXIMATELY 54 HOURS DUE TO
                         BOILER OUTAGES.

 2/84  SYSTEM    100.0          .0                      .0                     696     0     0

       ** PROBLEMS/SOLUTIONS/COMMENTS

                         THE UNIT WAS DOWN FOR THE ENTIRE MONTH BECAUSE OF A SCHEDULED OUTAGE.

 3/84  SYSTEM     99.8        96.4        99.7        50.5                     744   390   376
```

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
4/84	SYSTEM	99.8	99.7	99.8	97.0			720	701	699	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS DOWN 1.3 HOURS DUE TO PROBLEMS WITH A BYPASS DAMPER.

THE UNIT WAS OFF LINE APPROXIMATELY 367 HOURS DUE TO BOILER-RELATED PROBLEMS.

5/84	SYSTEM	100.0	100.0	100.0	99.9			744	743	743	

** PROBLEMS/SOLUTIONS/COMMENTS

FOR APPROXIMATELY 36 HOURS DURING APRIL THE FGD SYSTEM WAS OFF LINE FOR 1.3 HOURS DURING APRIL DUE TO ELECTRICAL PROBLEMS.

DURING APRIL THE UNIT WAS OFF LINE FOR 20 HOURS DUE TO BOILER OUTAGES.

THE UTILITY REPORTED THAT THE UNIT WAS DOWN APPROXIMATELY 114 HOURS DURING APRIL DUE TO BOILER PROBLEMS.

6/84	SYSTEM	99.3	99.0	99.2	94.2			720	685	678	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY, THE UTILITY REPORTED THAT THE UNIT WAS DOWN APPROXIMATELY 1 HOUR DUE TO A BOILER OUTAGE.

7/84	SYSTEM	97.9	82.4	97.1	70.8			744	639	527	

** PROBLEMS/SOLUTIONS/COMMENTS

FOR APPROXIMATELY 36 HOURS DURING JUNE, THE UNIT WAS DOWN DUE TO BOILER OUTAGES.

DURING JUNE, THE FGD SYSTEM WAS DOWN APPROXIMATELY 5 HOURS DUE TO MAINTENANCE ON AN INDUCED DRAFT FAN.

8/84	SYSTEM	97.9	97.6	97.9	97.4			744	743	725	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY, THE FGD SYSTEM WAS DOWN 1.3 HOURS DUE TO THE CLOSING OF AN INLET DAMPER.

ON JULY 23 AND 24, THE FGD SYSTEM WAS DOWN A TOTAL OF 14.4 HOURS DUE TO ABSORBER DUCT PRESSURE PROBLEMS.

THE UNIT WAS DOWN APPROXIMATELY 202 HOURS IN JULY DUE TO BOILER RELATED PROBLEMS.

9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 2 WAS DOWN FOR 16 HOURS IN AUGUST DUE TO A LEAK IN THE I.D. FAN HOUSING.

DURING AUGUST REID GARDNER 2 WAS DOWN FOR 4 HOURS DUE TO BOILER RELATED PROBLEMS.

NEVADA POWER: REID GARDNER 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

INFORMATION WAS UNAVAILABLE FOR SEPTEMBER 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NEVADA POWER	
PLANT NAME	REID GARDNER	
UNIT NUMBER	3	
CITY	MOAPA	
STATE	NEVADA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.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	105	
GROSS UNIT GENERATING CAPACITY - MW	125	
NET UNIT GENERATING CAPACITY W/FGD - MW	110	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	125	
** 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	223.21	(473000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	176.7	(350 F)
STACK HEIGHT - M	61.	(200 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	6.3	(20.6 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	28959.	(12450 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	8.00	
RANGE ASH CONTENT - %	8.0-10.0	
AVERAGE MOISTURE CONTENT - %	9.00	
RANGE MOISTURE CONTENT - %	5.5-6.0	
AVERAGE SULFUR CONTENT - %	.50	
RANGE SULFUR CONTENT - %	0.5-1.0	
AVERAGE CHLORIDE CONTENT - %	.05	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
TYPE	MULTICLONE	
SUPPLIER	RESEARCH-COTTRELL	
PARTICLE REMOVAL EFFICENCY -%	75.0	
** PARTICLE SCRUBBER		
NUMBER	1	
INITIAL START-UP DATE	6/76	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	FIXED THROAT	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	THYSSEN/CEA	
DIMENSIONS - FT	1.5 DIA X 18.0	
SHELL GENERIC MATERIAL	CARBON STEEL; HIGH ALLOY	
SHELL SPECIFIC MATERIAL	AISI 1110; NICKEL BASE/CHROMIUM-IRON-COPPER-MOLY	
LINER GENERIC MATERIAL	NONE; ORGANIC	
LINER SPECIFIC MATERIAL	N/A; NATURAL RUBBER	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	157.5	(2500 GPM)
L/G RATIO - LITER/CU.M	1.3	(10.0 GAL/1000ACF)
PRESSURE DROP - KPA	.8	(3.3 IN-H2O)
SUPERFICIAL GAS VELOCITY - M/S	50.3	(165.0 FT/S)
INLET GAS FLOW RATE - CU.M/S	223.2	(473000 ACFM)
INLET GAS TEMPERATURE - C	176.7	(350 F)
PARTICLE REMOVAL EFFICIENCY - %	97.0	

NEVADA POWER: REID GARDNER 3 (CONT.)

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	SODIUM CARBONATE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	THYSSEN/CEA
A-E FIRM	BECHTEL
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.00
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	85.00
CURRENT STATUS	1
COMMERCIAL START-UP	7/76
INITIAL START-UP	6/76
CONTRACT AWARDED	7/73

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	1	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	SIEVE TRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	THYSSEN/CEA	
DIMENSIONS - FT	30.0 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	NATURAL RUBBER	
LINER MATERIAL TRADE NAME/COMMON TYPE	BLACK NATURAL RUBBER	
GAS CONTACTING DEVICE TYPE	PERFORATED TRAYS	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	38.	(600 GPM)
L/G RATIO - L/CU.M	.2	(1.6 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.7	(3.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.4	(11.0 FT/S)
SO2 REMOVAL EFFICIENCY - %	91.2	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	1	
GENERIC TYPE	CENTRIFUGAL	
SPECIFIC TYPE	RADIAL VANE	
TRADE NAME/COMMON TYPE	NR	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	1	
PRESSURE DROP - KPA	.1	(.5 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	

** REHEATER

GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER	
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE	
TEMPERATURE INCREASE - C	27.8	(50 F)
INLET FLUE GAS TEMPERATURE - C	48.3	(119 F)
NUMBER OF TUBES PER BUNDLE	24	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

NEVADA POWER: REID GARDNER 3 (CONT.)

** FANS

NUMBER	1	
DESIGN	CENTRIFUGAL	
SUPPLIER	BUFFALO FORGE	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	223.21	(473000 ACFM)
FLUE GAS TEMPERATURE - C	176.7	(350 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

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
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	INERT FLAKE-FILLED VINYL ESTER

** REAGENT PREPARATION EQUIPMENT

FUNCTION	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK

** TANKS

SERVICE	NUMBER
SCRUBBER RECYCLE	1

** PUMPS

SERVICE	NUMBER
SCRUBBER RECIRCULATION	3
ABSORBER RECIRCULATION	3

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SLUDGE

** TREATMENT

METHOD	BLEED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	INTERIM
TYPE	POND
LOCATION	ON-SITE
SITE TREATMENT	CLAY LINING

NEVADA POWER: REID GARDNER 3 (CONT.)

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	GRAVITY FLOW FROM INTERIM SLUDGE POND
SITE TREATMENT	CLAY LINING

** WATER BALANCE

WATER LOOP TYPE	CLOSED	
MAKEUP WATER ADDITION - LITERS/S	9.8	(155 GPM)

** FGD SPARE CAPACITY INDICES

ABSORBER - % .0

** FGD SPARE COMPONENT INDICES

ABSORBER .0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/76	SYSTEM	82.0	45.9	70.4	42.7			744	692	318	

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL BOILER TESTING OPERATIONS BEGAN IN EARLY APRIL 1976. INITIAL FLUE GAS SCRUBBING SYSTEM TESTING BEGAN IN LATE JUNE 1976.

THE UNIT 3 SCRUBBING SYSTEM WAS PLACED IN OPERATION ON JULY 12, 1976. THE SYSTEM DESIGN WAS BASED ON INFORMATION AND DATA OBTAINED FROM AN 8000-ACFM PILOT PLANT PROGRAM CONDUCTED AT THIS STATION IN 1971 AND 1972.

A HIGH SOLIDS CONCENTRATION IN THE VENTURI SCRUBBING SOLUTION CYCLE WAS A PROBLEM DURING JULY.

FOUR OUTAGES WERE REPORTED FOR THE MONTH, THREE OF WHICH WERE FORCED SCRUBBER OUTAGES.

A BUCKET ELEVATOR MALFUNCTION WAS A PROBLEM DURING JULY FORCING THE SYSTEM OUT OF SERVICE FOR 109 HOURS.

8/76	SYSTEM	43.2	43.2	43.2	43.2			744	744	321	

** PROBLEMS/SOLUTIONS/COMMENTS

A REHEATER MOTOR BURNOUT OCCURRED IN AUGUST.

THE VENTURI FLOOR WAS EFFECTIVELY DESTROYED DURING AUGUST.

SCRUBBER OUTAGE TIME WAS REQUIRED TO REPAIR AN ID FAN ELECTRICAL MALFUNCTION AND TO INSTALL ID FAN INSULATION.

THICKENER TANK PLUGGING CAUSED FGD DOWN TIME.

SCRUBBER OUTAGES TOTALLED 423 HOURS IN AUGUST.

9/76	SYSTEM	50.6	46.2	46.9	43.6			720	679	314	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS PLACED BACK IN SERVICE ON SEPTEMBER 14 IN FOLLOWING EXTENSIVE REPAIRS AND MODIFICATIONS FROM THE PRECEEDING MONTH.

A VENTURI VIBRATION TRIP RESULTED IN NEARLY 14 HOURS OF FGD SYSTEM OUTAGE TIME.

TWO REHEATER FAN TRIPS OCCURRED IN SEPTEMBER ACCOUNTING FOR 14 HOURS OF

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

FGD SYSTEM OUTAGE TIME.

10/76	SYSTEM	21.0	28.4	28.4	20.9			744	548	155	

** PROBLEMS/SOLUTIONS/COMMENTS

HIGH SOLIDS CONTENT IN THE VENTURI RECYCLE SOLUTION RESULTED IN 26 HOURS OF SCRUBBER OUTAGE TIME.

A SCRUBBER GAS DAMPER MALFUNCTION FORCED THE FGD SYSTEM OUT OF SERVICE FOR FOUR HOURS.

VENTURI BOX LEAKS WERE ENCOUNTERED FORCING THE SCRUBBER OUT OF SERVICE FROM OCTOBER 8 THROUGH THE END OF THE MONTH.

11/76	SYSTEM	28.5	68.7	68.7	28.5			720	298	205	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBING SYSTEM WAS OUT OF SERVICE THE FIRST HALF OF NOVEMBER AS REPAIRS OF LEAKS IN THE VENTURI SCRUBBER BOX CONTINUED. THE SYSTEM WAS RESTARTED ON NOVEMBER 19.

A SCREW CONVEYOR MALFUNCTION (PREVENTING CHEMICAL MIXING) RESULTING IN 68 HOURS OF SCRUBBER OUTAGE TIME.

12/76	SYSTEM	99.0	97.0	98.9	97.0			744	744	722	

** PROBLEMS/SOLUTIONS/COMMENTS

A BOILER HIGH TEMPERATURE TRIP FORCED THE SCRUBBER OUT OF SERVICE FOR 14 HOURS EARLY IN DECEMBER.

ONE MINOR EIGHT HOUR SCRUBBER OUTAGE OCCURRED WHEN REPAIRS WERE MADE ON THE ID FAN EXPANSION JOINT.

1/77	SYSTEM	98.3	98.3	98.3	97.1			744	735	723	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OUT OF SERVICE NEARLY NINE HOURS FOR BOILER-RELATED PROBLEMS.

A PLUGGED TRAY OCCURRED IN JANUARY RESULTING IN 3.5 HOURS OF FGD SYSTEM OUTAGE TIME.

A REHEATER STEAM LEAK RESULTED IN A MINOR NINE HOUR FGD SYSTEM FORCED OUTAGE.

2/77	SYSTEM	74.5	69.7	70.0	59.6			672	575	400	

** PROBLEMS/SOLUTIONS/COMMENTS

THREE FORCED SCRUBBER OUTAGES WERE CAUSED BY HIGH DIFFERENTIAL PRESSURE PROBLEMS IN THE SCRUBBER TRAY AMMOUNTING TO 117 HOURS.

A 54 HOUR OUTAGE WAS REQUIRED TO CLEAN OUT A SODIUM CARBONATE LINE.

3/77	SYSTEM	43.5	51.6	51.6	43.5			744	627	324	

NEVADA POWER: REID GARDNER 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 RUBBER LINING IN THE SEPARATOR REQUIRED 167 HOURS OF DOWNTIME IN MARCH FOR CURING.

THE SCRUBBER FAN EXPANSION JOINT BLEW OUT CAUSING 225 HOURS OF OUTAGE TIME.

A 25 HOUR OUTAGE WAS REQUIRED TO CLEAN A PLUGGED TRAY.

A SCRUBBER LIMIT SWITCH TRIPPED THE SCRUBBER OFF FOR THREE HOURS DURING MARCH.

4/77	SYSTEM	85.8	84.6	85.5	83.3			720	709	600

** PROBLEMS/SOLUTIONS/COMMENTS

A HIGH TRAY DIFFERENTAL PRESSURE RESULTED IN 86 HOURS OF FGD SYSTEM DOWN TIME.

A PLUGGED STRAINER IN THE TRAY RECYCLE TANK OCCURRED CAUSING 16 HOURS OF OUTAGE TIME.

THE SCRUBBER WAS OFF LINE 18 HOURS FOR BOILER-RELATED PROBLEMS IN EARLY APRIL.

5/77	SYSTEM	62.8	26.3	97.7	16.6			744	470	124

** PROBLEMS/SOLUTIONS/COMMENTS

THE MODULE WAS UNAVAILABLE DURING THE FIRST THREE WEEKS OF THE MONTH BECAUSE OF A FORCED OUTAGE REQUIRED FOR THE REPLACEMENT OF THE FRP LINER IN THE SCRUBBER SEPARATOR SECTION. MOST OF THIS SCRUBBER OUTAGE TIME COINCIDED WITH A BOILER OUTAGE.

APPROXIMATELY 1.4 HOURS OF SCRUBBER OUTAGE TIME WERE REQUIRED TO REWIRE A REHEATER FAN CIRCUIT BREAKER.

REPAIR OF VENTURI DAMPER CONTROLS REQUIRED 1.5 HOURS OF SCRUBBER OUTAGE TIME.

6/77	SYSTEM	65.6	64.5	64.8	63.1			720	705	455

** PROBLEMS/SOLUTIONS/COMMENTS

HIGH TRAY DIFFERENTIAL PRESSURE READINGS RESULTED IN 192 HOURS OF SCRUBBER OUTAGE TIME TO MAKE CORRECTIONS.

A VENTURI RECYCLE LINE THROTTLE VALVE MALFUNCTIONED DURING JANUARY FORCING THE SCRUBBER OUT OF SERVICE 56 HOURS.

THE SCRUBBER WAS OUT OF SERVICE 18 HOURS BECAUSE OF BOILER-RELATED PROBLEMS.

7/77	SYSTEM	72.9	72.9	72.9	72.9			744	744	542

** PROBLEMS/SOLUTIONS/COMMENTS

PROBLEMS RELATED TO HIGH DIFFERENTIAL TRAY PRESSURE ACCOUNTED FOR 160 HOURS OF THE JULY SCRUBBER OUTAGE TIME.

REPAIRS TO A VENTURI DISCHARGE VALVE CONTRIBUTED 19 HOURS TO FGD SYSTEM OUTAGE TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
				SCRUBBER FAN VIBRATION PROBLEMS CAUSED 23 HOURS OF SCRUBBER OUTAGE TIME.							
8/77	SYSTEM	69.7	59.7	62.5	50.4			744	629	375	

** PROBLEMS/SOLUTIONS/COMMENTS

PROBLEMS RELATED TO HIGH DIFFERENTIAL PRESSURE READINGS AT THE SCRUBBER TRAY SECTION CONTINUED INTO EARLY AUGUST AND ACCOUNTED FOR 59 HOURS OF SCRUBBER OUTAGE TIME.

THE SCRUBBING SYSTEM WAS FORCED OUT OF SERVICE 147 HOURS IN AUGUST TO MAKE REPAIRS MADE NECESSARY BY A VENTURI RECYCLE LINE LEAK.

A SCRUBBER OUTLET HIGH TEMPERATURE FALSE ALARM CAUSED A 19 HOUR SYSTEM SHUTDOWN.

THE BOILER WAS OUT OF SERVICE FOR 144 HOURS DURING AUGUST.

9/77	SYSTEM	89.7	89.7	98.8	89.7			720	720	646	

** PROBLEMS/SOLUTIONS/COMMENTS

HIGH SOLIDS IN THE VENTURI RECYCLE SYSTEM CAUSED EIGHT HOURS OF SCRUBBER OUTAGE TIME IN SEPTEMBER.

NEW EFFLUENT AND POST NEUTRALIZATION LINES WERE INSTALLED DURING SEPTEMBER REQUIRING 66 HOURS OF SCHEDULED SCRUBBER OUTAGE TIME.

10/77	SYSTEM	99.4	90.0	99.0	61.2			744	506	455	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER WAS DOWN 284 HOURS DURING OCTOBER BECAUSE OF A SCHEDULED BOILER OUTAGE.

4.5 HOURS OF OUTAGE TIME OCCURRED AS A RESULT OF HIGH VIBRATION PROBLEMS ON A SCRUBBER FAN.

11/77	SYSTEM	88.8	88.0	88.6	86.7			720	710	624	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER WAS OUT OF SERVICE 80 HOURS FOR THE INSTALLATION OF AN OUTLET NOZZLE IN THE BOOSTER TANK.

THE BOILER WAS OUT OF SERVICE APPROXIMATELY 15 HOURS IN NOVEMBER.

12/77	SYSTEM	84.8	90.1	93.1	83.8			744	692	623	

** PROBLEMS/SOLUTIONS/COMMENTS

A FAULTY SYSTEM THERMOCOUPLE FORCED THE SCRUBBER OUT OF SERVICE 4.4 HOURS.

BOILER OUTAGE TIME AMOUNTED TO 75 HOURS IN DECEMBER.

THE INSTALLATION OF TRAY SPRAY STRAINER REQUIRED SOME SCRUBBER OUTAGE TIME.

THE FGD SYSTEM WAS OFF LINE TO INSTALL NEW SENSING LINES.

1/78	SYSTEM	99.5	99.5	99.5	99.5			744	744	740	

NEVADA POWER: REID GARDNER 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

A PLUGGED VENTURI NOZZLE RESULTED IN FOUR HOURS OF SCRUBBER OUTAGE TIME DURING JANUARY.

2/78	SYSTEM	95.5	95.0	95.1	87.5		672	619	588

** PROBLEMS/SOLUTIONS/COMMENTS

A 16 HOUR FGD SYSTEM OUTAGE DUE TO A HIGH VENTURI TEMPERATURE READING (CAUSED BY FAULTY WIRING) OCCURRED DURING FEBRUARY.

A MINOR 13 HOUR OUTAGE WAS NECESSARY TO CHECK THE VENTURI TEMPERATURE INDICATOR.

THE FGD SYSTEM WAS FORCED OUT OF SERVICE BY MIX TANK PLUGGING WHICH MADE IT IMPOSSIBLE TO MIX CHEMICALS IN LATE FEBRUARY.

3/78	SYSTEM	97.3	96.9	97.2	96.5		744	741	718

** PROBLEMS/SOLUTIONS/COMMENTS

THE MIX TANK PROBLEM WHICH BEGAN IN LATE FEBRUARY CONTINUED INTO MARCH CAUSING THE ONLY FGD DOWNTIME FOR THE MONTH. THE MIX TANK OUTAGE FOR BOTH MONTHS COMBINED TOTALLED 22 HOURS.

A FURNACE HIGH/LOW PRESSURE TRIP CAUSED A BOILER OUTAGE OF SIX HOURS.

4/78	SYSTEM	97.1	89.3	96.8	87.3		720	705	629

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN 21 HOURS FOR REPAIRS ON THE VENTURI EMERGENCY SPRAY SYSTEM.

THE BOILER WAS DOWN APPROXIMATELY 70 HOURS DURING APRIL FOR NON-SCRUBBER RELATED PROBLEMS.

5/78	SYSTEM	97.4	76.5	96.2	66.4		744	646	494

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WAS A SCHEDULED OUTAGE OF 230 HOURS FOR BOILER MAINTENANCE DURING MAY.

A 20 HOUR SCRUBBER FORCED OUTAGE RESULTED FROM A FAULTY TEMPERATURE PROBE AT THE VENTURI DURING MAY.

6/78	SYSTEM	95.9	95.6	95.9	95.2		720	715	686

** PROBLEMS/SOLUTIONS/COMMENTS

A HIGH/LOW FURNACE PRESSURE TRIP RESULTED IN A FIVE HOUR BOILER OUTAGE.

A 29 HOUR FGD SYSTEM OUTAGE OCCURRED WHEN THE FIRE SPRAY SYSTEM WAS OUT OF SERVICE.

7/78	SYSTEM	81.1	80.3	80.5	78.4		744	726	583

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
8/78	SYSTEM	98.2	97.1	98.2	97.1			744	744	722	

** PROBLEMS/SOLUTIONS/COMMENTS

LOW VENTURI FLOW CAUSED A 16 HOUR FGD OUTAGE. THIS WAS CORRECTED WHEN THE RACE TRACK SPRAY COLLAR AND NOZZLES WERE CLEANED.

A SCHEDULED OUTAGE TO CLEAN THE BOILER TURBINE LUBE OIL COOLERS OCCURRED DURING JULY TAKING THE SCRUBBER AND BOILER OUT OF SERVICE FOR 20 HOURS.

AN OUTAGE WAS REQUIRED FOR INSPECTION OF THE VENTURI TANK AND VENTURI RACE TRACK COLLAR. DURING THE OUTAGE THE TANK AND RACE TRACK NOZZLES WERE CLEANED AND THE RUBBER LINING ON THE VENTURI SPOOL WAS REPLACED.

A 36 HOUR SCRUBBER OUTAGE WAS REQUIRED TO CLEAN THE VENTURI RACE TRACK SPRAY COLLAR.

9/78	SYSTEM	100.0	96.4	100.0	31.6			720	236	228	

** PROBLEMS/SOLUTIONS/COMMENTS

ONE EIGHT HOUR FORCED BOILER OUTAGE OCCURRED DUE TO HIGH FURNACE PRESSURE READING.

THE SCRUBBER WAS FORCED OFF LINE ON AUGUST 28 DUE TO HIGH SCRUBBER FAN OUTLET PRESSURE FOR APPROXIMATELY NINE HOURS. THE SCRUBBER PRESSURE SENSING LINE WAS CLEANED.

ON AUGUST 29 THE SCRUBBER EFFLUENT SOLIDS LEVEL WAS HIGH CAUSING AN OUTAGE OF APPROXIMATELY FIVE HOURS. THE SYSTEM WAS FLUSHED TO CORRECT THE PROBLEM.

10/78	SYSTEM	100.0			.0			744	0	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS TAKEN OUT OF SERVICE ON SEPTEMBER 10 FOR A TURBINE OVERHAUL WHICH LASTED THROUGH THE END OF THE MONTH.

11/78	SYSTEM	98.4	92.6	97.6	66.3			720	515	477	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN THE ENTIRE MONTH OF OCTOBER AS THE TURBINE OVERHAUL CONTINUED.

12/78	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO FGD SYSTEM OUTAGES OCCURRED DURING DECEMBER.

1/79	SYSTEM	66.4	67.2	67.2	66.4			744	735	494	67.2

NEVADA POWER: REID GARDNER 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
2/79	SYSTEM	48.7	45.7	46.7	44.9			672	661	302	57.0

** PROBLEMS/SOLUTIONS/COMMENTS

95 HOURS OF SCRUBBER OUTAGE TIME WAS NECESSARY TO REPAIR A HOLE IN THE VENTURI BOX.

TWO FORCED OUTAGES OCCURRED BECAUSE OF A HIGH EFFLUENT SOLIDS LEVEL. THE RECYCLE SYSTEM WAS CLEANED. PROBLEMS WITH HIGH EFFLUENT SOLIDS ACCOUNTED FOR 154 HOURS OF OUTAGE TIME.

3/79	SYSTEM	100.0	97.9	100.0	32.3			744	246	241	63.1

** PROBLEMS/SOLUTIONS/COMMENTS

A STEAM LEAK IN THE SCRUBBER REHEATER COIL RESULTED IN A 54 HOUR SCRUBBER OUTAGE.

THE FGD SYSTEM WAS OFF FOR A FEW HOURS TO REPAIR A LEAK IN THE VENTURI LINE.

THE SCRUBBER WAS OUT OF SERVICE 139 HOURS TO REPAIR LEAKS IN EFFLUENT AND VENTURI LINES.

THE SCRUBBER WAS OFF WITH THE BOILER BECAUSE OF A HIGH FURNACE PRESSURE BOILER TRIP.

THE VENTURI RACE TRACK NOZZLES WERE CLEANED DURING THE 25 HOUR FEBRUARY BOILER OUTAGE.

REPAIRS RESULTING FROM A REHEATER FAN BURN UP ACCOUNTED FOR 151 HOURS OF THE FEBRUARY SCRUBBER OUTAGE TIME.

4/79	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	74.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER AND FGD SYSTEM WERE OFF-LINE FOR 39 HOURS SO THAT A BOILER ID FAN COULD BE REPAIRED AND BALANCED.

THE BOILER AND FGD SYSTEM WERE OFF-LINE 465 HOURS FOR SCHEDULED MAINTENANCE.

5/79	SYSTEM	98.8	97.7	97.7	97.5			744	742	725	79.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO SCRUBBER OUTAGES OCCURRED DURING APRIL.

6/79	SYSTEM	94.2	91.3	93.5	83.5			720	659	602	81.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER WAS INADVERTENTLY REMOVED FROM SERVICE. SINCE THE SCRUBBER WAS NOT OPERATING THE UTILITY TOOK THE OPPORTUNITY TO CLEAN THE SCRUBBER PRESSURE SENSING LINES. THE SYSTEM WAS OUT OF SERVICE FOR ABOUT 10 HOURS.

THE SCRUBBER PRESSURE SENSING LINES WERE CLEANED AGAIN AFTER A BOILER TRIP ON HIGH FURNACE PRESSURE. THIS OUTAGE LASTED ABOUT NINE HOURS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
7/79	SYSTEM	93.2	93.2	93.2	93.2			744	744	694	83.8

** PROBLEMS/SOLUTIONS/COMMENTS

77 HOURS OF BOILER OUTAGE TIME WAS REQUIRED DURING JUNE TO REPAIR A BOILER TUBE LEAK.

THE SCRUBBER WAS OUT OF SERVICE WHILE REPAIRS WERE MADE ON THE FIRE WATER EMERGENCY SPRAY SYSTEM.

8/79	SYSTEM	87.6	93.0	92.6	87.6			744	701	652	84.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE 3A VENTURI RECYCLE PUMP HAD A BAD PUMP CASING LEAK CAUSING ABOUT 50 HOURS OF OFF TIME.

THE 3B VENTURI PUMP WAS OUT OF SERVICE FOR MAINTENANCE.

9/79	SYSTEM	100.0	98.8	100.0	90.2			720	658	650	86.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER THE SCRUBBER WENT OFF LINE WITH THE BOILER TO REPAIR BOILER TUBE LEAKS.

10/79	SYSTEM	97.2	97.2	97.2	97.2			744	744	723	87.4

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER THE SCRUBBER WENT OFF LINE BECAUSE THERE WAS NO EMERGENCY SPRAY TO THE SCRUBBER. THE 2A LOAD CENTER WAS OUT FOR MAINTENANCE AND THERE WAS NO POWER TO OPERATE THE FIRE PUMP.

11/79	SYSTEM	100.0	98.7	100.0	80.4			720	587	579	88.0

** PROBLEMS/SOLUTIONS/COMMENTS

TWO OUTAGES OCCURRED DURING NOVEMBER DUE TO HIGH FURNACE PRESSURE CAUSING A BOILER TRIP. THE BOILER TRIP OUTAGES TOTALLED 32 HOURS.

THE SCRUBBER AND BOILER WERE TAKEN OFF LINE ON NOVEMBER 25 FOR SCHEDULED MAINTENANCE.

12/79	SYSTEM	86.6	72.4	74.8	39.7			744	408	295	87.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF FOR THE FIRST TWO WEEKS OF DECEMBER FOR SCHEDULED MAINTENANCE.

TWO SCRUBBER OUTAGES OCCURRED LATER IN THE MONTH DUE TO THE REHEATER BLOWER

NEVADA POWER: REID GARDNER 3 (CONT.)

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

MOTOR BURN OUTS. THESE OUTAGES TOTALLED 100 HOURS.

1/80	SYSTEM	100.0	99.8	100.0	91.4			744	681	680	99.7

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE SCRUBBER AND BOILER WERE OFF LINE FOR APPROXIMATELY 64 HOURS SO THAT THE BOILER ID FAN COULD BE REPAIRED AND BALANCED.

2/80	SYSTEM	100.0	98.1	100.0	77.9			696	552	542	99.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE BOILER AND SCRUBBER WERE OFF LINE ONCE AT THE BEGINNING AND ONCE AT THE END OF THE MONTH TO BALANCE THE BOILER ID FAN. BOILER ID FAN BALANCING ACCOUNTED FOR 121 HOURS OF THE SCRUBBER OUTAGE TIME.

THE SCRUBBER AND BOILER WERE TAKEN OFF LINE SO THAT COAL LEAKS ON THE BURNER LINES COULD BE REPAIRED.

HIGH FURNACE PRESSURE TRIPPED THE BOILER OFF LINE. THIS CAUSED THE SCRUBBER TO BE OFF LINE FOR SEVEN HOURS.

3/80	SYSTEM	100.0	99.6	100.0	60.3			744	450	448	99.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER AND SCRUBBER WERE TAKEN OFF-LINE TWICE DURING MARCH. THE FIRST OUTAGE WAS TO BALANCE THE BOILER ID FAN. LATER IN THE MONTH THE ID FANS AND THE ESPS HAD TO BE REPAIRED. THE BOILER OUTAGES KEPT THE SCRUBBER OFF-LINE 296 HOURS IN MARCH.

4/80	SYSTEM	100.0			.0			720	0	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS AVAILABLE 100% DURING APRIL, HOWEVER, DID NOT OPERATE DUE TO THE OVERHAUL OF BOTH THE DUST COLLECTOR AND THE ID FAN.

5/80	SYSTEM	.0	.0	.0	.0			744	462	0	77.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN THE ENTIRE MONTH FOR THE OVERHAUL OF THE FGD ID FANS. BECAUSE OF THIS, THE SYSTEM AVAILABILITY WAS ZERO FOR MAY.

6/80	SYSTEM	75.2	81.4	81.4	72.2			720	639	520	78.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE ID FAN OVERHAUL WAS COMPLETED EARLY IN JUNE.

THE BOILER WAS OUT OF SERVICE FOR 21 HOURS.

7/80	SYSTEM	95.7	96.4	95.7	95.2			744	735	721	82.6

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER RELATED OUTAGES KEPT THE FGD SYSTEM OFF LINE FOR SEVERAL HOURS.

A HIGH VENTURI OUTLET TEMPERATURE FORCED THE FGD SYSTEM OFF LINE DURING PART OF JULY.

A HIGH VENTURI OUTLET TEMPERATURE FORCED THE FGD SYSTEM OFF LINE DURING

NEVADA POWER: REID GARDNER 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
8/80	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	85.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS AVAILABLE DURING ALL OF AUGUST.

9/80	SYSTEM	96.8	96.8	96.8	96.8			720	720	697	87.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OUT OF SERVICE IN SEPTEMBER BECAUSE OF ROUTINE CLEANING AND MAINTENANCE.

10/80	SYSTEM	85.0	84.0	84.4	80.7			744	715	600	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS TAKEN OFF-LINE DURING THE BEGINNING OF OCTOBER DUE TO A SCHEDULED UNIT OUTAGE.

DURING THE MONTH TWO OUTAGES AMOUNTING TO 111 HOURS OF OUTAGE TIME WERE CAUSED BY PROBLEMS WITH THE REHEATER FAN MOTOR.

11/80	SYSTEM	94.8	100.0	94.8	94.8			720	682	682	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER A SHEARED PIN ON THE AIR PREHEATER COUPLING FORCED THE SYSTEM OUT OF SERVICE FOR APPROXIMATELY SEVEN HOURS.

PROBLEMS WITH A TUBE LEAK FORCED THE SYSTEM DOWN SO THAT NECESSARY REPAIRS COULD BE PERFORMED.

12/80	SYSTEM	100.0	95.7	99.5	71.4			744	531	531	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER THE SYSTEM WAS SHUTDOWN FOR A SCHEDULED OUTAGE WHICH LASTED APPROXIMATELY 210 HOURS.

1/81	SYSTEM	98.9	98.9	98.9	98.9			744	744	735	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE SYSTEM WAS SHUT DOWN APPROXIMATELY EIGHT HOURS TO REPAIR THE OUTLET DRAIN LINE AND TO UNPLUG THE VENTURI NOZZLES.

2/81	SYSTEM	100.0	100.0	100.0	100.0			672	672	672	

** PROBLEMS/SOLUTIONS/COMMENTS

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

3/81	SYSTEM	88.6	67.2	67.2	30.0			744	332	223	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE BOILER WAS OUT OF SERVICE APPROXIMATELY 403 HOURS DUE TO MAINTENANCE.

APPROXIMATELY 85 HOURS OF OUTAGE TIME WAS DUE TO THE CLEANING OF THE VENTURI NOZZLES AND THE TRAY SPRAY.

NEVADA POWER: REID GARDNER 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	100.0	99.7	99.7	94.2			720	680	678	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOILER WAS OUT OF SERVICE APPROXIMATELY 28 HOURS TO REMOVE BUILD UP ON PENDENTS.

5/81	SYSTEM	97.7	97.5	97.8	96.4			744	735	717	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE SYSTEM WAS OFF-LINE FOR APPROXIMATELY SEVEN HOURS TO REPAIR A LEAK IN THE VENTURI LINE.

THE VENTURI PUMP NEEDED REPAIR DURING THE MONTH CAUSING ADDITIONAL DOWN TIME.

PROBLEMS WERE ENCOUNTERED WITH A TEMPERATURE PROBE.

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	96.8	96.3	96.7	93.0			744	719	692	

** PROBLEMS/SOLUTIONS/COMMENTS

24 HOURS OF OUTAGE TIME WERE REQUIRED TO CLEAN THE VENTURI THROAT SPRAY HEADER (RACE TRACK). THE RACE TRACK WAS CLEANED TWICE DURING THE MONTH.

THE STACK WAS INSPECTED DURING JULY.

8/81	SYSTEM	97.9	97.9	97.9	97.9			744	744	728	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS OUT OF SERVICE FOR 16 HOURS DURING AUGUST TO CLEAN THE ABSORBER TRAY.

9/81	SYSTEM	100.0	98.2	100.0	75.0			720	550		

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE NO FGD-RELATED OUTAGES DURING THE MONTH OF SEPTEMBER.

10/81	SYSTEM	99.5	99.3	99.4	93.8			744	702	698	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER PROBLEMS WERE ENCOUNTERED WITH THE VENTURI EXPANSION JOINT. THIS ACCOUNTED FOR 4 HOURS OF DOWN TIME.

11/81	SYSTEM	97.8	97.8	97.8	97.8			720	720	703	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER HIGH TEMPERATURE IN THE VENTURI TRIPPED THE SYSTEM.

THE ABSORBER WAS FORCED OFF-LINE DUE TO BUILD-UP. APPROXIMATELY 11 HOURS OF DOWN TIME WAS NEEDED FOR CLEANING.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
12/81	SYSTEM	99.4	97.8	96.6	48.8			744	371	363	

** PROBLEMS/SOLUTIONS/COMMENTS

ON DECEMBER 6 THE UNIT WAS TAKEN OUT OF SERVICE FOR A SCHEDULED OVERHAUL. THE UNIT RETURNED TO SERVICE ON DECEMBER 22.

ON DECEMBER 28 THE FGD SYSTEM WAS SHUT DOWN TO REPAIR A VENTURI PUMP. THE OUTAGE LASTED APPROXIMATELY FIVE HOURS.

1/82	SYSTEM	98.2	96.3	98.4	86.0			744	664	640	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OUT OF SERVICE FOR APPROXIMATELY 13 HOURS TO CLEAN AN ABSORBER TRAY.

2/82	SYSTEM	98.6	97.5	98.5	87.1			672	600	585	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY APPROXIMATELY TWO HOURS OF SYSTEM DOWN TIME WAS DUE TO A LEAK IN THE ID FAN LUBE OIL SYSTEM.

HIGH TEMPERATURES IN THE VENTURI OUTLET FORCED THE SYSTEM OFF-LINE FOR ABOUT EIGHT HOURS.

THE BOILER WAS TAKEN OFF-LINE ON FEBRUARY 27 FOR A SCHEDULED OVERHAUL.

3/82	SYSTEM	100.0	90.6	90.6	30.9			744	254	230	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCHEDULED BOILER OVERHAUL CONTINUE UNTIL MARCH 18.

DURING MARCH NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

4/82	SYSTEM	91.1	91.0	91.0	90.9			720	719	655	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE SYSTEM WAS TAKEN OFF-LINE THREE TIMES DUE TO A FAULTY TEMPERATURE PROBE.

THE SYSTEM WAS FORCED OFF-LINE ONCE DUE TO A FAN HIGH VIBRATION.

5/82	SYSTEM	85.5	94.3	88.6	88.6			744	699	659	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS TAKEN OFF-LINE TWICE DURING MAY DUE TO HIGH ID FAN VIBRATION.

6/82	SYSTEM	100.0	97.5	97.6	95.6			720	706	688	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE THE FGD SYSTEM WAS OFF-LINE PART OF THE TIME TO CONNECT THE SEAL WATER LINES TO THE PUMPS.

7/82	SYSTEM	95.0	96.6	94.6	86.9			744	669	646	

NEVADA POWER: REID GARDNER 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
8/82	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER TUBE LEAKS ACCOUNTED FOR APPROXIMATELY 61 HOURS OF DOWN TIME FOR THE FGD SYSTEM DURING JULY.

CONTROL PROBLEMS WITH AN ID FAN RESULTED IN 4 HOURS OF OUTAGE TIME DURING THE MONTH.

A CLEANING OF THE ABSORBER SPRAY NOZZLE RACE TRACK ACCOUNTED FOR 10 HOURS OF DOWN TIME FOR THE SYSTEM.

REPAIRS ON THE ABSORBER TRAY TOWER SPRAY LINE RESULTED IN AN FGD SYSTEM OUTAGE DURING JULY.

A 20 HOUR OUTAGE RESULTED FROM A CLEANING OF THE ABSORBER TRAYS.

9/82	SYSTEM	94.9	97.8	94.9	94.9			720	699	683	

** PROBLEMS/SOLUTIONS/COMMENTS

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

10/82	SYSTEM	100.0	98.3	100.0	45.8			744	347	341	

** PROBLEMS/SOLUTIONS/COMMENTS

A CLEANING OF THE ABSORBER TRAYS ACCOUNTED FOR APPROXIMATELY 22 HOURS OF DOWN TIME DURING SEPTEMBER.

THE REPLACEMENT OF EFFLUENT SYSTEM VALVES ACCOUNTED FOR A 2 HOUR OUTAGE DURING THE MONTH.

EFFLUENT LINE REPAIRS RESULTED IN APPROXIMATELY 13 HOURS OF DOWN TIME DURING THE MONTH.

11/82	SYSTEM	96.2	63.9	75.8	12.0			720	135	86	

** PROBLEMS/SOLUTIONS/COMMENTS

ELECTRICAL PROBLEMS ACCOUNTED FOR APPROXIMATELY 30 HOURS OF DOWN TIME DURING THE MONTH.

THE UNIT WAS OUT OF SERVICE APPROXIMATELY 15 DAYS DURING OCTOBER FOR A SCHEDULED OVERHAUL.

12/82	SYSTEM	97.5	70.6	94.9	46.6			744	491	347	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OUT OF SERVICE FOR 66 HOURS DURING NOVEMBER FOR A SCHEDULED OVERHAUL.

BOILER TUBE LEAKS ACCOUNTED FOR APPROXIMATELY 23 DAYS OF OUTAGE TIME DURING NOVEMBER.

PROBLEMS WITH AN ID FAN CONTROL DAMPER RESULTED IN APPROXIMATELY 28 HOURS OF DOWN TIME FOR THE FGD SYSTEM.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		APPROXIMATELY 16 DAYS OF OUTAGE TIME DURING DECEMBER RESULTED FROM BOILER TUBE LEAKS.									
		PROBLEMS WITH ID FAN CONTROLS WERE EXPERIENCED DURING DECEMBER.									
1/83	SYSTEM	100.0	98.2	100.0	41.8			744	317	311	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ALL OUTAGE TIME DURING JANUARY WAS DUE TO BOILER TUBE LEAKS.									
2/83	SYSTEM	98.1	98.3	98.1	96.5			672	660	649	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		APPROXIMATELY 13 HOURS OF DOWN TIME WAS REQUIRED FOR THE BALANCING OF AN ID FAN.									
		BOILER-RELATED PROBLEMS ACCOUNTED FOR APPROXIMATELY 11 HOURS OF OUTAGE TIME DURING FEBRUARY.									
3/83	SYSTEM	100.0	98.2	100.0	85.5			744	648	636	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BOILER-RELATED PROBLEMS ACCOUNTED FOR APPROXIMATELY 12 HOURS OF DOWN TIME DURING MARCH.									
		THE UNIT WAS OUT OF SERVICE 4 DAYS DURING MARCH FOR A SCHEDULED OVERHAUL.									
4/83	SYSTEM	91.8	86.8	88.0	59.8			720	496	430	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OUT OF SERVICE FOR APPROXIMATELY 202 HOURS DURING THE MONTH FOR A SCHEDULED OVERHAUL.									
		THE UNIT WAS DOWN FOR 29 HOURS IN APRIL TO CHECK FOR I.D. FAN VIBRATIONS.									
		MAINTENANCE ON THE SCRUBBER EFFLUENT SYSTEM ACCOUNTED FOR 34 HOURS OF OUTAGE TIME IN APRIL.									
		A HIGH SOLIDS CONCENTRATION IN THE SCRUBBER FORCED THE UNIT OUT OF SERVICE FOR APPROXIMATELY 25 HOURS DURING THE MONTH.									
5/83	SYSTEM	98.5	97.3	98.4	96.9			744	741	721	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BOILER-RELATED PROBLEMS ACCOUNTED FOR APPROXIMATELY 12 HOURS OF OUTAGE TIME DURING THE MONTH.									
		A FAULTY VENTURI TEMPERATURE PROBE ACCOUNTED FOR APPROXIMATELY 12 HOURS OF OUTAGE TIME IN MAY.									
6/83	SYSTEM	95.8	94.1	94.3	69.6			720	533	501	

NEVADA POWER: REID GARDNER 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

A FAULTY TEMPERATURE PROBE ACCOUNTED FOR APPROXIMATELY 16 HOURS OF OUTAGE TIME IN JUNE.

A FAULTY DAMPER FORCED THE UNIT OUT OF SERVICE IN JUNE FOR 30 HOURS.

HIGH FURNACE PRESSURE RESULTED IN 11 HOURS OF UNIT DOWN TIME DURING THE MONTH.

THE UNIT WAS OUT OF SERVICE APPROXIMATELY 163 HOURS DURING JUNE DUE TO A LACK OF POWER DEMAND.

7/83	SYSTEM	96.0	96.7	95.6	87.0		744	670	647	

** PROBLEMS/SOLUTIONS/COMMENTS

APPROXIMATELY 64 HOURS OF OUTAGE TIME DURING JULY WAS DUE TO A LACK OF POWER DEMAND.

A LOSS OF VENTURI FLOW ACCOUNTED FOR APPROXIMATELY 18 HOURS OF DOWN TIME DURING THE MONTH.

A 12 HOUR OUTAGE DURING THE MONTH WAS REQUIRED TO CLEAN A VENTURI TANK.

A 3 HOUR OUTAGE OCCURRED DURING JULY DUE TO A BOILER PROBLEM.

8/83	SYSTEM	100.0	99.6	100.0	84.4		744	631	628	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER-RELATED OUTAGES ACCOUNTED FOR APPROXIMATELY 53 HOURS OF DOWN TIME DURING AUGUST.

THE UNIT WAS DOWN APPROXIMATELY 64 HOURS DURING AUGUST DUE TO A LACK OF POWER DEMAND.

9/83	SYSTEM	100.0	100.0	100.0	62.0		720	447	447	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER TUBE LEAKS ACCOUNTED FOR APPROXIMATELY 175 HOURS OF DOWN TIME DURING SEPTEMBER.

THE UNIT WAS DOWN APPROXIMATELY 79 HOURS DURING SEPTEMBER BECAUSE OF LOW POWER DEMAND.

10/83	SYSTEM	100.0	100.0	100.0	100.0		744	744	744	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED OUTAGES WERE ENCOUNTERED DURING OCTOBER 1983.

11/83	SYSTEM	100.0	100.0	100.0	82.7		720	595	595	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER RELATED PROBLEMS ACCOUNTED FOR APPROXIMATELY 52 HOURS OF DOWN TIME DURING NOVEMBER.

THE UTILITY REPORTED A SCHEDULED OUTAGE BEGINNING ON NOVEMBER 27 AND CONTINUING THROUGH THE END OF THE MONTH.

12/83	SYSTEM	100.0	100.0	100.0	66.0		744	491	491	

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN APPROXIMATELY 228 HOURS DURING THE MONTH FOR A SCHEDULED OUTAGE.

BOILER RELATED PROBLEMS ACCOUNTED FOR APPROXIMATELY 3 HOURS OF OUTAGE TIME DURING THE MONTH.

THE UNIT WAS DOWN APPROXIMATELY 22 HOURS DURING DECEMBER DUE TO LOW DEMAND.

1/84	SYSTEM	100.0	99.7	100.0	99.7			744	744	742	

** PROBLEMS/SOLUTIONS/COMMENTS

DUE TO A BOILER OUTAGE, THE FGD SYSTEM WAD DOWN 2.3 HOURS DURING JANUARY.

2/84	SYSTEM	100.0	100.0	100.0	100.0			696	696	696	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING FEBRUARY.

3/84	SYSTEM	100.0	100.0	100.0	98.3			744	731	731	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN APPROXIMATELY 13 HOURS DURING MARCH DUE TO A LACK OF POWER DEMAND.

4/84	SYSTEM	100.0	99.8	100.0	90.2			720	651	650	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN APPROXIMATELY 70 HOURS IN APRIL DUE TO BOILER OUTAGES.

5/84	SYSTEM	100.0	100.0	100.0	70.1			744	521	521	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF LINE APPROXIMATELY 223 HOURS IN MAY DUE TO A SCHEDULED BOILER OUTAGE.

6/84	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JUNE.

7/84	SYSTEM	96.1	96.0	96.0	95.6			744	741	711	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS SHUT DOWN APPROXIMATELY 4 HOURS TO INSPECT AN ABSORBER TRAY.

DURING JULY, THE FGD SYSTEM WAS DOWN 5.5 HOURS TO CLEAN THE EFFLUENT SYSTEM.

A 3.1 HOUR FGD SYSTEM OUTAGE OCCURRED IN JULY DUE TO FAN RELATED PROBLEMS.

A FORCED OUTAGE LASTING APPROXIMATELY 7 HOURS OCCURRED DURING JULY DUE TO

NEVADA POWER: REID GARDNER 3 (CONT.)

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

VENTURI SCRUBBER RELATED PROBLEMS.

THE FGD SYSTEM WAS OFF LINE 3.7 HOURS DURING JULY TO REPLACE THE 3B VENTURI MOTOR.

ABSORBER TRAY AND VENTURI SPRAY NOZZLE CLEANING RESULTED IN APPROXIMATELY 7 HOURS OF DOWN TIME DURING JULY.

THE UNIT WAS DOWN APPROXIMATELY 4 HOURS IN JULY DUE TO BOILER RELATED PROBLEMS.

8/84	SYSTEM	100.0	99.6	100.0	97.2			744	726	724	

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 3 WAS DOWN FOR 21 HOURS IN AUGUST DUE TO BOILER RELATED PROBLEMS. PROBLEMS.

9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR SEPTEMBER 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NEVADA POWER	
PLANT NAME	REID GARDNER	
UNIT NUMBER	4	
CITY	MOAPA	
STATE	NEVADA	
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	580	
GROSS UNIT GENERATING CAPACITY - MW	295	
NET UNIT GENERATING CAPACITY W/FGD - MW	250	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	250	

** 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	152.	(500 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	26749.	(11500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	8.00	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	.75	
RANGE SULFUR CONTENT - %	0.5-1.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	

*** PARTICLE CONTROL

** FABRIC FILTER

NUMBER	1
SUPPLIER	CARBORUNDUM

** 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	SODIUM CARBONATE
SYSTEM SUPPLIER	THYSSEN/CEA
A-E FIRM	FLUOR - PIONEER
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	85.00
CURRENT STATUS	1
COMMERCIAL START-UP	7/83
INITIAL START-UP	6/83

NEVADA POWER: REID GARDNER 4 (CONT.)

CONTRACT AWARDED	12/81

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NA
CONSTRUCTION MATERIAL SPECIFIC TYPE	NA

** ABSORBER

NUMBER	3
NUMBER OF SPARES	1
GENERIC TYPE	SPRAY TOWER
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY
TRADE NAME/COMMON TYPE	N/A
SHELL GENERIC MATERIAL	NA
SHELL SPECIFIC MATERIAL	NA
SHELL MATERIAL TRADE NAME/COMMON TYPE	NA
LINER GENERIC MATERIAL	NA
LINER SPECIFIC MATERIAL	NA
LINER MATERIAL TRADE NAME/COMMON TYPE	NA
GAS CONTACTING DEVICE TYPE	NONE

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	NA
GENERIC TYPE	NA
SPECIFIC TYPE	NA
TRADE NAME/COMMON TYPE	NA
CONSTRUCTION MATERIAL GENERIC TYPE	NA
CONSTRUCTION MATERIAL SPECIFIC TYPE	NA

** REHEATER

NUMBER	1
GENERIC TYPE	INDIRECT HOT AIR
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE
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	NA
GENERIC TYPE	NA
SPECIFIC TYPE	NA
CONSTRUCTION MATERIAL GENERIC TYPE	NA
CONSTRUCTION MATERIAL SPECIFIC TYPE	NA
LINER GENERIC MATERIAL TYPE	NA
LINER SPECIFIC MATERIAL TYPE	NA

** DUCTWORK

SHELL GENERIC MATERIAL TYPE	NA
SHELL SPECIFIC MATERIAL TYPE	NA
LINER GENERIC MATERIAL TYPE	NA
LINER SPECIFIC MATERIAL TYPE	NA

** REAGENT PREPARATION EQUIPMENT

FUNCTION	NA
DEVICE	NA
DEVICE TYPE	NA

** PUMPS

SERVICE	NUMBER
---	---
NA	****

NEVADA POWER: REID GARDNER 4 (CONT.)

** SOLIDS CONCENTRATING/DEWATERING
DEVICE NA

*** SLUDGE

** TREATMENT
METHOD NA
DEVICE NA
PROPRIETARY PROCESS NA

** DISPOSAL
NATURE FINAL
TYPE POND
LOCATION ON-SITE
SITE TREATMENT CLAY LINING

** WATER BALANCE
WATER LOOP TYPE OPEN

PERFORMANCE DATA

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM COMMENCED OPERATION IN JUNE AND IS CURRENTLY IN THE STARTUP PHASE OF OPERATION.

7/83	SYSTEM	95.8	14.3	73.3	11.6			744	606	87	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN APPROXIMATELY 626 HOURS DURING JULY DUE TO BOILER-RELATED PROBLEMS.

BYPASS DAMPER PROBLEMS ACCOUNTED FOR 32 HOURS OF OUTAGE TIME DURING THE MONTH.

8/83	SYSTEM	50.2	56.9	48.5	46.8			744	612	348	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN APPROXIMATELY 15 DAYS DURING AUGUST DUE TO BYPASS DAMPER PROBLEMS.

APPROXIMATELY 25 HOURS OF OUTAGE TIME DURING THE MONTH RESULTED FROM BOILER PROBLEMS.

9/83	SYSTEM	100.0	92.1	100.0	48.9			720	382	352	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER RELATED PROBLEMS AND SCHEDULED BOILER OVERHAUL ACCOUNTED FOR APPROXIMATELY 368 HOURS OF DOWN TIME DURING SEPTEMBER.

10/83	SYSTEM	99.6	95.2	98.9	35.4			744	277	264	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OUT OF SERVICE APPROXIMATELY 20 DAYS DURING OCTOBER FOR CONTINUATION OF THE SCHEDULED OUTAGE.

ADDITIONAL BOILER RELATED PROBLEMS ACCOUNTED FOR 14 HOURS OF DOWN TIME

NEVADA POWER: REID GARDNER 4 (CONT.)

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

DURING THE MONTH.

FAN PROBLEMS ACCOUNTED FOR 3 HOURS OF FGD SYSTEM DOWN TIME DURING THE MONTH

11/83	SYSTEM	100.0	98.2	100.0	96.5			720	707	695	

** PROBLEMS/SOLUTIONS/COMMENTS

APPROXIMATELY 26 HOURS OF OUTAGE TIME DURING NOVEMBER WAS DUE TO BOILER-TRIPS.

12/83	SYSTEM	99.9	99.2	99.9	98.2			744	737	731	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER RELATED PROBLEMS ACCOUNTED FOR APPROXIMATELY 12 HOURS OF DOWN TIME DURING DECEMBER.

ELECTRICAL PROBLEMS ACCOUNTED FOR A BRIEF 1 HOUR OUTAGE OF THE ABSORBER DURING DECEMBER.

1/84	SYSTEM	100.0	99.1	100.0	97.9			744	735	729	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN 2.3 HOURS DURING JANUARY DUE TO BOILER OUTAGES.

2/84	SYSTEM	99.6	99.2	99.5	82.7			696	581	576	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS DOWN APPROXIMATELY 3 HOURS DUE TO THE HIGH INLET TEMPERATURES OF MODULE A'S ABSORBERS.

THE FGD SYSTEM WAS DOWN APPROXIMATELY 117 HOURS IN FEBRUARY DUE TO BOILER PROBLEMS.

3/84	SYSTEM	100.0	99.0	99.9	51.0			744	383	380	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS SHUT DOWN FOR APPROXIMATELY 364 HOURS DURING MARCH DUE TO BOILER OUTAGES.

THE FGD SYSTEM WAS DOWN 0.3 HOURS DURING MARCH DUE TO BYPASS DAMPER PROBLEMS.

4/84	SYSTEM	99.9	100.0	99.8	84.1			720	606	606	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN 1 HOUR DURING APRIL DUE TO ELECTRICAL PROBLEMS.

5/84	SYSTEM	99.9	53.9	99.7	47.0			744	648	349	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF LINE FOR 393.5 HOURS DURING MAY DUE TO BOILER-RELATED PROBLEMS.

MODULES B AND C WERE FORCED OFF LINE ONE HOUR DURING MAY DUE TO LACK OF SOOT BLOWERS AND A RESULTING TRIP ON HIGH TEMPERATURES.

6/84	SYSTEM	99.9	99.5	99.9	95.1			720	688	685	

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN APPROXIMATELY 35 HOURS DUE TO BOILER RELATED PROBLEMS DURING JUNE.									
		AN ABSORBER TRIP DUE TO BAGHOUSE PROBLEMS LASTED APPROXIMATELY ONE-HALF HOUR DURING JUNE.									
7/84	SYSTEM	100.0	100.0	100.0	95.7			744	712	712	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN APPROXIMATELY 32 HOURS IN JULY DUE TO BOILER OUTAGES.									
8/84	SYSTEM	82.5	88.1	82.0	80.0			744	676	595	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING AUGUST, THE UNIT WAS DOWN 13.5 HOURS DUE TO BOILER RELATED PROBLEMS.									
		THE UNIT WAS DOWN 61 HOURS DURING AUGUST FOR MAINTENANCE ON ABSORBERS AND BURNERS.									
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR SEPTEMBER 1984.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NEW YORK STATE ELEC & GAS	
PLANT NAME	SOMERSET	
UNIT NUMBER	1	
CITY	SOMERSET	
STATE	NEW YORK	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	13.	(.030 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	850	
GROSS UNIT GENERATING CAPACITY - MW	625	
NET UNIT GENERATING CAPACITY W/FGD - MW	625	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	625	
** 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	1350.96	(2862800 ACFM)
BOILER FLUE GAS TEMPERATURE - C	156.1	(313 F)
STACK HEIGHT - M	137.	(450 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	7.6	(25.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	27912.	(12000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10500-12500
AVERAGE ASH CONTENT - %	12.00	
RANGE ASH CONTENT - %	10.0-22.0	
AVERAGE MOISTURE CONTENT - %	5.80	
RANGE MOISTURE CONTENT - %	6.0-10.0	
AVERAGE SULFUR CONTENT - %	2.70	
RANGE SULFUR CONTENT - %	2.0-3.0	
AVERAGE CHLORIDE CONTENT - %	.15	
RANGE CHLORIDE CONTENT - %	0.07-0.15	
*** PARTICLE CONTROL		
** ESP		
NUMBER	2	
TYPE	COLD SIDE	
PRESSURE DROP - KPA	.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	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS	
A-E FIRM	UNITED ENGINEERS & CONSTRUCTORS	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.77	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00	

NEW YORK STATE ELEC & GAS: SOMERSET 1 (CONT.)

CURRENT STATUS	1
COMMERCIAL START-UP	8/84
INITIAL START-UP	7/84
CONTRACT AWARDED	2/82

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NA
CONSTRUCTION MATERIAL SPECIFIC TYPE	NA

** ABSORBER

NUMBER	6	
NUMBER OF SPARES	2	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	PEABODY PROCESS SYSTEMS	
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 [ABSORBER BOTTOM &	
LINER MATERIAL TRADE NAME/COMMON TYPE	FLAKELINE 103; BLACK NATURAL RUBBER	
LIQUID RECIRCULATION RATE - LITER/S	2929.	(46500 GPM)
L/G RATIO - L/CU.M	8.7	(65.0 GAL/1000 ACF)
INLET GAS FLOW - CU. M/S	337.74	(715700 ACFM)
INLET GAS TEMPERATURE - C	156.1	(313 F)

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	NA
GENERIC TYPE	NA
SPECIFIC TYPE	NA
TRADE NAME/COMMON TYPE	NA
CONSTRUCTION MATERIAL GENERIC TYPE	NA
CONSTRUCTION MATERIAL SPECIFIC TYPE	NA

** REHEATER

NUMBER	1	
GENERIC TYPE	IN-LINE	
SPECIFIC TYPE	STEAM	
TRADE NAME/COMMON TYPE	NA	
TEMPERATURE INCREASE - C	27.8	(50 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NA	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NA	

** FANS

NUMBER	4
NUMBER OF SPARES	0
DESIGN	NR
FUNCTION	UNIT
APPLICATION	NR
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	NR

** DAMPERS

FUNCTION	NA
GENERIC TYPE	NA
SPECIFIC TYPE	NA
CONSTRUCTION MATERIAL GENERIC TYPE	NA
CONSTRUCTION MATERIAL SPECIFIC TYPE	NA
LINER GENERIC MATERIAL TYPE	NA
LINER SPECIFIC MATERIAL TYPE	NA

** DUCTWORK

SHELL GENERIC MATERIAL TYPE	NA
SHELL SPECIFIC MATERIAL TYPE	NA
LINER GENERIC MATERIAL TYPE	NA
LINER SPECIFIC MATERIAL TYPE	NA

NEW YORK STATE ELEC & GAS: SOMERSET 1 (CONT.)

** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	NR
DEVICE TYPE	NR
** TANKS	
SERVICE	NUMBER
---	---
ABSORBER RECYCLE	6
** PUMPS	
SERVICE	NUMBER
---	---
NA	****
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	VACUUM FILTER
*** SLUDGE	
** TREATMENT	
METHOD	STABILIZATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	N/A
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	NONE
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
SOURCE OF MAKEUP WATER	LAKE WATER & RECYCLE PLANT WASTE WATER

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT INITIAL OPERATION OF THE FGD SYSTEM AT SOMERSET 1 COMMENCED IN JULY 1984. COMMERCIAL START UP TOOK PLACE IN EARLY AUGUST. SINCE START UP, THE FGD SYSTEM HAS BEEN THROUGH THE EARLY SHAKEDOWN/DEBUGGING PHASE OF OPERATION.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NIAGARA MOHAWK POWER	
PLANT NAME	CHARLES R. HUNTLEY	
UNIT NUMBER	66	
CITY	BUFFALO	
STATE	NEW YORK	
REGULATORY CLASSIFICATION	E	
PARTICULATE EMISSION LIMITATION - NG/J	73.	(.170 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	602.	(1.400 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	*****	
GROSS UNIT GENERATING CAPACITY - MW	100	
NET UNIT GENERATING CAPACITY W/FGD - MW	95	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	100	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	CYCLING	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	188.76	(400000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	160.0	(320 F)
STACK HEIGHT - M	61.	(200 FT)
STACK SHELL	CARBON STEEL	
STACK TOP DIAMETER - M	3.7	(12.2 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	29075.	(12500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	7.03	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	1.80	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	.70	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	16	
TYPE	CYCLONE	
SUPPLIER	ATOMICS INTERNATIONAL	
** ESP		
NUMBER	1	
TYPE	COLD SIDE	
SUPPLIER	WESTERN PREC. DIVISION, JOY	
INLET FLUE GAS CAPACITY - CU.M/S	235.9	(500000 ACFM)
INLET FLUE GAS TEMPERATURE - C	154.4	(310 F)
** 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	SALEABLE PRODUCT	
SO2 REMOVAL MODE	SPRAY DRYING	
PROCESS TYPE	AQUEOUS CARBONATE/SPRAY DRYING	
SYSTEM SUPPLIER	ROCKWELL INTERNATIONAL	
A-E FIRM	UNITED ENGINEERS & CONSTRUCTORS	
DEVELOPMENT LEVEL	DEMONSTRATION	

NIAGARA MOHAWK POWER: CHARLES R. HUNTLEY 66 (CONT.)

NEW/RETROFIT	RETROFIT	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	87.50	
CURRENT STATUS	1	
COMMERCIAL START-UP	8/82	
INITIAL START-UP	4/82	
CONTRACT AWARDED	1/77	
** DESIGN AND OPERATING PARAMETERS		
OPER. & MAINT. REQUIREMENT - MANHR/DAY	840.0	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	1	
NUMBER OF SPARES	0	
GENERIC TYPE	SPRAY DRYER	
SPECIFIC TYPE	COUNTERCURRENT	
TRADE NAME/COMMON TYPE	ROTARY ATOMIZER	
SUPPLIER	ROCKWELL INTERNATIONAL	
DIMENSIONS - FT	42.0 DIA X 60.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	ASTM A-36	
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
LINER MATERIAL TRADE NAME/COMMON TYPE	N/A	
NUMBER OF CONTACTING ZONES	3	
L/G RATIO - L/CU.M	.0	(.2 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.7	(3.0 IN-H2O)
INLET GAS TEMPERATURE - C	162.8	(325 F)
SO2 REMOVAL EFFICIENCY - %	85.3	
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	DIRECT COMBUSTION	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** FANS		
NUMBER	1	
NUMBER OF SPARES	0	
DESIGN	NR	
SUPPLIER	BUFFALO FORGE	
FUNCTION	NR	
APPLICATION	NR	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	202.92	(430000 ACFM)
FLUE GAS TEMPERATURE - C	76.7	(170 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
** 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	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK
** PUMPS	
SERVICE	NUMBER
---	---
NR	****
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	CENTRIFUGE
*** SALEABLE BYPRODUCTS	
NATURE	ELEMENTAL SULFUR
FULL LOAD QUANTITY - M T/H	.54 (.60 TPH)
QUALITY - %	99.9
DISPOSITION	MARKETED
*** SLUDGE	
** TREATMENT	
METHOD	N/A
DEVICE	N/A
PROPRIETARY PROCESS	N/A
** DISPOSAL	
NATURE	N/A
TYPE	NONE
** PROCESS CONTROL AND INSTRUMENTATION	
PHYSICAL VARIABLES	SO2 & TEMP
MONITOR LOCATION	STACK
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK
** WATER BALANCE	
WATER LOOP TYPE	OPEN
EVAPORATION WATER LOSS - LITER/S	7.2 (114 GPM)
MAKEUP WATER ADDITION - LITERS/S	7.6 (121 GPM)
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/82	SYSTEM							720			

NIAGARA MOHAWK POWER: CHARLES R. HUNTLEY 66 (CONT.)

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

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL FGD OPERATIONS BEGAN AT THIS FACILITY DURING APRIL 1982.

5/82	SYSTEM	744
6/82	SYSTEM	720

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM COMMENCED OPERATION IN APRIL AND IS CURRENTLY IN THE STARTUP PHASE OF OPERATION. SOME MODIFICATIONS ARE BEING PERFORMED ON THE CLEANING FACILITY AND THE UTILITY IS PREPARING TO START UP THE REGENERATIVE SYSTEM.

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	720
4/83	SYSTEM	720
5/83	SYSTEM	744
6/83	SYSTEM	720

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM IS STILL IN THE STARTUP PHASE OF OPERATION. THE LONGEST NON-INTEGRATED RUN ACHIEVED BY THE FGD SYSTEM WAS FOR THREE WEEKS DURING THE MONTH OF JUNE. SINCE INITIAL STARTUP IN APRIL, 1982, THE DEMONSTRATION UNIT HAS ONLY ONCE MET COMPLIANCE BY OPERATING 24 CONTINUOUS HOURS AS A TOTAL INTEGRATED SYSTEM. ONCE THE SYSTEM HAS OBTAINED 330 DAYS OF COMPLIANCE OPERATION, THE UTILITY PLANS TO DISMANTLE THE SYSTEM AND AGAIN BURN LOW SULFUR COAL AS A COMPLIANCE STRATEGY.

REPAIRS WERE MADE TO THE ROTARY ATOMIZER MOTORS. IMPROPER ATOMIZATION WAS REPORTED AS THE REASON FOR THE REPAIRS.

REPAIRS WERE ALSO REQUIRED ON THE REDUCER PNEUMATIC CONVEYOR SYSTEM BECAUSE OF PLUGGING AND DUSTING PROBLEMS.

THE UTILITY REPORTED THAT IT EXPERIENCED PROBLEMS WITH THE CARBONATION TRAY WASH SYSTEM.

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

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 DRY SCRUBBER AND THE SULFUR BYPRODUCT RECOVERY PORTIONS OF THE FGD SYSTEM ARE FOR THE MOST PART MEETING COMPLIANCE LEVELS. MINOR PROBLEMS EXPERIENCED DURING THE THIRD QUARTER INCLUDED NOZZLE EROSION AND PNEUMATIC PUMP SEALS LEAKING.

THE SILICON CARBIDE NOZZLE INSERTS LOCATED IN THE ROTARY ATOMIZER HAVE BEEN ERODING (NOZZLE DIAMETER GRADUALLY ENLARGES). THE SUPPLIER IS PRESENTLY STUDYING THE PROBLEM.

REPAIRS WERE MADE TO THE PNEUMATIC SOLID FEED SYSTEM WHICH TRANSPORTS SPENT SLURRY FROM A STORAGE SILO TO THE MOLTEN SALT REDUCER. THE PNEUMATIC LINES WERE ENLARGED TO DECREASE BACK PRESSURE ON THE PUMP SEALS. THIS HELPS CORRECT THE LEAKING PROBLEM.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS OFF-LINE FOR APPROXIMATELY 10 DAYS IN DECEMBER TO REPAIR A BREAK IN THE REDUCER OFF-GAS PIPELINE. THIS LINE CARRIES CO2 GAS FROM THE REDUCER TO THE CARBONATION COLUMN WHICH IS PART OF THE NA2CO3 REGENERATION SYSTEM. VIBRATION PROBLEMS WERE ALSO EXPERIENCED WITH THE REDUCER FAN DUE TO MATERIAL BUILD-UP.

THE UTILITY REPORTED BRINGING THE FGD SYSTEM BACK TO OPERATION COMPLIANCE LEVELS BY YEAR'S END.

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 PROBLEMS WITH THE MOLTEN SALT REDUCER VESSEL REFRACTORY. THE FGD SYSTEM HAS BEEN ON STANDBY SINCE LATE JANUARY, 1984 WITH NO FURTHER TESTING SCHEDULED UNTIL THESE PROBLEMS ARE RESOLVED AND A DECISION IS MADE REGARDING A COURSE OF ACTION.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NORTHERN INDIANA PUB SERVICE	
PLANT NAME	SCHAHFER	
UNIT NUMBER	17	
CITY	WHEATFIELD	
STATE	INDIANA	
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	*****	
GROSS UNIT GENERATING CAPACITY - MW	391	
NET UNIT GENERATING CAPACITY W/FGD - MW	388	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	391	

** 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	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25353.	(10900 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10500-11600
AVERAGE ASH CONTENT - %	10.34	
RANGE ASH CONTENT - %	7.8-13.9	
AVERAGE MOISTURE CONTENT - %	11.25	
RANGE MOISTURE CONTENT - %	9.7-13.1	
AVERAGE SULFUR CONTENT - %	3.20	
RANGE SULFUR CONTENT - %	2.6-3.6	
AVERAGE CHLORIDE CONTENT - %	.02	
RANGE CHLORIDE CONTENT - %	0.01-0.02	

*** PARTICLE CONTROL

** ESP

NUMBER	1
NUMBER OF SPARES	0
TYPE	COLD SIDE
SUPPLIER	CARBORUNDUM ENVIRONMENTAL SYSTEMS

** 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	DUAL ALKALI
SYSTEM SUPPLIER	FMC
A-E FIRM	SARGENT & LUNDY
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00
CURRENT STATUS	1
COMMERCIAL START-UP	6/83
INITIAL START-UP	4/83
CONTRACT AWARDED	12/79

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** ABSORBER	
NUMBER	4
NUMBER OF SPARES	1
GENERIC TYPE	IMPINGEMENT TOWER
SPECIFIC TYPE	FIXED BAFFLE
TRADE NAME/COMMON TYPE	DISC CONTACTOR
SUPPLIER	FMC
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	FULL DIAMETER CONE-SPLASH RING CASCADES
NUMBER OF CONTACTING ZONES	3
** 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	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** FANS	
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
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR

NORTHERN INDIANA PUB SERVICE: SCHAHFER 17 (CONT.)

** PUMPS

SERVICE	NUMBER
NA	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	2

*** SLUDGE

** TREATMENT

METHOD	DEWATERED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	UNDECIDED
SITE TREATMENT	NR

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM COMMENCED OPERATION IN APRIL AND IS CURRENTLY IN THE STARTUP PHASE OF OPERATION.

7/83	SYSTEM	100.0	100.0	100.0	49.0			744	364	365	28.8
8/83	SYSTEM	100.0	100.0	100.0	31.2			744	232	232	19.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JULY AND AUGUST.

9/83	SYSTEM	100.0	100.0	100.0	15.1			720	109	109	10.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM EXPERIENCED BOILER-RELATED PROBLEMS DURING SEPTEMBER.

10/83	SYSTEM	100.0			.0			744	0	0	.0
11/83	SYSTEM	100.0	100.0	100.0	15.1			720	208	109	12.0
12/83	SYSTEM	100.0	100.0	100.0	75.3			744	560	560	34.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM AT SCHAHFER 17 EXPERIENCED BOILER-RELATED PROBLEMS DURING THE FOURTH QUARTER OF 1983.

1/84	SYSTEM	100.0			.0			744	0	0	.0

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 DOWN DURING THE ENTIRE MONTH OF JANUARY.									
2/84	SYSTEM	99.7	99.6	99.6	57.8			696	404	402	44.1
3/84	SYSTEM	99.9	99.8	99.8	79.7			744	594	593	73.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING FEBRUARY AND MARCH.									
4/84	SYSTEM	99.9	99.9	99.9	97.6			720	704	703	91.1
5/84	SYSTEM	100.0	100.0	100.0	98.5			744	733	733	83.2
6/84	SYSTEM	100.0	100.0	100.0	82.5			720	595	594	67.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE SECOND QUARTER OF 1984.									
7/84	SYSTEM	100.0	100.0	100.0	99.9			744	743	743	79.2
8/84	SYSTEM		100.0	100.0	100.0			744	744	744	75.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD RELATED OUTAGES WERE REPORTED DURING AUGUST.									
		NO MAJOR FGD RELATED PROBLEMS WERE REPORTED DURING JULY AND AUGUST.									
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR AUGUST AND SEPTEMBER 1984.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NORTHERN STATES POWER	
PLANT NAME	RIVERSIDE	
UNIT NUMBER	6-7	
CITY	MINNEAPOLIS	
STATE	MINNESOTA	
REGULATORY CLASSIFICATION	E	
PARTICULATE EMISSION LIMITATION - NG/J	172.	(.400 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	172.	(.400 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	350	
GROSS UNIT GENERATING CAPACITY - MW	110	
NET UNIT GENERATING CAPACITY W/FGD - MW	103	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	110	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	PEAK	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	320.89	(680000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	176.7	(350 F)
STACK HEIGHT - M	84.	(275 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	3.7	(12.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	21632.	(9300 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		9100-9500
AVERAGE ASH CONTENT - %	8.00	
RANGE ASH CONTENT - %	7.9-8.1	
AVERAGE MOISTURE CONTENT - %	22.00	
RANGE MOISTURE CONTENT - %	20.0-24.0	
AVERAGE SULFUR CONTENT - %	1.20	
RANGE SULFUR CONTENT - %	0.9-1.5	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** FABRIC FILTER		
NUMBER	1	
TYPE	REVERSE AIR	
SUPPLIER	JOY MANUFACTURING	
INLET FLUE GAS CAPACITY - CU.M/S	320.9	(680000 ACFM)
PRESSURE DROP - KPA	1.5	(6.0 IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.5	
TYPICAL GAS/CLOTH RATIO - M/MIN	.5	(1.8 FT/MIN)
** ESP		
NUMBER	0	
TYPE	NONE	
** 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	

NORTHERN STATES POWER: RIVERSIDE 6-7 (CONT.)

*** 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	BLACK & VEATCH
DEVELOPMENT LEVEL	DEMONSTRATION
NEW/RETROFIT	RETROFIT
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00
CURRENT STATUS	1
COMMERCIAL START-UP	12/80
INITIAL START-UP	11/80
CONTRACT AWARDED	10/79

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	1	
GENERIC TYPE	SPRAY DRYER	
SPECIFIC TYPE	CROSSFLOW	
TRADE NAME/COMMON TYPE	ROTARY ATOMIZER	
SUPPLIER	NIRO ATOMIZER	
DIMENSIONS - FT	46.0 HIGH X 40.0 DIA	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
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	
GAS-SIDE PRESSURE DROP - KPA	.5	(2.0 IN-H2O)
INLET GAS FLOW - CU. M/S	320.89	(680000 ACFM)
INLET GAS TEMPERATURE - C	176.7	(350 F)
SO2 REMOVAL EFFICIENCY - %	90.0	
PARTICLE REMOVAL EFFICENCY - %	99.7	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	NONE
NUMBER PER SYSTEM	0
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	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	
SUPPLIER	WESTINGHOUSE	
FUNCTION	BOOSTER	
APPLICATION	INDUCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	160.45	(340000 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

NORTHERN STATES POWER: RIVERSIDE 6-7 (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	
MANUFACTURER	JOY/DENVER	
NUMBER	1	
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	9.1	(10 TPH)

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL	
DEVICE	COMPARTMENTED	
DEVICE TYPE	NR	
MANUFACTURER	JOY/DENVER	
NUMBER	1	
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	4.5	(5 TPH)
PRODUCT QUALITY - % SOLIDS	35.0	

** TANKS

SERVICE	NUMBER
NR	2

** PUMPS

SERVICE	NUMBER
SLURRY TRANSFER	5

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SLUDGE

** TREATMENT

METHOD	N/A
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	OFF-SITE
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	NONE

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	OUTLET TEMP
MONITOR LOCATION	DRYER OUTLET
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES
ABSORBER .0

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
11/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

OPERATIONS AT THE RIVERSIDE UNIT COMMENCED IN NOVEMBER 1980. BY THE END OF NOVEMBER SUFFICIENT CHECKOUT HAD BEEN ACCOMPLISHED TO PERMIT PRELIMINARY FGD AND ESP OPERATION AND TEST WORK.

12/80 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

IN DECEMBER THE FGD SYSTEM WAS IN A PRELIMINARY OPERATION MODE AND THE NEW ID FANS AND BAGHOUSE WERE IN FINAL CHECKOUT.

1/81 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

BY MID-JANUARY THE PRELIMINARY CHECKOUT WAS COMPLETED AND THE NEW ID FANS AND BAGHOUSE WERE BROUGHT INTO SERVICE WITHOUT THE FGD SYSTEM IN OPERATION.

2/81 SYSTEM 672

** PROBLEMS/SOLUTIONS/COMMENTS

THE NEW ID FANS AND BAGHOUSE OPERATED WITHOUT THE FGD SYSTEM UNTIL LATE FEBRUARY SO THAT THE BOILER DRAFT CONTROL SYSTEM COULD BE ADJUSTED. AT THE CONCLUSION OF THE PERIOD, FULL LOAD BAGHOUSE PERFORMANCE TESTING WAS ACCOMPLISHED. RESULTS OF THE TESTS SHOWED NEGLIGIBLE TEMPERATURE CHANGES ACROSS THE FGD MODULE (WHICH WAS ACTING ONLY AS A BYPASS DUCT), A SMALL TEMPERATURE CHANGE ACROSS THE BAGHOUSE, STACK OPACITIES OF LESS THAN 5% FOR THE RIVERSIDE STACK DIAMETER, AND AN OUTLET MASS LOADING OF LESS THAN 0.03 LB/MMBTU.

BEGINNING IN LATE FEBRUARY AND CARRYING THROUGH EARLY MARCH, THE FGD SYSTEM OPERATED TO PERFORM THE FINAL TUNING OF THE ANALOG AND COMPUTER CONTROL SYSTEM.

3/81 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

ON MARCH 12, THE ENTIRE NEW SYSTEM WAS OPERATED FOR THE FIRST TIME. A WEEK LATER THE BOILER AND TURBINE EXPERIENCED PROBLEMS LIMITING OPERATION. BUT, BY MARCH 19, THE ENTIRE SYSTEM WAS OPERATING WITH THE LOAD INCREASING AS THE PLANT REPAIR WORK WAS BEING COMPLETED. BY MARCH 21, THE SYSTEM WAS INTO FGD AND BAGHOUSE PARAMETRIC TESTING AT FULL LOAD. SINCE THAT TIME, NEARLY ALL THE KEY TEST PARAMETERS HAVE DEMONSTRATED AT SEVERAL LEVELS.

4/81 SYSTEM 720

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT A PROBLEM WITH THE START-UP OF THE MATERIAL DISCHARGE SYSTEM HAS BEEN CAUSED BY A FAULTY MATERIAL SPECIFICATION ON THE CHAIN CONVEYOR AND SEVERAL LEGS OF TEMPORARY DENSE PHASE PNEUMATIC PIPING. AS OF APRIL, A NEW CONVEYOR OF HARDER MATERIAL HAD BEEN INSTALLED AND ALL TEMPORARY DISCHARGE PIPING REMOVED.

NORTHERN STATES POWER: RIVERSIDE 6-7 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF MAY AND JUNE.

7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1981.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER OF 1981.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1982.

4/82	SYSTEM							720	0		.0
5/82	SYSTEM							744	0		.0
6/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS DOWN ALL OF APRIL AND MAY FOR A SCHEDULED TURBINE OUTAGE. THE FGD SYSTEM WAS AVAILABLE APPROXIMATELY 90% DURING JUNE.

7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
					PERFORMANCE DATA						
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 OPERATED CONTINUOUSLY THROUGHOUT THE PERIOD AND THAT NO MAJOR SCHEDULED OR FORCED OUTAGES WERE ENCOUNTERED. FGD SYSTEM AVAILABILITY FOR THE PERIOD OF JULY 1982 THROUGH JUNE 1983 WAS APPROXIMATELY 80 %.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT FGD SYSTEM AVAILABILITY WAS APPROXIMATELY 80 TO 90% DURING THE THIRD QUARTER OF 1983.

THE UTILITY REPORTED PROBLEMS MAINTAINING AN ADEQUATE PERCENTAGE OF SOLIDS IN THE SLURRY DUE TO A RECYCLE ASH CONVEYOR TRIP AND FAILING DOUBLE FLAP VALVES ON THE BAGHOUSE.

THE UTILITY REPORTED SLURRY PUMP PROBLEMS DURING THE THIRD QUARTER.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT FGD SYSTEM AVAILABILITY WAS APPROXIMATELY 75 PERCENT DURING THE FOURTH QUARTER OF 1983.

A THREE-WEEK FORCED OUTAGE OCCURRED DURING THE FOURTH QUARTER DUE TO BEARING FAILURES ON A BAGHOUSE REVERSE AIR FAN. BOTH THE MOTOR AND FAN EXPERIENCED BEARING FAILURES.

THE UTILITY SWITCHED FROM BELT-DRIVE TO DIRECT-DRIVE BAGHOUSE REVERSE AIR FANS DURING THE FOURTH QUARTER OF 1983 TO ELIMINATE PROBLEMS WITH MAINTAINING PROPER BELT TENSION.

THE UTILITY REPORTED A FOUR-DAY FGD SYSTEM OUTAGE DURING THE FOURTH QUARTER DUE TO THE REMOVAL OF BUILD-UP FROM THE ABSORBER BOTTOM ASH OUTLET. THE UTILITY WAS TESTING THE USE OF PULVERIZED LIMESTONE WITH CALCIUM CHLORIDE AS AN ADDITIVE TO INCREASE REMOVAL EFFICIENCY. A BUILD UP ON THE ABSORBER WALLS RESULTED WHICH SUBSEQUENTLY DROPPED OFF AND FELL TO THE BOTTOM ASH OUTLET. A CREW HAD TO BE SENT IN TO REMOVE THE MATERIAL.

NORTHERN STATES POWER: RIVERSIDE 6-7 (CONT.)

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

THE UTILITY REPORTED SEVERAL SLURRY PUMP SEAL PROBLEMS DURING THE FOURTH QUARTER OF 1983. CONSIDERABLE MAINTENANCE TIME WAS REQUIRED TO MAKE INDIVIDUAL REPAIRS, HOWEVER, THE FGD SYSTEM AS A WHOLE WAS NOT AFFECTED.

THE UTILITY REPORTED AN ATOMIZER FAILURE DURING THE FOURTH QUARTER THAT WAS DUE TO A LACK OF LUBRICATING OIL.

1/84 SYSTEM 744

2/84 SYSTEM 696

3/84 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

FGD SYSTEM AVAILABILITY FOR THE FIRST QUARTER WAS ESTIMATED AT 85%.

PLUGGED SLURRY PUMPS RESULTED IN FGD OUTAGE TIME DURING THE FIRST QUARTER.

DURING THE FIRST QUARTER OF 1984, THE LOSS OF A REVERSE AIR FAN FOR THE BAGHOUSE CONTRIBUTED TO LOWERED AVAILABILITY FOR THE FGD SYSTEM.

4/84 SYSTEM 720

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT OPERATED ONLY 50 HOURS DURING APRIL DUE TO LOW POWER DEMAND. THE FGD SYSTEM ONLY OPERATED 17 HOURS DURING THE MONTH.

5/84 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT FGD SYSTEM AVAILABILITY DURING MAY WAS APPROXIMATELY 84%. 321 OPERATING HOURS WERE REPORTED.

6/84 SYSTEM 720

7/84 SYSTEM 744

8/84 SYSTEM 744

9/84 SYSTEM 720

** PROBLEMS/SOLUTIONS/COMMENTS

A SCHEDULED OUTAGE WAS REPORTED FOR THE PERIOD OF JUNE 2 TO AUGUST 1, 1984.

THROUGHOUT THE FIRST THREE QUARTERS OF 1984, THE UTILITY EXPERIENCED PROBLEMS WITH PLUGGED LINES TO THE ATOMIZER FEED SYSTEM. THE RESULTING FLOW LIMITATION LOWERED REMOVAL EFFICIENCIES.

BAGHOUSE PROBLEMS CONTINUED THROUGH THE FIRST THREE QUARTERS OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NORTHERN STATES POWER	
PLANT NAME	SHERBURNE	
UNIT NUMBER	1	
CITY	BECKER	
STATE	MINNESOTA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	37.	(.087 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	413.	(.960 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1420	
GROSS UNIT GENERATING CAPACITY - MW	750	
NET UNIT GENERATING CAPACITY W/FGD - MW	710	
NET UNIT GENERATING CAPACITY WO/FGD - MW	740	
EQUIVALENT SCRUBBED CAPACITY - MW	750	
** 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	1349.16	(2859000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	154.4	(310 F)
STACK HEIGHT - M	198.	(650 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	9.9	(32.6 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	19538.	(8400 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8300-8500
AVERAGE ASH CONTENT - %	9.00	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	25.00	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	.80	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	.03	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	0	
TYPE	NONE	
** PARTICLE SCRUBBER		
NUMBER	12	
NUMBER OF SPARES	2	
INITIAL START-UP DATE	3/76	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/VERTICALLY-ADJUSTABLE ROD DECKS	
TRADE NAME/COMMON NAME	ROD SCRUBBER	
SUPPLIER	COMBUSTION ENGINEERING	
DIMENSIONS - FT	3.0 X 25.5	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	TYPE 304 STAINLESS STEEL RODS	
NUMBER OF CONTACTING ZONES	2	
LIQUID RECIRCULATION RATE - LITER/S	223.0	(3540 GPM)
L/G RATIO - LITER/CU.M	1.8	(13.6 GAL/1000ACF)
PRESSURE DROP - KPA	3.5	(14.0 IN-H2O)
SUPERFICIAL GAS VELOCITY - M/S	24.4	(80.0 FT/S)
INLET GAS FLOW RATE - CU.M/S	122.6	(259900 ACFM)

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

INLET GAS TEMPERATURE - C	154.4	(310 F)
PARTICLE REMOVAL EFFICIENCY - %	99.0	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE/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 - %	99.00
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	50.00
ENERGY CONSUMPTION - %	4.0
CURRENT STATUS	1
COMMERCIAL START-UP	5/76
INITIAL START-UP	3/76
CONTRACT AWARDED	0/71

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	.70	
DESIGN COAL HEAT CONTENT - J/G	19305.8	(8300 BTU/LB)
DESIGN COAL ASH CONTENT - %	9.00	
DESIGN MOISTURE CONTENT - %	28.00	
SPACE REQUIREMENTS - SQ M	1312.0	(14123 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	212.0	

** QUENCHER/PRESATURATOR

NUMBER	0

** ABSORBER

NUMBER	12	
NUMBER OF SPARES	2	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	COMBUSTION ENGINEERING	
DIMENSIONS - FT	18 X 26.5 X 60	
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 151	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	378.	(6000 GPM)
L/G RATIO - L/CU.M	2.9	(21.8 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	129.77	(275000 ACFM)
INLET GAS TEMPERATURE - C	54.4	(130 F)
SO2 REMOVAL EFFICIENCY - %	50.0	
PARTICLE REMOVAL EFFICENCY - %	99.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	12	
NUMBER OF SPARES PER SYSTEM	2	
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	3	
FREEBOARD DISTANCE - M	3.20	(10.5 FT)
DISTANCE BETWEEN STAGES - CM	25.40	(10.0 IN)

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

DISTANCE BETWEEN VANES - CM	10.2	(4.00 IN)
PRESSURE DROP - KPA	.1	(.5 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	MAKE-UP WATER	
WASH FREQUENCY	ONCE PER 24 HRS	
WASH RATE - L/S	126.2	(2000 GAL/MIN)

** REHEATER

NUMBER	12	
NUMBER OF SPARES	2	
NUMBER PER MODULE	1	
GENERIC TYPE	IN-LINE	
SPECIFIC TYPE	HOT WATER	
TRADE NAME/COMMON TYPE	FIN TUBE	
LOCATION	10 FT ABOVE ME	
TEMPERATURE INCREASE - C	22.2	(40 F)
INLET FLUE GAS FLOW RATE - CU. M/S	94.38	(200000 ACFM)
INLET FLUE GAS TEMPERATURE - C	54.4	(130 F)
OUTLET FLUE GAS TEMPERATURE - C	76.7	(170 F)
NUMBER OF HEAT EXCHANGER BANKS	4	
NUMBER OF TUBES PER BUNDLE	45	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** FANS

NUMBER	4	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FAN	
FUNCTION	UNIT	
APPLICATION	INDUCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	94.38	(200000 ACFM)
FLUE GAS TEMPERATURE - C	76.7	(170 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

GENERIC TYPE	BUTTERFLY
SPECIFIC TYPE	N/A
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

GENERIC TYPE	BUTTERFLY
SPECIFIC TYPE	N/A
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
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	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	REHEATER TO STACK
SHELL GENERIC MATERIAL TYPE	CARBON STEEL

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

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	ALLIS CHALMERS
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	21.8 (24 TPH)
PRODUCT QUALITY - % SOLIDS	65.0

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	12
MAKEUP WATER	2
REAGENT PREP PRODUCT	4

** PUMPS

SERVICE	NUMBER
POND RETURN	1
THICKENER UNDERFLOW	1
MAKEUP WATER	1
REHEAT WATER	2
ABSORBER RECIRCULATION	2
LIMESTONE CLASSIFIER RECYCLE	****
LIMESTONE DILUTION	****
LIMESTONE SLURRY TRANSFER	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	2
NUMBER OF SPARES	1
DIMENSIONS - FT	160.0 DIA X 10.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
FEED STREAM SOURCE	ABSORBER BLEED
FEED STREAM CHARACTERISTICS	10% SOLIDS
OUTLET STREAM CHARACTERISTICS	28% SOLIDS
OUTLET STREAM DISPOSITION	POND
OVERFLOW STREAM DISPOSITION	LIMESTONE SLURRY TRANSFER TANK

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION
DEVICE	REACTION TANK
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	CLAY LINING
SITE DIMENSIONS	62 ACRES X 50 FT
SITE CAPACITY - CU.M	3791300 (3100.0 ACRE-FT)

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	SLURRY PH, SO2
PHYSICAL VARIABLES	PRESSURE DROP, PERCENT SOLIDS, TANK LEVELS
CONTROL LEVELS	PRESSURE DROP 12 IN H2O, 10% SOLIDS, PH=5-5.5
MONITOR TYPE	DUPONT [SO2]

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

MONITOR LOCATION	BOILER OUTLET & ON MODULES [SO2]
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	OPEN
RECEIVING WATER STREAM	MISSISSIPPI RIVER
SOURCE OF MAKEUP WATER	RIVER WATER & COOLING TOWER BLOWDOWN

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	95% CACO3
CONSUMPTION	3.0-3.5 TPH
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - % 9.0

** 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
3/76	SYSTEM							744			
4/76	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY A PRELIMINARY SYSTEM CHECKOUT WAS SUCCESFULLY COMPLETED BY PASSING AIR AND WATER THROUGH THE SYSTEM. THE SCRUBBING SYSTEM BEGAN FGD OPERATIONS ON MARCH 16. THE SHAKEDOWN PHASE OF OPERATIONS CONTINUED THROUGH APRIL.

5/76	101		62.0	55.0							
	102		83.0	73.0							
	103		81.0	72.0							
	104		59.0	52.0							
	105		72.0	64.0							
	106		90.0	80.0							
	107		57.0	50.0							
	108		69.0	61.0							
	109		60.0	53.0							
	110		75.0	66.0							
	111		72.0	64.0							
	112		67.0	59.0							
	SYSTEM	86.0	77.0	68.1				744	657	506	57.8

** PROBLEMS/SOLUTIONS/COMMENTS

FIRST COMMERCIAL OPERATION COMMENCED MAY 1, 1976. THIS IS AN INTERMEDIATE LOAD UNIT OPERATING NEAR FULL CAPACITY DURING THE DAY AND 35% CAPACITY AT NIGHT.

6/76	SYSTEM	84.0						720	688		69.9

** PROBLEMS/SOLUTIONS/COMMENTS

MODIFICATIONS ARE CONTINUING ON THE SPRAY SYSTEM, SPRAY NOZZLES AND STRAINER SYSTEM.

SINCE APRIL THE UTILITY AND SYSTEM SUPPLIER HAVE BEEN MAKING CONTINUAL SYSTEM MODIFICATIONS, REQUIRING THE UNIT TO OPERATE AT NO GREATER THAN 80% CAPACITY.

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
7/76	101		80.0		55.0						
	102		62.0		43.0						
	103		71.0		49.0						
	104		81.0		56.0						
	105		80.0		55.0						
	106		68.0		47.0						
	107		81.0		56.0						
	108		75.0		52.0						
	109		79.0		54.0						
	110		63.0		43.0						
	111		91.0		63.0						
	112		69.0		48.0						
	SYSTEM	84.0	81.8		56.5			744	512	419	49.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE SLURRY NOZZLES ARE FREQUENTLY PLUGGED BY PARTICLES ABOVE QUARTER INCH SIZE. STRAINER MODIFICATIONS ARE PLANNED TO ALLEVIATE THIS PROBLEM.

HARD SCALE GYPSUM FORMATION ON THE VESSEL WALLS HAS LEVELED OFF. THE CLEANING PROCESS CALLS FOR THREE TO FOUR MODULES TO BE TAKEN OUT OF SERVICE EACH NIGHT. THUS, EACH MODULE IS CLEANED ONCE EVERY THREE DAYS.

A 70-MAN CREW IS REQUIRED TO MAINTAIN SCRUBBER OPERATIONS.

THE DEPOSITION OF SOFT SOLIDS IS STILL CONTINUING IN THE REHEATERS.

SOFT SOLIDS ACCUMULATION IN THE MIST ELIMINATORS IS STILL CAUSING PROBLEMS.

8/76	101		46.0		44.0						
	102		93.0		88.0						
	103		51.0		48.0						
	104		84.0		80.0						
	105		83.0		79.0						
	106		76.0		72.0						
	107		71.0		67.0						
	108		84.0		80.0						
	109		81.0		77.0						
	110		76.0		72.0						
	111		87.0		82.0						
	112		91.0		86.0						
	SYSTEM	94.0	83.9		79.6			744	705	592	76.5
9/76	101		87.0		68.0						
	102		90.0		71.0						
	103		93.0		73.0						
	104		76.0		60.0						
	105		76.0		60.0						
	106		79.0		62.0						
	107		85.0		69.0						
	108		79.0		62.0						
	109		85.0		67.0						
	110		80.0		63.0						
	111		92.0		72.0						
	112		96.0		76.0						
	SYSTEM	95.0	92.6		73.0			720	566	524	65.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE STRAINER SYSTEM IS BEING MODIFIED. THE DUPLEX UNITS ARE TO BE REPLACED BY IN-TANK SCREENS AND SOOT BLOWERS. BOTH ARE LOCATED AT THE SUCTION SIDE OF THE SPRAY WATER PUMP.

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

CARBON STEEL FIN TUBE REHEAT BUNDLES ARE AN AREA OF CONCERN. MULTIPLE FAILURES IN FOUR UNITS HAVE BEEN EXPERIENCED.

10/76	101		97.0		79.0						
	102		84.0		68.0						
	103		96.0		78.0						
	104		96.0		78.0						
	105		95.0		77.0						
	106		30.0		24.0						
	107		74.0		60.0						
	108		76.0		62.0						
	109		91.0		74.0						
	110		81.0		66.0						
	111		100.0		81.0						
	112		87.0		71.0						
	SYSTEM	92.9	91.6		74.4			744	606	554	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY IS CONSIDERING MODIFYING THE DESIGN OF THE SHERBURNE 1 AND 2 FGD SYSTEMS FROM MARBLE BED TO SPRAY TOWER ABSORBERS. AT PRESENT ONE MODULE AT SHERBURNE 1 HAS BEEN CONVERTED TO A SPRAY TOWER ON AN EXPERIMENTAL BASIS.

11/76	101		83.0		83.0						
	102		80.0		80.0						
	103		87.0		87.0						
	104		79.0		79.0						
	105		92.0		92.0						
	106		80.0		80.0						
	107		93.0		93.0						
	108		89.0		89.0						
	109		69.0		69.0						
	110		78.0		78.0						
	111		73.0		73.0						
	112		93.0		93.0						
	SYSTEM	93.0	90.6		90.6			720	720	652	88.4
12/76	101		88.0		85.0						
	102		84.0		82.0						
	103		87.0		84.0						
	104		80.0		78.0						
	105		71.0		69.0						
	106		97.0		94.0						
	107		91.0		88.0						
	108		95.0		92.0						
	109		94.0		91.0						
	110		88.0		85.0						
	111		73.0		71.0						
	112		75.0		73.0						
	SYSTEM	94.7	93.0		90.2			744	722	671	87.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY IS NOW CONDUCTING A FULL-LOAD EVALUATION STUDY, ANALYZING SYSTEM OPERATION ON 10 MODULES VS. THE DESIGNED 11 MODULES.

APPROXIMATELY ONE-THIRD OF THE STRAINER MODIFICATIONS ON MODULE 101 ARE COMPLETED.

THE UNIT IS CURRENTLY HAVING DIFFICULTY COMPLYING WITH THE 20% OPACITY REGULATION DUE TO THE EXTREMELY FINE FLY ASH BEING EMITTED (70% LESS THAN 1 MICRON).

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
1/77	101		94.0		77.0						
	102		75.0		61.0						
	103		99.0		81.0						
	104		76.0		62.0						
	105		96.0		78.0						
	106		77.0		63.0						
	107		70.0		57.0						
	108		92.0		75.0						
	109		81.0		66.0						
	110		40.0		33.0						
	111		75.0		61.0						
	112		95.0		76.0						
	SYSTEM	90.0	88.2		71.8			744	607	535	70.1
2/77	101		89.0		81.0						
	102		99.0		90.0						
	103		64.0		58.0						
	104		96.0		87.0						
	105		64.0		58.0						
	106		99.0		90.0						
	107		81.0		73.0						
	108		62.0		56.0						
	109		98.0		89.0						
	110		93.0		84.0						
	111		98.0		89.0						
	112		61.0		55.0						
	SYSTEM	91.0	91.3		82.7			672	609	556	79.5
3/77	101		47.0		47.0						
	102		92.0		92.0						
	103		95.0		95.0						
	104		93.0		93.0						
	105		93.0		93.0						
	106		95.0		95.0						
	107		88.0		88.0						
	108		93.0		93.0						
	109		95.0		95.0						
	110		83.0		83.0						
	111		78.0		78.0						
	112		72.0		72.0						
	SYSTEM	95.0	93.1		93.0			744	743	692	92.8

** PROBLEMS/SOLUTIONS/COMMENTS

ALL MODULES ARE NOW FITTED WITH IN-TANK STRAINERS. LOW JANUARY-MARCH OPERABILITIES RESULTED FROM COMPLETION OF STRAINER MODIFICATIONS.

4/77	101		84.4		84.2						
	102		65.3		65.1						
	103		92.5		92.2						
	104		95.4		95.1						
	105		96.2		96.0						
	106		62.2		62.1						
	107		72.8		72.6						
	108		91.4		91.1						
	109		58.5		58.3						
	110		92.9		92.6						
	111		90.4		90.1						
	112		87.9		87.6						
	SYSTEM	95.0	90.0		89.7			720	718	646	86.4
5/77	101		96.5		40.5						

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
	102		48.1		20.2						
	103		92.3		38.7						
	104		87.2		36.6						
	105		94.9		39.8						
	106		96.5		40.5						
	107		81.4		34.1						
	108		97.8		41.0						
	109		95.8		40.2						
	110		77.9		32.7						
	111		34.9		14.7						
	112		86.9		36.4						
	SYSTEM	92.0	90.0		37.8			744	312	281	35.6
6/77	101		76.0		26.0						
	102		77.0		27.0						
	103		75.0		26.0						
	104		75.0		26.0						
	105		30.0		10.0						
	106		87.0		30.0						
	107		58.0		20.0						
	108		44.0		15.0						
	109		61.0		21.0						
	110		80.0		28.0						
	111		.0		.0						
	112		83.0		29.0						
	SYSTEM	92.0	67.8		23.4			720	248	168	23.9

** PROBLEMS/SOLUTIONS/COMMENTS

A SCHEDULED TURBINE OVERHAUL LASTED FROM MAY 14 TO JUNE 18.

THE EVALUATION STUDY INITIATED DURING THE NOVEMBER-DECEMBER PERIOD WAS TEMPORARILY TERMINATED SO THAT STRAINER MODIFICATIONS COULD BE COMPLETED. THE STUDY SHOULD BEGIN AGAIN IN THE NEAR FUTURE.

7/77	101		93.0		92.0						
	102		66.0		65.0						
	103		92.0		91.0						
	104		90.0		89.0						
	105		92.0		91.0						
	106		94.0		93.0						
	107		91.0		90.0						
	108		17.0		17.0						
	109		94.0		93.0						
	110		83.0		82.0						
	111		78.0		77.0						
	112		83.0		82.0						
	SYSTEM	97.0	88.5		87.5			744	736	651	86.6

** PROBLEMS/SOLUTIONS/COMMENTS

SOME STAINLWSS STEEL MODIFICATIONS TOOK PLACE.

WHILE THE UNIT WAS OUT IN JUNE THE FGD SYSTEM WAS CLEANED. THIS CLEANING WAS CREDITED FOR ONE OF THE HIGHEST AVAILABILITIES EVER DEMONSTRATED ON THIS UNIT.

8/77	101		85.0		73.0						
	102		89.0		77.0						
	103		66.0		57.0						
	104		55.0		47.0						
	105		81.0		70.0						
	106		90.0		77.0						

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
	107		83.0		71.0						
	108		79.0		68.0						
	109		72.0		62.0						
	110		85.0		73.0						
	111		90.0		77.0						
	112		66.0		57.0						
	SYSTEM	95.0	85.6		73.6			744	640	548	64.9

** PROBLEMS/SOLUTIONS/COMMENTS

ONLY REGULAR MAINTENANCE WAS REQUIRED ON THE FGD SYSTEM IN AUGUST.

9/77	101		86.0		82.0						
	102		85.0		81.0						
	103		88.0		84.0						
	104		92.0		88.0						
	105		88.0		84.0						
	106		44.0		42.0						
	107		83.0		79.0						
	108		90.0		86.0						
	109		84.0		80.0						
	110		77.0		73.0						
	111		77.0		73.0						
	112		82.0		78.0						
	SYSTEM	95.0	88.7		84.6			720	686	609	78.2

** PROBLEMS/SOLUTIONS/COMMENTS

TWENTY-FOUR PUMPS ARE BEING COMPLETELY OVERHAULED.

THE MODULE 106 SPRAY WATER PUMP WAS OVERHAULED IN SEPTEMBER.

SOME ANGLES WERE INSTALLED ON THE PRIMARY CONTACTOR RODS TO RESIST EROSION.

10/77	101		70.0		57.0						
	102		81.0		66.0						
	103		95.0		78.0						
	104		97.0		79.0						
	105		63.0		52.0						
	106		35.0		29.0						
	107		87.0		71.0						
	108		99.0		81.0						
	109		96.0		79.0						
	110		39.0		32.0						
	111		58.0		47.0						
	112		96.0		79.0						
	SYSTEM	88.0	83.3		68.2			744	609	507	65.5

** PROBLEMS/SOLUTIONS/COMMENTS

STRAINER/WASHER SCREEN EROSION HAS BEEN A PROBLEM. REPAIR AND REPLACEMENT HAS BEEN CONTINUALLY NECESSARY. 316L SS MATERIAL WILL BE USED IN THE FUTURE.

11/77	101		77.0		76.0						
	102		91.0		89.0						
	103		42.0		41.0						
	104		86.0		84.0						
	105		79.0		77.0						
	106		82.0		80.0						
	107		87.0		85.0						
	108		91.0		89.0						

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	109		89.0		87.0						
	110		89.0		87.0						
	111		92.0		90.0						
	112		52.0		51.0						
	SYSTEM	92.0	87.0		85.1			720	705	613	77.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE REPLACEMENT PROGRAM WILL BEGIN ON DECEMBER 21, 1977. IT TAKES FOUR TO SIX DAYS FOR WORK ON EACH MODULE TO REPLACE THE STRAINER SYSTEM.

LOW MODULE OPERABILITIES WERE PRIMARILY A RESULT OF SPRAY WATER PUMP OVERHAULS WHICH ARE CONTINUING AT A RATE OF ONE TO TWO A WEEK (THERE ARE 24 PUMPS ON THE SYSTEM).

12/77	101		97.0		73.0						
	102		90.0		67.0						
	103		95.0		71.0						
	104		94.0		70.0						
	105		71.0		53.0						
	106		92.0		69.0						
	107		26.0		20.0						
	108		67.0		50.0						
	109		96.0		72.0						
	110		98.0		74.0						
	111		95.0		71.0						
	112		90.0		67.0						
	SYSTEM	93.0	91.9		68.8			744	557	512	59.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 107 REQUIRED EXTENSIVE MAINTENANCE ALONG WITH DOWNTIME FOR STRAINER REPLACEMENT.

PUMP OVERHAULS AND REPLACEMENT OF CARBON STEEL STRAINERS WITH 316L SS WERE PERFORMED ON MODULE 107 IN DECEMBER.

1/78	101		83.0		72.0						
	102		63.0		55.0						
	103		88.0		77.0						
	104		73.0		64.0						
	105		84.0		73.0						
	106		84.0		73.0						
	107		92.0		80.0						
	108		64.0		56.0						
	109		91.0		79.0						
	110		80.0		70.0						
	111		88.0		77.0						
	112		82.0		71.0						
	SYSTEM	92.0	88.4		77.0			744	648	573	68.0
2/78	101		.0		.0						
	102		93.0		88.0						
	103		92.0		87.0						
	104		89.0		84.0						
	105		74.0		70.0						
	106		85.0		81.0						
	107		89.0		84.0						
	108		88.0		83.0						
	109		76.0		72.0						
	110		86.0		82.0						
	111		88.0		83.0						
	112		87.0		82.0						
	SYSTEM	92.0	86.1		81.5			672	636	548	73.6

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
3/78	101		71.0		65.0						
	102		83.0		75.0						
	103		64.0		58.0						
	104		89.0		81.0						
	105		90.0		82.0						
	106		83.0		75.0						
	107		62.0		56.0						
	108		89.0		81.0						
	109		97.0		88.0						
	110		71.0		65.0						
	111		79.0		72.0						
	112		90.0		82.0						
	SYSTEM	92.0	88.0		80.0			744	676	595	76.9
4/78	101		92.0		91.0						
	102		87.0		86.0						
	103		87.0		86.0						
	104		44.0		44.0						
	105		81.0		80.0						
	106		85.0		84.0						
	107		91.0		90.0						
	108		86.0		85.0						
	109		92.0		91.0						
	110		91.0		90.0						
	111		87.0		86.0						
	112		52.0		52.0						
	SYSTEM	95.0	88.6		87.7			720	713	632	87.2
5/78	101		61.0		52.0						
	102		86.0		73.0						
	103		85.0		73.0						
	104		86.0		73.0						
	105		89.0		76.0						
	106		64.0		55.0						
	107		62.0		53.0						
	108		83.0		71.0						
	109		82.0		70.0						
	110		71.0		61.0						
	111		87.0		74.0						
	112		79.0		67.0						
	SYSTEM	95.0	85.0		72.6			744	635	540	69.0
6/78	101		50.0		50.0						

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES WHICH ARE SHOWING OPERABILITY OF LESS THAN 80%, ARE THOSE IN WHICH THE STRAINER MODIFICATIONS WERE PERFORMED.

A BULK ENTRAINMENT SEPARATOR WAS INSTALLED ALONG WITH A KOCH WASH TRAY DURING THE PERIOD.

MODULE 101 WAS DOWN IN FEBRUARY FOR MODIFICATIONS TO THE SPRAY TOWER ABSORBER. MODIFICATIONS INCLUDED INSTALLATION OF A NEW PRE-MIST ELIMINATOR (KOCH WASH TRAY), NEW SPRAY NOZZLES AND REPLACEMENT OF TWO INCH DIAMETER STAINLESS STEEL RODS WITH 6.625-INCH DIAMETER CERAMIC-COATED CARBON STEEL RODS IN A MODULE PRIMARY CONTACTOR.

** PROBLEMS/SOLUTIONS/COMMENTS

STRAINER MODIFICATIONS WERE PERFORMED ON MODULES 104 AND 112 WHICH ACCOUNTED FOR THE LOW MODULE OPERABILITIES.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	102		84.0		84.0						
	103		85.0		84.0						
	104		85.0		84.0						
	105		62.0		62.0						
	106		78.0		78.0						
	107		55.0		55.0						
	108		83.0		83.0						
	109		88.0		87.0						
	110		82.0		82.0						
	111		72.0		72.0						
	112		95.0		94.0						
	SYSTEM	93.0	83.6		83.2			720	717	599	77.8
7/78	101		82.0		76.0						
	102		76.0		71.0						
	103		71.0		66.0						
	104		74.0		69.0						
	105		75.0		70.0						
	106		52.0		49.0						
	107		75.0		70.0						
	108		63.0		59.0						
	109		62.0		58.0						
	110		72.0		67.0						
	111		66.0		62.0						
	112		73.0		68.0						
	SYSTEM	95.0	76.5		71.4			744	694	531	71.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE OCCURRANCE OF PLUGGING PROBLEMS IN THE MIST ELIMINATOR HAS BEEN MORE FREQUENT THAN NORMAL.

THE STRAINER MODIFICATIONS CONTINUED IN JUNE AND JULY.

THE UTILITY IS EVALUATING NEW RUBBER LINED PUMPS (8000 GPM) TO HELP CORRECT THE REHEATER AND MIST ELIMINATOR PLUGGING PROBLEMS.

THE OCCURANCE OF PLUGGING PROBLEMS IN THE REHEATER HAS BEEN MORE FREQUENT THAN NORMAL

THE UTILITY IS PREPARING FOR THE STATE COMPLIANCE DEADLINE ON NOVEMBER 1, 1978. CURRENTLY TESTING HAS BEEN PROCEEDING ON DIFFERENT MODULES IN AN EFFORT TO FINE TUNE THE SYSTEM.

THE FGD SYSTEM HAS BEEN EXPERIENCING PRIMARY CONTACTOR WALL AND MARBLE BED WEAR.

THE UTILITY IS EVALUATING NEW STAINLESS STEEL MIST ELIMINATOR WASH LANCES (REPLACING THE ORIGINAL FIBERGLASS LANCES) TO HELP CORRECT THE REHEATER AND MIST ELIMINATOR PLUGGING PROBLEMS. THE FIBERGLASS WASH LANCES RUPTURE DURING PRESSURE SURGES.

8/78	101		64.0		64.0						
	102		65.0		65.0						
	103		73.0		73.0						
	104		63.0		63.0						
	105		65.0		65.0						
	106		80.0		79.0						
	107		81.0		80.0						
	108		73.0		73.0						
	109		63.0		63.0						
	110		73.0		72.0						
	111		64.0		64.0						

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
	112		83.0		83.0						
	SYSTEM	91.0	77.0		76.7			744	742	571	75.7
9/78	101		89.0		44.0						
	102		62.0		31.0						
	103		77.0		38.0						
	104		77.0		38.0						
	105		58.0		29.0						
	106		82.0		41.0						
	107		68.0		34.0						
	108		68.0		34.0						
	109		80.0		40.0						
	110		80.0		40.0						
	111		55.0		27.0						
	112		75.0		37.0						
	SYSTEM	97.0	79.2		39.4			720	357	283	34.9

** PROBLEMS/SOLUTIONS/COMMENTS

DIFFERENT MIST ELIMINATOR SPRAY PATTERNS ARE BEING TESTED AS POSSIBLE SOLUTION TO THE MIST ELIMINATOR PLUGGING PROBLEM REFERRED TO IN JULY.

THE BOILER WAS TAKEN OFF LINE ON SEPTEMBER 15, 1978 FOR A SCHEDULED ANNUAL BOILER AND TURBINE INSPECTION. THE BOILER CAME BACK ON LINE IN THE MIDDLE OF OCTOBER.

THE RUBBER LINED PUMPS THAT THE UTILITY WAS INVESTIGATING IN JULY, 1978 HAVE BEEN ORDERED. FOUR OF THE PUMPS HAVE BEEN RECEIVED AND ONE IS INSTALLED. THE OTHERS WILL BE INSTALLED AS THEY ARE RECEIVED.

10/78	101		95.0		48.0						
	102		65.0		33.0						
	103		80.0		40.0						
	104		17.0		9.0						
	105		66.0		33.0						
	106		88.0		45.0						
	107		53.0		27.0						
	108		72.0		36.0						
	109		88.0		44.0						
	110		70.0		35.0						
	111		85.0		43.0						
	112		73.0		37.0						
	SYSTEM	92.0	77.5		39.1			744	375	291	35.6

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES 104 AND 107 WERE DOWN IN OCTOBER AND MODULE 110 WAS DOWN IN OCTOBER AND NOVEMBER FOR THE INSTALLATION OF THE NEW 8000 GPM SPRAY PUMPS MENTIONED EARLIER.

THE BOILER AND SCRUBBER SHOWED LOW OPERATING HOURS FOR OCTOBER BECAUSE THE BOILER/TURBINE OVERHAUL CONTINUED THROUGH THE FIRST HALF OF OCTOBER.

11/78	101		42.0		42.0						
	102		51.0		51.0						
	103		88.0		87.0						
	104		81.0		80.0						
	105		71.0		70.0						
	106		78.0		77.0						
	107		77.0		76.0						
	108		63.0		63.0						
	109		85.0		84.0						
	110		61.0		61.0						

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	111		84.0		83.0						
	112		70.0		70.0						
	SYSTEM	92.0	77.4		76.7			720	714	552	76.2

** PROBLEMS/SOLUTIONS/COMMENTS

IN NOVEMBER MODULE 101 WAS DOWN (THE CONVERTED ROD SCRUBBER TEST MODULE) FOR PUMP WORK AND INTERNAL HEADER CONVERSION. THE MODULE IS BEING PREPAIRED FOR FURTHER TESTING.

12/78	101		77.0		76.0						
	102		73.0		72.0						
	103		77.0		76.0						
	104		73.0		72.0						
	105		86.0		85.0						
	106		87.0		86.0						
	107		93.0		91.0						
	108		85.0		84.0						
	109		93.0		91.0						
	110		86.0		85.0						
	111		90.0		89.0						
	112		88.0		87.0						
	SYSTEM	94.0	91.6		90.4			744	733	672	73.4
1/79	101		72.0		66.0						
	102		39.0		36.0						
	103		76.0		70.0						
	104		95.0		88.0						
	105		73.0		68.0						
	106		95.0		88.0						
	107		81.0		75.0						
	108		89.0		82.0						
	109		96.0		89.0						
	110		92.0		85.0						
	111		83.0		77.0						
	112		93.0		86.0						
	SYSTEM	94.0	89.5		82.7			744	688	615	63.2

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE PROBLEMS WITH THE COAL FEEDER BELTS RESULTING IN MOVING WET COAL FROM OLDER COAL STOCKPILES TO THE BOILER DURING THE DECEMBER-JANUARY PERIOD.

THE TESTING ON MODULE 101 HAS BEEN COMPLETED BUT NO RESULTS ARE YET AVAILABLE.

THE PROBLEMS ENCOUNTERED WERE MAINLY WEATHER RELATED IN DECEMBER AND JANUARY.

2/79	101		78.0		78.0						
	102		73.0		73.0						
	103		70.0		70.0						
	104		76.0		76.0						
	105		50.0		50.0						
	106		91.0		88.0						
	107		92.0		92.0						
	108		92.0		92.0						
	109		75.0		75.0						
	110		77.0		77.0						
	111		66.0		66.0						
	112		93.0		93.0						
	SYSTEM	89.0	84.8		84.8			672	672	570	64.2

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
3/79	101		61.0		60.0						
	102		88.0		87.0						
	103		45.0		44.0						
	104		86.0		85.0						
	105		94.0		93.0						
	106		71.0		70.0						
	107		91.0		90.0						
	108		73.0		72.0						
	109		91.0		90.0						
	110		80.0		79.0						
	111		89.0		88.0						
	112		80.0		79.0						
	SYSTEM	92.0	86.3		85.2			744	734	634	56.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE ONLY MAJOR PROBLEMS REPORTED BY THE UTILITY DURING FEBRUARY AND MARCH WERE BOILER RELATED-SPECIFICALLY PROBLEMS WITH WET COAL.

CURRENTLY THE UTILITY IS INCREASING THE RECYCLE PUMP CAPACITY BY INSTALLING 8000 GPM WORTHINGTON RECYCLE PUMPS. DURING THIS PERIOD THEY HAVE BEEN INSTALLED ON MODULES 101,103,104,105,107, AND 110.

4/79	SYSTEM	93.0						720	622		64.7

** PROBLEMS/SOLUTIONS/COMMENTS

AS OF NOVEMBER 1979 THE UTILITY DECIDED THAT IT WILL NO LONGER REPORT MODULAR INFORMATION.

5/79	SYSTEM	98.0						744	678		70.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO FGD SYSTEM PROBLEMS OCCURRED DURING APRIL OR MAY.

6/79	SYSTEM	93.0						720	701		70.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT SOME GENERAL PLUGGING WAS EXPERIENCED DURING JUNE BUT IT WAS NOT SERIOUS.

7/79	SYSTEM	93.0						744	695		72.0
8/79	SYSTEM	95.0						744	744		74.4
9/79	SYSTEM	92.0						720	166		17.1

** PROBLEMS/SOLUTIONS/COMMENTS

ON SEPTEMBER 8 THE UNIT WENT DOWN FOR THE ANNUAL BOILER/TURBINE INSPECTION AND IS EXPECTED TO BE OFF LINE UNTIL THE LAST WEEK OF OCTOBER.

10/79	SYSTEM	77.0						744	9		
11/79	SYSTEM	97.0						720	522		58.6
12/79	SYSTEM	95.0						744	744		82.3

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS SUPPOSED TO BE BACK ON LINE IN OCTOBER AFTER THE ANNUAL BOILER/TURBINE INSPECTION, BUT CONTAMINANTS IN THE MAIN TURBINE OIL MADE IT NECESSARY TO CONTINUE THE OUTAGE UNTIL THE SECOND WEEK OF NOVEMBER.

PRESENTLY THE UTILITY IS SELECTIVELY REMOVING MARBLE BEDS FROM SERVICE TO TEST THE FEASIBILITY OF CONVERTING THE FGD MODULES TO SPRAY TOWERS.

ALL PIPING HAS BEEN CONVERTED FROM CARBON STEEL TO FIBERGLASS.

1/80	SYSTEM	97.0						744	743		90.8
2/80	SYSTEM	97.0						696	687		66.2
3/80	SYSTEM	98.0						744	688		84.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER OF 1980 NO MAJOR PROBLEMS WERE ENCOUNTERED WITH THE FGD SYSTEM.

FROM MID-SEPTEMBER TO MID-OCTOBER THE UTILITY HAS SCHEDULED A BOILER OUTAGE AT WHICH TIME THE MARBLE BEDS WILL BE INSPECTED.

THE UTILITY HAS DECIDED TO CONVERT THE ENTIRE MARBLE BED SCRUBBING SYSTEM TO A SPRAY TOWER SYSTEM BY REMOVING THE MARBLE BEDS AND MODIFYING THE SPRAY ARRANGEMENT. TESTS CONDUCTED IN 1978 AND 1979 SHOW THAT MOST OF THE SO2 IS COLLECTED IN THE VENTURI SECTION OF THE SCRUBBING TRAINS AND THAT ALTHOUGH THE MARBLE BEDS IN THE ABSORBER SECTIONS IMPROVE INTIMATE SO2/SLURRY MIXING, SO2 REMOVAL EFFICIENCY OF THE SCRUBBING TRAINS IS NOT MARKEDLY DIFFERENT WHEN MARBLE BEDS ARE REMOVED.

4/80	SYSTEM	97.0						720	720		79.4
5/80	SYSTEM	96.0						744	720		78.1
6/80	SYSTEM	96.0						720	697		74.7

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR OPERATIONAL PROBLEMS WERE REPORTED DURING THE SECOND QUARTER OF 1980.

7/80	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	82.1

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE ENCOUNTERED IN JULY.

8/80	SYSTEM	100.0	100.0	100.0	99.2			744	738	738	69.1

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE TWO SHORT TERM OUTAGES IN JULY DUE TO BOILER RELATED TRIPS.

9/80	SYSTEM	100.0	100.0	100.0	99.6			720	717	717	76.8

** PROBLEMS/SOLUTIONS/COMMENTS

A BOILER RELATED PROBLEM CAUSED THE ONLY OUTAGE TIME IN SEPTEMBER.

10/80	SYSTEM	100.0		100.0	71.9			744	535	535	57.7

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
11/80	SYSTEM	100.0	.0		.0			720	0	0	.0
12/80	SYSTEM	100.0	100.0	100.0	81.0			744	603	603	51.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE OCTOBER-DECEMBER PERIOD THE UNIT WAS SHUTDOWN FOR THE ANNUAL BOILER/TURBINE INSPECTION. THE OUTAGE EXTENDED LONGER THAN EXPECTED DUE TO SOME BOILER TUBE LEAKS.

DURING THE ANNUAL BOILER/TURBINE INSPECTION GENERAL MAINTENANCE WAS PERFORMED ON THE SCRUBBING SYSTEM. THE MAINTENANCE INCLUDED THE OVERHAUL OF THE SPRAY PUMPS AND THE REBUILDING OF THE PC RODS.

1/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	73.2
2/81	SYSTEM	100.0	100.0	100.0	95.0			672	640	640	71.2
3/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	78.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

WORK IS CONTINUING ON CONVERTING THE MARBLE BED SCRUBBING SYSTEM TO A SPRAY TOWER SYSTEM. FIVE OF THE TWELVE ABSORBERS ARE COMPLETED.

4/81	SYSTEM	100.0	100.0	100.0	100.0			720	719	719	80.0
5/81	SYSTEM	100.0	100.0	100.0	81.0			744	608	608	62.0
6/81	SYSTEM	100.0	100.0	100.0	87.0			720	632	632	62.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER THE FGD SYSTEM WAS OUT OF SERVICE A FEW HOURS AS A RESULT OF A BOILER TUBE LEAK.

7/81	SYSTEM	100.0	100.0	100.0	91.0			744	678	678	65.0
8/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	69.0
9/81	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	71.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS TAKEN OUT OF SERVICE TWICE DURING THE THIRD QUARTER AS A RESULT OF BOILER TUBE LEAKS.

10/81	SYSTEM	100.0	100.0	100.0	92.0			744	690	690	71.0
11/81	SYSTEM	100.0	100.0	100.0	95.0			720	686	686	69.0
12/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	79.0

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER TUBE LEAKS CONTINUED TO BE A PROBLEM DURING THE FOURTH QUARTER.

THE FGD SYSTEM WAS OUT OF SERVICE FOR A SHORT PERIOD SO THAT THE BOILER AIR PREHEATER COULD BE CLEANED.

1/82	SYSTEM	100.0	100.0	100.0	99.2			744	738	738	88.2

UTILITY FGD SURVEY: OCTOBER 1983 - SEPTEMBER 1984

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
2/82	SYSTEM	100.0	100.0	100.0	96.4			672	648	648	84.3
3/82	SYSTEM	100.0	100.0	100.0	91.9			744	684	684	72.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER 1982.

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 APRIL 1982 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 1982 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										
11/83	SYSTEM							720			
12/83	SYSTEM							744			

NORTHERN STATES POWER: SHERBURNE 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										
	INFORMATION WAS NOT AVAILABLE 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 UNAVAILABLE FOR THE FIRST THREE QUARTERS OF 1984.										

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NORTHERN STATES POWER	
PLANT NAME	SHERBURNE	
UNIT NUMBER	2	
CITY	BECKER	
STATE	MINNESOTA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	37.	(.087 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	413.	(.960 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1420	
GROSS UNIT GENERATING CAPACITY - MW	750	
NET UNIT GENERATING CAPACITY W/FGD - MW	710	
NET UNIT GENERATING CAPACITY WO/FGD - MW	740	
EQUIVALENT SCRUBBED CAPACITY - MW	750	
** 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	1349.16	(2859000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	154.4	(310 F)
STACK HEIGHT - M	198.	(650 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	9.9	(32.6 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	19538.	(8400 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8300-8500
AVERAGE ASH CONTENT - %	9.00	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	25.00	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	.80	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	.03	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	0	
TYPE	NONE	
** PARTICLE SCRUBBER		
NUMBER	12	
NUMBER OF SPARES	2	
INITIAL START-UP DATE	4/77	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/VERTICALLY-ADJUSTABLE ROD DECKS	
TRADE NAME/COMMON NAME	ROD SCRUBBER	
SUPPLIER	COMBUSTION ENGINEERING	
DIMENSIONS - FT	3.0 X 25.5	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
LINER GENERIC MATERIAL	NONE	
LINER SPECIFIC MATERIAL	N/A	
GAS CONTACTING DEVICE TYPE	TYPE 304 STAINLESS STEEL RODS	
NUMBER OF CONTACTING ZONES	2	
LIQUID RECIRCULATION RATE - LITER/S	223.0	(3540 GPM)
L/G RATIO - LITER/CU.M	1.8	(13.6 GAL/1000ACF)
PRESSURE DROP - KPA	3.5	(14.0 IN-H2O)
SUPERFICIAL GAS VELOCITY - M/S	24.4	(80.0 FT/S)
INLET GAS FLOW RATE - CU.M/S	122.6	(259900 ACFM)

NORTHERN STATES POWER: SHERBURNE 2 (CONT.)

INLET GAS TEMPERATURE - C	154.4	(310 F)
PARTICLE REMOVAL EFFICIENCY - %	99.0	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE/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 - %	99.00
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	50.00
ENERGY CONSUMPTION - %	4.0
CURRENT STATUS	1
COMMERCIAL START-UP	4/77
INITIAL START-UP	3/77
CONTRACT AWARDED	0/71

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	.70	
DESIGN COAL HEAT CONTENT - J/G	19305.8	(8300 BTU/LB)
DESIGN COAL ASH CONTENT - %	9.00	
DESIGN MOISTURE CONTENT - %	28.00	
SPACE REQUIREMENTS - SQ M	1312.0	(14123 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	212.0	

** QUENCHER/PRESATURATOR

NUMBER	0

** ABSORBER

NUMBER	12	
NUMBER OF SPARES	2	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	COMBUSTION ENGINEERING	
DIMENSIONS - FT	18 X 26.5 X 60	
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 151	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	378.	(6000 GPM)
L/G RATIO - L/CU.M	2.9	(21.8 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	129.77	(275000 ACFM)
INLET GAS TEMPERATURE - C	54.4	(130 F)
SO2 REMOVAL EFFICIENCY - %	50.0	
PARTICLE REMOVAL EFFICENCY - %	99.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	12	
NUMBER OF SPARES PER SYSTEM	2	
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	3	
FREEBOARD DISTANCE - M	3.20	(10.5 FT)
DISTANCE BETWEEN STAGES - CM	25.40	(10.0 IN)

NORTHERN STATES POWER: SHERBURNE 2 (CONT.)

DISTANCE BETWEEN VANES - CM	10.2	(4.00 IN)
PRESSURE DROP - KPA	.1	(.5 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	MAKE-UP WATER	
WASH FREQUENCY	ONCE PER 24 HRS	
WASH RATE - L/S	126.2	(2000 GAL/MIN)

** REHEATER

NUMBER	12	
NUMBER OF SPARES	2	
NUMBER PER MODULE	1	
GENERIC TYPE	IN-LINE	
SPECIFIC TYPE	HOT WATER	
TRADE NAME/COMMON TYPE	FIN TUBE	
LOCATION	10 FT ABOVE ME	
TEMPERATURE INCREASE - C	22.2	(40 F)
INLET FLUE GAS FLOW RATE - CU. M/S	94.38	(200000 ACFM)
INLET FLUE GAS TEMPERATURE - C	54.4	(130 F)
OUTLET FLUE GAS TEMPERATURE - C	76.7	(170 F)
NUMBER OF HEAT EXCHANGER BANKS	4	
NUMBER OF TUBES PER BUNDLE	45	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** FANS

NUMBER	4	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FAN	
FUNCTION	UNIT	
APPLICATION	INDUCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	94.38	(200000 ACFM)
FLUE GAS TEMPERATURE - C	76.7	(170 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

GENERIC TYPE	BUTTERFLY
SPECIFIC TYPE	N/A
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

GENERIC TYPE	BUTTERFLY
SPECIFIC TYPE	N/A
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
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	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	REHEATER TO STACK
SHELL GENERIC MATERIAL TYPE	CARBON STEEL

NORTHERN STATES POWER: SHERBURNE 2 (CONT.)

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	ALLIS CHALMERS
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	21.8 (24 TPH)
PRODUCT QUALITY - % SOLIDS	65.0

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	12
MAKEUP WATER	1
REAGENT PREP PRODUCT	4

** PUMPS

SERVICE	NUMBER
POND RETURN	1
THICKENER UNDERFLOW	1
MAKEUP WATER	1
REHEAT WATER	2
SCRUBBER RECIRCULATION	2
ABSORBER RECIRCULATION	12
LIMESTONE CLASSIFIER RECYCLE	****
LIMESTONE DILUTION	****
LIMESTONE SLURRY TRANSFER	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	2
NUMBER OF SPARES	1
DIMENSIONS - FT	160.0 DIA X 10.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
FEED STREAM SOURCE	ABSORBER BLEED
FEED STREAM CHARACTERISTICS	10% SOLIDS
OUTLET STREAM CHARACTERISTICS	28% SOLIDS
OUTLET STREAM DISPOSITION	POND
OVERFLOW STREAM DISPOSITION	LIMESTONE SLURRY TRANSFER TANK

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION
DEVICE	REACTION TANK
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	CLAY LINING
SITE DIMENSIONS	62 ACRES X 50 FT
SITE CAPACITY - CU.M	3791300 (3100.0 ACRE-FT)

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	SLURRY PH, SO2
PHYSICAL VARIABLES	PRESSURE DROP, PERCENT SOLIDS, TANK LEVELS
CONTROL LEVELS	PRESSURE DROP 12 IN H2O, 10% SOLIDS, PH=5-5.5

NORTHERN STATES POWER: SHERBURNE 2 (CONT.)

MONITOR TYPE	DUPONT [SO2]
MONITOR LOCATION	BOILER OUTLET & ON MODULES [SO2]
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	OPEN
RECEIVING WATER STREAM	MISSISSIPPI RIVER
SOURCE OF MAKEUP WATER	RIVER WATER & COOLING TOWER BLOWDOWN

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	95% CACO3
CONSUMPTION	3.0-3.5 TPH
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - % 9.0

** 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
4/77	201		.0		.0						
	202		95.0		91.9						
	203		93.3		90.3						
	204		87.4		84.6						
	205		82.6		80.0						
	206		83.8		81.1						
	207		93.7		90.7						
	208		73.9		71.5						
	209		90.5		87.6						
	210		86.8		84.0						
	211		84.7		81.9						
	212		85.5		82.8						
	SYSTEM	92.0	87.0		84.2	57.50	99.00	720	697	590	83.0
5/77	201		32.9		28.5						
	202		100.0		86.6						
	203		44.4		38.4						
	204		94.6		81.9						
	205		93.9		81.3						
	206		100.0		86.6						
	207		75.9		65.7						
	208		98.0		84.8						
	209		93.9		81.3						
	210		92.2		79.8						
	211		91.2		78.9						
	212		97.8		84.7						
	SYSTEM	91.0	92.3		79.9			744	644	594	76.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM BEGAN OPERATIONS IN APRIL 1977. ONLY MINOR PROBLEMS OCCURRED DURING APRIL AND MAY. THE SYSTEM IS CURRENTLY IN A SHAKEDOWN PHASE OF OPERATION.

6/77	201	92.0	92.0	
	202	76.0	76.0	
	203	78.0	78.0	
	204	79.0	79.0	
	205	89.0	89.0	
	206	74.0	74.0	

NORTHERN STATES POWER: SHERBURNE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
	207		67.0		67.0						
	208		88.0		88.0						
	209		88.0		88.0						
	210		78.0		78.0						
	211		45.0		45.0						
	212		85.0		85.0						
	SYSTEM	96.0	85.4		85.4			720	720	615	79.5

** PROBLEMS/SOLUTIONS/COMMENTS

CRACKING AND BUBBLING OF THE CEILCOTE LINING HAS BEEN OBSERVED ABOVE THE LIQUID LEVEL OF THE INTERNAL RECYCLE TANK.

7/77	201		96.0		78.0						
	202		87.0		70.0						
	203		86.0		70.0						
	204		97.0		79.0						
	205		96.0		78.0						
	206		88.0		71.0						
	207		88.0		71.0						
	208		95.0		77.0						
	209		57.0		46.0						
	210		93.0		75.0						
	211		94.0		76.0						
	212		87.0		70.0						
	SYSTEM	97.0	96.7		78.3			744	602	531	69.6
8/77	201		88.0		80.0						
	202		75.0		68.0						
	203		67.0		61.0						
	204		82.0		74.0						
	205		84.0		76.0						
	206		35.0		32.0						
	207		81.0		74.0						
	208		80.0		73.0						
	209		56.0		51.0						
	210		79.0		72.0						
	211		71.0		64.0						
	212		33.0		30.0						
	SYSTEM	93.0	75.6		68.6			744	675	510	66.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE SPRAY PUMPS WERE OVERHAULED DURING AUGUST ON MODULES 206 AND 209.

THE SPRAY NOZZLES ON MODULES 206 AND 209 REQUIRED EXTENSIVE CLEANING.

9/77	201		89.0		89.0						
	202		61.0		61.0						
	203		82.0		82.0						
	204		90.0		90.0						
	205		81.0		81.0						
	206		86.0		86.0						
	207		52.0		52.0						
	208		88.0		88.0						
	209		56.0		56.0						
	210		87.0		87.0						
	211		73.0		73.0						
	212		86.0		86.0						
	SYSTEM	94.0	84.6		84.6			720	717	609	79.4

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE STRAINERS IN THE MODULE 207 AND 209 REACTION TANKS HAVE STARTED ERODING. THE UTILITY ANTICIPATES REPLACING THEM VERY SOON.

10/77	201		98.0	90.0						
	202		89.0	82.0						
	203		87.0	80.0						
	204		86.0	79.0						
	205		62.0	57.0						
	206		99.0	91.0						
	207		98.0	90.0						
	208		93.0	86.0						
	209		96.0	88.0						
	210		96.0	88.0						
	211		70.0	64.0						
	212		81.0	75.0						
	SYSTEM	95.0	95.9	88.2		744	684	656	81.6	

** PROBLEMS/SOLUTIONS/COMMENTS

THE LOW OPERABILITIES ARE DUE TO SPRAY WATER PUMP OVERHAULS. 24 PUMPS ARE BEING OVERHAULED.

STRAINER/WASHER SCREEN EROSION HAS BEEN A PROBLEM. 316 SS MATERIAL WILL BE USED IN THE FUTURE. REPLACEMENT MATERIAL IS EXPECTED TO ARRIVE IN DECEMBER AND WORK IS EXPECTED TO LAST FOR THREE MONTHS.

11/77	201		85.0	84.0						
	202		93.0	92.0						
	203		68.0	68.0						
	204		80.0	79.0						
	205		93.0	92.0						
	206		73.0	73.0						
	207		75.0	75.0						
	208		66.0	66.0						
	209		94.0	93.0						
	210		77.0	77.0						
	211		91.0	90.0						
	212		65.0	65.0						
	SYSTEM	91.0	87.3	86.7		720	715	624	81.7	
12/77	201		53.0	52.0						
	202		93.0	92.0						
	203		94.0	93.0						
	204		87.0	86.0						
	205		89.0	88.0						
	206		95.0	94.0						
	207		93.0	92.0						
	208		83.0	82.0						
	209		62.0	61.0						
	210		82.0	81.0						
	211		90.0	89.0						
	212		92.0	91.0						
	SYSTEM	93.0	92.1	91.0		744	733	677	80.6	
1/78	201		91.0	83.0						
	202		75.0	69.0						
	203		64.0	59.0						
	204		72.0	66.0						
	205		74.0	68.0						
	206		67.0	61.0						

NORTHERN STATES POWER: SHERBURNE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	207		91.0		83.0						
	208		88.0		81.0						
	209		77.0		71.0						
	210		72.0		66.0						
	211		73.0		70.0						
	212		84.0		77.0						
	SYSTEM	92.0	84.4		77.6			744	682	577	70.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE REPLACEMENT OF STRAINER SCREENS BEGAN ON DECEMBER 21. FOUR TO SIX DAYS OF WORK ON EACH MODULE ARE REQUIRED TO MAKE STRAINER SCREEN REPLACEMENTS.

2/78	201		83.0		77.0						
	202		85.0		78.0						
	203		55.0		51.0						
	204		91.0		84.0						
	205		89.0		82.0						
	206		76.0		70.0						
	207		71.0		66.0						
	208		89.0		82.0						
	209		85.0		78.0						
	210		81.0		75.0						
	211		97.0		90.0						
	212		60.0		55.0						
	SYSTEM	92.0	87.4		80.7			672	620	542	73.8

** PROBLEMS/SOLUTIONS/COMMENTS

STRAINER MODIFICATIONS WERE PERFORMED ON MODULES 203 AND 212.

3/78	201		82.0		82.0						
	202		92.0		92.0						
	203		90.0		90.0						
	204		83.0		83.0						
	205		78.0		78.0						
	206		85.0		85.0						
	207		91.0		91.0						
	208		62.0		62.0						
	209		83.0		83.0						
	210		78.0		78.0						
	211		88.0		88.0						
	212		89.0		89.0						
	SYSTEM	97.0	91.0		91.0			744	744	677	87.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT GENERATED MAXIMUM MEGAWATT-HOURS AND THE FGD SYSTEM TIED THE HIGHEST RECORDED AVAILABILITY OF 97%.

STRAINER MODIFICATIONS WERE PERFORMED ON MODULES 208 AND 210.

4/78	201		70.0		70.0						
	202		82.0		82.0						
	203		90.0		90.0						
	204		84.0		84.0						
	205		91.0		91.0						
	206		83.0		83.0						
	207		84.0		84.0						
	208		86.0		86.0						
	209		78.0		78.0						
	210		90.0		90.0						

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	211		67.0		67.0						
	212		85.0		85.0						
	SYSTEM	92.0	90.0		90.0			720	719	648	81.9

** PROBLEMS/SOLUTIONS/COMMENTS

FROM FULL SCALE STARTUP ON APRIL 1, THE SYSTEM HAS BEEN OPERATING VERY WELL WITH NO MAJOR PROBLEMS ENCOUNTERED. THE UTILITY IS MAINTAINING A SCHEDULE OF NIGHTLY CLEANING ON THE SCRUBBERS. THE CURRENT SCHEME IS SUCH THAT EACH MODULE IS CLEANED AFTER SEVEN OR EIGHT DAYS OF OPERATION.

MODULE 201 WAS CONVERTED TO A SPRAY TOWER DURING APRIL.

5/78	201		97.0		16.0						
	202		94.0		15.0						
	203		80.0		13.0						
	204		90.0		15.0						
	205		90.0		15.0						
	206		89.0		14.0						
	207		90.0		15.0						
	208		92.0		15.0						
	209		28.0		5.0						
	210		91.0		15.0						
	211		78.0		13.0						
	212		14.0		2.0						
	SYSTEM	91.0	84.8		13.9			744	120	103	12.7

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE LINER FAILURES (CEILCOTE) IN MOST OF THE MODULES DURING APRIL AND MAY. THE LINERS WERE REPAIRED BY THE CEILCOTE COMPANY AT THEIR OWN EXPENSE.

THE UNIT WENT DOWN ON MAY 6 FOR THE FIRST YEAR BOILER AND TURBINE INSPECTION AND WAS DOWN THE REMAINDER OF MAY.

6/78	201		77.0		61.0						
	202		46.0		37.0						
	203		41.0		33.0						
	204		67.0		53.0						
	205		62.0		49.0						
	206		62.0		49.0						
	207		72.0		57.0						
	208		78.0		62.0						
	209		60.0		48.0						
	210		62.0		49.0						
	211		76.0		60.0						
	212		75.0		60.0						
	SYSTEM	95.0	70.7		56.2			720	572	405	61.3
7/78	201		87.0		82.0						
	202		89.0		83.0						
	203		62.0		58.0						
	204		93.0		87.0						
	205		90.0		84.0						
	206		64.0		60.0						
	207		86.0		81.0						
	208		67.0		63.0						
	209		64.0		60.0						
	210		81.0		76.0						
	211		73.0		68.0						
	212		71.0		67.0						
	SYSTEM	95.0	84.3		79.0			744	697	588	71.5

NORTHERN STATES POWER: SHERBURNE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
8/78	201		88.0		82.0						
	202		100.0		93.0						
	203		48.0		45.0						
	204		79.0		74.0						
	205		81.0		76.0						
	206		72.0		67.0						
	207		64.0		60.0						
	208		87.0		81.0						
	209		54.0		50.0						
	210		76.0		71.0						
	211		80.0		75.0						
	212		71.0		66.0						
	SYSTEM	93.0	81.8		76.4			744	695	569	69.8
9/78	201		72.0		72.0						
	202		82.0		82.0						
	203		70.0		70.0						
	204		61.0		61.0						
	205		74.0		74.0						
	206		64.0		64.0						
	207		82.0		82.0						
	208		72.0		72.0						
	209		75.0		75.0						
	210		78.0		78.0						
	211		82.0		82.0						
	212		68.0		68.0						
	SYSTEM	96.0	80.0		80.0			720	720	576	74.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY IS EVALUATING NEW RUBBER LINED PUMPS (8000 GPM) AS POSSIBLE SOLUTIONS TO THE MIST ELIMINATOR AND REHEATER PLUGGING PROBLEMS.

THE UTILITY IS EVALUATING NEW STAINLESS STEEL MIST ELIMINATOR WASH LANCES (TO REPLACE ORIGINAL FIBERGLASS LANCES).

THE FGD SYSTEM HAS BEEN EXPERIENCING PRIMARY CONTACTOR WALL AND MARBLE BED WEAR.

THE UTILITY IS PREPARING FOR THE STATE COMPLIANCE DEADLINE ON NOVEMBER 1. CURRENTLY TESTING HAS BEEN PROCEEDING ON DIFFERENT MODULES IN AN EFFORT TO FINE TUNE THE SYSTEM.

PLUGGING PROBLEMS IN THE REHEATER HAVE BEEN MORE FREQUENT THAN NORMAL.

THE UTILITY IS IN THE PROCESS OF REPLACING THE ORIGINAL ZURN DUPLEX STRAINERS WITH 316 SS STRAINERS.

THE INLET SEAL STRIPS WERE REPAIRED.

PLUGGING PROBLEMS IN THE MIST ELIMINATOR HAVE BEEN MORE FREQUENT THAN NORMAL.

** PROBLEMS/SOLUTIONS/COMMENTS

THE RUBBER LINED PUMPS THAT THE UTILITY WAS INVESTIGATING HAVE BEEN ORDERED. FOUR OF THE PUMPS HAVE BEEN RECEIVED AND ONE IS INSTALLED. THE OTHERS WILL BE INSTALLED AS THEY ARE RECEIVED.

DIFFERENT MIST ELIMINATOR SPRAY PATTERNS ARE BEING TESTED TO MINIMIZE PLUGGING OCCURRENCES.

NO FGD RELATED OUTAGES WERE REPORTED BY THE UTILITY FOR THE AUGUST-

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
			SEPTEMBER REPORT PERIOD.								
10/78	201		90.0		83.0						
	202		79.0		73.0						
	203		59.0		55.0						
	204		73.0		68.0						
	205		69.0		64.0						
	206		64.0		59.0						
	207		78.0		72.0						
	208		76.0		70.0						
	209		72.0		67.0						
	210		69.0		64.0						
	211		72.0		67.0						
	212		82.0		76.0						
	SYSTEM	94.0	80.3		74.4			744	688	553	68.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER MODULE 203 EXPERIENCED STRAINER PLUGGING.

DURING OCTOBER MODULE 203 EXPERIENCED REHEATER PROBLEMS WHICH TOGETHER WITH STRAINER PLUGGING CAUSED A FOUR TO FIVE DAY OUTAGE.

11/78	201		84.0		55.0						
	202		45.0		30.0						
	203		82.0		54.0						
	204		80.0		52.0						
	205		75.0		49.0						
	206		58.0		38.0						
	207		77.0		51.0						
	208		75.0		49.0						
	209		83.0		54.0						
	210		83.0		54.0						
	211		72.0		47.0						
	212		47.0		31.0						
	SYSTEM	92.0	78.3		51.3			720	472	369	44.6

** PROBLEMS/SOLUTIONS/COMMENTS

LOW NOVEMBER BOILER HOURS RESULTED FROM A NECESSARY TURBINE INSPECTION.

NORMAL OVERHAUL MAINTENANCE WAS PERFORMED ON THE SPRAY PUMPS OF MODULES 202 AND 212.

12/78	201		85.0		84.0						
	202		92.0		91.0						
	203		89.0		88.0						
	204		84.0		83.0						
	205		84.0		83.0						
	206		84.0		83.0						
	207		96.0		95.0						
	208		88.0		87.0						
	209		78.0		77.0						
	210		92.0		91.0						
	211		81.0		80.0						
	212		94.0		93.0						
	SYSTEM	94.0	95.2		94.0			744	733	698	74.0
1/79	201		57.0		53.0						
	202		89.0		82.0						
	203		91.0		84.0						
	204		85.0		79.0						
	205		92.0		85.0						

NORTHERN STATES POWER: SHERBURNE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	206		82.0		76.0						
	207		75.0		69.0						
	208		97.0		90.0						
	209		74.0		68.0						
	210		88.0		81.0						
	211		100.0		92.0						
	212		90.0		83.0						
	SYSTEM	94.0	92.7		85.6			744	688	638	66.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE PROBLEMS ENCOUNTERED IN DECEMBER AND JANUARY WERE MAINLY WEATHER RELATED.

THERE WERE PROBLEMS WITH THE COAL FEEDER BELTS RESULTING IN MOVING WET COAL FROM OLDER COAL STOCKPILES TO THE BOILER DURING THE DECEMBER-JANUARY PERIOD.

2/79	201		86.0		86.0						
	202		84.0		84.0						
	203		73.0		73.0						
	204		89.0		89.0						
	205		59.0		59.0						
	206		76.0		76.0						
	207		72.0		72.0						
	208		68.0		68.0						
	209		80.0		80.0						
	210		75.0		75.0						
	211		92.0		92.0						
	212		65.0		65.0						
	SYSTEM	93.0	83.6		83.5			672	671	561	66.2
3/79	201		85.0		85.0						
	202		69.0		69.0						
	203		78.0		78.0						
	204		47.0		47.0						
	205		71.0		71.0						
	206		76.0		76.0						
	207		90.0		90.0						
	208		78.0		78.0						
	209		50.0		50.0						
	210		85.0		85.0						
	211		57.0		57.0						
	212		86.0		86.0						
	SYSTEM	91.0	79.3		79.3			744	744	590	53.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE ONLY PROBLEMS ENCOUNTERED DURING FEBRUARY AND MARCH WERE BOILER-RELATED PROBLEMS RESULTING FROM WET COAL.

THE RECYCLE PUMPS ARE BEING REPLACED WITH LARGER 8000 GPM WORTHINGTON PUMPS. DURING THIS PERIOD THE PUMPS WERE INSTALLED ON MODULES 204 AND 206.

4/79	SYSTEM	95.0						720	717		71.8

** PROBLEMS/SOLUTIONS/COMMENTS

AS OF APRIL 1979 THE UTILITY HAS DECIDED THAT IT WILL ONLY REPORT THE AVAILABILITY OF THE TOTAL SYSTEM FOR THIS REPORT.

5/79	SYSTEM	99.0						744	263		28.1

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE LOW BOILER HOURS IN MAY WERE DUE TO COMMENCEMENT OF THE ANNUAL BOILER AND TURBINE INSPECTION.

ALL PIPING HAS BEEN CHANGED TO FIBERGLASS.

6/79	SYSTEM	90.0						720	454		38.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE ONLY PROBLEM REPORTED BY THE UTILITY WAS THE LOSS OF A BOILER SURGE PUMP AFTER THE UNIT RESTARTED.

7/79	SYSTEM	95.0						744	741		78.9
8/79	SYSTEM	96.0						744	740		72.3
9/79	SYSTEM	95.0						720	657		68.9

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR OPERATIONAL PROBLEMS HAVE BEEN ENCOUNTERED WITH THIS UNIT SINCE IT CAME BACK ON LINE AFTER THE ANNUAL BOILER/TURBINE OVERHAUL IN MAY.

10/79	SYSTEM	94.0						744	732		
11/79	SYSTEM	97.0						720	719		
12/79	SYSTEM	97.0						744	662		

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR BOILER OR FGD OPERATIONAL PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER OF 1979.

1/80	SYSTEM	97.0						744	744		90.1
2/80	SYSTEM	96.0						696	696		91.8
3/80	SYSTEM	98.0						744	744		91.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER OF 1980 THE FGD SYSTEM EXPERIENCED NO MAJOR PROBLEMS.

A FOUR WEEK BOILER OUTAGE IS SCHEDULED FOR MAY AT WHICH TIME THE MARBLE BEDS WILL BE REMOVED FROM THE FGD SYSTEM.

THE UTILITY HAS DECIDED TO CONVERT THE ENTIRE MARBLE BED SCRUBBING SYSTEM TO A SPRAY TOWER SYSTEM BY REMOVING THE MARBLE BEDS AND MODIFYING THE SPRAY ARRANGEMENT. TESTS CONDUCTED AT UNIT 1 IN 1978 AND 1979 SHOW THAT MOST OF THE SO2 IS COLLECTED IN THE VENTURI SECTION OF THE SCRUBBING TRAINS AND THAT ALTHOUGH THE MARBLE BEDS IN THE ABSORBER SECTIONS IMPROVE INTIMATE SO2/SLURRY MIXING, SO2 REMOVAL EFFICIENCY OF THE SCRUBBING TRAINS IS NOT MARKEDLY DIFFERENT WHEN MARBLE BEDS ARE REMOVED.

4/80	SYSTEM	96.0						720	704		68.6

NORTHERN STATES POWER: SHERBURNE 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 MAJOR OPERATIONAL PROBLEMS WERE ENCOUNTERED IN APRIL.									
5/80	SYSTEM	96.0						744	214		24.2
6/80	SYSTEM	100.0						720	51		2.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS OUT OF SERIVE MOST OF MAY AND JUNE BECAUSE OF THE ANNUAL BOILER AND TURBINE INSPECTION.									
7/80	SYSTEM	100.0	100.0	100.0	82.7			744	615	615	63.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BOILER TUBE LEAKS CAUSED THE BOILER NOT TO OPERATE FOR 73 HOURS IN JULY.									
		BOTTOM ASH PLUGGING ALSO FORCED THE BOILER DOWN FOR 56 HOURS.									
8/80	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	70.7
9/80	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	100.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER AND FGD SYSTEM RAN CONTINUOUSLY THROUGH AUGUST AND SEPTEMBER WITHOUT ANY PROBLEMS.									
10/80	SYSTEM	100.0	100.0	100.0	99.7			744	742	742	81.9
11/80	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	82.2
12/80	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	79.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE OCTOBER-DECEMBER PERIOD THE FGD SYSTEM WAS AVAILABLE 100% OF THE TIME.									
1/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	76.5
2/81	SYSTEM	100.0	100.0	100.0	98.8			672	664	664	77.0
3/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	78.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.									
		WORK IS CONTINUING ON CONVERTING THE MARBLE BED SCRUBBING SYSTEM TO A SPRAY TOWER SYSTEM. SEVEN OF THE TWELVE ABSORBERS ARE COMPLETED.									
4/81	SYSTEM	100.0	100.0	100.0	80.0			720	579	579	61.0
5/81	SYSTEM	100.0	100.0	100.0	91.0			744	679	679	69.0
6/81	SYSTEM	100.0	100.0	100.0	99.0			720	713	713	73.0

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE SECOND QUARTER THE FGD SYSTEM WAS OUT OF SERVICE A FEW HOURS AS A RESULT OF A BOILER TUBE LEAK.									
7/81	SYSTEM	100.0	100.0	100.0	99.0			744	741	741	72.0
8/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	70.0
9/81	SYSTEM	100.0	100.0	100.0	85.0			720	616	616	58.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM WAS TAKEN OUT OF SERVICE TWICE DURING THE THIRD QUARTER AS A RESULT OF BOILER TUBE LEAKS.									
10/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	79.0
11/81	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	73.0
12/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	79.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BOILER TUBE LEAKS CONTINUED TO BE A PROBLEM DURING THE FOURTH QUARTER.									
1/82	SYSTEM	100.0	100.0	100.0	94.4			744	702	702	82.9
2/82	SYSTEM	100.0	100.0	100.0	17.6			672	118	118	16.1
3/82	SYSTEM	100.0	100.0	100.0	51.9			744	386	386	37.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER 1982. HOWEVER, THE UNIT WAS DOWN MOST OF FEBRUARY AND PART OF MARCH FOR A SCHEDULED BOILER/TURBINE INSPECTION.									
4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SECOND QUARTER 1982 UPDATE INFORMATION IS NOT AVAILABLE AT THIS 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			

NORTHERN STATES POWER: SHERBURNE 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 APRIL 1982 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 1982 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										
11/83	SYSTEM							720			
12/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS NOT AVAILABLE 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 UNAVAILABLE FOR THE FIRST THREE QUARTERS OF 1984.										

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PACIFIC POWER & LIGHT	
PLANT NAME	JIM BRIDGER	
UNIT NUMBER	4	
CITY	ROCK SPRINGS	
STATE	WYOMING	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	86.	(.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	2034	
GROSS UNIT GENERATING CAPACITY - MW	550	
NET UNIT GENERATING CAPACITY W/FGD - MW	508	
NET UNIT GENERATING CAPACITY WO/FGD - MW	509	
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	1283.57	(2720000 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	21632.	(9300 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	9.00	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	18.00	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	.56	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	.01	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** ESP		
TYPE	COLD SIDE	
SUPPLIER	CARBORUNDUM	
INLET FLUE GAS CAPACITY - CU.M/S	1099.9	(2330890 ACFM)
INLET FLUE GAS TEMPERATURE - C	121.1	(250 F)
PARTICLE REMOVAL EFFICENCY - %	99.0	
** 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	SODIUM CARBONATE	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	AIR CORRECTION DIVISION, UOP	
A-E FIRM	BECHTEL	
DEVELOPMENT LEVEL	FULL SCALE	

PACIFIC POWER & LIGHT: JIM BRIDGER 4 (CONT.)

NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.00
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	91.00
ENERGY CONSUMPTION - %	.2
CURRENT STATUS	1
COMMERCIAL START-UP	2/80
INITIAL START-UP	9/79
CONTRACT AWARDED	10/76

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	3
GENERIC TYPE	TRAY TOWER
SPECIFIC TYPE	SIEVE TRAY
TRADE NAME/COMMON TYPE	N/A
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	NATURAL RUBBER
LINER MATERIAL TRADE NAME/COMMON TYPE	BLACK NATURAL RUBBER
GAS CONTACTING DEVICE TYPE	PERFORATED TRAY
NUMBER OF CONTACTING ZONES	1
L/G RATIO - L/CU.M	2.7 (20.0 GAL/1000 ACF)
SO2 REMOVAL EFFICIENCY - %	91.0

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
VANE ANGLES - DEGREES	45
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** REHEATER

GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
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

PACIFIC POWER & LIGHT: JIM BRIDGER 4 (CONT.)

** REAGENT PREPARATION EQUIPMENT

FUNCTION	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK

** PUMPS

SERVICE	NUMBER
-------	------
ABSORBER RECIRCULATION	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
OUTLET STREAM CHARACTERISTICS	18% SOLIDS

*** SLUDGE

** TREATMENT

METHOD	THICKENED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	CLAY LINING
SITE SERVICE LIFE - YRS	11

** WATER BALANCE

WATER LOOP TYPE	CLOSED

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.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

THE UNIT STARTED OPERATIONS AS SCHEDULED IN SEPTEMBER 1979. PRESENTLY THE FGD SYSTEM IS IN THE START UP PHASE WITH COMMERCIAL OPERATION SCHEDULED FOR DECEMBER.

THE UTILITY IS IN THE PROCESS OF CHECKING INTERLOCKS AND OTHER COMPONENTS BUILT INTO THE FGD SYSTEM TO PROTECT THE BOILER. FLUE GAS IS PASSING THROUGH MODULES ON AN INDIVIDUAL BASIS. THE FGD SYSTEM WILL NOT BE OPERATED IN AN INTEGRATED MODE UNTIL LATE OCTOBER.

10/79	SYSTEM							744			
11/79	SYSTEM							720			
12/79	SYSTEM							744			

PACIFIC POWER & LIGHT: JIM BRIDGER 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

SHAKEDOWN OPERATIONS CONTINUED THROUGHOUT THE FOURTH QUARTER OF 1979.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT IS STILL IN THE SHAKEDOWN PHASE OF OPERATIONS. A NUMBER OF MECHANICAL PROBLEMS AND SOME CONTROL PROBLEMS HAVE BEEN ENCOUNTERED. NO PROCESS-RELATED PROBLEMS HAVE OCCURRED.

4/80	41		27.5	18.4	22.3	14.2					
	42		24.0	23.9	26.3	18.4					
	43		26.6	34.0	34.2	26.1					
	SYSTEM		26.0	25.4	27.6	19.6		720	553	141	

** PROBLEMS/SOLUTIONS/COMMENTS

ALL THREE MODULES WERE OUT OF SERVICE THE FIRST 21 DAYS OF APRIL WHILE THE UTILITY WAITED FOR DELIVERY OF NEW SPRAY NOZZLES. SOME PLUGGING HAD OCCURRED IN THE ORIGINAL NOZZLES. THE NEW NOZZLES WERE INSTALLED FOR TESTING PURPOSES.

5/80	41		95.2	46.0	92.6	42.9					
	42		72.4	75.1	71.7	70.1					
	43		100.0	81.6	100.0	76.1					
	SYSTEM		89.2	67.6	88.1	63.0		744	694	469	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 42 WAS FORCED OUT OF SERVICE FOR EIGHT DAYS IN MAY WHILE A VORTEX BREAKER WAS INSTALLED IN THE ABSORBER VESSEL. THE VESSEL WAS DRAINING BEFORE REACHING DESIGN FLUID LEVELS.

VORTEX BREAKERS WERE INSTALLED IN MODULES 41 AND 43 AS WELL BUT INSTALLATION IN THESE MODULES WAS NOT UNDERTAKEN DURING PERIODS WHEN MODULE SERVICE WAS REQUIRED.

6/80	41		81.2	77.7	66.5	30.9					
	42		89.2	100.0	85.1	43.2					
	43		86.0	75.0	73.6	29.8					
	SYSTEM		85.5	87.1	75.4	34.6		744	296	258	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN FOR 5 DAYS TO REPAIR A RECIRCULATION PUMP BREAKER ON MODULE 41.

MODULES 41 AND 42 WERE UNAVAILABLE FOR A COMBINED TOTAL OF 6 DAYS DUE TO THE REPLACING OF THE PH CONTROL PIPING.

7/80	41		97.3	67.2	96.0	64.8					
	42		97.4	91.2	97.1	87.8					
	43		99.4	90.2	99.3	86.9					
	SYSTEM		98.0	82.9	97.6	79.8		744	717	594	

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 IN JULY.										
8/80	41	99.7	92.8	99.7	86.1						
	42	94.1	92.3	93.6	85.6						
	43	94.7	68.4	92.4	63.5						
	SYSTEM	96.2	84.5	95.2	78.4			744	690	583	
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO FGD RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF AUGUST.										
9/80	SYSTEM				.0			720	0	0	
10/80	SYSTEM				.0			744	0	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE BOILER AND FGD SYSTEM WERE OUT OF SERVICE DURING THE MONTHS OF SEPTEMBER AND OCTOBER FOR THE ANNUAL BOILER OUTAGE.										
11/80	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO INFORMATION WAS AVAILABLE FOR NOVEMBER 1980.										
12/80	41	100.0	85.9	100.0	77.2						
	42	91.7	74.6	88.9	66.9						
	43	93.0	71.6	90.4	64.2						
	SYSTEM	94.9	77.4	93.1	69.4			744	668	517	
	** PROBLEMS/SOLUTIONS/COMMENTS										
	SCALING PROBLEMS WERE ENCOUNTERED DURING DECEMBER. NO OTHER MAJOR FGD-RELATED PROBLEMS WERE REPORTED FOR THE MONTH.										
1/81	SYSTEM							744	695		
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION FOR THE MONTH OF JANUARY WAS NOT AVAILABLE.										
2/81	41	93.3	83.8	93.7	82.4						
	42	83.9	82.1	88.0	80.8						
	43	31.5	23.6	27.3	23.2						
	SYSTEM	69.6	63.2	69.7	62.1			672	661	417	
	** PROBLEMS/SOLUTIONS/COMMENTS										
	MODULE 43 WAS DOWN FOR APPROXIMATELY 11 DAYS DURING FEBRUARY FOR INSTALLATION OF A NEW PRESATURATOR AND RECYCLE NOZZLES.										
3/81	41	85.3	81.0	83.4	73.4						
	42	70.6	70.6	68.5	64.0						
	43	49.5	42.1	43.0	38.2						
	SYSTEM	68.5	64.6	65.0	58.5			744	674	435	

PACIFIC POWER & LIGHT: JIM BRIDGER 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										
		DURING MARCH, PROBLEMS WERE ENCOUNTERED WITH FLOW METERS AND THERE WAS A LACK OF SPARE PARTS NECESSARY FOR FGD SYSTEM OPERATION.									
4/81	41	3.3	1.2	1.1	1.1						
	42	90.8	88.6	89.0	82.4						
	43	100.0	93.4	99.7	86.9						
	SYSTEM	62.5	61.1	63.3	56.8			720	669	409	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE 41 EXPERIENCED LOW AVAILABILITY DURING APRIL AS A RESULT OF FAILURE OF THE MAG FLOW METER.									
5/81	41	100.0	76.1	100.0	59.1						
	42	.0	.0	.0	.0						
	43	100.0	98.8	100.0	76.7						
	SYSTEM	66.7	58.3	66.7	45.3			744	578	337	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE 42 WAS UNAVAILABLE DURING MAY DUE TO FAILURE OF THE MAG FLOW METER.									
6/81	41	100.0	99.1	99.1	95.1						
	42	100.0	.0		.0						
	43	100.0	98.9	100.0	95.0						
	SYSTEM	100.0	66.0	99.6	63.4			720	691	456	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF JUNE. MODULE 42 WAS NOT IN SERVICE AS A RESULT OF LOW UNIT DEMAND.									
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			

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
					PERFORMANCE DATA						
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 1981 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 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										
				THE UTILITY REPORTED THAT THE FGD SYSTEM WAS DOWN 3 HOURS DURING THE FOURTH QUARTER DUE TO LOW PH IN ABSORBER MODULES 43 AND 44.							
				THE FGD SYSTEM WAS DOWN 2 HOURS DURING THE FOURTH QUARTER DUE TO SODA LIQUOR MAKEUP FLOW PROBLEMS AT MODULE 43.							
				A 4 HOUR FGD SYSTEM OUTAGE OCCURRED DURING THE FOURTH QUARTER DUE TO THE REPAIR OF LEAKS.							
				TOTAL FGD SYSTEM OPERATING TIME DURING THE FOURTH QUARTER WAS REPORTED TO BE 2199 HOURS.							
1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			
4/84	SYSTEM							720			

PACIFIC POWER & LIGHT: JIM BRIDGER 4 (CONT.)

PERFORMANCE DATA											
PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
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 NO MAJOR FGD-RELATED PROBLEMS AROSE DURING THE FIRST THREE QUARTERS OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PENNSYLVANIA POWER	
PLANT NAME	BRUCE MANSFIELD	
UNIT NUMBER	1	
CITY	SHIPPINGPORT	
STATE	PENNSYLVANIA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	15.	(.035 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	258.	(.600 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	2360	
GROSS UNIT GENERATING CAPACITY - MW	917	
NET UNIT GENERATING CAPACITY W/FGD - MW	780	
NET UNIT GENERATING CAPACITY WO/FGD - MW	818	
EQUIVALENT SCRUBBED CAPACITY - MW	917	
** 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	1580.86	(3350000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	140.6	(285 F)
STACK HEIGHT - M	290.	(950 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	5.9	(19.2 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	27912.	(12000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	12.80	
RANGE ASH CONTENT - %	8.0-15.0	
AVERAGE MOISTURE CONTENT - %	7.00	
RANGE MOISTURE CONTENT - %	5.5-8.5	
AVERAGE SULFUR CONTENT - %	3.50	
RANGE SULFUR CONTENT - %	3.0-4.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	0	
TYPE	NONE	
** PARTICLE SCRUBBER		
NUMBER	6	
NUMBER OF SPARES	0	
INITIAL START-UP DATE	12/75	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	FIXED-THROAT/TOP-ENTRY PLUMB BOB	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	GE ENVIRONMENTAL SERVICES	
DIMENSIONS - FT	35.5 DIA X 52.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1258.2	(19971 GPM)
L/G RATIO - LITER/CU.M	4.8	(35.8 GAL/1000ACF)
PH CONTROL ADDITIVE	THIOSORBIC LIME	
PRESSURE DROP - KPA	4.7	(19.0 IN-H2O)
SUPERFICIAL GAS VELOCITY - M/S	61.0	(200.0 FT/S)

PENNSYLVANIA POWER: BRUCE MANSFIELD 1 (CONT.)

INLET GAS FLOW RATE - CU.M/S	263.3	(558000 ACFM)
INLET GAS TEMPERATURE - C	140.6	(285 F)
SO2 REMOVAL EFFICENCY - %	70.0	
PARTICLE REMOVAL EFFICIENCY - %	99.8	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIME
PROCESS ADDITIVES	MAG
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
A-E FIRM	GILBERT/COMMONWEALTH ASSOCIATES
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	92.10
ENERGY CONSUMPTION - %	4.1
CURRENT STATUS	1
COMMERCIAL START-UP	6/76
INITIAL START-UP	12/75
CONTRACT AWARDED	10/74

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	4.70	
DESIGN COAL HEAT CONTENT - J/G	27679.4	(11900 BTU/LB)
DESIGN COAL ASH CONTENT - %	19.70	
OPER. & MAINT. REQUIREMENT - MANHR/DAY	214.0	

** QUENCHER/PRESATURATOR

NUMBER	0

** ABSORBER

NUMBER	6	
NUMBER OF SPARES	0	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	FIXED THROAT	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	GE ENVIRONMENTAL SERVICES	
DIMENSIONS - FT	34.0 DIA X 51.5	
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	GLASS FLAKE-FILLED POLYESTER	
LINER MATERIAL TRADE NAME/COMMON TYPE	RIGIFLAKE 4850	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1112.	(17650 GPM)
L/G RATIO - L/CU.M	5.5	(41.4 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.5	(6.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	30.5	(100.0 FT/S)
INLET GAS FLOW - CU. M/S	201.31	(426600 ACFM)
INLET GAS TEMPERATURE - C	52.8	(127 F)
SO2 REMOVAL EFFICIENCY - %	92.1	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	6	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
MANUFACTURER	HEIL PROCESS EQUIPMENT	
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	

PENNSYLVANIA POWER: BRUCE MANSFIELD 1 (CONT.)

PRESSURE DROP - KPA	.1	(.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	THICKENER OVERFLOW	
WASH FREQUENCY	ONCE EVERY 12 MINUTES	
WASH RATE - L/S	3.8	(60 GAL/MIN)

** FANS

NUMBER	6	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FUEL ECONOMIZER	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	WET	
FLUE GAS FLOW RATE - CU.M/S	263.32	(558000 ACFM)
FLUE GAS TEMPERATURE - C	47.8	(118 F)
PRESSURE DROP - KPA	18.9	(62.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEE;; HIGH ALLOY; HIGH ALLOY; HIGH ALLOY	

** DAMPERS

NUMBER	6	
FUNCTION	SHUT-OFF	
GENERIC TYPE	BUTTERFLY	
SPECIFIC TYPE	N/A	
MANUFACTURER	MOSSER	
SEAL AIR FLOW - CU. M/S	.00	(0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** DAMPERS

NUMBER	6	
FUNCTION	NONE	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	NR	
MANUFACTURER	MOSSER	
SEAL AIR FLOW - CU. M/S	.00	(0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** DAMPERS

NUMBER	6	
FUNCTION	CONTROL	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	NR	
MANUFACTURER	GREEN FAN	
SEAL AIR FLOW - CU. M/S	.00	(0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** 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 TO INOPERABLE REHEATER
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

PENNSYLVANIA POWER: BRUCE MANSFIELD 1 (CONT.)

** DUCTWORK

LOCATION	OUTLET FROM INOPERABLE REHEATER
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	DETENTION
DEVICE TYPE	N/A
MANUFACTURER	DORR-OLIVER
NUMBER	2
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	20.0 (22 TPH)
PRODUCT QUALITY - % SOLIDS	13.5

** TANKS

SERVICE	NUMBER
SCRUBBER RECYCLE	6
ABSORBER RECYCLE	6
THICKENER OVERFLOW	1
CALCILOX ADDITION (MIX)	3
SLAKER TANK	2
SLURRY STORAGE	1

** PUMPS

SERVICE	NUMBER
VENTURI RECIRCULATION	12
SLURRY FEED	4
LIME SLURRY RECIRCULATION	4
ABSORBER RECIRCULATION	12
THICKENER UNDERFLOW	4
THICKENER CLEAR WATER TRANSFER	4
SLUDGE	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
CONFIGURATION	CYLINDRICAL
DIMENSIONS - FT	200.0 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 (WALLS); MAT-REINFO
FEED STREAM SOURCE	PARTICLE SCRUBBER BLEED
FEED STREAM CHARACTERISTICS	10% SOLIDS
OUTLET STREAM CHARACTERISTICS	30% SOLIDS
OUTLET STREAM DISPOSITION	SLUDGE TREATMENT
OVERFLOW STREAM DISPOSITION	PARTICLE SCRUBBER RECYCLE LOOP

*** SLUDGE

** TREATMENT

METHOD	FIXATION
DEVICE	MIX TANK
PROPRIETARY PROCESS	DRAVO (CALCILOX)
INLET QUALITY - %	30.0

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	OFF-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	NONE
SITE DIMENSIONS	1300-1400 ACRES

PENNSYLVANIA POWER: BRUCE MANSFIELD 1 (CONT.)

SITE CAPACITY - CU.M	59927000 (49000.0 ACRE-FT)
SITE SERVICE LIFE - YRS	25

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	INLET SLURRY TO SCRUBBER & ABSORBER
CHEMICAL PARAMETERS	PH
CONTROL LEVELS	PH 7
MONITOR TYPE	UNILOCK
MONITOR LOCATION	SPRAY HEADERS
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	OPEN
RECEIVING WATER STREAM	OHIO RIVER

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	THIOSORBIC LIME
PRINCIPAL CONSTITUENT	90% CAO MIN., 2-6% MGO, MAX. 4% ACID INSOLUBLES
SOURCE/SUPPLIER	DRAVO
UTILIZATION - %	84.0
POINT OF ADDITION	SLAKER

** FGD SPARE CAPACITY INDICES

SCRUBBER - %	.0
ABSORBER - %	.0
MIST ELIMINATOR - %	.0
FAN - %	.0
THICKENER - %	.0

** FGD SPARE COMPONENT INDICES

SCRUBBER	.0
ABSORBER	.0
MIST ELIMINATOR	.0
FAN	.0
THICKENER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/75	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATION (SHAKEDOWN AND DEBUGGING) FOR PART OF THE SYSTEM COMMENCED IN DECEMBER 1975.

0/76 SYSTEM

** PROBLEMS/SOLUTIONS/COMMENTS

SINCE THE UNIT COMMENCED SCRUBBING OPERATIONS A NUMBER OF PROBLEM AREAS HAVE BEEN ENCOUNTERED. MAJOR AREAS OF CONCERN ARE SPECIFIED BELOW:

1. EXCESSIVE MAINTENANCE PROBLEMS WITH THE WET ID FAN HOUSINGS.
2. EXCESSIVE WATER ENTRAINMENT AND CARRY OVER OUT OF THE STACK CAUSING A STACK RAIN PROBLEM.
3. REHEAT BURNER PROBLEMS.
4. STACK FLUE LINER FAILURES.

1/76 SYSTEM 744

PENNSYLVANIA POWER: BRUCE MANSFIELD 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 UNIT SHUT DOWN FOR ONE WEEK DUE TO PLUGGED MIST ELIMINATORS.

AN ID FAN HOUSING VIBRATION CAUSED PART OF THE ONE WEEK OUTAGE, ALONG WITH THE MIST ELIMINATOR PROBLEMS.

2/76	SYSTEM							696			
3/76	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

FIRST ATTEMPTS AT STARTING UP THE REHEAT BURNERS WERE MADE THIS MONTH. SO MANY PROBLEMS WERE ENCOUNTERED THAT THE SYSTEM SUPPLIER IS GOING TO REDESIGN NEW REHEAT BURNERS.

4/76	SYSTEM							720	506		

** PROBLEMS/SOLUTIONS/COMMENTS

THE INSTALLATION BEGAN PARTIAL COMMERICAL OPERATION ON APRIL 5.

TOTAL OPERATING HOURS ACCUMULATED TO DATE ARE AS FOLLOWS: 0, 210, 984, 2147, 2808, AND 2427 FOR MODULES A THROUGH F RESPECTIVELY. THE SCRUBBING SYSTEM IS CURRENTLY HANDLING FLUE GAS AT A TOTAL EQUIVALENT CAPACITY OF APPROXIMATELY 640 MW (GROSS).

5/76	A			35.1		28.1					
	B			100.0		81.3					
	C			99.5		79.6					
	D			82.7		66.1					
	E			100.0		83.6					
	F			82.9		66.3					
	SYSTEM		80.0	83.4		67.5		744	595	502	

** PROBLEMS/SOLUTIONS/COMMENTS

THE LAST SCRUBBER TRAIN WAS PLACED IN SERVICE DURING THE MONTH. DURING OFF PEAK HOURS ON THE WEEKENDS WHEN THE UNIT IS OPERATING AT REDUCED LOADS, MAINTENANCE IS PERFORMED ON THE SHUT DOWN FGD MODULES SO THAT THEY WILL BE IN OPERATING CONDITION FOR FULL LOAD OPERATION DURING THE HIGH DEMAND.

6/76	A			99.2		99.2					
	B			94.4		94.4					
	C			97.4		97.4					
	D			93.6		93.6					
	E			97.9		97.9					
	F			79.6		79.6					
	SYSTEM		100.0	93.7		93.7		720	720	675	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DECLARED COMMERCIALLY AVAILABLE FOR FULL LOAD OPERATION AT 825 MW (NET) ON JUNE 1, 1976. OVER THE PERIOD A REVISED SCRUBBER BAFFLE SYSTEM WAS INSTALLED IN AN EFFORT TO CORRECT SCRUBBER RECYCLE PUMP CAVITATION PROBLEMS.

7/76	A			79.8		72.2					
	B			87.7		79.3					
	C			90.0		81.5					

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	D		94.7		85.6						
	E		98.4		88.9						
	F		98.2		88.8						
	SYSTEM	90.0	91.5		82.7			744	673	615	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM SUPPLIER IS STILL TRYING TO SOLVE THE REHEAT BURNER PROBLEMS.

TESTS CONDUCTED THIS MONTH SHOWED THAT THE FGD SYSTEM MIST ELIMINATORS ARE NOT PERFORMING TO DESIGN AND THAT THERE IS EXCESSIVE WATER ENTRAINED IN THE CLEANED FLUE GASSES CAUSING A STACK RAIN PROBLEM. CHEMICO IS WORKING ON THE DESIGN OF ADDITIONAL MIST ELIMINATORS THAT WILL REMOVE THIS EXCESS WATER.

8/76	A		95.3		90.3						
	B		87.9		83.3						
	C		92.6		87.8						
	D		75.9		71.9						
	E		70.9		67.2						
	F		94.8		89.8						
	SYSTEM	95.0	86.2		81.7			744	705	608	

** PROBLEMS/SOLUTIONS/COMMENTS

SECONDARY VERTICAL MIST ELIMINATORS WERE INSTALLED IN THE ABSORBER DISCHARGE DUCT IN AN ATTEMPT TO REDUCE THE EXCESSIVE ENTRAINED WATER. THEY DID NOT WORK BECAUSE THE FLUE GAS BLEW THEM APART IN A FEW MINUTES OF OPERATION.

9/76	A		98.3		98.3						
	B		85.7		85.7						
	C		96.3		96.3						
	D		96.5		96.5						
	E		82.8		82.8						
	F		64.4		64.4						
	SYSTEM	100.0	87.3		87.3			720	720	629	
10/76	A		96.1		95.4						
	B		74.3		73.8						
	C		85.4		84.8						
	D		83.8		83.2						
	E		93.5		92.9						
	F		93.5		92.9						
	SYSTEM	99.0	87.8		87.2			744	739	649	
11/76	A		97.5		37.5						
	B		100.0		38.6						
	C		100.0		39.2						
	D		40.8		15.7						
	E		57.4		22.1						
	F		88.8		34.2						
	SYSTEM	38.0	80.8		31.2			720	277	225	

** PROBLEMS/SOLUTIONS/COMMENTS

A THREE WEEK OUTAGE OCCURRED DUE TO A FURNACE IMPLOSION.

DURING THE OUTAGE SCALE THROUGHOUT THE FGD SYSTEM WAS REMOVED.

DURING THE THREE WEEK OUTAGE THE UNIT 1 CHIMNEY FLUES WERE INSPECTED. THE A-SIDE FLUE POLYESTER LINING MATERIAL WAS FLAKING OFF AND ACID ATTACK WAS STARTING TO CORRODE THE CARBON STEEL FLUE. THE LINING SUPPLIER IS INVESTIGATING THE PROBLEM.

PENNSYLVANIA POWER: BRUCE MANSFIELD 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
			DURING THE OUTAGE THE PLUGGED MIST ELIMINATORS WERE CLEANED.								
12/76	A		80.9		78.5						
	B		100.0		97.5						
	C		94.7		91.9						
	D		60.0		58.2						
	E		86.1		83.6						
	F		86.7		84.1						
	SYSTEM	100.0	84.7		82.3			744	722	612	
1/77	A	95.0	98.0		89.0						
	B	92.0	91.0		82.0						
	C	77.0	74.0		68.0						
	D	95.0	98.0		89.0						
	E	92.0	93.0		84.0						
	F	91.0	91.0		83.0						
	SYSTEM	90.3	90.8		82.5			744	675	614	

** PROBLEMS/SOLUTIONS/COMMENTS

SEVERE WINTER WEATHER MADE OPERATION OF THE OUTDOOR FGD SYSTEM VERY DIFFICULT AND AFFECTED THE RELIABILITY OF THE UNIT.

DURING THE FIRST PART OF THE MONTH THE THICKENER RAKE MECHANISM JAMMED AND COULD NOT BE REPAIRED. THE THICKENER WAS OPERATED FOR APPROXIMATELY THREE WEEKS WITH THE RAKE STOPPED UNTIL THE UNIT 2 THICKENER COULD BE PUT INTO EMERGENCY SERVICE.

2/77	A	77.0	81.0		65.0						
	B	69.0	70.0		56.0						
	C	77.0	81.0		65.0						
	D	86.0	96.0		77.0						
	E	92.0	100.0		81.0						
	F	81.0	84.0		67.0						
	SYSTEM	80.3	85.3		68.5			672	540	460	

** PROBLEMS/SOLUTIONS/COMMENTS

A SECOND SET OF VERTICAL SECONDARY MIST ELIMINATORS WAS INSTALLED IN THE ABSORBER DISCHARGE DUCT BUT THE FLUE GAS BLEW THEM OUT BEFORE THEIR EFFICIENCY FOR REMOVING ENTRAINED WATER IN THE FLUE GAS COULD BE TESTED.

3/77	A	99.0	98.0		34.8						
	B	100.0	100.0		35.5						
	C	58.0	58.0		20.4						
	D	95.0	95.0		33.9						
	E	97.0	97.0		34.5						
	F	80.0	77.0		27.2						
	SYSTEM	88.2	87.5		31.1			744	264	231	

** PROBLEMS/SOLUTIONS/COMMENTS

AT MIDNIGHT ON MARCH 12, THE UNIT WAS SHUT DOWN FOR A 10-WEEK TURBINE OVERHAUL OUTAGE.

DURING THE MARCH OUTAGE REPAIRS WERE STARTED ON THE A-SIDE CHIMNEY FLUE WHICH WILL NOT BE COMPLETED UNTIL THE END OF AUGUST. AN INSPECTION OF THE B-SIDE CHIMNEY FLUE SHOWED THE SAME TYPE OF REPAIRS WOULD BE NEEDED, BUT WORK WILL NOT START ON THE B-SIDE UNTIL THE A-SIDE FLUE HAS BEEN REPAIRED. BECAUSE OF THESE REPAIRS THE UNIT WILL BE OPERATING AT APPROXIMATELY HALF LOAD FOR ROUGHLY ONE YEAR.

BECAUSE OF THE EXCESSIVE MAINTENANCE REQUIRED ON THE RUBBER LINED CARBON STEEL ID FAN HOUSINGS FROM PIECES OF SCRUBBER SCALE DAMAGING THE LINING

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

AND CORROSION OF THE CARBON STEEL, INCONEL PLATE WILL BE INSTALLED ON THE SCROLL AREA OF EACH OF THE SIX FANS DURING THE OUTAGE.

A NEWLY DESIGNED SECONDARY VERTICAL MIST ELIMINATOR WILL BE INSTALLED IN THE ABSORBER DISCHARGE DUCT OF ONE OF THE SCRUBBER MODULES DURING THE OUTAGE.

DURING THE OUTAGE ALL SCRUBBING VESSELS, DUCTS, PIPING AND MIST ELIMINATOR WILL BE CLEANED AND ALL THE SCALE REMOVED.

DURING OPERATION OF THE FGD SYSTEM THE PH CONTROL COULD NOT BE AUTOMATED BECAUSE OF POOR DESIGN AND OPERATIONAL PROBLEMS WITH THE PROVIDED CONTROL SYSTEM. PH CONTROL WAS MANUALLY SAMPLED AND CONTROLLED OVER APPROXIMATELY ONE YEAR OF OPERATION. THE PH CONTROL AND MONITORING SYSTEM ARE BEING REVISED BY OPERATING PERSONNEL DURING THE OUTAGE IN AN EFFORT TO IMPROVE THE THE PH CONTROL SYSTEM.

THE LIME ADDITION PIPING IS BEING REVISED IN EACH OF THE SCRUBBER VESSELS DUE TO THE SEVERE SCALING OCCURRING WITH THE CURRENT LIME AODITION SYSTEM.

THE SYSTEM SUPPLIER IS REDESIGNING THE EXISTING MIST ELIMINATOR SPRAY PIPING IN AN EFFORT TO CORRECT THE EXCESSIVE SCALING AND PLUGGING OF THE MIST ELIMINATORS.

CHANGES IN FLUSH WATER AND SEAL WATER PIPING ARE BEING MADE IN AN EFFORT TO CLOSE THE WATER LOOP.

NEWLY MODIFIED REHEAT BURNERS WILL BE INSTALLED DURING THE OUTAGE AND TESTED ON THE B-SIDE REHEATER WHEN THE UNIT STARTS UP IN MAY.

THE UNIT 1 THICKENER WAS CLEANED OUT AND THE JAMMED RAKE DRIVE MECHANISM WAS REPAIRED DURING THE OUTAGE.

4/77	SYSTEM				.0			720	0	0	.0
5/77	A	.0	.0	.0							
	B	.0	.0	.0							
	C	.0	.0	.0							
	D	100.0	84.0	13.7							
	E	100.0	84.8	13.8							
	F	47.2	41.2	6.7							
	SYSTEM	41.2	35.0	5.7				744	121	42	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS STARTED UP ON MAY 23 USING D, E, AND F MODULES DUE TO REPAIRS BEING MADE TO THE A-SIDE CHIMNEY FLUE.

THERE WERE PROBLEMS SLAKING LIME AND GETTING MAGNESIUM LEVELS BUILT UP IN THE SCRUBBER RECYCLE LOOPS AFTER STARTUP.

6/77	A	.0	.0	.0							
	B	.0	.0	.0							
	C	.0	.0	.0							
	D	94.0	100.0	94.0							
	E	95.0	100.0	95.1							
	F	90.0	97.0	90.0							
	SYSTEM	46.5	49.5	46.5				720	669	335	

** PROBLEMS/SOLUTIONS/COMMENTS

HORIZONTAL MIST ELIMINATOR PRESSURE DROPS INCREASED TO THE POINT THAT NEW MIST ELIMINATORS HAD TO BE INSTALLED IN JUNE ON THE D, E AND F SCRUBBERS AND THE D AND E ABSORBERS.

PENNSYLVANIA POWER: BRUCE MANSFIELD 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
7/77	A	.0	.0		.0						
	B	.0	.0		.0						
	C	.0	.0		.0						
	D	99.0	100.0		66.0						
	E	99.0	100.0		66.0						
	F	100.0	100.0		63.0						
	SYSTEM	49.7	50.0		32.5			744	473	242	

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 1 WAS DOWN FROM JULY 1 THROUGH JULY 12 TO MAKE SOME MODIFICATIONS TO THE GENERATOR COOLING SYSTEM. ON JULY 19 AND 20 THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES TESTED THE SO2 AND PARTICLE EMISSIONS FROM THE UNIT 1 FGD SYSTEM. SO2 EMISSIONS WERE 0.44 LB/MM BTU AND 1.26 LB/MM BTU FOR THE TWO TESTS RESPECTIVELY. FGD SO2 REMOVAL EFFICIENCY VARIED FROM 78% TO 89% FOR THE MONTH.

8/77	A	55.0	57.0		52.0						
	B	53.0	56.0		50.0						
	C	31.0	31.0		28.0						
	D	96.0	100.0		93.0						
	E	95.0	100.0		93.0						
	F	88.0	95.0		85.0						
	SYSTEM	69.7	73.2		66.8			744	692	497	

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 1 WAS DOWN FROM AUGUST 13 TO 15 BECAUSE OF BOILER TUBE LEAKS.

ON AUGUST 16 THE 1A CHIMNEY FLUE LINER REPAIRS WERE COMPLETED AND THE A, B AND C TRAINS WERE STARTED UP.

SEVERAL REPAIRS WERE MADE TO THE ID FAN HOUSING THIS MONTH.

THE AVERAGE SO2 REMOVAL EFFICIENCY FOR THE MONTH WAS 86.7% BASED ON THREE GRAB SAMPLES.

YORK RESEARCH BEGAN SETTING UP EQUIPMENT TO CONTINUOUSLY MONITOR THE SO2 REMOVAL EFFICIENCIES AS PART OF AN EPA RESEARCH PROJECT TO DETERMINE FEASIBLE NSPS FOR FGD.

EXTENSIVE MODIFICATIONS ARE BEING MADE IN THE PH CONTROL SYSTEMS IN AN EF FORT TO DEVISE A WORKABLE PH CONTROL SYSTEM.

9/77	A	84.0	97.0		75.0						
	B	82.0	95.0		73.0						
	C	81.0	98.0		76.0						
	D	53.0	60.0		46.0						
	E	50.0	56.0		44.0						
	F	43.0	44.0		34.0						
	SYSTEM	65.5	75.0		58.0			720	558	418	

** PROBLEMS/SOLUTIONS/COMMENTS

FROM SEPTEMBER 17 TO 22 THE UNIT WAS DOWN TO INSTALL RIGGING IN THE 1B CHIMNEY FLUE TO BEGIN FLUE LINER REPAIRS. D, E AND F TRAINS WERE OFF THE REMAINDER OF THE MONTH.

THE AVERAGE SO2 REMOVAL EFFICIENCIES FOR THE MONTH WERE 93.2% BASED ON FOUR GRAB SAMPLE TESTS.

A BOILER TUBE LEAK CAUSED THE UNIT TO BE DOWN SEPTEMBER 10 TO 12.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/77	A	93.0	96.0		93.0						
	B	98.0	100.0		98.0						
	C	87.0	90.0		87.0						
	D	.0	.0		.0						
	E	.0	.0		.0						
	F	.0	.0		.0						
	SYSTEM	46.3	47.7		46.3			744	720	344	

** PROBLEMS/SOLUTIONS/COMMENTS

THE C-MODULE MIST ELIMINATOR SPRAY NOZZLES AND MIST ELIMINATOR ITSELF WERE CLEANED.

ABS STACK REPAIRS ON UNIT 2 NECESSITATED TAKING UNIT 1 DOWN FOR TWO DAYS. (A PROTECTIVE CAP HAD TO BE PUT OVER THE 2B FLUE BY HELICOPTER. PREVAILING WINDS NECESSITATED TAKING UNIT 1 OFF IN ORDER TO DO THIS.)

11/77	A	95.0	95.0		95.0						
	B	99.0	99.0		99.0						
	C	91.0	91.0		91.0						
	D	.0	.0		.0						
	E	.0	.0		.0						
	F	.0	.0		.0						
	SYSTEM	47.5	47.5		47.5			720	720	342	

** PROBLEMS/SOLUTIONS/COMMENTS

REMOVAL OF THE OLD COATING AND PRIMING OF THE FLUE LINING IN FLUE 1B IS PROCEEDING SLOWER THAN ANTICIPATED. IT IS EXPECTED THAT TOTAL WORK ON THE FLUE WILL NOT BE COMPLETED UNTIL FEBRUARY OR MARCH 1978.

12/77	A	100.0	100.0		91.0						
	B	93.0	94.0		79.0						
	C	99.0	100.0		91.0						
	D	.0	.0		.0						
	E	.0	.0		.0						
	F	.0	.0		.0						
	SYSTEM	48.7	49.0		43.5			744	626	324	

** PROBLEMS/SOLUTIONS/COMMENTS

SANDBLASTING OF UNIT 1B FLUE IS NEARING COMPLETION. THE FLUE WILL BE RELINED WITH CXL-2000.

0/78 SYSTEM

** PROBLEMS/SOLUTIONS/COMMENTS

NOTE: AN ATTEMPT IS ALWAYS MADE TO BEGIN OPERATION OF THE BOILER AND FGD SYSTEM SIMULTANEOUSLY AT BRUCE MANSFIELD. OCCASIONALLY PROBLEMS DELAY BOILER STARTUP MAKING IT POSSIBLE FOR MONTHLY FGD MODULE HOURS TO EXCEED ACTUAL BOILER HOURS.

1/78	A	100.0	100.0		58.0						
	B	.0	.0		.0						
	C	100.0	100.0		58.0						
	D	.0	.0		.0						
	E	.0	.0		.0						
	F	.0	.0		.0						
	SYSTEM	33.3	33.3		19.3			744	331	144	

PENNSYLVANIA POWER: BRUCE MANSFIELD 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 UNIT TRIPPED SEVERAL TIMES DUE TO DIFFICULTIES IN BURNING WET STOCK-PILE COAL.									
		THERE WERE PROBLEMS WITH THE 1B FAN WHICH NECESSITATED EXTENSIVE REPAIRS. LINING ABRASION AND DISBONDMENT IN THE FAN CAUSED CORROSION OF UNDERLYING-SUPPORT METAL.									
2/78	A	79.0	100.0		79.0						
	B	61.0	80.0		61.0						
	C	82.0	100.0		82.0						
	D	.0	.0		.0						
	E	.0	.0		.0						
	F	.0	.0		.0						
	SYSTEM	37.0	46.7		37.0			672	514	249	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		EXTENSIVE REPAIRS TO THE 1B ID FAN AND THE EMERGENCY NEED FOR LOAD FROM THE PLANT DURING THE COAL STRIKE TEMPORARILY OVERLOADED THE 1A AND 1C TRAINS. THE 1C MIST ELIMINATORS WILL BE REPLACED AS A RESULT OF THIS.									
		THE 1B FLUE RELINING CONTINUED.									
3/78	A	43.0	47.0		43.0						
	B	91.0	98.0		91.0						
	C	90.0	97.0		90.0						
	D	65.0	70.0		65.0						
	E	50.0	54.0		50.0						
	F	60.0	65.0		60.0						
	SYSTEM	66.5	71.8		66.5			744	689	495	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		REPLACEMENT OF THE LINING IN THE 1B CHIMNEY WITH CXL 2000 WAS COMPLETED.									
		REPAIRS WERE MADE ON THE A, B AND C FAN HOUSINGS.									
4/78	A	74.0	74.0		74.0						
	B	88.0	88.0		88.0						
	C	49.0	49.0		49.0						
	D	87.0	87.0		87.0						
	E	97.0	97.0		97.0						
	F	94.0	94.0		94.0						
	SYSTEM	81.5	81.5		81.5			720	720	587	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FAN HOUSINGS LEAK REPAIRS WERE MADE DURING APRIL.									
		MISCELLANEOUS LEAK REPAIRS WERE MADE TO DUCTS.									
5/78	A	98.0	97.0		59.0						
	B	.0	.0		.0						
	C	98.0	97.0		59.0						
	D	91.0	85.0		52.0						
	E	92.0	84.0		52.0						
	F	92.0	86.0		53.0						
	SYSTEM	78.5	74.8		45.8			744	457	341	

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
					PERFORMANCE DATA						
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE ANNUAL BOILER INSPECTION OUTAGE BEGAN ON MAY 20.								
			EXTENSIVE REPAIRS WERE MADE ON THE 1B FAN.								
6/78	A	.0									
	B	.0									
	C	100.0									
	D	100.0									
	E	100.0									
	F	100.0									
	SYSTEM	66.7			.0			720	0	0	.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE BOILER INSPECTION AND GENERATOR STATOR COOLER REPAIRS CONTINUED THROUGH JUNE.								
7/78	SYSTEM							744			
8/78	SYSTEM							744			
9/78	SYSTEM							720			
10/78	SYSTEM	96.3						744	671		
11/78	SYSTEM							720			
12/78	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
			NO INFORMATION WAS AVAILABLE FOR THIS REPORT PERIOD.								
1/79	SYSTEM							744			
2/79	SYSTEM							672			
3/79	SYSTEM							744			
4/79	SYSTEM							720			
5/79	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
			UNIT 1 IS CURRENTLY DOWN FOR A BOILER OVERHAUL.								
			SIX OF THE TWELVE FAN HOUSINGS HAVE BEEN CHANGED FROM CARBON STEEL TO INCOLLOY 825.								
6/79	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTS THAT THE AVAILABILITY FROM JANUARY 1, 1979 THROUGH MAY 31, 1979 WAS 92.0%.								
			THE UTILITY REPORTED THAT FAN MOTOR FAILURES WERE A MAJOR PROBLEM AREA DURING THE FIRST HALF OF 1979.								
7/79	SYSTEM							744			

PENNSYLVANIA POWER: BRUCE MANSFIELD 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
8/79	SYSTEM							744			
9/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

FAN HOUSING WORK (CHANGING FROM LINED CARBON STEEL TO INCOLLOY 825) IS CONTINUING.

NEW PH MONITOR MODIFICATIONS HAVE YIELDED PROMISING RESULTS WITH RESPECT TO MONITOR AVAILABILITY.

THE FGD SYSTEM ATTRIBUTED 17.4% OF THE TOTAL UNIT UNAVAILABILITY FOR 1979 TO DATE. THE BREAKDOWN IS AS FOLLOWS:
- 7.6% SCRUBBER ID FAN WORK/PROBLEMS
- 8.3% GENERAL SCRUBBER PROBLEMS AND MAINTENANCE
- 1.0% REAGENT HANDLING PROBLEMS (LIME SLAKER AND PIPING)
- 0.5% MIST ELIMINATOR PLUGGING

10/79	SYSTEM	96.1						744			
11/79	SYSTEM	90.8						720			
12/79	SYSTEM	99.8						744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE PERIOD AN ADDITIONAL FAN HOUSING WAS REPLACED WITH THE NEW INCOLLOY 825. BY THE END OF 1980 ALL THE FAN HOUSINGS WILL BE REPLACED WITH THE NEW MATERIAL.

WHERE THE NEW PH MONITORS HAVE BEEN INSTALLED, THE PROBE MAINTENANCE HAS BEEN CUT 80%, AND THE MIST ELIMINATORS HAVE BEEN LESS OF A PROBLEM TO MAINTAIN.

THE SLUDGE PUMPS HAVE BEEN A PROBLEM. THE PUMPS REQUIRE AN OVERHAUL EVERY 1000 HOURS AND HAVE FREQUENT VALVE FAILURES. NEW VALVE MANIFOLDS MAY BE INSTALLED TO IMPROVE PUMP SERVICE BY ALLOWING ACCESS TO INDIVIDUAL BALL VALVES.

1/80	SYSTEM	98.6	100.0		73.1			744	544	544	
2/80	SYSTEM	98.4	100.0		74.9			696	521	521	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS OCCURRED DURING JANUARY AND FEBRUARY.

3/80	SYSTEM	98.8	100.0		72.6			744	540	540	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE ONE WEEK IN MARCH DUE TO A PLUGGED AIR PREHEATER. NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED FOR MARCH.

4/80	SYSTEM	91.1	100.0		81.4			720	586	586	
5/80	SYSTEM							744			
6/80	SYSTEM							720			

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
	** PROBLEMS/SOLUTIONS/COMMENTS										
			INFORMATION FOR THE MONTHS OF MAY AND JUNE IS NOT YET AVAILABLE.								
7/80	SYSTEM	98.4	100.0		85.9			744	639	639	
8/80	SYSTEM	98.9	100.0		55.4			744	412	412	
9/80	SYSTEM	95.3	100.0		74.0			720	533	533	
10/80	SYSTEM	98.3	100.0		28.1			744	209	209	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			ON OCTOBER 10 THE UNIT WAS TAKEN OUT OF SERVICE FOR A TURBINE OVERHAUL. DURING THIS OUTAGE THE UTILITY COMMENCED THE INSTALLATION OF A MANIFOLD SYSTEM IN THE STACK. THE OUTAGE IS SCHEDULED TO LAST APPROXIMATELY 12 WEEKS.								
11/80	SYSTEM	.0			.0			720	0	0	
12/80	SYSTEM	.0			.0			744	0	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING THE YEAR MINOR EROSION PROBLEMS WITH THE ID FAN ROTORS WERE ENCOUNTERED. FOUR OF THE SIX ID FAN ROTORS HAVE BEEN REPAIRED.								
			BRUCE MANSFIELD 1 REMAINED OFF LINE DURING NOVEMBER AND DECEMBER AS A RESULT OF THE TURBINE OVERHAUL.								
1/81	SYSTEM							672			
2/81	SYSTEM							672			
3/81	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT THE FGD SYSTEM AVAILABILITY WAS 99.13%.								
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM	99.9						720	457		
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MINOR UNIT OUTAGES OCCURRED DURING THE SECOND QUARTER DUE TO BOILER TUBE LEAKS. THE UTILITY REPORTED THAT THE YEAR TO DATE UNIT AVAILABILITY WAS 69.82%.								
			DURING THE SECOND QUARTER NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED. THE UTILITY REPORTED THAT THE YEAR TO DATE FGD SYSTEM AVAILABILITY WAS 99.0%.								
7/81	SYSTEM							744			
8/81	SYSTEM	97.0						744			
9/81	SYSTEM	98.7						720			

PENNSYLVANIA POWER: BRUCE MANSFIELD 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

OVERALL FGD SYSTEM AVAILABILITY WAS NOT REPORTED FOR THE MONTH OF JULY. THE MAJOR PROBLEM ENCOUNTERED DURING THE THIRD QUARTER WAS MIST ELIMINATOR BUILDUP MAKING CLEANING NECESSARY.

THE YEAR TO DATE AVAILABILITY OF THE FGD SYSTEM (THROUGH AUGUST) WAS REPORTED TO BE 98.5%.

10/81	SYSTEM	99.5						744			
11/81	SYSTEM	97.5						720			
12/81	SYSTEM	99.0						744			

** PROBLEMS/SOLUTIONS/COMMENTS

MIST ELIMINATOR CLEANING CONTINUED TO BE A PROBLEM DURING THE FOURTH QUARTER.

1/82	SYSTEM	97.8						744			
2/82	SYSTEM	99.4						672			
3/82	SYSTEM	99.6						744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT FGD SYSTEM PERFORMANCE WAS OUTSTANDING FOR THE FIRST QUARTER 1982.

4/82	A	99.9									
	B	97.4									
	C	99.6									
	D	99.5									
	E	99.9									
	F	94.9									
	SYSTEM	98.5	100.0		99.9			720	719	719	72.1
5/82	A	100.0									
	B	100.0									
	C	86.7									
	D	97.2									
	E	85.7									
	F	99.2									
	SYSTEM	94.8	100.0		100.0			744	744	744	75.4
6/82	A	98.6									
	B	90.8									
	C	93.1									
	D	93.9									
	E	99.0									
	F	97.5									
	SYSTEM	95.5	100.0		100.0			720	720	720	72.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER OF 1982.

7/82	A	99.0									
	B	100.0									

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	C	96.7									
	D	100.0									
	E	100.0									
	F	97.8									
	SYSTEM	98.9	100.0		77.8			744	579	579	54.6
8/82	A	100.0									
	B	98.2									
	C	98.6									
	D	96.2									
	E	99.2									
	F	80.3									
	SYSTEM	95.4	100.0		100.0			744	744	744	69.3

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JULY AND AUGUST 1982.

9/82	A	9.8									
	B	9.8									
	C	9.8									
	D	9.8									
	E	9.3									
	F	9.8									
	SYSTEM	9.7	100.0		9.7			720	70	70	5.4

** PROBLEMS/SOLUTIONS/COMMENTS

A SCHEDULED BOILER OUTAGE COMMENCED ON SEPTEMBER 3.

10/82	A	50.1									
	B	49.2									
	C	50.1									
	D	50.1									
	E	49.0									
	F	44.6									
	SYSTEM	48.9	100.0		47.8			744	356	356	22.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCHEDULED BOILER OUTAGE ENDED ON OCTOBER 15.

11/82	A	100.0									
	B	100.0									
	C	100.0									
	D	100.0									
	E	100.0									
	F	83.4									
	SYSTEM	97.2	100.0		86.4			720	622	622	58.3
12/82	A	100.0									
	B	95.1									
	C	100.0									
	D	95.3									
	E	95.3									
	F	100.0									
	SYSTEM	97.6	100.0		78.1			744	581	581	43.6

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING NOVEMBER AND DECEMBER 1982.

1/83	A	93.3									

PENNSYLVANIA POWER: BRUCE MANSFIELD 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	B	98.7									
	C	98.4									
	D	100.0									
	E	89.9									
	F	89.9									
	SYSTEM	95.1	100.0		100.0			744	744	744	62.3
2/83	A	100.0									
	B	90.1									
	C	93.9									
	D	100.0									
	E	92.0									
	F	94.2									
	SYSTEM	95.0	100.0		100.0			672	672	672	65.3
3/83	A	100.0									
	B	97.9		.0	.0						
	C	100.0									
	D	89.9									
	E	100.0									
	F	100.0									
	SYSTEM	98.0	100.0		94.1			744	700	700	61.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1983.

4/83	A	99.9									
	B	99.9									
	C	99.6									
	D	99.9									
	E	99.9									
	F	99.9									
	SYSTEM	99.8	100.0		87.8			720	632	632	54.4
5/83	A	94.9									
	B	100.0									
	C	100.0									
	D	100.0									
	E	92.1									
	F	100.0									
	SYSTEM	97.8	100.0		100.0			744	744	744	56.5
6/83	A	100.0									
	B	99.5									
	C	100.0									
	D	85.9									
	E	100.0									
	F	100.0									
	SYSTEM	97.6	100.0		65.1			720	469	469	40.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER OF 1983.

7/83	A	100.0	91.0	91.0	90.2						
	B	100.0	88.6	88.6	87.8						
	C	100.0	87.6	87.6	86.8						
	D	99.6	89.8	89.8	89.0						
	E	100.0	92.4	92.4	91.5						
	F	99.2	87.4	87.4	86.6						
	SYSTEM	99.8	89.5	89.5	88.6			744	737	660	64.0

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 THIRD QUARTER OF 1983.									
8/83	A	100.0	88.3	88.4	79.0						
	B	99.0	92.8	92.9	83.1						
	C	99.9	88.8	88.8	79.4						
	D	93.5	88.8	88.8	79.4						
	E	91.2	79.6	79.7	71.2						
	F	107.1	87.0	87.0	77.8						
	SYSTEM	98.4	87.6	87.6	78.3			744	666	583	54.3
9/83	A	100.0	94.3	94.3	94.3						
	B	93.9	79.2	79.2	79.2						
	C	90.6	46.7	46.7	46.7						
	D	95.7	73.2	73.2	73.2						
	E	100.0	94.0	94.0	94.0						
	F	100.0	91.1	91.1	91.1						
	SYSTEM	96.7	79.7	79.7	79.7			720	720	574	58.2
10/83	A	22.1	87.7	87.7	19.4						
	B	21.8	70.0	70.0	15.5						
	C	22.1	68.2	68.2	15.1						
	D	.0	.0	.0	.0						
	E	22.1	90.1	90.1	19.9						
	F	22.1	78.6	78.6	17.3						
	SYSTEM	18.3	65.8	65.8	14.5			744	164	108	11.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED A SCHEDULED BOILER OUTAGE DURING OCTOBER.									
		MODIFICATIONS TO THE MODULE D INDUCED DRAFT FAN MOTOR AND MOTOR BASE WERE MADE DURING OCTOBER.									
11/83	A	76.9	79.9	79.9	61.0						
	B	76.9	69.4	69.4	52.9						
	C	76.9	79.8	79.8	60.8						
	D	61.9	72.5	72.5	55.3						
	E	76.6	82.1	82.1	62.6						
	F	76.3	43.9	43.9	33.5						
	SYSTEM	74.2	71.3	71.3	54.4			720	549	391	41.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SCHEDULED BOILER OUTAGE WHICH BEGAN IN OCTOBER ENDED ON NOVEMBER 7.									
12/83	A	99.2	67.1	67.1	28.6						
	B	100.0	55.1	55.1	23.5						
	C	100.0	85.6	85.6	36.6						
	D	99.1	75.6	75.6	32.3						
	E	99.5	61.4	61.4	26.2						
	F	100.0	65.5	65.5	28.0						
	SYSTEM	99.6	68.4	68.4	29.2			744	318	217	19.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER.									
1/84	A	100.0	76.4	76.4	72.6						

PENNSYLVANIA POWER: BRUCE MANSFIELD 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	B	93.2	89.8	89.8	85.3						
	C	98.1	79.1	79.1	75.1						
	D	94.2	83.6	83.6	79.4						
	E	93.6	89.4	89.4	84.9						
	F	100.0	85.6	85.6	81.3						
	SYSTEM	96.5	84.0	84.0	79.8			744	707	594	58.1
2/84	A	91.4	85.1	85.1	85.1						
	B	91.2	73.0	73.0	73.0						
	C	93.4	90.1	90.1	90.1						
	D	92.8	86.2	86.2	86.2						
	E	99.8	93.7	93.7	93.7						
	F	88.3	79.7	79.7	79.7						
	SYSTEM	92.8	84.6	84.6	84.6			696	696	589	71.2
3/84	A	92.3	83.5	83.5	81.3						
	B	99.1	97.2	97.2	94.6						
	C	99.9	97.0	97.0	94.5						
	D	93.6	87.9	87.9	85.6						
	E	99.1	100.0	101.0	98.4						
	F	95.3	89.6	89.6	87.2						
	SYSTEM	96.6	92.5	92.7	90.3			744	725	672	78.9
4/84	A	91.7	89.3	89.3	83.8						
	B	87.4	83.2	83.2	78.1						
	C	92.1	88.1	88.1	82.6						
	D	95.0	84.7	84.7	79.4						
	E	94.1	91.2	91.2	85.6						
	F	96.3	89.1	89.1	83.6						
	SYSTEM	92.8	87.6	87.6	82.2			720	675	592	65.6
5/84	A	91.2	81.6	81.6	81.6						
	B	92.7	77.2	77.2	77.2						
	C	93.4	92.5	92.5	92.5						
	D	92.8	92.1	92.1	92.1						
	E	91.6	84.5	84.5	84.5						
	F	83.7	69.8	69.8	69.8						
	SYSTEM	90.9	82.9	82.9	82.9			744	744	617	72.3

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD RELATED PROBLEMS WERE REPORTED DURING THE PERIOD OF JANUARY THROUGH MAY 1984.

6/84	A	94.1	89.5	89.5	79.2						
	B	88.3	85.6	85.6	75.7						
	C	90.4	88.4	88.4	78.2						
	D	99.1	92.8	92.8	82.1						
	E	99.1	86.7	86.7	76.7						
		45.9	48.0	48.0	42.5						
	SYSTEM	86.1	81.8	81.8	72.4			720	637	521	60.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE MODULE F INDUCED DRAFT FAN MOTOR AND BASE UNDERWENT MODIFICATIONS DURING JUNE.

7/84	A	99.7	92.1	92.1	91.7						
	B	95.2	88.2	88.2	87.8						
	C	89.7	72.9	72.9	72.6						
	D	93.1	81.0	81.0	80.6						
	E	93.4	76.7	76.7	76.3						
	F	91.8	78.7	78.7	78.4						
	SYSTEM	93.8	81.6	81.6	81.2			744	741	604	64.8

PENNSYLVANIA POWER: BRUCE MANSFIELD 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
8/84	A	91.7	90.9	90.9	86.6						
	B	92.5	80.0	80.0	76.2						
	C	93.0	87.7	87.7	83.5						
	D	98.2	77.6	77.6	73.9						
	E	98.4	94.0	94.0	89.5						
	F	100.0	98.1	98.1	93.4						
	SYSTEM	95.6	88.1	88.1	83.8			744	708	624	65.3

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD RELATED PROBLEMS WERE REPORTED DURING JULY AND AUGUST, 1984.

9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR SEPTEMBER 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PENNSYLVANIA POWER	
PLANT NAME	BRUCE MANSFIELD	
UNIT NUMBER	2	
CITY	SHIPPINGPORT	
STATE	PENNSYLVANIA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	15.	(.035 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	258.	(.600 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	2360	
GROSS UNIT GENERATING CAPACITY - MW	917	
NET UNIT GENERATING CAPACITY W/FGD - MW	780	
NET UNIT GENERATING CAPACITY WO/FGD - MW	818	
EQUIVALENT SCRUBBED CAPACITY - MW	917	
** 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	1580.86	(3350000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	140.6	(285 F)
STACK HEIGHT - M	290.	(950 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	5.9	(19.2 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	27912.	(12000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	12.80	
RANGE ASH CONTENT - %	8.0-15.0	
AVERAGE MOISTURE CONTENT - %	7.00	
RANGE MOISTURE CONTENT - %	5.5-8.5	
AVERAGE SULFUR CONTENT - %	3.50	
RANGE SULFUR CONTENT - %	3.0-4.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	0	
TYPE	NONE	
** PARTICLE SCRUBBER		
NUMBER	6	
NUMBER OF SPARES	0	
INITIAL START-UP DATE	7/77	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	FIXED-THROAT/TOP-ENTRY PLUMB BOB	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	GE ENVIRONMENTAL SERVICES	
DIMENSIONS - FT	35.5 DIA X 52.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1258.2	(19971 GPM)
L/G RATIO - LITER/CU.M	4.8	(35.8 GAL/1000ACF)
PH CONTROL ADDITIVE	THIOSORBIC LIME	
PRESSURE DROP - KPA	4.7	(19.0 IN-H2O)
SUPERFICIAL GAS VELOCITY - M/S	61.0	(200.0 FT/S)

PENNSYLVANIA POWER: BRUCE MANSFIELD 2 (CONT.)

INLET GAS FLOW RATE - CU.M/S	263.3	(558000 ACFM)
INLET GAS TEMPERATURE - C	140.6	(285 F)
SO2 REMOVAL EFFICENCY - %	70.0	
PARTICLE REMOVAL EFFICIENCY - %	99.8	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIME	
PROCESS ADDITIVES	MAG	
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES	
A-E FIRM	GILBERT/COMMONWEALTH ASSOCIATES	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	92.10	
ENERGY CONSUMPTION - %	4.1	
CURRENT STATUS	1	
COMMERCIAL START-UP	10/77	
INITIAL START-UP	7/77	
CONTRACT AWARDED	10/74	

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	4.70	
DESIGN COAL HEAT CONTENT - J/G	27679.4	(11900 BTU/LB)
DESIGN COAL ASH CONTENT - %	19.70	
OPER. & MAINT. REQUIREMENT - MANHR/DAY	214.0	

** QUENCHER/PRESATURATOR

NUMBER	0

** ABSORBER

NUMBER	6	
NUMBER OF SPARES	0	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	FIXED THROAT	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	GE ENVIRONMENTAL SERVICES	
DIMENSIONS - FT	34.0 DIA X 51.5	
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	GLASS FLAKE-FILLED POLYESTER	
LINER MATERIAL TRADE NAME/COMMON TYPE	RIGIFLAKE 4850	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1112.	(17650 GPM)
L/G RATIO - L/CU.M	5.5	(41.4 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.5	(6.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	30.5	(100.0 FT/S)
INLET GAS FLOW - CU. M/S	201.31	(426600 ACFM)
INLET GAS TEMPERATURE - C	52.8	(127 F)
SO2 REMOVAL EFFICIENCY - %	92.1	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	6	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
MANUFACTURER	HEIL PROCESS EQUIPMENT	
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	

PENNSYLVANIA POWER: BRUCE MANSFIELD 2 (CONT.)

PRESSURE DROP - KPA	.1	(.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	THICKENER OVERFLOW	
WASH FREQUENCY	ONCE EVERY 12 MINUTES	
WASH RATE - L/S	3.8	(60 GAL/MIN)

** FANS

NUMBER	6	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FUEL ECONOMIZER	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	WET	
FLUE GAS FLOW RATE - CU.M/S	263.32	(558000 ACFM)
FLUE GAS TEMPERATURE - C	47.8	(118 F)
PRESSURE DROP - KPA	18.9	(62.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEE;; HIGH ALLOY; HIGH ALLOY; HIGH ALLOY	

** DAMPERS

NUMBER	6	
FUNCTION	SHUT-OFF	
GENERIC TYPE	BUTTERFLY	
SPECIFIC TYPE	N/A	
MANUFACTURER	MOSSER	
SEAL AIR FLOW - CU. M/S	.00	(0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** DAMPERS

NUMBER	6	
FUNCTION	NONE	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	NR	
MANUFACTURER	MOSSER	
SEAL AIR FLOW - CU. M/S	.00	(0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** DAMPERS

NUMBER	6	
FUNCTION	CONTROL	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	NR	
MANUFACTURER	GREEN FAN	
SEAL AIR FLOW - CU. M/S	.00	(0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** 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 TO INOPERABLE REHEATER
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	OUTLET FROM INOPERABLE REHEATER
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	DETENTION
DEVICE TYPE	N/A
MANUFACTURER	DORR-OLIVER
NUMBER	2
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	20.0 (22 TPH)
PRODUCT QUALITY - % SOLIDS	13.5

** TANKS

SERVICE	NUMBER
SCRUBBER RECYCLE	6
ABSORBER RECYCLE	6
THICKENER OVERFLOW	1
CALCILOX ADDITION [MIX]	3
SLAKER TANK	2
SLURRY STORAGE	1

** PUMPS

SERVICE	NUMBER
VENTURI RECIRCULATION	12
SLURRY FEED	4
LIME SLURRY RECIRCULATION	4
ABSORBER RECIRCULATION	12
THICKENER UNDERFLOW	4
THICKENER CLEAR WATER TRANSFER	4
SLUDGE	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
CONFIGURATION	CYLINDRICAL
DIMENSIONS - FT	200.0 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 [WALLS]; MAT-REINFO
FEED STREAM SOURCE	PARTICLE SCRUBBER BLEED
FEED STREAM CHARACTERISTICS	10% SOLIDS
OUTLET STREAM CHARACTERISTICS	30% SOLIDS
OUTLET STREAM DISPOSITION	SLUDGE TREATMENT
OVERFLOW STREAM DISPOSITION	PARTICLE SCRUBBER RECYCLE LOOP

*** SLUDGE

** TREATMENT

METHOD	FIXATION
DEVICE	MIX TANK
PROPRIETARY PROCESS	DRAVO [CALCILOX]
INLET QUALITY - %	30.0

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	OFF-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	NONE
SITE DIMENSIONS	1300-1400 ACRES

PENNSYLVANIA POWER: BRUCE MANSFIELD 2 (CONT.)

SITE CAPACITY - CU.M	59927000 (49000.0 ACRE-FT)
SITE SERVICE LIFE - YRS	25

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	INLET SLURRY TO SCRUBBER & ABSORBER
CHEMICAL PARAMETERS	PH
CONTROL LEVELS	PH 7
MONITOR TYPE	UNILOCK
MONITOR LOCATION	SPRAY HEADERS
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	OPEN
RECEIVING WATER STREAM	OHIO RIVER

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	THIOSORBIC LIME
PRINCIPAL CONSTITUENT	90% CAO MIN., 2-6% MGO, MAX. 4% ACID INSOLUBLES
SOURCE/SUPPLIER	DRAVO
UTILIZATION - %	84.0
POINT OF ADDITION	SLAKER

** FGD SPARE CAPACITY INDICES

SCRUBBER - %	.0
ABSORBER - %	.0
MIST ELIMINATOR - %	.0
FAN - %	.0
THICKENER - %	.0

** FGD SPARE COMPONENT INDICES

SCRUBBER	.0
ABSORBER	.0
MIST ELIMINATOR	.0
FAN	.0
THICKENER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/77	2A	94.0	100.0		83.0						
	2B	97.0	100.0		88.0						
	2C	98.0	100.0		87.0						
	2D	63.0	61.0		48.0						
	2E	66.0	59.0		47.0						
	2F	61.0	51.0		41.0						
	SYSTEM	79.8	78.5		65.7			744	595	489	

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 2 WAS DECLARED AVAILABLE FOR COMMERCIAL OPERATION AT 825 MW ON OCTOBER 1, 1977.

THE SPRAYS IN THE 2F FAN WERE CLEANED.

REPAIRS WERE MADE TO THE 2B FLUE STACK LINING BECAUSE OF PREMATURE FAILURE OF SEVERAL TEST PATCHES.

THE UNIT TRIPPED DUE TO FAULTY GENERATOR CONTROL TRANSFORMERS.

11/77	2A	100.0	100.0		83.0						
	2B	96.0	100.0		81.0						
	2C	88.0	92.0		74.0						
	2D	47.0	57.0		46.0						
	2E	55.0	52.0		42.0						

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	2F	47.0	42.0		34.0						
	SYSTEM	72.2	73.8		60.0			720	581	432	

** PROBLEMS/SOLUTIONS/COMMENTS

PROBLEMS ASSOCIATED WITH THE STATION POWER TRANSFORMERS CAUSED LIMITATION IN LOAD ON UNIT 2. THREE OF THE SIX STATION POWER TRANSFORMERS FOR UNIT 2 WERE DESTROYED.

12/77	2A	74.0	77.0		63.0						
	2B	99.0	100.0		86.0						
	2C	98.0	100.0		83.0						
	2D	100.0	100.0		86.0						
	2E	89.0	85.0		69.0						
	2F	99.0	93.0		76.0						
	SYSTEM	93.2	92.5		77.2			744	607	574	

** PROBLEMS/SOLUTIONS/COMMENTS

COLD WEATHER CAUSED SOME FREEZING PROBLEMS WITH PROCESS PIPING.

1/78	2A	95.0	58.0		31.0						
	2B	100.0	100.0		76.0						
	2C	96.0	56.0		29.0						
	2D	94.0	100.0		70.0						
	2E	99.0	100.0		64.0						
	2F	99.0	96.0		50.0						
	SYSTEM	97.2	85.0		53.3			744	391	397	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT TRIPPED SEVERAL TIMES DUE TO DIFFICULTIES IN BURNING WET STOCK-PILE COAL. WHEN THE UNIT WAS ON LINE DURING THIS MONTH, THE WET COAL ALSO PREVENTED FULL LOAD OPERATION OF COAL MILLS.

BOILER CONTROL VALVE ("W" VALVE) PROBLEMS COMPOUNDED START-UP DIFFICULTIES.

2/78	2A	84.0	46.0		48.0						
	2B	87.0	68.0		68.0						
	2C	89.0	88.0		88.0						
	2D	97.0	71.0		71.0						
	2E	99.0	99.0		99.0						
	2F	78.0	78.0		78.0						
	SYSTEM	89.0	75.0		75.3			672	672	506	

** PROBLEMS/SOLUTIONS/COMMENTS

MANY PROBLEMS OCCURRED WITH ID FAN COOLERS DUE TO INCLEMENT WEATHER.

3/78	2A	100.0	100.0		67.0						
	2B	93.0	91.0		60.0						
	2C	13.0	10.0		13.0						
	2D	95.0	100.0		68.0						
	2E	95.0	96.0		64.0						
	2F	97.0	99.0		65.0						
	SYSTEM	82.2	82.7		56.2			744	494	418	

** PROBLEMS/SOLUTIONS/COMMENTS

EXTENSIVE ID FAN HOUSING REPAIRS WERE PERFORMED ON THE 2C FAN.

A BOILER TUBE LEAK CAUSED SEVERAL DAYS OUTAGE.

PENNSYLVANIA POWER: BRUCE MANSFIELD 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
4/78	2A	100.0	82.0		81.0						
	2B	100.0	82.0		81.0						
	2C	59.0	59.0		59.0						
	2D	15.0	15.0		15.0						
	2E	14.0	14.0		14.0						
	2F	13.0	13.0		13.0						
	SYSTEM	50.2	44.2		43.8			720	713	315	

** PROBLEMS/SOLUTIONS/COMMENTS

FLUE LINING REPAIRS ON THE 2B CHIMNEY BEGAN ON APRIL 5.

EXTENSIVE REPAIRS WERE MADE ON THE 2C ID FAN, CAUSING IT TO BE DOWN FROM MARCH 6 THROUGH APRIL 13.

5/78	2A	100.0	100.0		37.0						
	2B	100.0	100.0		37.0						
	2C	100.0	100.0		37.0						
	2D	.0	.0		.0						
	2E	.0	.0		.0						
	2F	.0	.0		.0						
	SYSTEM	50.0	50.0		18.5			744	270	138	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF-LINE FOR THREE WEEKS FOR REPAIRS TO THE 2C ID FAN, INCLUDING COVERING THE HOUSING WITH INCOLOY 825.

2B STACK LINING REPAIRS CONTINUED.

6/78	2A	70.0	100.0		70.0						
	2B	69.0	100.0		69.0						
	2C	66.0	100.0		66.0						
	2D	.0	.0		.0						
	2E	.0	.0		.0						
	2F	.0	.0		.0						
	SYSTEM	34.2	50.0		34.2			720	417	246	

** PROBLEMS/SOLUTIONS/COMMENTS

2B STACK LINING REPAIRS CONTINUED.

-NOTE: AN ATTEMPT IS ALWAYS MADE TO BEGIN OPERATION OF THE BOILER AND FGD SYSTEM SIMULTANEOUSLY AT BRUCE MANSFIELD. OCCASIONALLY PROBLEMS DELAY BOILER START-UP, MAKING IT POSSIBLE FOR MONTHLY FGD MODULE HOURS TO EXCEED ACTUAL BOILER HOURS.

7/78	SYSTEM							744			
8/78	SYSTEM							744			
9/78	SYSTEM							720			
10/78	SYSTEM	99.3						744	144		
11/78	SYSTEM							720			
12/78	SYSTEM							744			

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

** PROBLEMS/SOLUTIONS/COMMENTS

NO INFORMATION WAS AVAILABLE FOR THIS PERIOD.

1/79	SYSTEM							744			
2/79	SYSTEM							672			
3/79	SYSTEM							744			
4/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

NO INFORMATION WAS REPORTED FOR THIS PERIOD BY THE UTILITY.

5/79	SYSTEM							744			
6/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE AVAILABILITY FOR JANUARY 1, 1979 THROUGH MAY 31, 1979 WAS 88.8%.

THE UTILITY REPORTED THAT SOME FAN PROBLEMS WERE RECENTLY ENCOUNTERED.

7/79	SYSTEM							744			
8/79	SYSTEM							744			
9/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

CHIMNEY LINING WORK (APPLICATION OF CXL 2000) WAS COMPLETED IN EARLY 1979.

FAN HOUSING WORK (CHANGING FROM LINED CARBON STEEL TO INCOLLOY 825) IS CONTINUING.

NEW PH MONITOR MODIFICATIONS HAVE YIELDED PROMISING RESULTS WITH RESPECT TO MONITOR AVAILABILITY.

THE FGD SYSTEM ATTRIBUTED 10.8% OF THE TOTAL UNIT UNAVAILABILITY FOR 1979 TO DATE. THE BREAKDOWN IS AS FOLLOWS:

- 5.0% CHIMNEY (FINISHED CXL 2000 APPLICATION)
- 1.3% GENERAL SCRUBBER PROBLEMS AND MAINTENANCE
- 1.5% ID FAN WORK/PROBLEMS
- 2.0% MIST ELIMINATOR PLUGGING
- 1.0% EMISSION VIOLATION (CUT BACK OF BOILER LOAD BECAUSE OF LOW SO2 REMOVAL EFFICIENCY).

10/79	SYSTEM	97.5						744			
11/79	SYSTEM	100.0						720			
12/79	SYSTEM	96.5						744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE PERIOD AN ADDITIONAL FAN HOUSING WAS REPLACED WITH THE NEW INCOLLOY 825. BY THE END OF 1980 ALL THE FAN HOUSINGS WILL BE REPLACED WITH THE NEW MATERIAL.

PENNSYLVANIA POWER: BRUCE MANSFIELD 2 (CONT.)

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

WHERE THE NEW PH MONITORS HAVE BEEN INSTALLED, PROBE MAINTENANCE HAS BEEN CUT 80%, AND MIST ELIMINATOR MAINTENANCE HAS BEEN LESS OF A PROBLEM.

THE SLUDGE PUMPS HAVE BEEN A PROBLEM. THE PUMPS REQUIRE AN OVERHAUL EVERY 1000 HOURS AND HAVE FREQUENT VALVE FAILURES. NEW VALVE MANIFOLDS MAY BE INSTALLED TO IMPROVE PUMP SERVICE BY ALLOWING ACCESS TO INDIVIDUAL BALL VALVES.

1/80	SYSTEM	97.1	100.0		75.7			744	563	563	
2/80	SYSTEM	94.7	100.0		89.3			696	622	622	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM EXPERIENCED NO MAJOR PROBLEMS DURING JANUARY AND FEBRUARY.

3/80	SYSTEM	98.4	100.0		47.4			744	353	353	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE 16 DAYS IN MARCH FOR A SCHEDULED BOILER INSPECTION. NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED.

4/80	SYSTEM	89.5	100.0		87.0			720	626	626	
5/80	SYSTEM							744			
6/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE MONTHS OF MAY AND JUNE IS NOT YET AVAILABLE.

7/80	SYSTEM	95.4	100.0		76.8			744	571	571	
8/80	SYSTEM	93.9	100.0		74.1			744	551	551	
9/80	SYSTEM	97.9	100.0		75.1			720	541	541	
10/80	SYSTEM	97.2	100.0		90.3			744	672	672	
11/80	SYSTEM	97.2	100.0		82.5			720	594	594	
12/80	SYSTEM	97.9	100.0		68.1			744	507	507	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING A TURBINE OVERHAUL OF UNIT 1, A MANIFOLD SYSTEM WAS BEING INSTALLED IN THE STACK. UNIT 2 IS SCHEDULED TO BE SHUTDOWN IN LATE 1981 OR EARLY 1982 SO THAT THE MANIFOLD SYSTEM CAN BE COMPLETED. DURING THIS OUTAGE THE ID FAN ROTORS, WHICH HAVE ERODED, ARE SCHEDULED TO BE REPLACED.

1/81	SYSTEM							744			
2/81	SYSTEM							672			

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS TAKEN OUT OF SERVICE ON FEBRUARY 28, 1981 FOR A SCHEDULED FOUR WEEK OUTAGE.

3/81	SYSTEM							744			

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

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT THE FGD SYSTEM AVAILABILITY WAS 97.37%.

4/81	SYSTEM							720		
5/81	SYSTEM							744		
6/81	SYSTEM	99.8						720	590	

** PROBLEMS/SOLUTIONS/COMMENTS

MINOR UNIT OUTAGES OCCURRED DURING THE SECOND QUARTER DUE TO BOILER TUBE LEAKS. THE UNIT WAS ALSO DOWN DURING PART OF THE QUARTER DUE TO LOW LOAD REQUIREMENTS. THE UTILITY REPORTED THAT THE YEAR TO DATE UNIT AVAILABILITY WAS 72.9%.

DURING THE SECOND QUARTER NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED. THE UTILITY REPORTED THAT THE YEAR TO DATE FGD SYSTEM AVAILABILITY WAS 98.2%.

7/81	SYSTEM							744		
8/81	SYSTEM	96.7						744		
9/81	SYSTEM	96.3						720		

** PROBLEMS/SOLUTIONS/COMMENTS

OVERALL FGD SYSTEM AVAILABILITY WAS NOT REPORTED FOR THE MONTH OF JULY. THE MAJOR PROBLEM ENCOUNTERED DURING THE THIRD QUARTER WAS MIST ELIMINATOR BUILDUP MAKING CLEANING NECESSARY.

DURING SEPTEMBER THE UTILITY REPORTED PROBLEMS WITH THE ID FAN SPRAYS PLUGGING.

THE YEAR TO DATE AVAILABILITY OF THE FGD SYSTEM (THROUGH AUGUST) WAS REPORTED TO BE 97.9%.

10/81	SYSTEM	98.0						744		
11/81	SYSTEM	94.2						720		
12/81	SYSTEM	94.8						744		

** PROBLEMS/SOLUTIONS/COMMENTS

AT THE END OF NOVEMBER THE BOILER WAS TAKEN OFF-LINE FOR SCHEDULED MAINTENANCE. DURING THIS TIME THE ID FAN MOTOR WAS REPLACED. THE OUTAGE LASTED FOR APPROXIMATELY TWO WEEKS WHICH INCLUDES SOME TIME IN DECEMBER.

1/82	SYSTEM	98.1						744		
2/82	SYSTEM	98.4						672		
3/82	SYSTEM	99.3						744		

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT FGD SYSTEM PERFORMANCE WAS OUTSTANDING FOR THE FIRST QUARTER 1982.

PENNSYLVANIA POWER: BRUCE MANSFIELD 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
4/82	A	98.3									
	B	96.4									
	C	97.8									
	D	99.3									
	E	99.5									
	F	99.9									
	SYSTEM	98.5	100.0		64.3			720	463	463	37.5
5/82	A	99.3									
	B	87.9									
	C	99.0									
	D	83.1									
	E	98.2									
	F	93.5									
	SYSTEM	93.5	100.0		83.5			744	621	621	60.0
6/82	A	95.5									
	B	100.0									
	C	98.9									
	D	100.0									
	E	100.0									
	F	97.9									
	SYSTEM	98.7	100.0		95.3			720	686	686	71.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER OF 1982.

7/82	A	95.1									
	B	95.2									
	C	97.6									
	D	98.0									
	E	97.7									
	F	95.3									
	SYSTEM	96.5	100.0		100.0			744	744		81.3
8/82	A	98.2									
	B	98.8									
	C	97.3									
	D	97.2									
	E	100.0									
	F	99.6									
	SYSTEM	98.5	100.0		52.6			744	391	391	30.1
9/82	A	100.0									
	B	96.8									
	C	100.0									
	D	95.0									
	E	98.1									
	F	94.0									
	SYSTEM	97.3	100.0		77.8			720	560	560	48.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1982.

10/82	A	99.1									
	B	98.3									
	C	98.2									
	D	96.9									

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	E	98.5									
	F	95.9									
	SYSTEM	97.8	100.0		96.1			744	715	715	61.8
11/82	A	90.9									
	B	99.1									
	C	95.3									
	D	100.0									
	E	93.1									
	F	100.0									
	SYSTEM	96.4	100.0		85.3			720	614	614	54.0

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD-RELATED PROBLEMS WERE REPORTED DURING OCTOBER AND NOVEMBER 1982.

12/82	A	41.7									
	B	92.0									
	C	98.4									
	D	99.4									
	E	95.0									
	F	99.4									
	SYSTEM	87.6	100.0		91.9			744	684	684	48.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER REPAIRS WERE MADE ON THE 2A ID FAN. MOTOR MODIFICATIONS WERE PERFORMED AND THE J-BOLTS, GROUTS, AND SOLE PLATES OF THE MOTOR BASE WERE REPLACED.

1/83	A	94.9									
	B	100.0									
	C	100.0									
	D	99.8									
	E	91.2									
	F	100.0									
	SYSTEM	97.6	100.0		100.0			744	744	744	60.9
2/83	A	100.0									
	B	96.5									
	C	95.5									
	D	99.0									
	E	100.0									
	F	90.0									
	SYSTEM	96.8	100.0		100.0			672	672	672	64.6

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD-RELATED PROBLEMS WERE REPORTED DURING JANUARY AND FEBRUARY 1983.

3/83	A	73.6									
	B	1.1									
	C	1.1									
	D	73.0									
	E	57.6									
	F	79.4									
	SYSTEM	47.6	100.0		79.4			744	591	591	34.7

** PROBLEMS/SOLUTIONS/COMMENTS

A SCHEDULED TURBINE/GENERATOR OUTAGE COMMENCED ON MARCH 25.

DURING MARCH REPAIRS WERE MADE ON THE 2B AND 2C ID FANS. MOTOR MODIFICATIONS WERE PERFORMED AND THE J-BOLTS, GROUT, AND SOLE PLATE OF THE MOTOR

PENNSYLVANIA POWER: BRUCE MANSFIELD 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
		BASE WERE REPLACED.									
4/83	A	.0			.0						
	B	.0			.0						
	C	.0			.0						
	D	.0			.0						
	E	.0			.0						
	F	.0			.0						
	SYSTEM	.0			.0			720	0	0	.0
5/83	A	.0			.0						
	B	.0			.0						
	C	.0			.0						
	D	.0			.0						
	E	.0			.0						
	F	.0			.0						
	SYSTEM	.0			.0			744	0	0	.0
6/83	A	64.4									
	B	50.8									
	C	64.7									
	D	63.8									
	E	64.7									
	F	64.7									
	SYSTEM	62.2	100.0		50.7			720	365	365	29.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SCHEDULED TURBINE/GENERATOR OUTAGE WHICH COMMENCED IN MARCH ENDED ON JUNE 11.									
7/83	A	91.9	76.7	76.7	76.7						
	B	100.0	95.6	95.6	95.6						
	C	98.9	94.6	94.6	94.6						
	D	96.0	85.5	85.5	85.5						
	E	56.1	46.9	46.9	46.9						
	F	98.6	91.5	91.5	91.5						
	SYSTEM	90.3	81.8	81.8	81.8			744	744	609	66.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED MODIFICATIONS TO THE MODULE E INDUCED DRAFT FAN MOTOR AND MOTOR BASE DURING JULY.									
8/83	A	100.0	90.7	90.7	81.6						
	B	96.8	76.3	76.3	68.7						
	C	94.4	76.9	76.9	69.2						
	D	100.0	87.5	87.5	78.8						
	E	61.8	51.2	51.2	46.1						
	F	96.3	85.4	85.4	76.9						
	SYSTEM	91.5	78.0	78.0	70.2			744	669	522	57.1
9/83	A	95.8	61.0	61.0	55.1						
	B	98.3	81.3	81.3	73.5						
	C	99.2	68.1	68.1	61.5						
	D	99.8	86.0	86.0	77.8						
	E	99.1	78.1	78.1	70.6						
	F	95.5	72.5	72.5	65.6						
	SYSTEM	98.0	74.5	74.5	67.3			720	651	485	45.9

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 AUGUST AND SEPTEMBER 1983.									
10/83	A	100.1	77.5	77.5	68.8						
	B	95.8	96.5	96.5	85.8						
	C	95.7	74.0	74.0	65.7						
	D	98.6	72.3	72.3	64.2						
	E	96.2	81.5	81.5	72.4						
	F	94.7	68.8	68.8	61.2						
	SYSTEM	96.8	78.4	78.4	69.7			744	661	519	49.0
11/83	A	99.0	84.5	84.5	80.7						
	B	98.4	79.4	79.4	75.8						
	C	97.2	71.0	71.0	67.8						
	D	94.6	81.6	81.6	77.9						
	E	99.8	77.2	77.2	73.8						
	F	98.4	68.1	68.1	65.0						
	SYSTEM	97.9	76.9	76.9	73.5			720	688	529	61.2
12/83	A	98.7	79.2	79.2	77.0						
	B	98.8	73.4	73.4	71.4						
	C	99.6	80.4	80.4	78.2						
	D	100.0	69.5	69.5	67.6						
	E	95.6	80.6	80.6	78.4						
	F	100.0	86.1	86.1	83.7						
	SYSTEM	98.8	78.2	78.2	76.1			744	724	566	63.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE FOURTH QUARTER OF 1983.									
1/84	A	100.0	79.0	79.0	74.6						
	B	99.4	96.4	96.4	91.0						
	C	98.8	80.3	80.3	75.8						
	D	49.4	31.5	31.5	29.7						
	E	99.8	94.2	94.2	89.0						
	F	96.9	89.0	89.0	84.0						
	SYSTEM	90.7	78.4	78.4	74.0			744	702	551	58.2
2/84	A	95.4	82.8	82.8	76.3						
	B	96.0	89.0	89.0	82.0						
	C	97.5	85.1	85.1	78.4						
	D	66.9	61.1	61.1	56.3						
	E	99.2	83.7	83.7	77.2						
	F	83.8	64.2	64.2	59.2						
	SYSTEM	89.8	77.7	77.7	71.6			696	641	498	56.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JANUARY AND FEBRUARY.									
3/84	A	100.0	93.8	93.8	93.8						
	B	98.1	95.4	95.4	95.4						
	C	95.0	94.4	94.4	94.4						
	D	100.0	89.1	89.1	89.1						
	E	95.6	93.3	93.3	93.3						
	F	25.5	26.1	26.1	26.1						
	SYSTEM	85.7	82.0	82.0	82.0			744	744	610	79.0

PENNSYLVANIA POWER: BRUCE MANSFIELD 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										
		MODULE F UNDER WENT DRAFT FAN MOTOR AND BASE MODIFICATIONS AND WAS OUT OF SERVICE PART OF THE MONTH.									
4/84	A	94.4	86.8	86.8	86.7						
	B	95.7	96.1	96.1	96.0						
	D	94.5	87.6	87.6	87.5						
	E	95.3	93.5	93.5	93.3						
	F	66.7	66.8	66.8	66.7						
	SYSTEM	89.8	83.9	83.9	83.8			720	719	603	77.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE MODULE F INDUCED DRAFT MOTOR FAILED DURING APRIL, 1984.									
5/84	A	25.7	77.9	77.9	22.7						
	B	9.6	29.5	29.5	8.6						
	C	16.9	58.1	58.1	16.9						
	D	25.7	86.6	86.6	25.3						
	E	25.2	80.2	80.2	23.4						
	F	25.7	84.3	84.3	24.6						
	SYSTEM	21.5	69.4	69.4	20.3			744	217	151	16.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A SCHEDULED BOILER OUTAGE STARTED ON MAY 11, 1984.									
6/84	A	88.4	91.3	91.3	83.1						
	B	88.9	90.3	90.3	82.2						
	C	89.7	74.6	74.6	67.9						
	D	88.1	83.6	83.6	76.1						
	E	88.5	82.3	82.3	74.9						
	F	89.4	87.4	87.4	79.6						
	SYSTEM	88.8	84.9	84.9	77.3			720	655	557	66.0
7/84	B	95.9	88.1	88.1	83.1						
	C	97.8	83.3	83.3	78.5						
	D	93.5	78.2	78.2	73.7						
	E	97.7	84.0	84.0	79.2						
	F	101.4	88.9	88.9	83.7						
	SYSTEM	97.2	84.3	84.3	79.5			744	701	591	64.3
8/84	A	97.1	100.0	103.2	84.9						
	B	99.2	95.2	95.2	78.4						
	C	97.1	97.3	97.3	80.1						
	D	99.4	98.0	98.0	80.6						
	E	94.9	81.0	81.0	66.7						
	F	95.3	88.7	88.7	73.0						
	SYSTEM	97.2	93.4	93.9	77.3			744	612	575	58.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD RELATED PROBLEMS WERE REPORTED DURING JULY AND AUGUST, 1984.									
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR SEPTEMBER 1984.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PENNSYLVANIA POWER	
PLANT NAME	BRUCE MANSFIELD	
UNIT NUMBER	3	
CITY	SHIPPINGPORT	
STATE	PENNSYLVANIA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	32.	(.075 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	258.	(.600 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	2360	
GROSS UNIT GENERATING CAPACITY - MW	917	
NET UNIT GENERATING CAPACITY W/FGD - MW	800	
NET UNIT GENERATING CAPACITY WO/FGD - MW	828	
EQUIVALENT SCRUBBED CAPACITY - MW	917	
** 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	1580.86	(3350000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	140.6	(285 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	5.9	(19.2 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	27912.	(12000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	12.50	
RANGE ASH CONTENT - %	11.5-13.5	
AVERAGE MOISTURE CONTENT - %	7.00	
RANGE MOISTURE CONTENT - %	5.5-8.5	
AVERAGE SULFUR CONTENT - %	4.30	
RANGE SULFUR CONTENT - %	3.0-4.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	4	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	LODGE-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	395.2	(837500 ACFM)
INLET FLUE GAS TEMPERATURE - C	140.6	(285 F)
PRESSURE DROP - KPA	.8	(3. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	95.0	
** 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		

PENNSYLVANIA POWER: BRUCE MANSFIELD 3 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIME
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	M.W. KELLOGG
A-E FIRM	GILBERT/COMMONWEALTH ASSOCIATES
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	95.00
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	92.20
ENERGY CONSUMPTION - %	3.1
CURRENT STATUS	1
COMMERCIAL START-UP	10/80
INITIAL START-UP	6/80
CONTRACT AWARDED	6/77

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	4.75	
DESIGN COAL HEAT CONTENT - J/G	27679.4	(11900 BTU/LB)
DESIGN COAL ASH CONTENT - %	19.70	

** QUENCHER/PRESATURATOR

NUMBER	0

** ABSORBER

NUMBER	5	
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	32.5 WIDE X 15 HIGH X 112.8 LONG	
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	NONE	
NUMBER OF CONTACTING ZONES	6	
LIQUID RECIRCULATION RATE - LITER/S	4158.	(66000 GPM)
L/G RATIO - L/CU.M	10.5	(78.8 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.4	(1.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	6.7	(22.0 FT/S)
INLET GAS FLOW - CU. M/S	395.22	(837500 ACFM)
INLET GAS TEMPERATURE - C	140.6	(285 F)
SO2 REMOVAL EFFICIENCY - %	92.5	
PARTICLE REMOVAL EFFICENCY - %	90.0	

** 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
MANUFACTURER	HEIL
CONFIGURATION	VERTICAL
NUMBER OF STAGES	1
NUMBER OF PASSES PER STAGE	3
SUPERFICAL GAS VELOCITY - M/S	6.1 (20.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE
WASH WATER SOURCE	THICKENER OVERFLOW

** REHEATER

GENERIC TYPE	NONE
SPECIFIC TYPE	N/A

PENNSYLVANIA POWER: BRUCE MANSFIELD 3 (CONT.)

TRADE NAME/COMMON TYPE	N/A
CONSTRUCTION MATERIAL GENERIC TYPE	NONE
CONSTRUCTION MATERIAL SPECIFIC TYPE	N/A
** FANS	
NUMBER	4
NUMBER OF SPARES	0
DESIGN	CENTRIFUGAL
SUPPLIER	WESTINGHOUSE
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
** DAMPERS	
NUMBER	5
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	5
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	4
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	8
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	4
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
** DUCTWORK	
LOCATION	INLET UP TO DAMPER
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

PENNSYLVANIA POWER: BRUCE MANSFIELD 3 (CONT.)

** DUCTWORK

LOCATION	DAMPER TO ABSORBER
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

** DUCTWORK

LOCATION	OUTLET
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	DETENTION
DEVICE TYPE	N/A
MANUFACTURER	DORR OLIVER

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	****
REAGENT PREP PRODUCT	****
THICKENER OVERFLOW	****
LIME TRANSFER	****
FLY ASH & THICKENER UNDERFLOW	****

** PUMPS

SERVICE	NUMBER
SLURRY RECIRCULATION	6
SLURRY TRANSFER FROM STORAGE TANK	****
SLURRY TRANSFER FROM SLAKER	****
THICKENER UNDERFLOW	****
THICKENER OVERFLOW	****
MIST ELIMINATOR WASH	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
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	REACTION TANK BLEED
FEED STREAM CHARACTERISTICS	10% SOLIDS
OUTLET STREAM CHARACTERISTICS	30-40% SOLIDS
OUTLET STREAM DISPOSITION	SLUDGE TREATMENT TANK
OVERFLOW STREAM DISPOSITION	MIST ELIMINATOR WASH TANK

*** SLUDGE

** TREATMENT

METHOD	FIXATION
DEVICE	MIX TANK
PROPRIETARY PROCESS	DRAVO (CALCILOX)
INLET QUALITY - %	10.0

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	OFF-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	NONE
SITE DIMENSIONS	1300-1400 ACRES
SITE SERVICE LIFE - YRS	22

PENNSYLVANIA POWER: BRUCE MANSFIELD 3 (CONT.)

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH
CONTROL LEVELS	PH 5.5 TO 6.5
MONITOR LOCATION	REACTION TANK

** WATER BALANCE

WATER LOOP TYPE	OPEN
RECEIVING WATER STREAM	OHIO RIVER

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	THIOSORBIC LIME
PRINCIPAL CONSTITUENT	90% CAO MIN., 2-6% MGO, MAX. 4% ACID INSOLUBLES
SOURCE/SUPPLIER	DRAVO
POINT OF ADDITION	SLAKER

** FGD SPARE CAPACITY INDICES

ABSORBER - %	25.0

** 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
6/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATION OF THE FGD SYSTEM COMMENCED ON JUNE 9, 1980. THE UTILITY REPORTED THAT IT IS PRESENTLY IN THE PROCESS OF DEBUGGING THE SYSTEM.

7/80	SYSTEM							744			
8/80	SYSTEM							744			
9/80	SYSTEM	100.0	100.0		100.0			720	720	720	

** PROBLEMS/SOLUTIONS/COMMENTS

COMMERCIAL OPERATION OF UNIT 3 COMMENCED ON SEPTEMBER 29, 1980.

10/80	SYSTEM	89.1	100.0		74.1			744	551	551	
11/80	SYSTEM	90.3	100.0		63.2			720	455	455	
12/80	SYSTEM	91.1	100.0		68.0			744	506	506	

** PROBLEMS/SOLUTIONS/COMMENTS

SINCE STARTUP THE UTILITY HAS EXPERIENCED PROBLEMS WITH THE CEILCOTE LINER WEARING ON THE ABSORBER WALLS.

PROBLEMS WITH MIST CARRYOVER HAVE RESULTED IN THE INSTALLATION OF BAFFLES AT THE MIST ELIMINATOR TROUGHS.

SINCE STARTUP PROBLEMS HAVE OCCURRED AS A RESULT OF H2S GAS GENERATION IN DEAD SPOTS OF THE REACTION TANKS. THE TANK AGITATORS ARE BEING RELOCATED.

1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

PENNSYLVANIA POWER: BRUCE MANSFIELD 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

DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT THE FGD SYSTEM AVAILABILITY WAS 99.92%.

4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM	97.8						720	614		

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE YEAR TO DATE UNIT AVAILABILITY WAS 80.9 %.

DURING THE SECOND QUARTER NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED. THE UTILITY REPORTED THAT THE YEAR TO DATE FGD SYSTEM AVAILABILITY WAS 96.5 %.

7/81	SYSTEM							744			
8/81	SYSTEM	99.1						744			
9/81	SYSTEM	99.6						720			

** PROBLEMS/SOLUTIONS/COMMENTS

OVERALL FGD SYSTEM AVAILABILITY WAS NOT REPORTED FOR THE MONTH OF JULY. THE MAJOR PROBLEM ENCOUNTERED DURING THE THIRD QUARTER WAS MIST ELIMINATOR BUILDUP RESULTING IN DOWN TIME FOR CLEANING.

THE YEAR TO DATE AVAILABILITY OF THE FGD SYSTEM (THROUGH AUGUST) WAS REPORTED TO BE 97.2%.

10/81	SYSTEM	99.2						744			
11/81	SYSTEM	100.0						720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE END OF SEPTEMBER AND PART OF OCTOBER THE BOILER WAS TAKEN OFF-LINE FOR SCHEDULED MAINTENANCE.

12/81	SYSTEM	100.0						744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO FGD-RELATED PROBLEMS OCCURRED DURING DECEMBER.

1/82	SYSTEM	99.9						744			
2/82	SYSTEM	100.0						672			
3/82	SYSTEM	99.9						744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT FGD SYSTEM PERFORMANCE WAS OUTSTANDING FOR THE FIRST QUARTER 1982.

4/82	A	99.9									
	B	99.9									

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	C	99.9									
	D	99.9									
	E	99.9									
	SYSTEM	100.0	100.0		85.8			720	618	618	62.6
5/82	A	100.0									
	B	100.0									
	C	100.0									
	D	64.3									
	E	93.2									
	SYSTEM	100.0	100.0		90.5			744	673	673	58.9
6/82	A	100.0									
	B	100.0									
	C	100.0									
	D	37.4									
	E	100.0									
	SYSTEM	100.0	100.0		100.0			720	720	720	72.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER OF 1982.

7/82	A	96.5									
	B	100.0									
	E	96.8									
	D	96.0									
	E	74.1									
	SYSTEM	100.0	100.0		100.0			744	744	744	82.6
8/82	A	99.3									
	B	89.4									
	C	100.0									
	D	100.0									
		100.0									
	SYSTEM	100.0	100.0		97.4			744	725	725	71.7
9/82	A	96.5									
	B	100.0									
	C	100.0									
	D	82.3									
	E	100.0									
	SYSTEM	100.0	100.0		99.3			720	715	715	66.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1982.

10/82	A	100.0									
	B	95.3									
	C	94.8									
	D	100.0									
	E	100.0									
	SYSTEM	100.0	100.0		99.6			744	741	741	66.8

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD-RELATED PROBLEMS WERE REPORTED DURING OCTOBER.

11/82	A	14.4									
	B	14.4									

PENNSYLVANIA POWER: BRUCE MANSFIELD 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	C	14.4									
	D	14.4									
	E	14.4									
	SYSTEM	18.0	100.0		14.4			720	104	104	5.2

** PROBLEMS/SOLUTIONS/COMMENTS

A SCHEDULED BOILER OUTAGE OCCURRED DURING NOVEMBER.

12/82	A	98.0									
	B	99.3									
	C	92.6									
	D	100.0									
	E	100.0									
	SYSTEM	100.0	100.0		52.4			744	390	390	26.0

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD-RELATED PROBLEMS WERE REPORTED DURING DECEMBER.

1/83	A	94.3									
	B	99.3									
	C	99.1									
	D	100.0									
	E	100.0									
	SYSTEM	100.0	100.0		94.8			744	705	705	58.5
2/83	A	100.0									
	B	95.4									
	C	100.0									
	D	87.4									
	E	96.4									
	SYSTEM	100.0	100.0		100.0			672	672	672	62.5
3/83	A	97.7									
	B	94.5									
	C	96.0									
	D	100.0									
	E	100.0									
	SYSTEM	100.0	100.0		90.6			744	674	674	59.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1983.

4/83	A	91.4									
	B	97.2									
	C	99.9									
	D	96.3									
	E	99.9									
	SYSTEM	100.0	100.0		91.7			720	660	660	61.7
5/83	A	91.0									
	B	100.0									
	C	100.0									
	D	100.0									
	E	100.0									
	SYSTEM	100.0	100.0		100.0			744	744	744	64.7
6/83	A	80.9									
	B	97.5									
	C	96.7									

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	D	97.4									
	E	74.6									
	SYSTEM	100.0	100.0		100.0			720	720	720	71.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER OF 1983.

7/83	A	100.0									
	B	98.1									
	C	100.0									
	D	100.0									
	E	100.0									
	SYSTEM	100.0						744	744		72.9
8/83	A	75.1									
	B	100.0									
	C	88.3									
	D	93.2									
	E	96.9									
	SYSTEM	100.0						744	667		62.5
9/83	A	88.7									
	B	100.0									
	C	87.7									
	D	88.8									
	E	97.3									
	SYSTEM	100.0						720	720		61.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1983.

10/83	A	75.9									
	B	100.1									
	C	100.1									
	D	100.1									
	E	100.1									
		100.0									
	SYSTEM							744	658		52.0

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING OCTOBER.

11/83	A	100.0									
	B	100.0									
	C	38.8									
	D	100.0									
	E	95.2									
	SYSTEM	100.0						720	718		65.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE MODULE C MIST ELIMINATORS WERE REPLACED DURING OCTOBER.

12/83	A	96.5									
	B	100.0									
	C	100.0									
	D	91.2									
	E	80.9									
	SYSTEM	100.0						744	637		55.8

PENNSYLVANIA POWER: BRUCE MANSFIELD 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
1/84	A	98.2									
	B	100.0									
	C	100.0									
	D	95.9									
	E	96.2									
	SYSTEM	100.0						744	712		62.3
2/84	A	33.1									
	B	33.1									
	C	33.1									
	D	33.1									
	E	33.1									
	SYSTEM	41.4						696	230		21.4

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE PERIOD OF DECEMBER FEBRUARY 1984.

3/84	A	.0			.0						
	B	.0			.0						
	C	.0			.0						
	D	.0			.0						
	E										
	SYSTEM	.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 3 WAS OFF LINE DUE TO A SCHEDULED OUTAGE ON THE TURBINE-GENERATOR.

4/84	A	43.3									
	B	43.3									
	C	43.3									
	D	43.3									
	E	43.3									
	SYSTEM	54.1						720	240		15.8

** PROBLEMS/SOLUTIONS/COMMENTS

BRUCE MANSFIELD 3 ENDED A SCHEDULED TURBINE OUTAGE ON APRIL 17, 1984.

5/84	A	100.0									
	B	100.0									
	C	95.6									
	D	92.0									
	E	93.0									
	SYSTEM	100.0						744	707		73.3
6/84	A	100.0									
	B	86.2									
	C	50.9									
	D	100.0									
	E	100.0									
	SYSTEM	100.0						720	682		73.6
7/84	A	91.3									
	B	86.4									
	C	74.8									
	D	93.6									
	E	89.3									
	SYSTEM	100.0						744	678		66.8
8/84	A	100.0									

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	85.3									
	C	100.0									
	D	84.4									
	E	100.0									
	SYSTEM	100.0						744	744		78.6

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD RELATED PROBLEMS WERE REORTED FROM MAY THROUGH AUGUST, 1984.

9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR SEPTEMBER 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PHILADELPHIA ELECTRIC	
PLANT NAME	CROMBY	
UNIT NUMBER	1	
CITY	PHOENIXVILLE	
STATE	PENNSYLVANIA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	387.	(.900 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	351	
GROSS UNIT GENERATING CAPACITY - MW	160	
NET UNIT GENERATING CAPACITY W/FGD - MW	150	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	150	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	******	
BOILER TYPE	******	
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	******	(****** BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	8.20	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	2.00	
RANGE SULFUR CONTENT - %	2.0-4.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** FABRIC FILTER		
NUMBER	1	
NUMBER OF SPARE COMPARTMENTS	0	
** PARTICLE SCRUBBER		
NUMBER	3	
NUMBER OF SPARES	1	
INITIAL START-UP DATE	10/82	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/VERTICALLY ADJUSTABLE ROD DECKS	
TRADE NAME/COMMON NAME	ROD SCRUBBER	
SUPPLIER	ENVIRONEERING	
SHELL GENERIC MATERIAL	NA	
SHELL SPECIFIC MATERIAL	NA	
LINER GENERIC MATERIAL	NA	
LINER SPECIFIC MATERIAL	NA	
PRESSURE DROP - KPA	2.5	(10.0 IN-H2O)
INLET GAS TEMPERATURE - C	138.3	(281 F)
SO2 REMOVAL EFFICENCY - %	6.0	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	SALEABLE PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	MAGNESIUM OXIDE	
SYSTEM SUPPLIER	UNITED ENGINEERS	
A-E FIRM	UNITED ENGINEERS & CONSTRUCTORS	

PHILADELPHIA ELECTRIC: CROMBY 1 (CONT.)

DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	RETROFIT
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	92.00
CURRENT STATUS	1
COMMERCIAL START-UP	1/83
INITIAL START-UP	10/82
CONTRACT AWARDED	8/79

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	3.50

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	3
NUMBER OF SPARES	1
GENERIC TYPE	SPRAY TOWER
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
SUPPLIER	ENVIRONEERING
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
INLET GAS TEMPERATURE - C	60.6 (141 F)

** 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	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

DESIGN	NR
FUNCTION	NR
APPLICATION	NR
SERVICE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR

** 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

PHILADELPHIA ELECTRIC: CROMBY 1 (CONT.)

** PUMPS

SERVICE	NUMBER
NA	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	CENTRIFUGE
OVERFLOW STREAM CHARACTERISTICS	25%

*** SALEABLE BYPRODUCTS

NATURE	SULFURIC ACID
DISPOSITION	MARKETED

*** SLUDGE

** TREATMENT

METHOD	NA
DEVICE	NA
PROPRIETARY PROCESS	NA

** DISPOSAL

NATURE	N/A
TYPE	NONE
SITE TREATMENT	NR

** PROCESS CONTROL AND INSTRUMENTATION

CONTROL LEVELS	15% SOLIDS SLURRY IN ABSORBER RECYCLE TANK; ABSO

** FGD SPARE CAPACITY INDICES

ABSORBER - %	50.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.1

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			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR OCTOBER TO DECEMBER 1982.										
1/83	SYSTEM	100.0	100.0	100.0	54.9			744	408	408	
2/83	SYSTEM	100.0			.0			672	0	0	
3/83	SYSTEM	100.0	100.0	100.0	70.8			744	526	526	

UTILITY FGD SURVEY: OCTOBER 1983 - SEPTEMBER 1984

PHILADELPHIA ELECTRIC: CROMBY 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 1983.									
4/83	SYSTEM	100.0	100.0	100.0	90.2			720	649	649	
5/83	SYSTEM	100.0	100.0	100.0	70.0			744	521	521	
6/83	SYSTEM	100.0	100.0	100.0	94.9			720	683	683	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER OF 1983.									
7/83	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
8/83	SYSTEM	100.0	100.0	100.0	88.0			744	655	655	
9/83	SYSTEM	100.0	100.0	100.0	89.7			720	646	646	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1983.									
10/83	SYSTEM	100.0	100.0	100.0	92.8			744	690	690	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF OCTOBER.									
11/83	SYSTEM							720			
12/83	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR NOVEMBER AND DECEMBER 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			

PHILADELPHIA ELECTRIC: CROMBY 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

THE UTILITY REPORTED NO MAJOR FGD-RELATED PROBLEMS DURING THE FIRST THREE QUARTERS OF 1984. FGD SYSTEM AVAILABILITY WAS ESTIMATED AT 98.4%.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PHILADELPHIA ELECTRIC	
PLANT NAME	EDDYSTONE	
UNIT NUMBER	1	
CITY	EDDYSTONE	
STATE	PENNSYLVANIA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	193.	(.450 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1395	
GROSS UNIT GENERATING CAPACITY - MW	240	
NET UNIT GENERATING CAPACITY W/FGD - MW	208	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	240	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	******	
BOILER TYPE	******	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	********	(******* ACFM)
BOILER FLUE GAS TEMPERATURE - C	157.2	(315 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	31634.	(13600 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	8.70	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	5.90	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	2.00	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	

*** PARTICLE CONTROL

** PARTICLE SCRUBBER	
NUMBER	3
NUMBER OF SPARES	0
INITIAL START-UP DATE	6/80
GENERIC TYPE	VENTURI TOWER
SPECIFIC TYPE	NA
TRADE NAME/COMMON NAME	NA
SUPPLIER	PEABODY-LURGI
SHELL GENERIC MATERIAL	STAINLESS STEEL
SHELL SPECIFIC MATERIAL	AUSTENITIC
LINER GENERIC MATERIAL	NONE
LINER SPECIFIC MATERIAL	N/A
GAS CONTACTING DEVICE TYPE	NONE
NUMBER OF CONTACTING ZONES	1

*** FGD SYSTEM

** GENERAL DATA	
SALEABLE PRODUCT/THROWAWAY PRODUCT	SALEABLE PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	MAGNESIUM OXIDE
SYSTEM SUPPLIER	UNITED ENGINEERS
A-E FIRM	UNITED ENGINEERS & CONSTRUCTORS
DEVELOPMENT LEVEL	DEMONSTRATION
NEW/RETROFIT	RETROFIT
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.00
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	92.00
CURRENT STATUS	1

PHILADELPHIA ELECTRIC: EDDYSTONE 1 (CONT.)

COMMERCIAL START-UP	12/82
INITIAL START-UP	9/82
CONTRACT AWARDED	8/79

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	3	
NUMBER OF SPARES	0	
GENERIC TYPE	PACKED TOWER	
SPECIFIC TYPE	GRID PACKING	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	ENVIRONEERING, RILEY STOKER	
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	ROD DECKS	
NUMBER OF CONTACTING ZONES	2	
LIQUID RECIRCULATION RATE - LITER/S	843.	(13384 GPM)
L/G RATIO - L/CU.M	6.5	(48.5 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	2.5	(10.0 IN-H2O)
INLET GAS FLOW - CU. M/S	188.76	(400000 ACFM)
INLET GAS TEMPERATURE - C	160.0	(320 F)

** 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	DIRECT COMBUSTION
SPECIFIC TYPE	IN-LINE BURNER
TRADE NAME/COMMON TYPE	OIL
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

DESIGN	NR
FUNCTION	NR
APPLICATION	NR
SERVICE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR

** 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

PHILADELPHIA ELECTRIC: EDDYSTONE 1 (CONT.)

DEVICE TYPE	NR
** PUMPS	
SERVICE	NUMBER
NA	****
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	NA
*** SALEABLE BYPRODUCTS	
NATURE	SULFURIC ACID
DISPOSITION	MARKETED
*** SLUDGE	
** TREATMENT	
METHOD	NA
DEVICE	NA
PROPRIETARY PROCESS	NA
** DISPOSAL	
NATURE	N/A
TYPE	NONE
SITE TREATMENT	N/A
** WATER BALANCE	
WATER LOOP TYPE	OPEN
MAKEUP WATER ADDITION - LITERS/S	8.3 (132 GPM)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/82	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	DURING MAY INITIAL DEBUGGING OPERATIONS COMMENCED WITH ONE MODULE OUT OF THREE ON-LINE. PRESENTLY, THE SYSTEM IS IN THE SHAKEDOWN PHASE OF OPERATION.										
6/82	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	DURING JUNE INITIAL DEBUGGING OPERATIONS CONTINUED WITH ONE MODULE OUT OF THREE ON-LINE. PRESENTLY, THE SYSTEM IS IN THE SHAKEDOWN PHASE OF OPERATION.										
7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720	0	0	.0
10/82	SYSTEM							744	0	0	.0
11/82	SYSTEM							720	0	0	.0
12/82	SYSTEM							744	0	0	.0
1/83	SYSTEM	100.0			.0			744	0	0	.0
2/83	SYSTEM	100.0			.0			672	0	0	.0

PHILADELPHIA ELECTRIC: EDDYSTONE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
3/83	SYSTEM	100.0	100.0	100.0	11.2			744	83	83	6.7
4/83	SYSTEM	100.0			.0			720	0	0	.0
5/83	SYSTEM	100.0			.0			744	0	0	.0
6/83	SYSTEM	100.0			.0			720	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT HAS BEEN DOWN SINCE THE FALL OF 1982 DUE TO BOILER STEAM TUBE CRACKING, HOWEVER IT DID OPERATE FOR A BRIEF PERIOD DURING MARCH 1983. IT WILL MOST LIKELY BE DOWN FOR THE REMAINDER OF 1983.

7/83	SYSTEM	100.0			.0			744		0	
8/83	SYSTEM	100.0			.0			744		0	
9/83	SYSTEM	100.0			.0			720		0	

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER-RELATED PROBLEMS CONTINUED THROUGH SEPTEMBER 1983.

10/83	SYSTEM	100.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

A BOILER-RELATED FORCED OUTAGE OCCURRED DURING OCTOBER 1983.

11/83	SYSTEM	100.0			.0			720	0	0	.0
12/83	SYSTEM	100.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT UNIT 1 WAS OFF LINE DURING NOVEMBER AND DECEMBER 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

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS BROUGHT BACK ON LINE IN MID-FEBRUARY, 1984. FGD SYSTEM AVAILABILITY WAS ESTIMATED AT 75% FOR THE FIRST THREE QUARTERS OF 1984. OUTAGE TIME WAS ATTRIBUTED TO SCHEDULED OUTAGES FOR ROUTINE MAINTENANCE AND CLEANING.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PHILADELPHIA ELECTRIC	
PLANT NAME	EDDYSTONE	
UNIT NUMBER	2	
CITY	EDDYSTONE	
STATE	PENNSYLVANIA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	193.	(.450 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1395	
GROSS UNIT GENERATING CAPACITY - MW	334	
NET UNIT GENERATING CAPACITY W/FGD - MW	290	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	334	
** 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	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	******	(****** BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	7.40	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	2.00	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** PARTICLE SCRUBBER		
NUMBER	3	
NUMBER OF SPARES	0	
GENERIC TYPE	NA	
SPECIFIC TYPE	NA	
TRADE NAME/COMMON NAME	NA	
SHELL GENERIC MATERIAL	NA	
SHELL SPECIFIC MATERIAL	NA	
LINER GENERIC MATERIAL	NA	
LINER SPECIFIC MATERIAL	NA	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	SALEABLE PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	MAGNESIUM OXIDE	
SYSTEM SUPPLIER	UNITED ENGINEERS	
A-E FIRM	UNITED ENGINEERS & CONSTRUCTORS	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	92.00	
CURRENT STATUS	1	
COMMERCIAL START-UP	12/82	
INITIAL START-UP	11/82	
CONTRACT AWARDED	8/79	

PHILADELPHIA ELECTRIC: EDDYSTONE 2 (CONT.)

** DESIGN AND OPERATING PARAMETERS

** 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	NR	
TRADE NAME/COMMON TYPE	NR	
SUPPLIER	AMERICAN AIR FILTER	
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	
INLET GAS FLOW - CU. M/S	283.14	(600000 ACFM)
INLET GAS TEMPERATURE - C	160.0	(320 F)

** 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	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

DESIGN	NR
FUNCTION	NR
APPLICATION	NR
SERVICE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR

** 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

** PUMPS

SERVICE	NUMBER
---	---
NA	****

** SOLIDS CONCENTRATING/DEWATERING
DEVICE — NA

*** SALEABLE BYPRODUCTS
NATURE — SULFURIC ACID
DISPOSITION — MARKETED

*** SLUDGE

** TREATMENT
METHOD — NA
DEVICE — NA
PROPRIETARY PROCESS — NA

** DISPOSAL
NATURE — N/A
TYPE — NONE
SITE TREATMENT — N/A

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 OF THE FGD SYSTEM OCCURRED DURING NOVEMBER, 1982.										
12/82	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR DECEMBER 1982.										
1/83	SYSTEM	100.0	100.0	100.0	86.4			744	643	643	
2/83	SYSTEM	100.0	100.0	100.0	88.9			672	597	597	
3/83	SYSTEM	100.0	100.0	100.0	86.0			744	640	640	
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1983.										
4/83	SYSTEM	100.0	100.0	100.0	99.9			720	719	719	
5/83	SYSTEM	100.0	100.0	100.0	91.2			744	678	678	
6/83	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 SECOND QUARTER OF 1983.										
7/83	SYSTEM	100.0	100.0	100.0	80.4			744	598	598	
8/83	SYSTEM	100.0	100.0	100.0	79.9			744	594	594	
9/83	SYSTEM	100.0	100.0	100.0	44.7			720	322	322	

PHILADELPHIA ELECTRIC: EDDYSTONE 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 PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1983.								
10/83	SYSTEM	100.0			.0			744	0	0	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED AN ANNUAL OUTAGE AT UNIT 2 DURING OCTOBER 1983.								
11/83	SYSTEM	100.0			.0			720	0	0	.0
12/83	SYSTEM	100.0			.0			744	0	0	.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT UNIT 2 WAS OFF LINE DURING NOVEMBER AND DECEMBER 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										
			THE UTILITY REPORTED THAT THE FGD SYSTEM WAS BROUGHT BACK ON LINE IN MID-FEBRUARY, 1984. FGD SYSTEM AVAILABILITY WAS ESTIMATED AT 75% FOR THE FIRST THREE QUARTERS OF 1984. OUTAGE TIME WAS ATTRIBUTED TO SCHEDULED OUTAGES FOR ROUTINE MAINTENANCE AND CLEANING.								

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PLATTE RIVER POWER AUTHORITY	
PLANT NAME	RAWHIDE	
UNIT NUMBER	1	
CITY	WELLINGTON	
STATE	COLORADO	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	13.	(.030 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	56.	(.130 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	215.	(.500 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	250	
GROSS UNIT GENERATING CAPACITY - MW	279	
NET UNIT GENERATING CAPACITY W/FGD - MW	250	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	279	
** 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	552.12	(1170000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	132.2	(270 F)
STACK HEIGHT - M	154.	(505 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	5.3	(17.5 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	19771.	(8500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		7943-9064
AVERAGE ASH CONTENT - %	5.47	
RANGE ASH CONTENT - %	3.7-11.6	
AVERAGE MOISTURE CONTENT - %	25.96	
RANGE MOISTURE CONTENT - %	23.8-27.7	
AVERAGE SULFUR CONTENT - %	.34	
RANGE SULFUR CONTENT - %	0.2-0.4	
AVERAGE CHLORIDE CONTENT - %	.01	
RANGE CHLORIDE CONTENT - %	0.00-0.02	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** FABRIC FILTER		
NUMBER	2	
TYPE	STEPPED TUBE SHEET	
SUPPLIER	JOY MFG.	
INLET FLUE GAS CAPACITY - CU.M/S	563.0	(1193000 ACFM)
INLET FLUE GAS TEMPERATURE - C	76.7	(170 F)
PRESSURE DROP - KPA	.7	(3.0 IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.7	
TYPICAL GAS/CLOTH RATIO - M/MIN	.5	(1.8 FT/MIN)
** ESP		
NUMBER	0	
TYPE	NONE	
** 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	

PLATTE RIVER POWER AUTHORITY: RAWHIDE 1 (CONT.)

*** 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	BLACK & VEATCH
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.79
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	80.00
CURRENT STATUS	1
COMMERCIAL START-UP	4/84
INITIAL START-UP	12/83
CONTRACT AWARDED	3/80

** DESIGN AND OPERATING PARAMETERS

** 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	46.0 X 36.0	
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	
LIQUID RECIRCULATION RATE - LITER/S	9.	(145 GPM)
GAS-SIDE PRESSURE DROP - KPA	.9	(3.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	24.4	(80.0 FT/S)
INLET GAS FLOW - CU. M/S	252.94	(536000 ACFM)
INLET GAS TEMPERATURE - C	132.2	(270 F)
SO2 REMOVAL EFFICIENCY - %	80.0	
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	0
GENERIC TYPE	NONE
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

NUMBER	6	
DESIGN	NR	
SUPPLIER	WESTINGHOUSE; NOVENCO	
FUNCTION	NR	
APPLICATION	NR	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	92.74	(196534 ACFM)

PLATTE RIVER POWER AUTHORITY: RAWHIDE 1 (CONT.)

FLUE GAS TEMPERATURE - C	76.7	(170 F)
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

** 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	1.8	(2 TPH)

** REAGENT PREPARATION EQUIPMENT

FUNCTION	SLAKER
DEVICE	NR
DEVICE TYPE	NR
NUMBER	2
PRODUCT QUALITY - % SOLIDS	20.0

** PUMPS

SERVICE	NUMBER
---	---
NA	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SLUDGE

** TREATMENT

METHOD	N/A
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	INTERIM	
TYPE	LANDFILL	
SITE TRANSPORTATION METHOD	TRUCK	
SITE TREATMENT	NONE	
SITE CAPACITY - CU.M	2042410	(1670.0 ACRE-FT)
SITE SERVICE LIFE - YRS	35	

** WATEP BALANCE

WATER LOOP TYPE	CLOSED	
EVAPORATION WATER LOSS - LITER/S	27.0	(429 GPM)
MAKEUP WATER ADDITION - LITERS/S	.4	(7 GPM)
SOURCE OF MAKEUP WATER	WATER REUSE PROGRAM	

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIME
CONSUMPTION	81 TPH

PLATTE RIVER POWER AUTHORITY: RAWHIDE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
12/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM AT RAWHIDE 1 STARTED UP IN DECEMBER 1983 AND IS CURRENTLY IN THE SHAKEDOWN/DEBUGGING PHASE OF OPERATION. COMMERCIAL START-UP IS SCHEDULED FOR APRIL 1984.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE SYSTEM WAS IN A START UP MODE DURING THE FIRST QUARTER OF 1984.

4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS DOWN APPROXIMATELY 50% OF THE TIME DURING THE SECOND QUARTER OF 1984. THE MAJORITY OF PROBLEMS HAVE BEEN DUE TO AN APPARENT DESIGN FLAW IN THE CAPACITY OF RECYCLED FLYASH WHICH WAS TO DROP INTO THE RECYCLE CHAMBER FOR CONVEYANCE TO THE SPRAY DRYER. MODIFICATIONS WERE COMPLETED IN JUNE ON THE CONVEYANCE SYSTEM.

7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED PROBLEMS IN REMOVING FLYASH FROM A BAGHOUSE DURING THE THIRD QUARTER. FLUIDIZED BED STONES WERE ADDED TO INCREASE SURFACE AREA, HOWEVER THE ASH EVENTUALLY HAD TO BE REMOVED WITH A VACUUM TRUCK.

ADDITIONAL PROBLEMS AROSE IN REMOVING THE FLYASH FROM THE VACUUM TRUCK AND RESULTED IN A DECISION TO LANDFILL IT.

THE FGD SYSTEM WAS DOWN MORE THAN 50% OF THE TIME DURING THE THIRD QUARTER DUE TO RECYCLE ASH PROBLEMS.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PUBLIC SERVICE INDIANA	
PLANT NAME	GIBSON	
UNIT NUMBER	5	
CITY	PRINCETON	
STATE	INDIANA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.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	3250	
GROSS UNIT GENERATING CAPACITY - MW	670	
NET UNIT GENERATING CAPACITY W/FGD - MW	495	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	670	
** 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	152.	(500 FT)
STACK SHELL	NR	
STACK TOP DIAMETER - M	5.8	(19.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	******	(****** BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10282-11516
AVERAGE ASH CONTENT - %	********	
RANGE ASH CONTENT - %	8.4-15.3	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	3.30	
RANGE SULFUR CONTENT - %	2.0-4.4	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	ENVIROTECH	
INLET FLUE GAS CAPACITY - CU.M/S	1076.9	(2282000 ACFM)
INLET FLUE GAS TEMPERATURE - C	148.9	(300 F)
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		

PUBLIC SERVICE INDIANA: GIBSON 5 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	MAG
SYSTEM SUPPLIER	M.W. KELLOGG
A-E FIRM	SARGENT & LUNDY
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	86.00
CURRENT STATUS	1
COMMERCIAL START-UP	3/83
INITIAL START-UP	10/82
CONTRACT AWARDED	5/79

** DESIGN AND OPERATING PARAMETERS

** 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	
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	HYDRAULICALLY-BONDED MORTAR	
LINER MATERIAL TRADE NAME/COMMON TYPE	PRE-KRETE G-8	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	4	
LIQUID RECIRCULATION RATE - LITER/S	2327.	(36930 GPM)
L/G RATIO - L/CU.M	7.2	(53.5 GAL/1000 ACF)
INLET GAS FLOW - CU. M/S	325.74	(690280 ACFM)
INLET GAS TEMPERATURE - C	137.8	(280 F)
SO2 REMOVAL EFFICIENCY - %	95.0	
PARTICLE REMOVAL EFFICENCY - %	80.0	

** 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 STAGES	1	
NUMBER OF PASSES PER STAGE	1	
SUPERFICAL GAS VELOCITY - M/S	6.7	(22.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	MAKEUP	
WASH RATE - L/S	50.5	(800 GAL/MIN)

** REHEATER

NUMBER	4	
NUMBER OF SPARES	1	
NUMBER PER MODULE	1	
GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER	
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE	
INLET FLUE GAS TEMPERATURE - C	210.0	(410 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** FANS

NUMBER	4	
NUMBER OF SPARES	1	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FAN	
FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	365.72	(775000 ACFM)
FLUE GAS TEMPERATURE - C	143.3	(290 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	

** FANS

NUMBER	2
NUMBER OF SPARES	0
DESIGN	CENTRIFUGAL
SUPPLIER	WESTINGHOUSE
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY

** FANS

NUMBER	2
NUMBER OF SPARES	0
DESIGN	CENTRIFUGAL
SUPPLIER	WESTINGHOUSE
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY

** 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

LOCATION	DOWN STREAM OF ABSORBERS
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	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	1

** REAGENT PREPARATION EQUIPMENT

FUNCTION	SLAKER
MANUFACTURER	WALLACE & TIERNAN
NUMBER	1

** PUMPS

SERVICE	NUMBER
---	---
RECIRCULATION	16

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	2
NUMBER OF SPARES	1
CONFIGURATION	CIRCULAR
DIMENSIONS - FT	150.0 DIA
SHELL SPECIFIC MATERIAL TYPE	CONCRETE

PUBLIC SERVICE INDIANA: GIBSON 5 (CONT.)

LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER
FEED STREAM CHARACTERISTICS	10% SOLIDS
OUTLET STREAM CHARACTERISTICS	30% SOLIDS
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	VACUUM FILTER
NUMBER	4
NUMBER OF SPARES	1
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
FEED STREAM CHARACTERISTICS	30% SOLIDS
OUTLET STREAM CHARACTERISTICS	50% SOLIDS
*** SLUDGE	
** TREATMENT	
METHOD	FIXATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	CONVERSION SYSTEMS [POZ-O-TEC]
** DISPOSAL	
NATURE	NA
TYPE	NA
SITE TREATMENT	NR
** PROCESS CONTROL AND INSTRUMENTATION	
CHEMICAL PARAMETERS	INLET SO2,PH
MONITOR LOCATION	ABSORBER INLET
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK/FEED FORWARD
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
MAKEUP WATER ADDITION - LITERS/S	38.4 (609 GPM)
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	CACO3
POINT OF ADDITION	BALL MILL
** 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			

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 EXPERIENCING PROBLEMS WITH SLURRY REENTRAINMENT TO THE GAS STREAM RESULTING IN AN INCREASED CONCENTRATION OF PARTICULATE MATTER IN THE FLUE GAS. THE PROBLEM FORCED THEM TO LIMIT BOILER LOAD TO 410 MW.

4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

UTILITY REPORTED THAT ITS SLURRY REENTRAINMENT PROBLEM IS BELIEVED TO BE DUE TO UNDERDESIGNED DOWNCOMERS AND DRAIN TUBES. DESIGN MODIFICATIONS WILL BE IMPLEMENTED AND TESTED ON ONE OF THE FOUR WEIR MODULES. TESTING IS SCHEDULED FOR SOMETIME IN AUGUST OR SEPTEMBER. IF TESTS ARE SUCCESSFUL, THE UTILITY PLANS TO MAKE MODIFICATIONS ON THE REMAINING 3 MODULES AND SCHEDULE A FULL LOAD COMPLIANCE TEST IN NOVEMBER.

7/83	A	27.3	27.3	100.0	27.3						
	B	98.5	98.5	99.9	98.5						
	C	75.7	75.5	99.6	75.5						
	D	95.4	95.4	99.9	95.4						
	SYSTEM	99.0	98.9	100.0	98.9			744	744	736	
8/83	A	100.0	75.7	100.0	75.5						
	B	95.0	94.3	98.7	94.1						
	C	.0	.0		.0						
	D	99.3	94.2	99.1	94.0						
	SYSTEM	98.1	88.1	99.3	87.9			744	742	654	
9/83	A	86.7	99.9	100.0	84.6						
	B	86.0	92.8	100.0	78.6						
	C	33.3	37.7	100.0	31.9						
	D	53.3	62.8	100.0	53.2						
	SYSTEM	86.4	97.7	100.0	82.8			720	610	596	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE TESTS WERE SUCCESSFUL AND THE MODIFICATIONS WILL BE IMPLEMENTED ON THE REMAINING 3 MODULES. THE MODIFICATIONS SEEMED TO HAVE SOLVED THEIR WATER CARRYOVER AND OPACITY PROBLEMS. THE UNIT WILL UNDERGO CERTIFICATION IN NOVEMBER.

THE SYSTEM SUPPLIER IS PRESENTLY WORKING TO SOLVE A HIGH ABSORBER FLUE GAS VELOCITY PROBLEM. THE DESIGN AND ACTUAL FLUE GAS VELOCITIES ARE 24.5 AND 60.0 FT/SEC, RESPECTIVELY. THE SUPPLIER BELIEVES THAT THE SLURRY SPRAY FROM THE HIGH PRESSURE NOZZLES IS COMPRESSING THE GAS FLOW AND SUBSEQUENTLY CAUSING POOR GAS DISTRIBUTION AND HIGHER THAN DESIGN GAS VELOCITIES. THE SUPPLIER PLANS TO TEST LOW PRESSURE NOZZLES AND/OR INSTALL GAS DISTRIBUTION VANES.

CORROSION WAS REPORTED IN THE LOWER PLENUM ON THE BYPASS REHEAT DUCT. GIBSON 5 USES TWO TYPES OF REHEAT, DEPENDING UPON THE SULFUR CONTENT OF THE COAL BEING BURNED. PRIMARY REHEAT IS DONE WITH 17-20% BYPASS WHEN BURNING PERFORMANCE COAL. THE INDIRECT HOT AIR STEAM HEAT EXCHANGERS ARE ONLY USED WHEN THEY HAVE TO BYPASS LESS WHEN THE SULFUR CONTENT OF THE COAL GETS TOO HIGH.

10/83	A	9.7	25.2	100.0	2.6						

PUBLIC SERVICE INDIANA: GIBSON 5 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	100.0	100.0	11.3						
	C	100.0	94.2	100.0	9.5						
	D	.0	.0		.0						
	SYSTEM	69.9	73.1	100.0	7.8			744	75	58	2.8

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES A AND D WERE NOT AVAILABLE DURING OCTOBER DUE TO ABSORBER WATER CARRYOVER PROBLEMS. THE SYSTEM SUPPLIER IS MAKING MODIFICATIONS.

11/83	A	63.6	85.0	100.0	76.9						
	B	46.9	51.8	100.0	46.9						
	C	94.7	93.9	100.0	85.0						
	D	53.2	34.7	100.0	31.4						
	SYSTEM	86.2	88.4	100.0	80.1			720	652	577	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED OUTAGES WERE REPORTED DURING NOVEMBER 1983.

12/83	A	91.9	89.4	100.0	89.0						
	B	.0	.0		.0						
	C	96.8	92.0	100.0	91.5						
	D	92.7	82.5	100.0	82.1						
	SYSTEM	93.8	88.0	100.0	87.5			744	740	651	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER, MODIFICATIONS WERE BEING MADE BY THE VENDOR AT THE B MODULE TO CORRECT A DRAINAGE PROBLEM FROM THE ABSORBER TO THE REACTOR.

1/84	A	59.8	58.3	98.4	58.3						
	B	62.0	62.0	100.0	62.0						
	C	70.0	70.0	99.0	70.0						
	D	73.0	61.0	100.0	61.0						
	SYSTEM	88.3	83.8	100.0	83.8			744	744	623	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT ONE MODULE WAS DOWN DURING THE MONTH FOR DESIGN MODIFICATIONS.

THE REMAINING MODULES WERE HELD OUT APROXIMATELY TWO DAYS EVERY TWO TO THREE WEEKS FOR MIST ELIMINATOR CLEANING.

2/84	A	97.0	70.7	91.4	29.0						
	B	100.0	62.0	96.2	25.4						
	C	84.8	34.0	102.1	13.9						
	D	100.0	96.6	100.0	39.7						
	SYSTEM	100.0	87.8	100.0	36.0			696	286	251	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING FEBRUARY.

3/84	A	76.5	67.1	100.0	55.2						
	B	94.5	92.4	100.0	76.1						
	C	96.0	90.8	100.0	74.7						
	D	60.5	66.9	100.0	55.1						
	SYSTEM	100.0	100.0	100.0	87.1			744	613	648	

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

** PROBLEMS/SOLUTIONS/COMMENTS

SLURRY RECIRCULATION SPRAY NOZZLES WERE CLEANED DURING MARCH.

THE REACTOR BLOW DOWN VALVES OF MODULES A AND D WERE REPLACED DURING MARCH.

MODULE A AND D REACTOR VENT BLOWER WERE REBUILT, AND THE REACTOR VENT BLOWER BEARINGS OF MODULE C WERE REPLACED DURING THE MONTH.

THE REACTOR SUMP PUMP SUCTION VALVES OF MODULE D WERE REBUILT DURING MARCH.

MODULE D BOOSTER FAN BEARINGS WERE REPLACED DURING THE MONTH.

THE MIST ELIMINATOR STIFFENERS FOR MODULE D WERE INSTALLED DURING MARCH.

MODULE B AND D FILTER DRUMS WERE RECLOTHED DURING THE MONTH.

THE BALL MILL SUMP PUMPS OF MODULES A AND B WERE REBUILT DURING MARCH.

A BROKEN SCREW IN THE MODULE B FLYASH ADDITIVE LIME SCREW CONVEYOR CAUSED ADDITIONAL OUTAGE TIME IN MARCH.

A BROKEN SUPPORT BEAM IN MODULE A CONTRIBUTED TO FGD OUTAGE DURING THE MONTH.

THE UTILITY REPORTED REPLACING SLURRY FEED PUMP BELTS DURING MARCH.

4/84	A	.0	.0		.0					
	B	23.3	100.0	100.0	22.2					
	C	23.3	94.8	101.3	21.0					
	D	20.0	78.5	82.8	17.4					
	SYSTEM	22.2	91.1	94.7	20.2		720	159	145	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FLYASH SILO BAG FILTERS OF MODULE B WERE REPLACED DURING THE MONTH.

A UNIT OUTAGE OCCURRED FROM APRIL 8 TO MAY 7, 1984, DURING WHICH TIME NUMEROUS REPAIRS WERE MADE.

THE 117 LA SLAKER WAS REBUILT DURING APRIL.

THE FOLLOWING FAN REPAIRS WERE MADE DURING THE APRIL UNIT OUTAGE:
(1) MODULE A'S REACTOR VENT BLOWER WAS REPLACED.
(2) MODULE C'S REACTOR VENT BLOWER BEARINGS WERE REPLACED.
(3) THE BOOSTER FANS OF MODULES A, B AND C WERE INSPECTED.

THE MIST ELIMINATOR TRAYS OF MODULES A AND C WERE REBUILT DURING APRIL.

THE FOLLOWING VALVE REPAIRS WERE MADE DURING THE APRIL UNIT OUTAGE:
(1) THE REPLACEMENT OF TWO REACTOR VENT BLOWER CHECK VALVES.
(2) THE RUBBER BOOT ON THE SUCTION VALVE OF UNDER FLOW PUMP, B-2, WAS REPLACED.
(3) THE MANUAL BLOCKING VALVE ON UNDERFLOW PUMP, B-2, WAS REPLACED.
(4) THE SLURRY RECIRCULATION PUMP SUCTION VALVES OF MODULES B AND C WERE REPACKED.

THE FOLLOWING PUMP REPAIRS WERE MADE DURING THE APRIL UNIT OUTAGE:
(1) THE SLURRY FEED PUMPS OF MODULES A, B AND C WERE REBUILT.
(2) THE SEAL WATER BOOSTER PUMPS OF MODULES A AND B WERE REBUILT.
(3) THE SLURRY RECIRCULATION PUMPS, A-1 THROUGH A-4 AND B-1 THROUGH B-4, WERE REPACKED.
(4) THE SLURRY RECIRCULATION PUMP, A-1, WAS REBUILT (NEW PROPELLER, SLEEVE,

PUBLIC SERVICE INDIANA: GIBSON 5 (CONT.)

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

SEALS, RUBBER LINE).
(5) THE SLURRY RECIRCULATION PUMP, B-3, WAS REBUILT.
(6) THE SLURRY RECIRCULATION PUMP OIL OF MODULES A, B AND C WAS CHANGED.

THE SLURRY RECIRCULATION SPRAY NOZZLES WERE CLEANED DURING APRIL.

THE FOLLOWING BALL MILL REPAIRS WERE MADE DURING THE APRIL UNIT OUTAGE:
(1) MAIN JOURNAL BEARINGS WERE REPACKED.
(2) CLUTCH BOOTS WERE REPLACED.
(3) OIL WAS CHANGED.
(4) FEED CHUTE, TROMMEL SCREEN, OUTLET DISCHARGE HOOD AND DISECTOR VALVE WERE REPLACED.

THE PUG MILL BEARINGS, SEALS, SLEEVES, WIPERS AND OIL WERE REPLACED DURING THE APRIL UNIT OUTAGE.

THE SURGE TANK AGITATOR RUBBER LINING WAS REPLACED DURING APRIL.

DURING APRIL, THE OUTLET DUCTWORK WAS CLEANED OF SLURRY AND SLUDGE. ALSO, APPROXIMATELY 20% OF THE PRE-KRETE WAS REPLACED.

5/84	A	.0	.0		.0						
	B	65.5	87.9	100.0	61.8						
	C	71.0	87.7	100.0	61.7						
	D	71.0	74.4	99.2	52.3						
	SYSTEM	69.1	83.3	99.7	58.6			744	523	436	38.7

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS OUT OF SERVICE DURING MAY TO CHANGE MIST ELIMINATOR SUPPORTS.

THE SLEEVES AND THROAT LINES OF SLURRY RECIRCULATION PUMPS, C-1, C-2, C-3 AND A-2, WERE INSTALLED DURING MAY.

THE 117L SLAKER WAS REBUILT DURING MAY.

THE BALL MILL CLASSIFIER WAS REBUILT DURING THE MONTH.

THE REACTOR SLURRY RECIRCULATION PUMP SUCTION VALVES OF MODULE C WERE REPACKED DURING MAY.

6/84	A	89.4	81.4	100.0	81.4						
	B	96.5	88.2	100.0	88.2						
	C	63.9	42.2	100.0	42.2						
	D	80.7	75.0	100.0	75.0						
	SYSTEM	100.0	95.6	100.0	95.6			720	720	688	70.8

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE C WAS OUT OF SERVICE FOR SEVEN DAYS DURING JUNE DUE TO MIST ELIMINATOR MODIFICATION.

THE FOLLOWING VALVE REPAIRS WERE MADE DURING JUNE:
(1) THE VACUUM FILTER REGULATING VALVE BOOTS OF MODULES 5B AND 5C WERE REPLACED.
(2) THE FILTER FEED PUMP RECIRCULATION VALVE OF MODULE 5A WAS REBUILT.
(3) THE SUCTION VALVES OF THICKENER UNDERFLOW PUMPS, 5A-1 AND 5A-2, WERE REBUILT.
(4) 117L AND 117LA SLAKER TORQUE VALVES WERE REPLACED.
(5) THE A-2 MIST ELIMINATOR VALVE WAS REPLACED.

THE 117LA SLAKER BELT WAS REPLACED DURING JUNE.

THE VACUUM FILTER DRUM OF MODULE C WAS REWIRED DURING JUNE.

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

DURING THE MONTH, THE SLEEVE AND THROAT RING OF RECIRCULATION PUMP, D-1, WERE REBUILT, AND THE 5A-1 UNDERFLOW PUMP WAS REBUILT.

MODULES C AND D ABSORBER SPRAY NOZZLES WERE CLEANED DURING JUNE.

7/84	A	88.7	83.0	100.0	80.4						
	B	50.1	32.2	100.0	31.2						
	C	61.8	34.7	99.6	33.6						
	D	96.6	89.1	99.8	86.3						
	SYSTEM	99.1	79.6	100.0	77.2			744	721	574	48.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE MIST ELIMINATOR BRACING OF MODULES B AND C WAS MODIFIED DURING JULY.

THE 5B SLAKER WEIGH FEEDER BELT WAS REPLACED DURING THE MONTH.

THE ABSORBER NOZZLES OF MODULE B WERE CLEANED DURING JULY.

THE EXPANSION JOINTS ON THE FLYASH ROTARY FEEDERS 5A AND 5B WERE REPLACED DURING JULY.

THE UTILITY REPORTED THAT THE EXPANSION BOOT FOR THE ADDITIVE AND DOLOMITIC LIME SILOS LIVE BOTTOM WAS REPLACED DURING THE MONTH.

THE FILTER BAGS IN THE ADDITIVE AND DOLOMITIC LIME DAY BIN DUST COLLECTORS WERE REPLACED DURING JULY.

DURING JULY, NEW METAL WAS WELDED ONTO THE BALL MILL CENTER PARTITION IN AREAS OF EXCESSIVE WEAR.

THE 5A9 MIST ELIMINATOR VALVE WAS REPLACED DURING JULY.

THE REGULATING VALVE BOOT WAS REPLACED ON FILTER VAT 5A DURING JULY.

FILTER DRUM 5A RECEIVED A NEW WIRE WRAP DURING JULY.

8/84	A	68.4	47.8	100.0	42.9						
	B	80.8	83.0	88.4	74.5						
	C	87.4	92.0	89.1	82.5						
	D	34.9	33.0	100.0	29.6						
	SYSTEM	90.5	85.3	100.0	76.5			744	667	569	51.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT SLAKER REPAIRS WERE MADE DURING THE MONTH OF AUGUST.

REPAIRS WERE MADE ON THE BALL MILL DURING THE MONTH OF AUGUST.

A RUBBER EXPANSION JOINT WAS REPLACED ON THE LIME SILO.

A REACTOR VENT BLOWER WAS REBUILT DUE TO BAD INBOARD BEARINGS.

MODULES A,B,C,D UNDERWENT ROUTINE PUMP MAINTENANCE.

SLURRY CIRCULATION PUMP VALVES WERE REPLACED DUE TO LEAKS.

THE UTILITY REPORTED THAT THE FGD SYSTEM SUPPLIER MADE DESIGN MODIFICATIONS DURING THE MONTH.

PRECRETE AND FLAKEGLASS ABSORBER LININGS WERE REPAIRED.

SLURRY SPRAY NOZZLES WERE CLEANED DURING AUGUST.

PUBLIC SERVICE INDIANA: GIBSON 5 (CONT.)

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

MIST ELIMINATOR SUPPORT BEAMS WERE REPLACED DURING THE MONTH.

AN INLET SLIDE GATE DAMPER WAS REPLACED DURING AUGUST.

THE UTILITY REPORTED THAT A VACUUM FILTER CLOTH WAS REPLACED DURING AUGUST.

BAGS AND SEPARATOR STONES WERE REPLACED ON THE FLY ASH SILO.

9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR SEPTEMBER 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PUBLIC SERVICE OF NEW MEXICO	
PLANT NAME	SAN JUAN	
UNIT NUMBER	1	
CITY	WATERFLOW	
STATE	NEW MEXICO	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	9.	(.020 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	279.	(.650 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1560	
GROSS UNIT GENERATING CAPACITY - MW	361	
NET UNIT GENERATING CAPACITY W/FGD - MW	314	
NET UNIT GENERATING CAPACITY WO/FGD - MW	330	
EQUIVALENT SCRUBBED CAPACITY - MW	361	
** 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	750.32	(1590000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	122.8	(253 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	6.1	(20.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20934.	(9000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8000-11628
AVERAGE ASH CONTENT - %	22.00	
RANGE ASH CONTENT - %	12.6-22.5	
AVERAGE MOISTURE CONTENT - %	14.82	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	.80	
RANGE SULFUR CONTENT - %	0.6-1.3	
AVERAGE CHLORIDE CONTENT - %	.03	
RANGE CHLORIDE CONTENT - %	0.00-0.09	
*** PARTICLE CONTROL		
** ESP		
NUMBER	1	
TYPE	HOT SIDE	
SUPPLIER	WESTERN PREC. DIVISION, JOY	
INLET FLUE GAS CAPACITY - CU.M/S	943.8	(2000000 ACFM)
INLET FLUE GAS TEMPERATURE - C	371.1	(700 F)
PRESSURE DROP - KPA	.6	(3. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.8	
** PARTICLE SCRUBBER		
NUMBER	4	
NUMBER OF SPARES	1	
INITIAL START-UP DATE	4/78	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/BOTTOM-ENTRY PLUMB BOB	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	DAVY MCKEE	
DIMENSIONS - FT	12.5 DIA X 28.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
LINER GENERIC MATERIAL	INORGANIC	
LINER SPECIFIC MATERIAL	PREFIRED BRICK/SHAPES	
GAS CONTACTING DEVICE TYPE	STAINLESS STEEL	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	224.9	(3570 GPM)
L/G RATIO - LITER/CU.M	.9	(7.1 GAL/1000ACF)
PRESSURE DROP - KPA	3.1	(12.5 IN-H2O)
SUPERFICIAL GAS VELOCITY - M/S	48.8	(160.0 FT/S)

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 1 (CONT.)

INLET GAS FLOW RATE - CU.M/S	237.4	(503000 ACFM)
INLET GAS TEMPERATURE - C	134.4	(274 F)
PARTICLE REMOVAL EFFICIENCY - %	75.0	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	SALEABLE PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	WELLMAN LORD
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	DAVY MCKEE
A-E FIRM	STEARNS-ROGER
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	RETROFIT
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	4.4
CURRENT STATUS	1
COMMERCIAL START-UP	4/78
INITIAL START-UP	4/78
CONTRACT AWARDED	2/74

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	4	
NUMBER OF SPARES	1	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	VALVE TRAY	
TRADE NAME/COMMON TYPE	BUBBLE CAP TRAY TOWER	
SUPPLIER	DAVY MCKEE	
DIMENSIONS - FT	24.0 X 29.0 X 79.0	
SHELL GENERIC MATERIAL	INORGANIC	
SHELL SPECIFIC MATERIAL	HYDRAULICALLY-BONDED CONCRETE	
SHELL MATERIAL TRADE NAME/COMMON TYPE	PORTLAND CEMENT	
LINER GENERIC MATERIAL	INORGANIC	
LINER MATERIAL TRADE NAME/COMMON TYPE	ACID-RESISTANT BRICK [LOW H2O ABSORPTION]	
GAS CONTACTING DEVICE TYPE	VALVE TRAY	
NUMBER OF CONTACTING ZONES	5	
DISTANCE BETWEEN GAS CONTACTING ZONES - CM	5.1	(2.0IN)
LIQUID RECIRCULATION RATE - LITER/S	47.	(750 GPM)
L/G RATIO - L/CU.M	.2	(1.7 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	4.0	(16.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.3	(10.8 FT/S)
INLET GAS FLOW - CU. M/S	205.28	(435000 ACFM)
INLET GAS TEMPERATURE - C	48.9	(120 F)
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	
CONFIGURATION	HORIZONTAL	
NUMBER OF PASSES PER STAGE	1	
PRESSURE DROP - KPA	.0	(.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.2	(10.5 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	BLENDED	
WASH FREQUENCY	CONTINUOUS ON ONE & INTERMITTENT ON THE OTHER	
WASH RATE - L/S	3.8	(60 GAL/MIN)

** REHEATER

NUMBER	1	
GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER	
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE	
TEMPERATURE INCREASE - C	27.8	(50 F)
INLET FLUE GAS FLOW RATE - CU. M/S	647.45	(1372000 ACFM)
INLET FLUE GAS TEMPERATURE - C	51.7	(125 F)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	

** FANS

NUMBER	4	
DESIGN	CENTRIFUGAL	
SUPPLIER	BUFFALO FORGE	
FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	276.06	(585000 ACFM)
FLUE GAS TEMPERATURE - C	122.8	(253 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

LOCATION	ESP TO FANS
DIMENSIONS	16.0 X 24.0
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	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	1

** PUMPS

SERVICE	NUMBER
ABSORBER PRODUCT TRANSFER	2
SCRUBBER RECIRCULATION	4
ABSORBER RECIRCULATION	20
ABSORBER SPRAY RECIRCULATION	8

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

NATURE	SULFURIC ACID	
FULL LOAD QUANTITY - M T/H	1.45	(1.60 TPH)
QUALITY - %	99.0	
DISPOSITION	MARKETED	

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 1 (CONT.)

*** SLUDGE

** TREATMENT

METHOD	N/A
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	N/A
TYPE	NONE
SITE TREATMENT	N/A

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH & DENSITY
CONTROL LEVELS	PH 5.5-6.5; SP.GR. 1.2-1.3
MONITOR LOCATION	ABSORBER BLEED & PRODUCT SOLUTION
PROCESS CONTROL MANNER	MANUAL

** WATER BALANCE

WATER LOOP TYPE	CLOSED	
POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	45	
MAKEUP WATER ADDITION - LITERS/S	23.0	(365 GPM)

** 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
0/78	SYSTEM										

** PROBLEMS/SOLUTIONS/COMMENTS

NOTE: ALTHOUGH THIS FGD SYSTEM IS DESIGNED TO BRING THE BOILER INTO COMPLIANCE WITH A 0.34 LB/MM BTU SO2 EMISSION STANDARD, THE STATE HAS INITIALLY ONLY REQUIRED A 1.2 LB/MM BTU SO2 CONTROL LEVEL. SAN JUAN 1 WILL BE REQUIRED TO MEET THE MORE STRINGENT SO2 EMISSION LIMITATION VALUE BY SEPTEMBER 1, 1980. THE UNIT ONLY REQUIRES TWO OF THE FOUR SCRUBBING TRAINS TO MEET THE 1.2 LB/MM BTU LIMITATION VALUE; HOWEVER, THREE ARE REQUIRED FOR THE MORE STRINGENT LIMITATION VALUE (THE SYSTEM IS DESIGNED TO INCLUDE ONE SPARE SCRUBBING TRAIN WHEN MEETING THE 0.34 LB/MM BTU SO2 EMISSION STANDARD). BECAUSE OF THIS CHANGE IN EMISSION LIMITATION VALUES THE FGD SYSTEM WILL EFFECTIVELY HAVE AN ABSORBER SPARE COMPONENT INDEX OF 2.0 (100% SPARE CAPACITY FOR THIS SYSTEM) THROUGH AUGUST, 1980 AND 1.0 (33.3% SPARE CAPACITY FOR THIS SYSTEM) THEREAFTER. CONSEQUENTLY THE "SYSTEM" DEPENDABILITY FACTORS WILL BE CALCULATED AS:

MODULAR AVERAGE X 2.00
THROUGH AUGUST, 1980 AND:
MODULAR AVERAGE X 1.33
THEREAFTER.

4/78	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

SO2 ABSORPTION BEGAN ON APRIL 8, 1978 USING TWO OF THE FOUR CELLS. ONE THIRD OF THE FLUE GAS IS BEING BYPASSED. THE FGD SYSTEM IS IN A SHAKEDOWN/DEBUGGING PHASE. FULL COMMERCIAL FGD SYSTEM OPERATION IS EXPECTED IN JUNE.

5/78	SYSTEM							744			

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
	** PROBLEMS/SOLUTIONS/COMMENTS										
		OVER THE APRIL-MAY PERIOD 22 DAYS OF DATA WERE ACCUMULATED FOR THE FGD SYSTEM. DURING THIS PERIOD THE BOILER WAS OUT OF SERVICE SEVEN HOURS AND THE FGD SYSTEM 28 HOURS FOR UNSCHEDULED CORRECTIONS. THE SYSTEM HAS STILL NOT STABILIZED. NO MAJOR FGD SYSTEM PROBLEMS WERE REPORTED.									
6/78	SYSTEM							720			
7/78	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A HIGH PRESSURE DROP ACROSS THE VENTURIS PREVENTED FULL FLUE GAS FLOW THROUGH THE FGD SYSTEM IN JUNE AND JULY.									
8/78	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE HIGH VENTURI PRESSURE DROP REPORTED FOR JULY WAS LOWERED BY ADJUSTING INTERNAL PLUMB BOBS IN THE VENTURI THROATS.									
		REPAIRS WERE MADE TO THE MIST ELIMINATORS WHILE THE MODULES WERE DOWN FOR VENTURI PLUMB BOB ADJUSTMENTS.									
9/78	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A FIRE IN THE START-UP TRANSFORMER DUCT BANK CAUSED A TWO WEEK BOILER OUTAGE.									
10/78	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		HEAT TRACING FAILURES ALLOWED LINE FREEZING TO OCCUR.									
		SOME SULFUR PRODUCT HAS BEEN PRODUCED BUT THE CHEMICAL PLANT OPERATIONS HAVE NOT YET BEEN OPTOMIZED.									
		SHAKEDOWN/DEBUGGING OPERATIONS ARE CONTINUING.									
11/78	SYSTEM							720			
12/78	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ALTHOUGH THE FGD SYSTEM HAS BEEN OPERATING, WEATHER-RELATED PROBLEMS HAVE LIMITED OPERATIONS TO TWO MODULES.									
1/79	SYSTEM							744			
2/79	SYSTEM							672			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		FREEZE UPS RESULTED IN REHEATER LEAKS LIMITING ABSORBER OPERATIONS.									
3/79	SYSTEM							744			
4/79	SYSTEM							720			

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
5/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

HOURS ARE NOT YET AVAILABLE BECAUSE THE UTILITY IS CONCENTRATING EFFORTS ON OPERATION OF THIS NEW UNIT. THE UTILITY REPORTED THAT THE SCRUBBING MODULES THEMSELVES ARE OPERATING ACCEPTABLY. ALSO THE CHEMICAL PLANT IS AVAILABLE AND THERE IS NO SYSTEM PLUGGING WHATSOEVER.

THE MAJOR PROBLEM ENCOUNTERED WAS FAN VIBRATION. THE UTILITY HAS BEEN WORKING WITH THE SUPPLIER IN AN EFFORT TO DISCOVER WHY FAN BALANCE HAS BEEN DIFFICULT TO MAINTAIN.

7/79	SYSTEM							744			
8/79	SYSTEM							744			
9/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE THIRD QUARTER THE UNIT OPERATED WITH TWO ABSORBERS. ALL FOUR ABSORBERS HAVE BEEN LARGELY AVAILABLE. ONE ABSORBER WAS DOWN DUE TO BOOSTER BLOWER VIBRATION PROBLEMS.

10/79	SYSTEM							744			
11/79	SYSTEM							720			
12/79	A	94.0	79.0		23.8						
	B	100.0	67.4		20.3						
	C	.0	.0		.0						
	D	30.0	5.8		1.8						
	SYSTEM	100.0	76.1		23.0			744	224	171	

** PROBLEMS/SOLUTIONS/COMMENTS

NOTE: SEE COMMENTS FOR 00/78 EXPLAINING SYSTEM DEPENDABILITY CALCULATIONS.

A REHEATER PROBLEM HAS LIMITED SCRUBBING OPERATIONS TO TWO TO THE FOUR ABSORBER MODULES. IF THE BOILER WERE TO OPERATE AT A HIGHER LOAD THE REHEATERS WOULD BE UNABLE TO BOOST THE TEMPERATURE OF THE FLUE GAS ABOVE DEW POINT. THE FGD SYSTEM HAS BEEN LIMITING UNIT MWH PRODUCTION.

1/80	A	81.0	51.0		41.8						
	B	96.0	42.3		34.7						
	C	.0	.0		.0						
	D	83.0	79.3		65.1						
	SYSTEM	100.0	86.3		70.8			744	610	527	
2/80	A	.0	.0		.0						
	B	99.0	94.3		85.9						
	C	3.0	2.5		2.3						
	D	99.0	97.6		88.9						
	SYSTEM	100.0	97.2		88.6			696	634	616	
3/80	A	.0	.0		.0						
	B	100.0	50.4		17.6						
	C	58.1	82.8		29.2						
	D	97.5	85.5		30.1						
	SYSTEM	100.0	100.0	100.0	38.5			744	262	286	31.0

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SCRUBBER OPERATIONS AT UNIT ONE ARE STILL LIMITED TO TWO MODULES BECAUSE OF THE CURRENT LACK OF REHEATER CAPACITY.									
4/80	A	.0	.0		.0						
	B	98.2	71.5		48.2						
	C	50.0	7.2		4.9						
	D	91.7	71.5		48.2						
	SYSTEM	100.0	75.1	100.0	50.7			720	485	365	55.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ONLY TWO MODULES ARE NEEDED AT THE PRESENT TIME TO MEET CURRENT SO2 EMISSION REGULATIONS (SEE COMMENTS FOR 00/78).									
		A TUBE WALL LEAK FORCED THE BOILER OUT OF SERVICE DURING APRIL.									
		HIGH VIBRATIONS IN THE BOOSTER BLOWER IN MODULE D FOLLOWED AFTER THE UNIT OUTAGE.									
		HIGH VIBRATIONS IN THE BOOSTER BLOWER CAUSED MODULE A TO BE UNAVAILABLE THE ENTIRE MONTH.									
		REPAIR AND MAINTENANCE OF THE BOOSTER BLOWER AND ISOLATION DAMPERS IN MODULE C WERE PERFORMED DURING APRIL.									
5/80	A	73.1	62.1		55.9						
	B	99.7	37.2		33.5						
	C	75.5	71.8		64.7						
	D	80.2	19.9		17.9						
	SYSTEM	100.0	95.5	100.0	86.0			744	670	640	87.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BOOSTER BLOWER VIBRATIONS ARE CONTINUING IN ALL THE MODULES.									
		THERE WAS A UNIT OUTAGE SO THAT REPAIR WORK COULD BE UNDERTAKEN ON THE ESP.									
6/80	A	2.8	2.5		2.1						
	B	96.9	92.0		75.6						
	C	82.5	79.2		65.0						
	D	.1	.2		.1						
	SYSTEM	91.2	87.0	79.8	71.4			720	591	514	65.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A BOILER TUBE LEAK FORCED THE UNIT OUT OF SERVICE IN JUNE.									
		REPAIR WORK WAS DONE ON THE ISOLATION DAMPERS DURING JUNE.									
7/80	A	.0	.0		.0						
	B	30.4	16.0		16.0						
	C	89.2	87.9		87.9						
	D	82.8	79.6		79.6						
	SYSTEM	100.0	91.7		91.7			744	744	683	91.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS UNAVAILABLE IN JULY BECAUSE OF REPAIRS MADE TO THE ISOLATION DAMPER AND THE LOWER CHIMNEY SEAL.									
		MODULE B WAS FORCED OUT BECAUSE OF HIGH VIBRATIONS IN THE BOOSTER BLOWER.									

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 1 (CONT.)

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

VIBRATIONAL PROBLEMS ALSO KEPT MODULE D OFF LINE UNTIL JULY 4, WHEN THE BOOSTER BLOWER WAS BALANCED.

8/80	A	.0	.0		.0						
	B	21.5	21.5		21.5						
	C	91.1	77.8		77.8						
	D	94.4	90.1		90.1						
	SYSTEM	100.0	94.7	93.2	94.7			744	744	704	82.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A DID NOT OPERATE IN AUGUST BECAUSE OF REPAIRS MADE TO THE LOWER CHIMNEY SEAL.

MODULE B WAS OUT OF SERVICE FOR OVER 3 WEEKS TO CLEAN, PAINT, AND BALANCE THE BOOSTER BLOWER ROTOR.

CRACKED WELDS ON THE WATER INLET NOZZLES WERE REPAIRED ON MODULE C.

9/80	A	.0	.0		.0						
	B	37.2	57.4		31.4						
	C	39.4	56.1		30.7						
	D	45.1	71.8		39.3						
	SYSTEM	60.9	92.7	94.8	50.7			720	394	365	43.5

** PROBLEMS/SOLUTIONS/COMMENTS

HIGH VIBRATIONS IN THE BOOSTER BLOWER CAUSED MODULE C TO SHUT DOWN FOR PART OF SEPTEMBER.

THE FGD SYSTEM WAS DOWN FOR SEVERAL DAYS BECAUSE OF BOILER RELATED PROBLEMS.

THE BOILER AND FGD SYSTEM WENT DOWN ON SEPTEMBER 18, 1980 FOR SCHEDULED MAINTENANCE AND WERE UNAVAILABLE THE REST OF THE MONTH.

10/80	A	27.0	38.4		26.5						
	B	48.9	68.2		47.0						
	C	48.5	69.6		48.0						
	D	37.6	17.1		11.8						
	SYSTEM	50.8	73.3	73.7	50.0			744	513	376	58.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE FROM OCTOBER 1 TO OCTOBER 3 FOR A SCHEDULED OVERHAUL.

A REHEAT TUBE LEAK CAUSED THE UNIT TO SHUTDOWN FROM OCTOBER 5 TO OCTOBER 11. SCRUBBER MODULES B AND C WERE RETURNED TO OPERATION ON OCTOBER 14. MAINTENANCE ON MODULE D WAS NOT COMPLETED UNTIL OCTOBER 19 AND MODULE A ON OCTOBER 23.

11/80	A	88.6	53.7		48.8						
	B	91.1	84.4		76.5						
	C	94.9	59.4		53.9						
	D	93.6	86.4		19.3						
	SYSTEM	96.1	86.4	95.8	78.3			720	653	564	69.6

** PROBLEMS/SOLUTIONS/COMMENTS

ALL FOUR ABSORBER MODULES WERE AVAILABLE FOR MOST OF NOVEMBER EXCEPT FOR MINOR OUTAGES CAUSED BY COMPUTER PROBLEMS.

A TOTAL POWER FAILURE OCCURRED ON NOVEMBER 14 CAUSING THE UNIT TO BE OFF

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

LINE FOR FOUR DAYS.

12/80	A	96.4	83.0		81.3						
	B	85.6	80.2		78.6						
	C	96.5	75.3		73.8						
	D	.0	.0		.0						
	SYSTEM	100.0	90.1	99.4	88.3			744	729	657	73.3

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 1 WAS DOWN FROM DECEMBER 20 TO 22 IN ORDER TO TIE IN THE UNIT 4 MAIN TRANSFORMER.

THE "D" MODULE WAS DOWN THE ENTIRE MONTH SO THAT THE BOOSTER BLOWER ROTOR COULD BE CLEANED AND BALANCED. THE ABSORBER RECIRCULATING PUMP DISCHARGE VALVE WAS ALSO REPAIRED DURING THE MONTH.

1/81	A	98.9	96.3		94.3						
	B	99.2	97.0		95.0						
	C	98.3	94.0		92.1						
	D	.0	.0		.0						
	SYSTEM	100.0	99.0	100.0	97.0			744	729	722	87.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE BOILER WAS OUT OF SERVICE APPROXIMATELY 15 HOURS TO REPAIR THE LEAK IN THE BOILER FEEDWATER PUMP DISCHARGE LINE.

MODULE D WAS OUT OF SERVICE DURING JANUARY TO CLEAN AND BALANCE THE BOOSTER BLOWER ROTOR.

2/81	A	79.9	73.7		67.3						
	B	97.3	93.1		85.0						
	C	29.6	26.8		24.4						
	D	67.4	43.9		40.0						
	SYSTEM	98.0	92.0	96.0	84.0			672	613	565	75.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE BOILER WAS DOWN APPROXIMATELY 72 HOURS TO REPAIR THE AIR DUCT TO THE COAL MILL AND BECAUSE OF CONTAMINATED CONDENSATE AND BOILER FEEDWATER.

MODULES A AND C WERE DOWN APPROXIMATELY 72 HOURS DUE TO LACK OF DEMAND. MODULE C REMAINED DOWN APPROXIMATELY 384 HOURS DUE TO THE REPAIRS OF THE ISOLATION DAMPER.

MODULE D WAS IN SERVICE ON MARCH 2, 1981 AFTER ISOLATION DAMPER REPAIRS WERE COMPLETED.

MODULE D EXPERIENCED A 72 HOUR OUTAGE DUE TO LOW BOILER LOAD. THE OUTAGE CONTINUED FOR APPROXIMATELY 96 HOURS TO BALANCE THE BOOSTER BLOWER ROTOR.

3/81	A	97.4	76.8		34.7						
	B	95.0	55.4		25.0						
	C	27.0	22.9		10.3						
	D	.0	.0		.0						
	SYSTEM	100.0	66.0	82.0	30.0			744	336	223	38.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH OPERATION OF MODULE C WAS ERRATIC DUE TO SEVERAL BOILER TRIPS.

MODULE D WAS OUT OF SERVICE THE ENTIRE MONTH TO BALANCE THE BOOSTER BLOWER

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 1 (CONT.)

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

ROTOR.

THE BOILER WAS OUT OF SERVICE FROM MARCH 5 UNTIL MARCH 24 DUE TO A SCHEDULED OUTAGE. ADDITIONAL OUTAGE TIME ON MARCH 30 WAS DUE TO A LOSS OF POWER FEED FROM THE MAIN TRANSFORMER.

AN ADDITIONAL 24 HOURS OF OUTAGE TIME WAS DUE TO THE MALFUNCTION OF THE ESP.

4/81	A	96.9	94.0		84.2						
	B	92.2	82.9		74.3						
	C	96.7	94.0		84.2						
	D	8.5	9.5		8.5						
	SYSTEM	100.0	99.0	100.0	89.0			720	645	641	88.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOOSTER BLOWERS TRIPPED NUMEROUS TIMES BECAUSE OF COMPUTER PROBLEMS AND FOR REASONS UNKNONW.

MODULE D REMAINED OUT OF SERVICE UNTIL APRIL 23, DUE TO THE BALANCING OF THE BOOSTER BLOWER AND THE REPAIRING OF THE SCREW DRIVE ON THE INLET ISOLATION DAMPER.

THE BOILER WAS OUT FO SERVICE APPROXIMATELY 72 HOURS TO REPAIR A WATERWALL TUBE LEAK.

5/81	A	97.0	63.6		63.6						
	B	94.8	90.6		90.6						
	C	29.2	28.9		28.9						
	D	95.2	93.7		93.7						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	98.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY MODULE C EXPERIENCED SOME OUTAGE TIME DUE TO A BROKEN JACK SCREW ON THE ISOLATION DAMPER.

6/81	A	60.7	31.8		27.5						
	B	63.1	41.3		35.7						
	C	27.1	13.3		11.5						
	D	58.2	31.2		26.9						
	SYSTEM	64.7	45.0	50.8	38.9			720	622	280	80.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE ALL THE MODULES WERE DOWN PART OF THE MONTH FOR INSTRUMENT AIR TIE-IN AT THE FLYASH FILTERS AND BECAUSE OF A MULTIPLEXER FAILURE.

MODULE C INLET ISOLATION DAMPER REPAIRS WERE PERFORMED DURING THE MONTH.

MODULE D WAS UNAVAILABLE PART OF THE MONTH WHILE THE BOOSTER BLOWER ROTOR WAS BALANCED.

7/81	A	54.8	.0		.0						
	B	97.2	92.5		92.2						
	C	99.5	88.0		87.8						
	D	99.7	89.8		89.5						
	SYSTEM	100.0	97.0	100.0	96.0			744	742	717	81.0

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS UNAVAILABLE FOR PART OF JULY AS A RESULT OF PROBLEMS WITH THE INLET ISOLATION DAMPER.									
8/81	A	100.0	.0		.0						
	B	100.0	98.9		98.9						
	C	100.0	97.8		97.8						
	D	99.9	95.8		95.8						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	86.0
9/81	A	100.0	.0		.0						
	B	98.5	57.2		24.3						
	C	99.2	71.2		30.3						
	D	99.4	67.0		28.5						
	SYSTEM	100.0	75.0	90.0	32.0			720	701	228	82.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS REMOVED FROM SERVICE FROM SEPTEMBER 11 TO SEPTEMBER 28 FOR A SCHEDULED FALL OUTAGE.									
10/81	A	94.5	72.8		72.8						
	B	98.0	72.6		72.6						
	C	87.1	53.8		53.8						
	D	83.3	76.6		76.6						
	SYSTEM	100.0	95.6	100.0	95.6			744	744	711	90.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SEVERAL OUTAGES DURING OCTOBER WERE DUE TO ESP PROBLEMS.									
11/81	A	98.1	86.9		73.9						
	B	100.0	56.7		48.2						
	C	100.0	.0		.0						
	D	99.6	88.7		75.4						
	SYSTEM	100.0	95.0	100.0	81.0			720	612	583	65.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OFF-LINE APPROXIMATELY FOUR DAYS DUE TO ECONOMIZER TUBE LEAKS.									
		THE B MODULE WAS TAKEN OFF-LINE APPROXIMATELY NINE DAYS DURING NOVEMBER DUE TO A LACK OF STACK REHEAT.									
12/81	A	86.8	12.0		3.9						
	B	98.8	74.4		24.2						
	C	87.1	.0		.0						
	D	98.9	78.1		25.4						
	SYSTEM	98.9	78.1	100.0	25.4			744	242	189	28.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER THE UNIT WAS TAKEN OFF-LINE FOR THREE WEEKS TO REPAIR THE TURBINE.									
		MODULE A WAS DOWN PART OF THE MONTH WHILE BALANCING THE BOOSTER BLOWER ROTOR.									
1/82	A	97.8	64.0		45.4						
	B	98.7	83.9		59.5						

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	C	89.5	79.2		56.2						
	D	58.1	.0		.0						
	SYSTEM	100.0	92.0	99.0	65.0			744	528	487	40.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF-LINE FROM JANUARY 1 THRU JANUARY 9 TO COMPLETE TURBINE BEARING REPAIRS AND COUPLING ALIGNMENT.

MODULE C WAS UNAVAILABLE FOR 78 HOURS TO BALANCE THE BOOSTER BLOWER ROTOR.

MODULE D WAS OFF-LINE 312 HOURS BECAUSE THE INLET ISOLATION DAMPER WAS INOPERATIVE.

2/82	A	90.0	76.8		75.4						
	B	99.1	79.1		76.8						
	C	93.1	87.0		84.4						
	D	.0	.0		.0						
	SYSTEM	94.0	91.0	96.0	88.0			672	652	591	80.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM OPERATION WAS SUSPENDED ON FEBRUARY 2 THRU FEBRUARY 4 DUE TO ESP PROBLEMS.

ON FEBRUARY 4 THRU FEBRUARY 8 THE FGD SYSTEM OPERATION WAS LIMITED TO TWO MODULES DUE TO THE LACK OF STACK GAS REHEAT (HIGH WATER CONSUMPTION).

MODULE D EXPERIENCED INLET DAMPER PROBLEMS CAUSING ADDITIONAL DOWN TIME.

3/82	A	97.0	92.0		69.8						
	B	99.9	91.3		69.2						
	C	99.7	92.7		70.3						
	D	54.8	.0		.0						
	SYSTEM	100.0	97.0	100.0	74.0			744	564	547	65.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS TAKEN OFF LINE TO PERFORM REPAIRS ON THE BURNER.

NUMEROUS TRIPS OF MODULE A WAS DUE TO THE BOOSTER BLOWER.

MODULE D WAS OUT OF SERVICE FROM MARCH 1 TO MARCH 15 DUE TO REPAIRS TO THE INLET DAMPERS.

MODULE D WAS TAKEN OFF-LINE ON MARCH 30 TO BALANCE THE BOOSTER BLOWER ROTOR

4/82	A	98.2	75.0		68.1						
	B	96.8	54.5		49.4						
	C	97.1	78.9		71.5						
	D	92.8	77.9		70.7						
	SYSTEM	99.0	99.0	100.0	90.0			720	653	648	81.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF-LINE FOR THREE DAYS DURING APRIL DUE TO ECONOMIZER TUBE LEAKS.

MODULE D WAS OUT OF SERVICE FOR THREE DAYS TO REPLACE THE INBOARD MOTOR OIL SEAL AND BEARING ON THE BOOSTER BLOWER.

5/82	A	98.8	80.1		77.0						
	B	99.7	29.4		28.2						

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	C	99.7	50.0		48.0						
	D	990.0	60.0		57.5						
	SYSTEM	100.0	95.0		91.0			744	715	678	52.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE UNIT WAS OPERATED AT REDUCED CAPACITY DUE TO MILL PROBLEMS.

6/82	A	66.7	25.9		25.7						
	B	67.8	50.7		50.3						
	C	43.2	.1		.1						
	D	64.9	60.1		59.6						
	SYSTEM	100.0	68.4		67.8			720	714	489	46.0

** PROBLEMS/SOLUTIONS/COMMENTS

ALL ABSORBERS WERE OUT OF SERVICE FROM JUNE 9 THROUGH JUNE 18 DUE TO COMPUTER PROBLEMS.

MODULE C WAS DOWN FROM JUNE 23 THROUGH JUNE 30 TO BALANCE A BOOSTER FAN ROTOR AND TO REPLACE ITS BEARINGS.

7/82	A	95.4	92.5		90.1						
	B	.0	.0		.0						
	C	47.8	38.7		37.6						
	D	90.7	83.0		80.8						
	SYSTEM	100.0	100.0		100.0			744	724	744	69.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES B AND C WERE DOWN DURING JULY TO REPLACE BEARINGS IN THE BOOSTER FAN MOTOR.

8/82	A	97.7	91.1		89.8						
	B	.0	.0		.0						
	C	97.8	90.0		88.7						
	D	97.8	90.7		89.4						
	SYSTEM	100.0	100.0		100.0			744	733	744	80.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE B WAS DOWN FROM AUGUST 1 TO AUGUST 31 TO REPLACE A BEARING IN A BOOSTER FAN MOTOR.

9/82	A	56.7	98.7		21.7						
	B	.0	.0		.0						
	C	56.7	98.7		21.7						
	D	56.7	99.4		21.8						
	SYSTEM	85.0	100.0		32.6			720	158	235	31.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN DURING PART OF SEPTEMBER DUE TO A CHEMICAL PLANT OUTAGE.

A BOILER TUBE LEAK ALSO CONTRIBUTED TO THE UNIT OUTAGE IN SEPTEMBER.

MODULE B WAS DOWN DURING THE MONTH FOR REPAIRS ON A BOOSTER FAN MOTOR.

10/82	A	.0	.0		.0						
	B	.0	.0		.0						
	C	18.8	53.2		11.3						
	D	12.5	41.8		8.9						
	SYSTEM	15.7	47.5		10.1			744	158	75	10.0

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 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 UNIT WAS DOWN FROM OCTOBER 1 TO OCTOBER 24 FOR A SCHEDULED OVERHAUL.								
			THE FGD SYSTEM RESUMED OPERATION ON OCTOBER 28 FOLLOWING A CHEMICAL PLANT OUTAGE.								
11/82	A	78.6	30.6		28.1						
	B	56.3	4.1		3.8						
	C	97.8	94.6		86.8						
	D	80.1	86.4		79.3						
	SYSTEM	100.0	100.0		99.0			720	661	713	76.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE B WAS DOWN FROM NOVEMBER 18 TO NOVEMBER 30 TO REPAIR A DRIVE MOTOR ON AN INLET ISOLATION DAMPER.								
			ONLY TWO MODULES OPERATED DURING THE PERIOD DUE TO A LACK OF STACK REHEAT.								
			THE UNIT WAS DOWN FROM NOVEMBER 28 TO NOVEMBER 30 TO REPAIR AN ECONOMIZER TUBE LEAK.								
			MODULE A WAS DOWN FROM NOVEMBER 1 TO NOVEMBER 5 TO REPAIR AN INLET ISOLATION DAMPER.								
12/82	A	91.3	68.1		66.5						
	B	62.2	4.4		4.3						
	C	97.7	60.7		59.3						
	D	96.2	90.1		88.0						
	SYSTEM	100.0	100.0		100.0			744	727	744	89.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE A WAS OUT OF SERVICE FROM DECEMBER 4 TO DECEMBER 6 TO BALANCE A BOOSTER FAN ROTOR.								
			MODULE B WAS DOWN FROM DECEMBER 1 TO DECEMBER 10 TO REPAIR A BOOSTER FAN MOTOR.								
			ONLY TWO MODULES OPERATED DURING MOST OF THE MONTH DUE TO A LACK OF STACK REHEAT.								
1/83	A	88.4	82.5		71.5						
	B	39.9	22.2		19.2						
	C	75.1	49.0		42.5						
	D	92.2	81.6		70.7						
	SYSTEM	98.6	78.4		68.0			744	645	506	77.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UNIT WAS DOWN AT VARIOUS TIMES DURING JANUARY DUE TO BOILER-RELATED PROBLEMS.								
			AS OF JANUARY 1, 1983 THE NUMBER OF MODULES COMPRISING THE TOTAL FGD SYSTEM CHANGED FROM TWO TO THREE.								
2/83	A	99.0	99.4		96.0						
	B	99.0									
	C	96.0	99.4		96.0						
	D	99.0	99.4		96.0						
	SYSTEM	100.0	99.4		96.0			672	649	645	90.0

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
3/83	A	98.9	100.0		95.0						
	B	62.0	63.3		57.9						
	C	32.9	36.0		32.9						
	D	98.0	100.0		91.9						
	SYSTEM	97.3	99.8		92.6			744	681	689	83.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OUT OF SERVICE FROM FEBRUARY 26 TO FEBRUARY 27 DUE TO BOILER RELATED PROBLEMS.

MODULE B WAS DOWN DURING FEBRUARY TO REPAIR AN ABSORBER TRAY LEAK.

4/83	A	50.0	54.1		50.0						
	B	98.1	100.0		96.9						
	C	54.0	54.1		50.0						
	D	99.0	100.0		96.9						
	SYSTEM	100.0	100.0		97.9			720	665	720	67.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM MARCH 25 TO MARCH 27 DUE TO BOILER-RELATED PROBLEMS.

MODULES B AND C WERE OUT OF SERVICE DURING PART OF MARCH DUE TO REPAIRS ON LEAKING COLLECTOR TRAYS.

5/83	A	71.0	74.9		65.1						
	B	88.0	95.7		83.1						
	C	84.0	95.7		83.1						
	D	29.0	32.2		28.0						
	SYSTEM	90.7	99.5		86.5			744	646	744	71.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FOR APPROXIMATELY THREE DAYS DURING MAY TO REPAIR A BOILER TUBE LEAK.

THE UNIT TRIPPED ON MAY 20 DUE TO A LOSS OF POWER TO THE BOILER BURNER CONTROL.

THE UNIT WAS REMOVED FROM SERVICE ON MAY 21 TO REPAIR A COMPUTER-RELATED MALFUNCTION.

A UNIT TRIP OCCURRED ON MAY 24 DUE TO COMPUTER-RELATED PROBLEMS AT MODULES A AND B.

MODULES A AND D WERE DOWN DURING PART OF MAY TO REPAIR ABSORBER TRAY LEAKS.

6/83	A	52.9	49.0		49.0						
	B	93.1	93.1		93.1						
	C	99.0	99.0		99.0						
	D	56.9	56.9		56.9						
	SYSTEM	100.0	99.3		99.3			720	720	720	86.0

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 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										
		MODULES A AND D WERE DOWN DURING PART OF JUNE TO INSTALL SUMP LEVEL DETECTORS.									
		MODULES A AND D WERE OUT OF SERVICE DURING PART OF THE MONTH TO REPAIR ABSORBER TRAY LEAKS.									
		MODULE D WAS DOWN DURING PART OF JUNE DUE TO BLOWER VIBRATIONS.									
		THE UTILITY REPORTED THAT NO MAJOR OUTAGES OCCURRED DURING JUNE.									
7/83	A	98.0	91.0		65.1						
	B	68.0	88.2		63.0						
	C	57.9	79.7		57.0						
	D	81.0	60.2		43.0						
	SYSTEM	100.0	100.0		76.0			744	532	566	60.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OUT OF SERVICE APPROXIMATELY 10 DAYS DURING JULY DUE TO BOILER-RELATED PROBLEMS.									
		THE UNIT WAS DOWN FROM JULY 29 TO 31 FOR REHEATER TUBE LEAK REPAIRS.									
		MODULE B WAS DOWN DURING PART OF JULY FOR MIST ELIMINATOR PAD REPAIRS.									
		MODULES C AND D WERE DOWN DURING PART OF THE MONTH DUE TO BOOSTER FAN BALANCING PROBLEMS.									
8/83	A	97.0	75.9	100.0	72.6						
	B	16.9	16.0	22.8	15.3						
	C	75.0	27.0	38.2	25.8						
	D	88.0	83.0	100.0	79.3						
	SYSTEM	92.3	67.3	87.0	64.3			744	711	479	86.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN FROM AUGUST 1 TO 2 FOR REHEATER TUBE LEAK REPAIRS.									
		MODULE A WAS DOWN DURING PART OF AUGUST FOR CONTROL INSTRUMENTATION REPAIRS.									
		MODULE B WAS DOWN DURING PART OF AUGUST FOR MIST ELIMINATOR PAD REPAIRS.									
		MODULE C WAS DOWN DURING PART OF THE MONTH DUE TO OUTLET DAMPER REPAIRS.									
		MODULE D WAS OUT OF SERVICE DURING PART OF AUGUST TO REPAIR EXPANSION JOINT LEAKS.									
9/83	A	100.0	97.9	100.0	90.7						
	B	80.3	77.1	84.5	71.4						
	C	81.9	22.9	100.0	21.3						
	D	90.0	88.0	100.0	81.5						
	SYSTEM	100.0	95.3	100.0	88.3			720	667	636	77.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN FOR APPROXIMATELY 5 DAYS DURING SEPTEMBER DUE TO BOILER-RELATED PROBLEMS.									
		MODULE B WAS DOWN DURING PART OF SEPTEMBER FOR A MIST ELIMINATOR INSPECTION									

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			ABSORBER TRAYS WERE INSPECTED DURING SEPTEMBER AT MODULE B.								
			MODULE C WAS DOWN DURING PART OF SEPTEMBER DUE TO BOOSTER FAN PROBLEMS.								
			OUTLET DAMPER PROBLEMS CONTRIBUTED TO DOWN TIME AT MODULE C DURING THE MONTH.								
10/83	A	98.9	81.6	81.6	28.0						
	B	98.9	88.6	88.6	30.4						
	C	98.9	89.8	98.7	30.8						
	D	9.0	9.0	100.0	3.1						
	SYSTEM	100.0	89.7	100.0	30.7			744	255	229	25.0
11/83	A	.0	.0		.0						
	B	96.9	95.0	95.0	84.0						
	C	94.0	92.9	92.9	82.2						
	D	96.9	95.0	95.0	84.0						
	SYSTEM	96.0	94.3	94.3	83.4			720	637	601	75.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING OCTOBER AND NOVEMBER 1983.								
12/83	A	.0	.0		.0						
	B	96.4	95.0	95.0	94.4						
	C	94.4	90.0	90.0	89.4						
	D	96.4	97.0	97.0	96.4						
	SYSTEM	95.7	94.0	94.0	93.4			744	739	695	81.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE A WAS DOWN DURING DECEMBER DUE TO PROBLEMS WITH LEAKAGE.								
1/84	A	.0	.0		.0						
	B	99.7	97.8	97.8	97.7						
	C	98.7	85.9	85.9	85.8						
	D	99.7	97.8	97.8	97.7						
	SYSTEM	99.4	93.9	93.9	93.7			744	743	697	82.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE A WAS UNAVAILABLE DURING JANUARY DUE TO SUMP LEAKAGE.								
2/84	A	95.0	93.0	100.0	93.0						
	B	98.0	98.0	100.0	98.0						
	C	99.0	99.0	100.0	99.0						
	D	3.0	2.0	20.0	2.0						
	SYSTEM	98.3	97.3	100.0	97.3			696	696	677	88.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE D WAS DOWN DURING FEBRUARY FOR MIST ELIMINATOR REPAIRS.								
3/84	A	94.8	64.0	128.1	63.2						
	B	98.7	94.9	94.8	93.7						
	C	98.7	77.9	77.8	76.9						
	D	94.8	50.0	99.7	49.3						
	SYSTEM	100.0	95.6	100.0	94.4			744	735	702	87.3

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 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										
		A LACK OF REHEAT RESTRICTED FGD SYSTEM OPERATIONS AT MODULE D DURING FEBRUARY AND MARCH.									
4/84	A	.0	.0		.0						
	B	78.2	86.3	87.0	68.1						
	C	77.5	80.3	80.3	63.3						
	D	77.5	84.2	84.2	66.4						
	SYSTEM	77.7	83.6	83.8	65.9			720	568	475	64.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS DOWN DURING APRIL FOR ABSORBER TRAY SEAL REPAIRS.									
5/84	A	74.6	65.9	90.2	65.6						
	B	85.5	76.9	100.0	76.6						
	C	83.6	65.9	90.0	65.6						
	D	98.5	72.9	94.7	72.6						
	SYSTEM	100.0	93.8	100.0	93.5			744	741	695	93.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE A WAS DOWN DURING THE MONTH FOR ABSORBER RECIRCULATING PUMP REPAIRS.									
		ALL MODULES WERE DOWN AT VARIOUS TIMES DURING MAY DUE TO MULTIPLEXER PROBLEMS.									
6/84	A	41.0	35.0	55.5	35.0						
	B	85.0	80.0	94.1	80.0						
	C	91.9	51.9	56.5	51.9						
	D	66.9	50.0	74.7	50.0						
	SYSTEM	95.0	72.3	93.6	72.3			720	720	521	85.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JUNE.									
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE THIRD QUARTER OF 1984.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PUBLIC SERVICE OF NEW MEXICO	
PLANT NAME	SAN JUAN	
UNIT NUMBER	2	
CITY	WATERFLOW	
STATE	NEW MEXICO	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	21.	(.050 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	228.	(.530 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1560	
GROSS UNIT GENERATING CAPACITY - MW	350	
NET UNIT GENERATING CAPACITY W/FGD - MW	306	
NET UNIT GENERATING CAPACITY WO/FGD - MW	322	
EQUIVALENT SCRUBBED CAPACITY - MW	350	
** 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	725.78	(1538000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	122.8	(253 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	6.1	(20.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20934.	(9000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8000-11628
AVERAGE ASH CONTENT - %	22.00	
RANGE ASH CONTENT - %	12.6-22.5	
AVERAGE MOISTURE CONTENT - %	10.50	
RANGE MOISTURE CONTENT - %	8.1-15.0	
AVERAGE SULFUR CONTENT - %	.80	
RANGE SULFUR CONTENT - %	0.6-1.3	
AVERAGE CHLORIDE CONTENT - %	.03	
RANGE CHLORIDE CONTENT - %	0.00-0.09	
*** PARTICLE CONTROL		
** ESP		
NUMBER	1	
TYPE	HOT SIDE	
SUPPLIER	WESTERN PREC. DIVISION, JOY	
INLET FLUE GAS CAPACITY - CU.M/S	943.8	(2000000 ACFM)
INLET FLUE GAS TEMPERATURE - C	371.1	(700 F)
PRESSURE DROP - KPA	.6	(3. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.5	
** PARTICLE SCRUBBER		
NUMBER	4	
NUMBER OF SPARES	1	
INITIAL START-UP DATE	8/78	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/BOTTOM-ENTRY PLUMB BOB	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	DAVY MCKEE	
DIMENSIONS - FT	12.5 DIA X 28.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
LINER GENERIC MATERIAL	INORGANIC	
LINER SPECIFIC MATERIAL	PREFIRED BRICK/SHAPES	
GAS CONTACTING DEVICE TYPE	STAINLESS STEEL	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	224.9	(3570 GPM)
L/G RATIO - LITER/CU.M	.9	(7.1 GAL/1000ACF)
PRESSURE DROP - KPA	3.1	(12.5 IN-H2O)
SUPERFICIAL GAS VELOCITY - M/S	48.8	(160.0 FT/S)

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 2 (CONT.)

INLET GAS FLOW RATE - CU.M/S	229.8	(487000 ACFM)
INLET GAS TEMPERATURE - C	134.4	(274 F)
PARTICLE REMOVAL EFFICIENCY - %	75.0	

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	SALEABLE PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	WELLMAN LORD
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	DAVY MCKEE
A-E FIRM	STEARNS-ROGER
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	RETROFIT
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	4.6
CURRENT STATUS	1
COMMERCIAL START-UP	8/78
INITIAL START-UP	8/78
CONTRACT AWARDED	2/74

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	4	
NUMBER OF SPARES	1	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	VALVE TRAY	
TRADE NAME/COMMON TYPE	BUBBLE CAP TRAY TOWER	
SUPPLIER	DAVY MCKEE	
DIMENSIONS - FT	24.0 X 29.0 X 79.0	
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	ACID-RESISTANT BRICK [LOW H2O ABSORPTION]	
GAS CONTACTING DEVICE TYPE	VALVE TRAY	
NUMBER OF CONTACTING ZONES	5	
DISTANCE BETWEEN GAS CONTACTING ZONES - CM	5.1	(2.0IN)
LIQUID RECIRCULATION RATE - LITER/S	47.	(750 GPM)
L/G RATIO - L/CU.M	.2	(1.7 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	4.0	(16.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.3	(10.8 FT/S)
INLET GAS FLOW - CU. M/S	198.67	(421000 ACFM)
INLET GAS TEMPERATURE - C	48.9	(120 F)
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	
CONFIGURATION	HORIZONTAL	
NUMBER OF PASSES PER STAGE	1	
PRESSURE DROP - KPA	.0	(.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.2	(10.5 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	BLENDED	
WASH FREQUENCY	CONTINUOUS ON ONE & INTERMITTENT ON THE OTHER	
WASH RATE - L/S	3.8	(60 GAL/MIN)

** REHEATER

NUMBER	1	
GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER	
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE	
TEMPERATURE INCREASE - C	27.8	(50 F)
INLET FLUE GAS FLOW RATE - CU. M/S	62.67	(132800 ACFM)
INLET FLUE GAS TEMPERATURE - C	48.9	(120 F)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	

** FANS

NUMBER	4	
DESIGN	CENTRIFUGAL	
SUPPLIER	BUFFALO FORGE	
FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	276.06	(585000 ACFM)
FLUE GAS TEMPERATURE - C	122.8	(253 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

LOCATION	ESP TO FANS
DIMENSIONS	16.0 X 24.0
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	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	1

** PUMPS

SERVICE	NUMBER
ABSORBER PRODUCT TRANSFER	2
SCRUBBER RECIRCULATION	4
ABSORBER RECIRCULATION	20
ABSORBER SPRAY RECIRCULATION	8

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

NATURE	SULFURIC ACID	
FULL LOAD QUANTITY - M T/H	1.36	(1.50 TPH)
QUALITY - %	99.5	
DISPOSITION	MARKETED	

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 2 (CONT.)

*** SLUDGE

** TREATMENT

METHOD	N/A
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	N/A
TYPE	NONE
SITE TREATMENT	N/A

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH & DENSITY
CONTROL LEVELS	PH 5.5-6.5; SP.GR. 1.2-1.3
MONITOR LOCATION	ABSORBER BLEED & PRODUCT SOLUTION
PROCESS CONTROL MANNER	MANUAL

** WATER BALANCE

WATER LOOP TYPE	CLOSED	
POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	45	
MAKEUP WATER ADDITION - LITERS/S	22.4	(355 GPM)

** 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
0/78	SYSTEM										

** PROBLEMS/SOLUTIONS/COMMENTS

NOTE: ALTHOUGH THIS FGD SYSTEM IS DESIGNED TO BRING THE BOILER INTO COMPLIANCE WITH A 0.34 LB/MM BTU SO2 EMISSION STANDARD, THE STATE HAS INITIALLY ONLY REQUIRED A 1.2 LB/MM BTU SO2 CONTROL LEVEL. SAN JUAN 2 WILL BE REQUIRED TO MEET THE MORE STRINGENT SO2 EMISSION LIMITATION VALUE BY APRIL 18, 1980. THE UNIT ONLY REQUIRES TWO OF THE FOUR SCRUBBING TRAINS TO MEET THE 1.2 LB/MM BTU LIMITATION VALUE; HOWEVER, THREE ARE REQUIRED FOR THE MORE STRINGENT LIMITATION VALUE (THE SYSTEM IS DESIGNED TO INCLUDE ONE SPARE SCRUBBING TRAIN WHEN MEETING THE 0.34 LB/MM BTU SO2 EMISSION STANDARD). BECAUSE OF THIS CHANGE IN EMISSION LIMITATION VALUES THE FGD SYSTEM WILL EFFECTIVELY HAVE AN ABSORBER SPARE COMPONENT INDEX OF 2.0 (100% SPARE CAPACITY FOR THIS SYSTEM) THROUGH APRIL 17, 1980 AND 1.0 (33.3% SPARE CAPACITY FOR THIS SYSTEM) THEREAFTER. CONSEQUENTLY THE "SYSTEM" DEPENDABILITY FACTORS WILL BE CALCULATED AS:

MODULAR AVERAGE X 2.0
THROUGH APRIL 17, 1980 AND:
MODULAR AVERAGE X 1.33
THEREAFTER.

8/78	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL FGD OPERATIONS BEGAN IN LATE AUGUST. SHAKEDOWN/DEBUGGING OPERATIONS CONTINUED THROUGH AUGUST.

PROBLEMS WERE ENCOUNTERED WITH THE BOOSTER FAN CONTROL DAMPER.

10/78	SYSTEM							744			

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

** PROBLEMS/SOLUTIONS/COMMENTS

HEAT TRACING FAILURES ALLOWED LINE FREEZING TO OCCUR.

A TEMPORARY HIGH FLYASH LOADING WAS THE RESULT OF AN ESP MALFUNCTION.

THE FGD SYSTEM IS STILL EXPERIENCING ROUTINE START UP PHASE PROBLEMS.

11/78	SYSTEM							720			
12/78	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

ALTHOUGH FGD THE SYSTEM HAS BEEN OPERATING, WEATHER-RELATED PROBLEMS HAVE LIMITED OPERATIONS TO TWO MODULES. REHEATER LEAKS OCCURRED DURING THE PERIOD.

1/79	SYSTEM							744			
2/79	SYSTEM							672			
3/79	SYSTEM							744			
4/79	SYSTEM							720			
5/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

HOURS ARE NOT YET AVAILABLE BECAUSE THE UTILITY IS CONCENTRATING EFFORTS ON OPERATION OF THIS NEW UNIT. THE UTILITY REPORTED THAT THE SCRUBBING MODULES THEMSELVES ARE OPERATING ACCEPTABLY. ALSO THE CHEMICAL PLANT IS AVAILABLE AND THERE IS NO SYSTEM PLUGGING WHATSOEVER.

THE MAJOR PROBLEM ENCOUNTERED WAS FAN VIBRATION. THE UTILITY HAS BEEN WORKING WITH THE SUPPLIER IN AN EFFORT TO DISCOVER WHY FAN BALANCE HAS BEEN DIFFICULT TO MAINTAIN.

7/79	SYSTEM							744			
8/79	SYSTEM							744			
9/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE THIRD QUARTER TWO OF THE FOUR ABSORBERS WERE DOWN DUE TO BOOSTER BLOWER VIBRATION PROBLEMS.

10/79	SYSTEM							744			
11/79	SYSTEM							720			
12/79	E	100.0	80.1	66.9							
	F	100.0	73.3	61.3							
	G	.0	.0	.0							
	H	.0	.0	.0							
	SYSTEM	100.0	76.7	64.1				744	622	477	

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 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										
		NOTE: SEE COMMENTS FOR 00/78 EXPLAINING SYSTEM DEPENDABILITY CALCULATIONS.									
		DURING DECEMBER TWO MODULES WERE DOWN COMPLETELY AS A RESULT OF REHEATER PROBLEMS.									
1/80	E	92.0	63.0		62.4						
	F	100.0	.0		.0						
	G	.0	.0		.0						
	H	.0	.0		.0						
	SYSTEM	96.0	31.5		31.2			744	737	232	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE F-MODULE WAS AVAILABLE, HOWEVER, FGD SERVICE WAS NOT REQUIRED BECAUSE A BOILER-RELATED POWER FAILURE FORCED THE BOILER TO OPERATE AT LOW LOAD.									
2/80	E	97.0	65.7		64.5						
	F	22.0	12.3		12.1						
	G	.0	.0		.0						
	H	.0	.0		.0						
	SYSTEM	59.5	39.0		38.3			696	683	267	
3/80	E	87.0	.0		.0						
	F	85.0	93.6		59.4						
	G	.0	.0		.0						
	H	.0	.0		.0						
	SYSTEM	86.0	46.8		29.7			744	472	221	33.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING THE FIRST QUARTER ONLY ONE ABSORBER COULD BE OPERATED DUE TO AN ELECTRICAL PROBLEM. CURRENTLY, OPERATIONS ARE LIMITED TO TWO ABSORBERS UNTIL NEW REHEATERS ARE INSTALLED. REHEATER INSTALLATION IS EXPECTED TO BE COMPLETED IN APRIL.									
4/80	E	99.3	91.3		68.5						
	F	99.9	71.1		53.3						
	G	.0	.0		.0						
	H	44.2	58.5		43.9						
	SYSTEM	100.0	90.8	98.8	68.1			720	540	490	66.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE G IS DOWN FOR MAJOR REPAIRS WHICH WERE A RESULT OF AN INTERNAL FIRE EARLIER IN THE YEAR.									
		A REGULATION CHANGE EFFECTIVE APRIL 18, NOW REQUIRES THAT THREE MODULES OPERATE TO MEET SO2 REGULATIONS (SEE COMMENTS FOR 00/78).									
		MODULE H WAS UNAVAILABLE IN THE BEGINNING OF THE MONTH.									
5/80	E	99.1	97.3		86.7						
	F	98.9	95.2		84.8						
	G	.0	.0		.0						
	H	98.9	91.9		81.9						
	SYSTEM	99.0	94.8	100.0	84.5			744	663	628	79.1

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS DOWN FOR SEVERAL HOURS FOR MINOR MAINTENANCE AND BOILER TUBE REPAIRS.									
6/80	E	89.2	72.4		56.0						
	F	89.6	74.1		57.4						
	G	.0	.0		.0						
	H	88.8	83.8		64.9						
	SYSTEM	89.2	76.7	98.3	59.4			720	557	428	69.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		AN ELECTRICAL CABLE FAILURE PREVENTED MODULES E AND F FROM OPERATING SIMULTANEOUSLY. AUXILIARY POWER COULD ONLY BE PROVIDED TO ONE MODULE.									
7/80	E	97.6	55.4		49.1						
	F	96.9	85.0		75.3						
	G	.0	.0		.0						
	H	98.9	91.0		80.6						
	SYSTEM	97.8	77.1		68.3			744	659	508	79.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS DOWN FOR SEVERAL DAYS IN JULY TO REPAIR STEAM TUBE LEAKS.									
		THE POWER CABLE WHICH FAILED IN JUNE WAS REPAIRED THIS MONTH. THIS CABLE PERMITS SIMULTANEOUS OPERATION OF THE E AND F MODULES WITH THE H MODULE.									
8/80	E	98.4	90.2		85.8						
	F	97.8	72.7		69.1						
	G	.0	.0		.0						
	H	98.3	92.6		88.0						
	SYSTEM	98.2	85.2	100.0	81.0			744	707	602	88.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		TUBE LEAK REPAIRS IN THE BOILER CAUSED THE FGD SYSTEM NO TO OPERATE FOR TWO DAYS.									
9/80	E	99.0	56.1		51.9						
	F	99.3	56.1		51.9						
	G	.0	.0		.0						
	H	97.6	56.2		52.1						
	SYSTEM	98.6	56.1	62.5	51.9			720	667	374	85.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ESP PROBLEMS CAUSED ERRATIC OPERATION OF THE FGD SYSTEM FOR SEVERAL DAYS IN SEPTEMBER.									
		THE FGD SYSTEM WAS NOT OPERATED DURING A SCHEDULED OUTAGE OF THE CHEMICAL PLANT. THE SYSTEM WAS AVAILABLE DURING THIS TIME.									
		MODULE G WAS UNAVAILABLE IN SEPTEMBER BECAUSE OF ONGOING REPAIR OF FIRE DAMAGE.									
10/80	E	14.7	36.2		14.7						
	F	15.7	39.0		15.7						
	G	.0	.0		.0						
	H	1.1	.0		.0						
	SYSTEM	10.5	25.0	27.0	10.1			744	301	75	40.0

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
11/80	E	97.6	85.8		55.3						
	F	90.0	73.3		47.2						
	G	.0	.0		.0						
	H	57.2	20.7		13.3						
	SYSTEM	81.8	59.5	60.4	38.3			720	464	276	57.0

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 2 WAS OFF LINE FROM OCTOBER 4 TO OCTOBER 23 FOR A SCHEDULED FALL OUTAGE.

THE "H" MODULE WAS UNAVAILABLE ESSENTIALLY THE ENTIRE MONTH AS A RESULT OF MAINTENANCE BEING PERFORMED.

THE "G" MODULE REMAINED UNAVAILABLE DURING THE MONTH AS A RESULT OF THE FIRE DAMAGE INCURRED ON MARCH 24.

12/80	E	95.3	42.4		34.3						
	F	95.6	59.9		48.4						
	G	.0	.0		.0						
	H	69.4	51.7		41.8						
	SYSTEM	85.8	51.6	100.0	41.7			744	601	310	73.9

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 2 WAS DOWN FROM NOVEMBER 13 TO 18 TO REPAIR A WATERWALL TUBE LEAK AND FROM NOVEMBER 19 TO 23 AS A RESULT OF THE FAILURE OF A START-UP TRANSFORMER.

THE "H" MODULE WAS OUT OF SERVICE FROM NOVEMBER 1 TO 12 TO BALANCE THE ROTOR IN THE BOOSTER BLOWER AND TO REPAIR THE ABSORBER RECIRCULATING PUMP.

1/81	E	98.5	84.1		84.1						
	F	97.7	79.2		79.2						
	G	.0	.0		.0						
	H	97.6	89.8		89.8						
	SYSTEM	97.0	76.0	98.0	76.0			744	744	563	98.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM DECEMBER 6 TO 7 TO REPAIR A TUBE LEAK, BUT THEN REMAINED DOWN UNTIL DECEMBER 11 FOR A TRANSFORMER TIE-IN.

THE "H" MODULE WAS DOWN FROM DECEMBER 11 TO 19 TO REPAIR A LEAK THAT HAD DEVELOPED AT THE SUCTION SIDE OF THE ABSORBER RECIRCULATING PUMP.

THE UNIT 2 FGD SYSTEM EXPERIENCED A LOSS OF POWER ON DECEMBER 24 AND DID NOT RETURN TO SERVICE UNTIL DECEMBER 26 AS A RESULT OF COMPUTER PROBLEMS THAT DEVELOPED.

THE "G" MODULE REMAINED OUT OF SERVICE THROUGH THE END OF THE FOURTH QUARTER AS A RESULT OF THE FIRE DAMAGE INCURRED IN MARCH.

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY MODULE F WAS OUT OF SERVICE APPROXIMATELY 17 HOURS DUE TO BOILER LOAD CURTAILMENT.

THE FGD SYSTEM OPERATED ERRATICALLY DURING JANUARY DUE TO PRECIPITATOR PROBLEMS AND HIGH SOLIDS IN THE SCRUBBER SUMPS.

MODULE G REMAINED OUT OF SERVICE DUE TO REPAIRS ON THE INTERNALS DAMAGED

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

BY A FIRE ON MARCH 24, 1980.

2/81	E	96.6	43.2		34.4						
	F	99.1	54.0		43.0						
	G	.0	.0		.0						
	H	93.0	69.7		55.5						
	SYSTEM	96.0	31.0	99.0	25.0			672	535	166	68.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY MODULE E WAS OUT OF SERVICE APPROXIMATELY 72 HOURS DUE TO LACK OF DEMAND. THE TOTAL SYSTEM OPERATED INTERMITTENTLY FROM MARCH 2 THROUGH MARCH 10, 1981 DUE TO PRECIPITATOR REPAIRS.

THE BOILER WAS OUT OF SERVICE APPROXIMATELY 48 HOURS TO REPAIR A WATER-WALL TUBE LEAK AND APPROXIMATELY 96 HOURS TO REPAIR AN ECONOMIZER TUBE LEAK.

3/81	E	98.1	81.2		63.2						
	F	95.4	79.8		62.1						
	G	.0	.0		.0						
	H	94.5	86.2		67.1						
	SYSTEM	94.0	82.0	94.0	64.0			744	579	476	69.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE BOILER WAS OUT OF SERVICE APPROXIMATELY 165 HOURS DUE TO A SCHEDULED MAINTENANCE OUTAGE.

MODULE E WAS OUT OF SERVICE APPROXIMATELY 72 HOURS AND MODULE F FOR APPROXIMATELY 48 HOURS DUE TO LOW STACK GAS TEMPERATURE.

4/81	E	40.3	6.9		5.3						
	F	97.8	88.2		67.6						
	G	.0	.0		.0						
	H	96.9	90.8		69.6						
	SYSTEM	78.0	62.0	66.0	47.0			720	552	340	70.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOILER WAS OUT OF SERVICE APPROXIMATELY 168 HOURS DUE TO A SCHEDULED OUTAGE.

MODULE E WAS OUT OF SERVICE UNTIL APRIL 20, DUE TO HIGH BOOSTER BLOWER VIBRATIONS AND TO CLEAR PLUGGED TRAY RECIRCULATION PUMP LINES AND VALVES.

5/81	E	95.4	86.8		66.5						
	F	98.2	81.1		62.1						
	G	4.3	5.6		4.3						
	H	95.7	77.2		59.1						
	SYSTEM	97.8	83.5	95.8	64.0			744	570	476	71.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE BOILER WAS OUT OF SERVICE APPROXIMATELY 144 HOURS TO REMOVE CLINKERS FROM THE BOTTOM ASH AREA IN THE BOILER.

ADDITIONAL BOILER OUTAGE TIME WAS NEEDED TO REPAIR A BROKEN OIL LINE AT THE TURBINE.

ADDITIONAL OUTAGE TIME WAS DUE TO THE BOTTOM COLLECTOR TRAY LEAKING AT ALL FOUR WALLS.

6/81	E	62.4	49.7		49.7						

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	F	60.8	45.4		45.4						
	G	27.4	18.8		18.8						
	H	42.1	12.5		12.5						
	SYSTEM	62.5	41.8	47.4	41.8			720	720	301	91.0

** PROBLEMS/SOLUTIONS/COMMENTS

ALL THE ABSORBER MODULES WERE DOWN DURING PART OF THE MONTH FOR AN INSTRUMENT TIE-IN AT THE FLYASH FILTERS, TO MAKE ELECTRICAL CONNECTIONS TO NEW BUS BARS AND BECAUSE OF MULTIPLEXER PROBLEMS.

MODULE H WAS UNAVAILABLE PART OF JUNE DUE TO INLET DAMPER PROBLEMS.

MODULE G NEEDED INTERNAL REPAIRS DURING THE MONTH.

7/81	E	99.1	70.7		70.7						
	F	98.9	87.5		87.5						
	G	51.5	30.5		30.5						
	H	59.9	19.1		19.1						
	SYSTEM	93.0	80.0	86.0	80.0			744	744	594	74.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE H WAS DOWN FOR THE FIRST THIRTEEN DAYS OF THE MONTH FOR REPAIRS TO THE INLET ISOLATION DAMPER.

OPERATION OF THE FGD SYSTEM WAS LIMITED TO TWO ABSORBERS DURING THE LATTER HALF OF THE MONTH DUE TO A LACK OF STACK REHEAT.

8/81	E	100.0	52.5		42.5						
	F	100.0	61.3		49.6						
	G	10.8	13.3		10.8						
	H	100.0	.0		.0						
	SYSTEM	100.0	54.0	100.0	43.0			744	602	323	85.0

** PROBLEMS/SOLUTIONS/COMMENTS

OUTAGE TIME DURING THE MONTH FOR THE E AND F MODULES WAS ATTRIBUTED TO PROBLEMS WITH THE ELECTROSTATIC PRECIPITATORS. AS A RESULT, THE UNIT WAS DOWN FROM AUGUST 14 TO AUGUST 28 FOR PRECIPITATOR REPAIRS.

THE H MODULE WAS ON STANDBY THE ENTIRE MONTH SINCE ONLY TWO MODULES CAN BE OPERATED WITHOUT STACK GAS REHEAT.

THE G MODULE WAS DOWN MOST OF THE MONTH AS A RESULT OF MIST ELIMINATOR PAD DAMAGE AND HIGH SOLUTION LOSSES INTO THE SUMP.

9/81	E	11.9	5.5		5.4						
	F	25.4	17.9		17.6						
	G	75.0	10.4		10.3						
	H	93.9	23.4		23.1						
	SYSTEM	69.0	19.0	19.0	19.0			720	710	137	86.0

** PROBLEMS/SOLUTIONS/COMMENTS

ALL FGD SYSTEM MODULES WERE DOWN FROM SEPTEMBER 11 TO SEPTEMBER 30 AS A RESULT OF A SCHEDULED CHEMICAL PLANT OUTAGE.

THE G MODULE RESTARTED ON SEPTEMBER 8 AFTER COMPLETION OF MIST ELIMINATOR AND TRAY REPAIRS.

THE LACK OF STACK REHEAT KEPT MODULE F OFF-LINE THE MAJORITY OF THE MONTH.

THE H MODULE WAS DOWN FOR TWO DAYS DURING THE MONTH BECAUSE OF HIGH

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

VIBRATION ON THE BOOSTER FAN.

10/81	E	.0	.0		.0						
	F	6.4	.0		.0						
	G	95.2	93.4		68.1						
	H	95.2	92.8		67.7						
	SYSTEM	64.9	62.1	66.5	45.3			744	543	337	65.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER THE BOTTOM PADS IN THE MIST ELIMINATOR OF MODULE F WERE REPLACED CAUSING THE MODULE TO REMAIN OFF-LINE UNTIL OCTOBER 30. THE SYSTEM WAS PRIMARILY DOWN BECAUSE OF PROBLEMS WITH THE STACK REHEAT.

11/81	E	.0	.0		.0						
	F	98.6	80.6		66.2						
	G	98.6	79.2		65.1						
	H	81.2	59.1		48.6						
	SYSTEM	93.0	71.0	90.0	59.0			720	592	422	72.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER THE UNIT DOWN TIME WAS CAUSED BY ESP PROBLEMS.

MODULE E WAS OFF-LINE DURING THE MONTH TO REPLACE THE BOTTOM MIST ELIMINATOR AND THE BALLAST TRAY.

OUTAGE TIME FOR MODULE G WAS DUE TO A LACK OF STACK REHEAT.

12/81	E	87.2	51.3		51.3						
	F	98.9	80.5		80.5						
	G	98.9	92.2		92.2						
	H	25.7	10.7		10.7						
	SYSTEM	95.0	88.8	94.5	88.8			744	744	661	71.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE E WAS RESTARTED ON DECEMBER 4 AFTER THE PROLONGED OUTAGE TO REPAIR THE MIST ELIMINATOR PADS AND THE BOTTOM BALLAST TRAY.

ABSORBER OPERATIONS DURING THE MONTH WERE CURTAILED DUE TO ESP PROBLEMS, HIGH OPACITY IN THE STACK AND HIGH SOLIDS IN THE SUMPS.

MODULE H WAS OFF-LINE MOST OF THE MONTH DUE TO A BURNED OUT BOOSTER BLOWER MOTOR.

TWO MODULES WERE TAKEN OFF-LINE APPROXIMATELY NINE DAYS DUE TO A LACK OF STACK REHEAT.

1/82	E	95.0	63.3		61.1						
	F	97.6	66.1		63.8						
	G	98.2	63.1		61.0						
	H	63.2	51.7		50.0						
	SYSTEM	99.0	85.0	97.0	82.0			744	719	611	79.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY ALL MODULES WERE OFF-LINE FOR THREE DAYS DUE TO ESP PROBLEMS.

MODULE H WAS SHUT DOWN PART OF THE MONTH BECAUSE OF LOW OIL TEMPERATURE AND HIGH VIBRATION ON THE BOOSTER BLOWER.

THE UNIT WAS OFF-LINE AT THE END OF THE MONTH TO REPAIR THE PRIMARY AIR

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			DAMPER ON THE COAL MILL.								
2/82	E	100.0	75.0		.9						
	F	100.0	75.0		.9						
	G	100.0	75.0		.9						
	H	.0	.0		.0						
	SYSTEM	100.0	75.0	100.0	1.0			672	8	6	1.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS SHUT DOWN ON FEBRUARY 1 FOR EXTENSIVE TRUBINE REPAIRS.

MODULE H WAS DOWN THE ENTIRE MONTH FOR INLET DAMPER REPAIRS.

3/82	E	100.0			.0						
	F	100.0			.0						
	G	100.0			.0						
	H	.0			.0						
	SYSTEM	100.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN THE ENTIRE MONTH OF MARCH FOR AN OVERHAUL AND TURBINE REPAIRS.

MODULE H WAS OUT OF SERVICE FOR REPAIR OF THE INLET DAMPERS AND THE ABSORBER WALLS.

4/82	E	100.0			.0						
	F	100.0			.0						
	G	100.0			.0						
	H	.0			.0						
	SYSTEM	100.0			.0			720	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE UNIT WAS DOWN FOR TURBINE REPAIRS AND AN OVERHAUL. THE FGD SYSTEM WAS AVAILABLE DURING THE ENTIRE MONTH.

5/82	E	100.0			.0						
	F	100.0			.0						
	G	100.0			.0						
	H	.0			.0						
	SYSTEM	100.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE UNIT WAS DOWN FOR AN OVERHAUL AND TURBINE REPAIR WORK.

MODULE H WAS UNAVAILABLE DURING APRIL AND MAY WHILE THE INLET DAMPERS WERE BEING REPLACED AND THE ABSORBER WALLS WERE BEING REPAIRED.

6/82	E	45.8	14.4		10.6						
	F	46.0	18.1		13.3						
	G	44.9	21.2		15.6						
	H										
	SYSTEM	45.6	17.9		13.1			720	529	95	57.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM JUNE 1 TO JUNE 8 FOR TURBINE REPAIR AND OVERHAUL.

ALL ABSORBERS WERE OUT OF SERVICE FROM JUNE 9 TO JUNE 25 DUE TO COMPUTER PROBLEMS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
		MODULE H WAS UNAVAILABLE FROM JUNE 1 TO JUNE 30 DUE TO REPAIR OF THE ABSORBER CELL WALLS.									
7/82	E	69.1	43.0		30.1						
	F	92.9	80.8		56.6						
	G	51.7	71.2		49.9						
	H										
	SYSTEM	71.2	65.0		45.5			744	521	339	61.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE G WAS DOWN FROM JULY 14 TO JULY 28 FOR REPAIRS ON A SCRUBBER RECIRCULATION PUMP.

THE UNIT WAS DOWN FROM JULY 16 TO JULY 25 TO REPAIR A BOILER TUBE LEAK.

MODULE E WAS DOWN FROM JULY 1 TO JULY 6 FOR MAINTENANCE ON A BOOSTER FAN LUBE OIL SYSTEM.

MODULE H WAS DOWN FROM JULY 1 TO JULY 31 FOR ABSORBER CELL WALL REPAIRS.

A TURBINE BALANCING ALSO CONTRIBUTED TO THE UNIT DOWN TIME FROM JULY 16 TO JULY 25.

8/82	E	88.7	70.2		68.7						
	F	98.1	89.0		87.1						
	G	96.6	86.4		84.5						
	H	5.6	5.8		5.6						
	SYSTEM	96.4	83.8		82.0			744	728	610	64.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE ABSORBER OPERATION WAS RESTRICTED TO TWO MODULES AT VARIOUS TIMES DURING AUGUST DUE TO A LACK OF STACK REHEAT.

MODULE E WAS DOWN FROM AUGUST 16 TO AUGUST 18 TO REPAIR A BOOSTER FAN LUBE OIL SYSTEM.

MODULE H WAS DOWN FROM AUGUST 1 TO AUGUST 14 PARTLY FOR REPAIRS TO THE ABSORBER CELL WALLS.

A BOOSTER FAN ROTOR BALANCE ALSO CONTRIBUTED TO THE DOWN TIME DURING AUGUST FOR MODULE H.

MODULE H WAS DOWN FROM AUGUST 16 TO AUGUST 31 FOR REPAIRS ON A BOOSTER FAN MOTOR.

9/82	E	56.7	88.0		48.8						
	F	56.7	86.7		48.1						
	G	56.5	82.0		45.4						
	H										
	SYSTEM	56.6	85.5		47.4			720	399	341	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE H WAS DOWN DURING SEPTEMBER TO REPAIR A BOOSTER FAN MOTOR.

THE UNIT WAS DOWN DURING PART OF SEPTEMBER DUE TO A CHEMICAL PLANT OUTAGE.

10/82	E	47.0	33.5		32.8						
	F	16.7	11.8		11.6						
	G	47.4	47.2		46.2						
	H										
	SYSTEM	37.1	30.8		30.2			744	729	225	89.0

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 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 FGD SYSTEM RESUMED OPERATION ON OCTOBER 16 FOLLOWING A CHEMICAL PLANT OUTAGE.									
11/82	E	80.1	79.3		79.3						
	F	98.2	96.4		96.4						
	G	98.2	90.6		90.6						
	H										
	SYSTEM	92.2	88.8		88.8			720	720	639	96.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE E WAS DOWN FROM NOVEMBER 25 TO NOVEMBER 30 TO REPAIR LEAKS ON A BOTTOM COLLECTOR TRAY.									
		MODULE H WAS DOWN FOR THE ENTIRE MONTH TO REPAIR A BOOSTER FAN MOTOR.									
12/82	E	73.9	59.0		57.5						
	F	91.3	75.2		73.4						
	G	96.4	89.9		87.8						
	H										
	SYSTEM	87.2	74.7		72.9			744	726	542	81.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A UNIT TRIP OCCURRED BETWEEN DECEMBER 17 AND 18.									
		MODULE E WAS DOWN FROM DECEMBER 1 TO DECEMBER 5 AND AGAIN FROM DECEMBER 29 TO DECEMBER 31 TO REPAIR LEAKS ON A BOTTOM COLLECTOR TRAY.									
		MODULE F WAS DOWN FROM DECEMBER 26 TO DECEMBER 28 TO REPAIR A SCRUBBER RECIRCULATING PUMP.									
		MODULE H WAS DOWN DURING THE ENTIRE MONTH TO REPAIR A BOOSTER FAN MOTOR.									
		ONLY TWO MODULES OPERATED DURING PART OF THE PERIOD DUE TO A LACK OF STACK REHEAT.									
1/83	E	45.4	33.4		29.6						
	F	78.8	70.8		62.6						
	G	90.6	84.5		74.7						
	H										
	SYSTEM	71.6	62.9		55.6			744	658	414	78.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN FROM JANUARY 24 TO JANUARY 28 TO REPAIR AN ECONOMIZER TUBE LEAK.									
		THE UNIT WAS DOWN ON JANUARY 28 TO CLOSE A DOOR ON THE 2A PRECIPITATOR.									
2/83	E										
	F	68.0	67.7		60.0						
	G	94.9	100.0		89.0						
	H										
	SYSTEM	81.5	83.9		74.5			672	595	501	61.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN ON FEBRUARY 8 AND FROM FEBRUARY 15 TO FEBRUARY 18 DUE TO BOILER-RELATED PROBLEMS.									

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

MODULES E AND F WERE DOWN FROM FEBRUARY 15 TO FEBRUARY 18 TO SEAL THE ABSORBER TRAYS.

BOOSTER FAN PROBLEMS ALSO CONTRIBUTED TO THE OUTAGE FOR MODULE F DURING FEBRUARY.

MODULE H WAS DOWN FROM FEBRUARY 15 TO FEBRUARY 18 TO REPAIR A BOOSTER FAN MOTOR.

3/83	E	39.0	39.0	39.0						
	F	97.0	96.0	96.0						
	G	98.0	98.0	98.0						
	H									
	SYSTEM	78.0	77.6	77.6			744	744	578	71.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES E AND H WERE DOWN DURING MARCH TO REPAIR THE BOOSTER FAN MOTORS.

4/83	E	93.1	100.0	93.1						
	F	96.0	100.0	96.0						
	G	98.1	100.0	98.1						
	H	.0	.0	.0						
	SYSTEM	95.7	100.0	95.7			720	578	689	62.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN DURING PART OF APRIL FOR A SPRING OUTAGE.

THE MODULE H BOOSTER FAN WAS OUT OF SERVICE DURING PART OF THE MONTH TO REPAIR A MOTOR.

5/83	E	30.0	45.5	30.0						
	F	98.9	100.0	89.0						
	G	98.9	100.0	89.7						
	H	.0	.0	.0						
	SYSTEM	75.9	81.8	69.5			744	490	517	50.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM MAY 1 TO MAY 11 FOR A SCHEDULED OUTAGE.

A UNIT TRIP OCCURRED ON MAY 11 DUE TO PROBLEMS WITH AN AUXILIARY POWER SUPPLY.

A UNIT TRIP OCCURRED ON MAY 23 DUE TO BOILER FEED PUMP CONTROL PROBLEMS.

MODULE E WAS DOWN DURING PART OF MAY TO REPAIR ABSORBER TRAY LEAKS.

MODULE H WAS DOWN DURING THE MONTH TO REPAIR A BOOSTER FAN MOTOR.

6/83	E	90.0	86.0	86.0						
	F	96.9	96.0	96.0						
	G	95.0	93.1	93.1						
	H	5.0	5.0	5.0						
	SYSTEM	95.6	93.3	93.3			720	720	672	78.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES E AND H WERE DOWN DURING PART OF JUNE TO INSTALL SUMP LEVEL DETECTORS.

THE UTILITY REPORTED THAT NO MAJOR OUTAGES OCCURRED DURING JUNE.

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
7/83	E	41.0	41.0		41.0						
	F	98.0	98.0		98.0						
	G	34.0	34.0		34.0						
	H	98.9	97.0		97.0						
	SYSTEM	90.6	90.0		90.0			744	744	670	87.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE E WAS DOWN DURING PART OF JULY FOR ABSORBER TRAY REPAIRS.

MODULE E WAS DOWN DURING PART OF THE MONTH TO BALANCE A BOOSTER FAN.

MODULE G WAS DOWN DURING PART OF JULY TO REWIND THE BOOSTER FAN MOTOR.

8/83	E	41.0	40.1		40.1						
	F	97.0	91.9		91.9						
	G	28.0	26.9		26.9						
	H	84.0	78.0		78.0						
	SYSTEM	83.3	78.9		78.9			744	744	587	87.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE E WAS DOWN DURING PART OF AUGUST TO REPLACE ABSORBER TRAY CAPS.

MODULES G AND H WERE DOWN DURING PART OF THE MONTH TO REWIND THE BOOSTER FAN MOTOR.

9/83	E	.0	.0	.0	.0						
	F	98.1	90.9	100.0	64.0						
	G	99.0	89.9	78.1	63.3						
	H	99.0	93.9	100.0	66.1						
	SYSTEM	98.7	91.6	92.7	64.5			720	507	464	58.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM SEPTEMBER 14 TO 18 AND AGAIN FROM SEPTEMBER 19 TO 24 DUE TO REHEATER TUBE LEAKS.

MODULE E WAS DOWN DURING PART OF SEPTEMBER DUE TO DISTORTED ABSORBER TRAYS.

10/83	E	.0	.0		.0						
	F	98.0	93.0	93.0	93.0						
	G	98.9	4.0	4.0	4.0						
	H	77.0	73.9	73.9	73.9						
	SYSTEM	91.3	57.0	57.0	57.0			744	744	424	84.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE E WAS DOWN DURING OCTOBER DUE TO BRICK WALL LINER FAILURE.

11/83	E	.0	.0		.0						
	F	95.0	93.0	93.0	73.3						
	G	96.9	87.0	87.0	68.6						
	H	96.9	82.0	82.0	64.7						
	SYSTEM	96.3	87.3	87.3	68.9			720	568	496	66.0

** PROBLEMS/SOLUTIONS/COMMENTS

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

12/83	E	.0	.0		.0						

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	F	98.9	84.0	84.0	83.7						
	G	98.9	86.0	86.0	85.8						
	H	98.9	80.1	80.1	79.8						
	SYSTEM	98.9	83.3	83.3	83.1			744	742	618	83.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE E WAS DOWN DURING DECEMBER FOR ABSORBER TRAY REPAIRS.

1/84	E	51.9	14.0	18.8	14.0						
	F	89.8	57.9	100.0	57.8						
	G	98.8	84.9	100.0	84.8						
	H	97.7	82.9	100.0	82.8						
	SYSTEM	100.0	79.9	100.0	79.8			744	743	594	83.5

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE E WAS DOWN DURING JANUARY AND FEBRUARY TO REPAIR A BENT ABSORBER TRAY.

2/84	E	90.9	26.0	47.4	23.9						
	F	90.9	90.9	100.0	83.5						
	G	72.6	62.0	97.8	56.9						
	H	72.6	69.0	75.9	63.4						
	SYSTEM	100.0	82.6	100.0	75.9			696	639	528	82.7

** PROBLEMS/SOLUTIONS/COMMENTS

A LACK OF REHEAT RESTRICTED FGD SYSTEM OPERATION AT MODULE E DURING THE MONTH.

3/84	E	28.6	86.7	100.0	24.9						
	F	28.6	93.8	100.0	26.9						
	G	28.6	45.0	100.0	12.9						
	H	13.4	.0	.0	.0						
	SYSTEM	33.1	75.2	100.0	21.6			744	213	160	25.5

** PROBLEMS/SOLUTIONS/COMMENTS

A LACK OF REHEAT RESTRICTED FGD SYSTEM OPERATIONS DURING MARCH.

4/84	E	86.9	71.0	100.0	70.1						
	F	83.9	15.0	100.0	14.9						
	G	90.8	83.0	100.0	81.9						
	H	90.8	76.9	100.0	76.0						
	SYSTEM	100.0	82.0	100.0	81.0			720	711	583	87.7

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE F WAS DOWN DURING APRIL FOR ABSORBER TRAY SEAL REPAIRS.

5/84	E	.0	.0		.0						
	F	91.9	88.0	88.0	88.0						
	G	95.0	91.9	91.9	91.9						
	H	95.0	86.0	86.0	86.0						
	SYSTEM	94.0	88.7	88.7	88.7			744	744	660	94.3
6/84	E	31.5	6.0	9.5	4.7						
	F	68.5	45.0	51.7	35.4						
	G	36.9	33.0	52.2	26.0						
	H	68.5	36.0	41.4	28.3						
	SYSTEM	68.5	40.0	51.6	31.5			720	567	227	71.0

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 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

MODULE E WAS DOWN DURING MAY AND JUNE FOR ABSORBER TRAY REPAIRS.

NEW BEAMS WERE INSTALLED AT MODULE E DURING THE MONTH.

ABSORBER TRAY SEALS WERE REPAIRED ON MODULE G DURING JUNE.

7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE THIRD QUARTER OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PUBLIC SERVICE OF NEW MEXICO	
PLANT NAME	SAN JUAN	
UNIT NUMBER	3	
CITY	WATERFLOW	
STATE	NEW MEXICO	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	9.	(.020 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	146.	(.340 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1560	
GROSS UNIT GENERATING CAPACITY - MW	534	
NET UNIT GENERATING CAPACITY W/FGD - MW	468	
NET UNIT GENERATING CAPACITY WO/FGD - MW	487	
EQUIVALENT SCRUBBED CAPACITY - MW	534	
** 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	963.05	(2040800 ACFM)
BOILER FLUE GAS TEMPERATURE - C	120.6	(249 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	8.5	(28.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20934.	(9000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8000-11628
AVERAGE ASH CONTENT - %	22.00	
RANGE ASH CONTENT - %	12.6-22.5	
AVERAGE MOISTURE CONTENT - %	10.50	
RANGE MOISTURE CONTENT - %	8.1-15.0	
AVERAGE SULFUR CONTENT - %	.80	
RANGE SULFUR CONTENT - %	0.6-1.3	
AVERAGE CHLORIDE CONTENT - %	.03	
RANGE CHLORIDE CONTENT - %	0.00-0.09	
*** PARTICLE CONTROL		
** PARTICLE SCRUBBER		
NUMBER	4	
NUMBER OF SPARES	1	
INITIAL START-UP DATE	1/82	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/BOTTOM-ENTRY PLUMB BOB	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	DAVY MCKEE	
DIMENSIONS - FT	14.5 DIA X 32.6	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
LINER GENERIC MATERIAL	INORGANIC	
LINER SPECIFIC MATERIAL	PREFIRED BRICK/SHAPES	
GAS CONTACTING DEVICE TYPE	STAINLESS STEEL	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	315.0	(5000 GPM)
L/G RATIO - LITER/CU.M	1.0	(7.5 GAL/1000ACF)
PRESSURE DROP - KPA	3.1	(12.5 IN-H2O)
SUPERFICIAL GAS VELOCITY - M/S	3.3	(10.8 FT/S)
INLET GAS FLOW RATE - CU.M/S	316.6	(671000 ACFM)
INLET GAS TEMPERATURE - C	133.3	(272 F)
PARTICLE REMOVAL EFFICIENCY - %	75.0	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	SALEABLE PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 3 (CONT.)

PROCESS TYPE	WELLMAN LORD
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	DAVY MCKEE
A-E FIRM	DAVY MCKEE
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	3.6
CURRENT STATUS	1
COMMERCIAL START-UP	12/79
INITIAL START-UP	12/79
CONTRACT AWARDED	8/78

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	4	
NUMBER OF SPARES	1	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	VALVE TRAY	
TRADE NAME/COMMON TYPE	BUBBLE CAP TRAY TOWER	
SUPPLIER	DAVY MCKEE	
DIMENSIONS - FT	30.0 X 33.5 X 78.0	
SHELL GENERIC MATERIAL	INORGANIC	
SHELL SPECIFIC MATERIAL	HYDRAULICALLY-BONDED CONCRETE	
SHELL MATERIAL TRADE NAME/COMMON TYPE	PORTLAND CEMENT	
LINER GENERIC MATERIAL	STAINLESS STEEL	
LINER SPECIFIC MATERIAL	AUSTENITIC	
LINER MATERIAL TRADE NAME/COMMON TYPE	TYPE 316L	
GAS CONTACTING DEVICE TYPE	VALVE TRAY	
NUMBER OF CONTACTING ZONES	5	
LIQUID RECIRCULATION RATE - LITER/S	35.	(550 GPM)
L/G RATIO - L/CU.M	.1	(1.1 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	4.2	(17.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.3	(10.8 FT/S)
INLET GAS FLOW - CU. M/S	240.67	(510000 ACFM)
INLET GAS TEMPERATURE - C	48.9	(120 F)
SO2 REMOVAL EFFICIENCY - %	90.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
NUMBER PER SYSTEM	2
GENERIC TYPE	IMPINGEMENT
SPECIFIC TYPE	BAFFLE
TRADE NAME/COMMON TYPE	CLOSED VANE
CONFIGURATION	HORIZONTAL
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
WASH WATER SOURCE	BLENDED
WASH FREQUENCY	CONTINUOUS ON ONE & INTERMITTENT ON THE OTHER
WASH RATE - L/S	10.4 (165 GAL/MIN)

** REHEATER

GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER	
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE	
INLET FLUE GAS FLOW RATE - CU. M/S	866.41	(1836000 ACFM)
INLET FLUE GAS TEMPERATURE - C	52.8	(127 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	4
NUMBER OF SPARES	1
DESIGN	CENTRIFUGAL
SUPPLIER	BUFFALO FORGE

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 3 (CONT.)

FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	328.25	(695600 ACFM)
FLUE GAS TEMPERATURE - C	120.6	(249 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** FANS

NUMBER	2
NUMBER OF SPARES	0
DESIGN	CENTRIFUGAL
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	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	1

** PUMPS

SERVICE	NUMBER
SCRUBBER RECIRCULATION	1

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

NATURE	SULFURIC ACID	
FULL LOAD QUANTITY - M T/H	19.05	(21.00 TPH)
DISPOSITION	MARKETED	

*** SLUDGE

** TREATMENT

METHOD	N/A
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	N/A
TYPE	NONE
SITE TREATMENT	N/A

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 3 (CONT.)

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH & DENSITY
CONTROL LEVELS	PH 5.5-6.5; SP.GR. 1.2-1.3
MONITOR LOCATION	ABSORBER BLEED & PRODUCT SOLUTION
PROCESS CONTROL MANNER	MANUAL

** WATER BALANCE

WATER LOOP TYPE	CLOSED

** 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
12/79	M	100.0	11.2		5.9						
	SYSTEM	100.0	11.2		5.9			744	392	44	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SAN JUAN 3 BOILER AND FGD SYSTEM BEGAN OPERATIONS IN DECEMBER 1979. CURRENTLY ONLY ONE MODULE IS OPERATING. THE OTHER THREE MODULES WILL BECOME OPERATIONAL ONE BY ONE UNTIL ALL ARE ON LINE. THE SYSTEM IS NOT EXPECTED TO BE FULLY OPERATIONAL (ALL FOUR MODULES) UNTIL 1982.

DURING DECEMBER THE BOILER EXPERIENCED ERRATIC OPERATIONS. NO FGD SYSTEM PROBLEMS WERE REPORTED.

1/80	M	86.0	54.4		41.5						
	SYSTEM	86.0	54.4		41.5			744	568	309	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM FIGURES REFLECT THE OPERATION OF A SINGLE MODULE. ONLY ONE MODULE WILL BE NEEDED UNTIL MAY 1982 TO MEET CURRENT SO2 EMISSION REGULATIONS.

2/80	M	98.0	13.6		1.0						
	SYSTEM	98.0	13.6		1.0			696	44	7	
3/80	M	85.5	78.3	79.6	56.7						
	SYSTEM	85.5	78.3	79.6	56.7			744	539	422	53.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE ONE MODULE CURRENTLY OPERATIONAL AT SAN JUAN 3 OPERATED WITHOUT ANY MAJOR PROBLEMS DURING THE FIRST QUARTER OF 1980. THE BOILER WAS OFF LINE FOR APPROXIMATELY 24 DAYS IN FEBRUARY DUE TO AN ELECTRICAL PROBLEM.

4/80	M	92.1	82.7	90.1	71.8						
	SYSTEM	92.1	82.7	90.1	71.8			720	625	517	77.0

** PROBLEMS/SOLUTIONS/COMMENTS

MINOR REPAIR WORK WAS DONE TO THE BOILER THIS MONTH. FGD SYSTEM AVAILABILITY WAS OVER 90%.

5/80	M	100.0	78.1	100.0	32.7						
	SYSTEM	100.0	78.1	100.0	32.7			744	311	243	35.0

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE BOILER WAS OUT OF SERVICE FOR A SCHEDULED MAINTENANCE OUTAGE.								
6/80	M	49.0	43.3	39.2	27.6						
	SYSTEM	49.0	43.3	39.2	27.6			720	460	127	55.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MINOR REPAIR AND MAINTENANCE OF THE BOILER CAUSED SYSTEM OUTAGE TIME.								
			THE FGD SYSTEM DID NOT OPERATE AFTER JUNE 19 DUE TO FAILURE OF THE MIST ELIMINATOR MESH PADS AND BOTTOM BALLAST TRAY.								
7/80	M	75.5	89.8	89.8	74.5						
	SYSTEM	75.5	89.8	89.8	74.5			744	617	554	66.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE FGD SYSTEM WAS RETURNED TO SERVICE ON JULY 5 AFTER BOILER AND FGD SYSTEM REPAIRS WERE MADE.								
8/80	M	83.2	81.6	82.7	80.2						
	SYSTEM	83.2	81.6	82.7	80.2			744	732	597	81.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
			BEARINGS ON THE CIRCULATING PUMP WERE REPLACED DURING AUGUST.								
			A PUMP DISCHARGE VALVE WAS REPLACED DUE TO LEAKAGE.								
9/80	M	96.7	59.4	59.1	45.7						
	SYSTEM	96.7	59.4	59.1	45.7			720	549	329	61.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE FGD SYSTEM WAS DOWN FOR SEVERAL DAYS IN SEPTEMBER BECAUSE OF BOILER TUBE LEAKS.								
			THE FGD SYSTEM WAS NOT OPERATED DURING A SCHEDULED OUTAGE OF THE CHEMICAL PLANT. THE SYSTEM WAS AVAILABLE DURING THIS TIME.								
10/80	M	91.0	65.1	67.2	63.7						
	SYSTEM	91.0	65.1	67.2	63.7			744	728	474	84.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING OCTOBER THE BOILER WAS OUT OF SERVICE FOR APPROXIMATELY 24 HOURS DUE TO A POWER TRIP CAUSED BY THE FORCED DRAFT FAN.								
			MODULE M WAS RETURNED TO SERVICE ON OCTOBER 8, 1980 FOLLOWING COMPLETION OF THE CHEMICAL PLANT OUTAGE. HOWEVER, MODULE M WAS SHUT DOWN ON OCTOBER 29, 1980 TO REPLACE THE BADLY DAMAGED BOTTOM COLLECTOR TRAY.								
11/80	M	59.0	73.0	86.0	38.0						
	SYSTEM	59.0	73.0	86.0	38.0			720	372	273	38.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING NOVEMBER THE BOILER WAS OUT OF SERVICE APPROXIMATELY 312 HOURS DUE TO A SCHEDULED MAINTENANCE OVERHAUL. DURING THIS TIME REPAIRS WERE MADE TO THE BOTTOM BALLAST TRAY AND SUPPORT BEAMS IN THE M MODULE.								

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 3 (CONT.)

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

MODULE M WAS NOT OPERATED FOR APPROXIMATELY 96 HOURS DUE TO A POWER FAILURE THAT CAUSED AN UPSET IN THE CHEMICAL PLANT AND CONSEQUENT LACK OF ABSORBER FEED SOLUTION.

12/80	M	90.0	86.0	87.0	65.0						
	SYSTEM	90.0	86.0	87.0	65.0			744	564	484	68.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE APPROXIMATELY 168 HOURS DUE TO TUBE LEAKS IN THE SUPERHEATER SECTION.

DURING DECEMBER MODULE M WAS OUT OF SERVICE APPROXIMATELY 50 HOURS DUE TO AN INSPECTION FOLLOWING MAJOR REPAIRS COMPLETED IN NOVEMBER.

1/81	M	99.9	90.0	98.0	55.0						
	SYSTEM	99.9	90.0	98.0	55.0			744	452	409	61.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE BOILER WAS OUT OF SERVICE APPROXIMATELY 264 HOURS TO REMOVE A CLINKER AND TO REPAIR A SUPERHEATER TUBE LEAK.

A BOILER TRIP CAUSED BY A LOW DRUM LEVEL CAUSED A SHORT OUTAGE.

2/81	M	81.0	80.0	80.0	75.0						
	SYSTEM	81.0	80.0	80.0	75.0			672	633	504	91.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE BOILER WAS OUT OF SERVICE APPROXIMATELY 48 HOURS DUE TO THE REPAIRS OF THE SUPERHEATER TUBE LEAK.

MODULE M WAS OUT OF SERVICE APPROXIMATELY 24 HOURS DUE TO A MAINTENANCE INSPECTION.

3/81	M	98.3	97.2	97.8	96.5						
	SYSTEM	98.3	97.2	97.8	96.5			744	739	718	90.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE BOILER WAS OUT OF SERVICE FOR APPROXIMATELY AN HOUR DUE TO THE FAILURE OF THE STEAM FLOW TRANSMITTER.

4/81	M	20.0	74.0	100.0	20.0						
	SYSTEM	20.0	74.0	100.0	20.0			720	195	145	24.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOILER WAS OUT OF SERVICE APPROXIMATELY 525 HOURS DUE TO A SCHEDULED MAINTENANCE OVERHAUL.

MODULE M WAS OUT OF SERVICE APPROXIMATELY 50 HOURS DUE THE REPLACEMENT OF THE MIST ELIMINATOR BEAMS AND REPAIRING OF BRICKWORK IN THE VENTURI.

5/81	M	7.5	36.8	36.8	5.8						
	SYSTEM	7.5	36.8	36.8	5.8			744	117	43	11.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE BOILER WAS OUT OF SERVICE APPROXIMATELY 600 HOURS DUE TO A SCHEDULED MAINTENANCE OVERHAUL.

DURING THE BOILER OUTAGE TIME THE UPPER AND LOWER MIST ELIMINATOR BEAMS IN

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

MODULE M WERE REPLACED.

A PORTION OF THE ABRASION RESISTANT TILES IN THE VENTURI SCRUBBER WERE ALSO REPLACED DURING MAY.

THE BOILER WAS OUT OF SERVICE APPROXIMATELY 24 HOURS DUE TO A TUBE LEAK.

6/81	M	70.8	55.9	55.9	27.8						
	SYSTEM	70.8	55.9	55.9	27.8			720	358	200	35.0

** PROBLEMS/SOLUTIONS/COMMENTS

TWO BOILER OUTAGES IN JUNE WERE CAUSED BY SUPERHEATER TUBE LEAKS.

MODULE M WAS DOWN FROM JUNE 4 THROUGH JUNE 11 TO BALANCE THE BOOSTER BLOWER ROTOR.

7/81	M	98.1	96.5	97.3	96.7						
	SYSTEM	98.0	96.0	97.0	96.0			744	738	712	93.0

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 3 HAD TWO ONE-DAY OUTAGES DURING THE MONTH THAT RESULTED FROM FAILURE OF THE BOILER FEED PUMP CONTROLLER.

8/81	M	85.5	85.5	85.5	85.5						
	SYSTEM	85.5	85.5	85.5	85.5			744	744	636	97.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE M WAS DOWN FOR FOUR DAYS DURING THE MONTH FOR INSPECTION OF THE INTERNALS.

9/81	M	96.8	31.8	31.8	31.0						
	SYSTEM	96.8	31.8	31.8	31.0			720	701	223	82.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE M WAS DOWN FOR TWO DAYS DURING THE FIRST HALF OF THE MONTH FOR BALANCING OF THE BOOSTER BLOWER ROTOR.

A SCHEDULED CHEMICAL PLANT OUTAGE KEPT MODULE M OFF-LINE FROM SEPTEMBER 11 TO SEPTEMBER 30.

10/81	K	8.5	11.4		8.5						
	M	98.2	84.4	97.3	62.4						
	SYSTEM	98.2	84.4	97.3	62.4			744	550	464	63.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER THE K MODULE WAS STARTED UP FOR THE FIRST TIME.

11/81	J	19.6	19.6		19.4						
	K	96.1	91.7		91.0						
	M	91.5	69.0		68.5						
	SYSTEM	94.0	90.0	93.0	89.0			720	714	644	90.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER MODULE K BECAME AVAILABLE FOR THE FIRST TIME.

DURING NOVEMBER, OPERATION OF 2 MODULES (K AND M) WAS CONSIDERED NECESSARY TO KEEP THE UNIT IN COMPLIANCE.

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
12/81	J	.0	.0		.0						
	K	98.9	91.1		88.3						
	L	34.5	31.3		30.4						
	M	91.8	61.4		59.5						
	SYSTEM	99.5	92.2	98.4	89.4			744	721	665	91.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE J WAS DOWN THE ENTIRE MONTH OF DECEMBER DUE TO A BURNED OUT BOOSTER BLOWER MOTOR.

MODULE L WAS IN THE START-UP MODE AND WAS INOPERATIVE UNTIL DECEMBER 21.

1/82	J	.0	.0		.0						
	K	41.3	39.7		38.3						
	L	41.3	39.6		38.2						
	M	62.6	57.7		55.6						
	SYSTEM	99.0	97.0	99.0	93.0			744	718	695	94.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY MODULE J WAS OUT OF SERVICE FOR THIRTEEN HOURS DUE TO FAILURE OF THE BOOSTER BLOWER MOTOR.

MODULE M WAS OUT OF SERVICE PART OF THE MONTH DUE TO REPAIRS TO THE CIRCULATING PUMPS.

ON JANUARY 14 MODULES J, K, L RETURNED TO CONSTRUCTION TO RESOLVE DEFICIENCIES. BEGINNING ON THIS DATE, UNTIL CONSTRUCTION IS COMPLETED, THE TOTAL SYSTEM CONSISTS OF THE M MODULE ONLY.

THE UNIT WAS SHUT DOWN OF JANUARY 31 DUE TO TUBE LEAKS.

2/82	J	.0			.0						
	K	.0			.0						
	L	.0			.0						
	M	88.1	78.9	87.0	62.5						
	SYSTEM	88.1	78.9	87.0	62.5			672	532	420	74.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER REMAINED OFF-LINE UNTIL FEBRUARY 5 DUE TO THE TUBE LEAKS EXPERIENCED DURING FEBRUARY AND TO REPLACE A BEARING.

MODULES J, K, L REMAINED OUT OF SERVICE IN FEBRUARY DUE TO CONTINUING CONSTRUCTION WORK.

THE M MODULE START-UP WAS DELAYED UNTIL FEBRUARY 10 DUE TO FROZEN FEED LINES AND BECAUSE OF A 440 VOLT TIE IN MODIFICATION.

3/82	J	.0			.0						
	K	.0			.0						
	L	.0			.0						
	M	98.2	79.7	98.0	79.6						
	SYSTEM	98.2	79.7	98.0	79.6			744	743	592	97.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE M WAS SHUT DOWN FROM MARCH 19 THRU MARCH 24 BECAUSE OF A CHEMICAL PLANT OUTAGE WHEN NO FEED WAS AVAILABLE.

4/82	J	.0	.0		.0						

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	K	.0	.0		.0						
	L	2.1	1.8		.7						
	M	100.0	65.0		25.0						
	SYSTEM	100.0	65.0	88.0	25.0			720	277	180	31.0

** PROBLEMS/SOLUTIONS/COMMENTS

ON APRIL 9 THROUGH APRIL 28 THE UNIT WAS DOWN FOR A SCHEDULED UNIT OUTAGE.

MODULES J, K AND L REMAINED UNDER CONSTRUCTION DURING APRIL.

5/82	J	66.3	59.1		40.2						
	K	59.8	48.6		33.1						
	L	38.7	39.7		27.0						
	M	.0	.0		.0						
	SYSTEM	99.0	95.0	98.0	64.0			744	506	479	53.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF-LINE FROM MAY 3 TO MAY 7 DUE TO HIGH VIBRATION ON THE EXCITER BEARING AND FROM MAY 16 TO MAY 23 TO REPAIR A SUPERHEATER TUBE LEAK.

MODULE J WAS OUT OF SERVICE FROM MAY 1 THRU MAY 11 TO PERFORM REPAIRS ON THE ABSORBER WALLS AND MODULE K WAS DOWN FROM MAY 1 THRU MAY 13 TO PERFORM THE SAME REPAIRS.

MODULE L AND M WERE OUT OF SERVICE PART OF THE MONTH TO REPAIR THE BOOSTER BLOWER MOTOR.

6/82	J	83.8	80.1		80.1						
	K	29.0	29.0		29.0						
	L	.0	.0		.0						
	M	.0	.0		.0						
	SYSTEM	56.4	54.6		54.6			720	720	393	90.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE J WAS DOWN FROM JUNE 4 TO JUNE 8 TO REPAIR A BOOSTER FAN MOTOR. MODULES L AND M WERE DOWN FROM JUNE 1 TO JUNE 30, ALSO FOR BOOSTER FAN MOTOR REPAIRS.

MODULE K WAS DOWN FROM JUNE 9 TO JUNE 30 TO REPAIR AN INLET ISOLATION DAMPER.

7/82	J	99.7	93.0		62.9						
	K	.0	.0		.0						
	L	36.2	47.5		32.1						
	M	.0	.0		.0						
	SYSTEM	67.9	70.3		47.5			744	503	354	63.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES K, L AND M WERE DOWN DURING JULY TO REPAIR BOOSTER FAN MOTORS.

THE UNIT WAS DOWN FROM JULY 7 TO JULY 16 TO REPAIR A BOILER TUBE LEAK.

8/82	J	100.0	78.1		78.1						
	K	64.5	61.0		61.0						
	L	77.6	72.3		72.3						
	M	.0	.0		.0						
	SYSTEM	100.0	100.0		100.0			744	744	744	86.0

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 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										
		MODULES K, L AND M WERE DOWN AT VAROUS TIMES DURING AUGUST TO REPAIR BOOSTER FAN MOTORS.									
9/82	J	.0	.0		.0						
	K	56.4	95.0		53.1						
	L	53.2	91.0		50.8						
	M	.0	.0		.0						
	SYSTEM	54.8	93.0		51.9			720	402	374	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN DURING PART OF SEPTEMBER DUE TO A CHEMICAL PLANT OUTAGE.									
		MODULE J WAS DOWN DURING SEPTEMBER TO REPLACE A BOTTOM DEMISTER.									
		MODULE M WAS DOWN DURING SEPTEMBER TO REPAIR A BOOSTER FAN MOTOR.									
10/82	J	17.3	5.7		5.6						
	K	36.4	36.4		36.3						
	L	61.3	36.5		36.4						
	M	.9	.9		.9						
	SYSTEM	58.0	39.8		39.7			744	742	295	94.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM RESUMED OPERATION ON OCTOBER 20 AFTER A CHEMICAL PLANT OUTAGE.									
11/82	J	98.2	24.6		24.6						
	K	100.0	100.0		100.0						
	L	95.4	79.9		79.9						
	M	93.3	42.9		42.9						
	SYSTEM	100.0	100.0		100.0			720	720	720	93.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE M WAS DOWN FROM NOVEMBER 1 TO NOVEMBER 3 TO BALANCE A BOOSTER FAN.									
		MODULES J AND M WERE ON STANDBY AT VARIOUS TIMES DURING THE MONTH DUE TO LOW DEMAND.									
12/82	J	99.6	87.1		56.5						
	K	94.5	62.9		40.7						
	L	66.8	48.5		31.5						
	M	83.2	68.7		44.5						
	SYSTEM	100.0	100.0		86.6			744	482	644	53.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN FROM DECEMBER 4 TO DECEMBER 10 FOR A BOILER INSPECTION.									
		THE UNIT WAS DOWN FROM DECEMBER 12 TO DECEMBER 18 TO REPAIR A BOILER TUBE LEAK.									
		MODULES L AND M WERE UNAVAILABLE FROM DECEMBER 13 TO DECEMBER 17 DUE TO AN INSPECTION OF THE BOTTOM COLLECTOR TRAYS AND MIST ELIMINATOR SUPPORT BEAMS.									
		MODULE L WAS DOWN FROM DECEMBER 23 TO DECEMBER 27 DUE TO ELECTRICAL PROBLEMS WITH A BOOSTER FAN.									
1/83	J	42.9	42.9		42.9						

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	K	89.4	68.7		68.7						
	L	97.3	93.3		93.3						
	M	99.3	87.2		87.2						
	SYSTEM	100.0	97.4		97.4			744	744	724	89.0

** PROBLEMS/SOLUTIONS/COMMENTS

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

AS OF JANUARY 1, 1983 THE NUMBER OF MODULES COMPRISING THE TOTAL FGD SYSTEM CHANGED FROM TWO TO THREE.

2/83	J										
	K	97.0	100.0		93.0						
	L	78.0	86.1		68.9						
	M	40.0	28.6		22.9						
	SYSTEM	71.7	71.6		61.6			672	538	414	73.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN AT VARIOUS TIMES DURING FEBRUARY DUE TO BOILER-RELATED PROBLEMS.

MODULES J, L AND M WERE OUT OF SERVICE DURING PART OF FEBRUARY TO REPAIR A BOOSTER FAN MOTOR.

AS OF JANUARY 1, 1983 THE NUMBER OF MODULES COMPRISING THE TOTAL FGD SYSTEM CHANGED FROM TWO TO THREE.

3/83	J	68.0	73.1		57.0						
	K	94.0	100.0		91.0						
	L	98.0	100.0		97.0						
	M										
	SYSTEM	86.6	91.0		81.7			744	580	608	74.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM MARCH 18 TO MARCH 20 DUE TO BOILER-RELATED PROBLEMS.

MODULES J AND M WERE OUT OF SERVICE DURING MARCH FOR REPAIRS ON THE BOOSTER FAN MOTORS.

AS OF JANUARY 1, 1983 THE NUMBER OF MODULES COMPRISING THE TOTAL FGD SYSTEM CHANGED FROM TWO TO THREE.

4/83	J	13.9	34.1		13.1						
	K	95.0	100.0		91.9						
	L	94.0	100.0		84.0						
	M	.0	.0		.0						
	SYSTEM	67.6	78.0		63.0			720	276	681	21.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN DURING PART OF APRIL FOR A SCHEDULED OUTAGE.

THE BOOSTER FANS ON MODULES J AND M WERE DOWN FOR MOTOR REPAIRS DURING APRIL.

5/83	J	48.9	45.4		44.9						
	K	98.9	98.0		96.9						
	L	98.9	96.1		95.0						
	M	.0	.0		.0						
	SYSTEM	82.2	79.8		78.9			744	736	744	62.0

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 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										

A UNIT TRIP OCCURRED ON MAY 16 DUE TO AN ELECTRICAL MAINTENANCE ERROR.

A CONDENSER CIRCULATION PUMP TRIPPED ON MAY 25 CAUSING A UNIT TRIP.

MODULE J WAS DOWN DURING MAY TO REPAIR A BOOSTER FAN MOTOR.

MODULE M WAS OUT OF SERVICE DURING PART OF MAY FOR BOOSTER FAN MOTOR REPAIRS.

6/83	J	100.0	100.0		95.0						
	K	100.0	100.0		94.0						
	L	100.0	100.0		94.0						
	M	.0	.0		.0						
	SYSTEM	100.0	100.0		94.3			720	385	720	71.0

** PROBLEMS/SOLUTIONS/COMMENTS

MECHANICAL PROBLEMS WERE ENCOUNTERED WITH A PRIMARY AIR HEATER GEAR BOX ON JUNE 8. THE UNIT WAS DOWN ON JUNE 9 AND 10 TO REPAIR THE AIR HEATER GEAR BOX.

THE UNIT WAS DOWN FROM JUNE 11 TO JUNE 18 AND AGAIN FROM JUNE 20 TO JUNE 26 DUE TO A BOILER TUBE LEAK.

A UNIT TRIP OCCURRED ON JUNE 18 DUE TO LOW VACUUM.

7/83	J	84.0	74.0	74.0	66.4						
	K	98.9	95.1	95.1	85.3						
	L	97.0	90.0	90.0	80.8						
	M	.0	.0	.0	.0						
	SYSTEM	93.3	86.3	86.3	77.5			744	668	577	72.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN APPROXIMATELY 5 DAYS DURING JULY DUE TO BOILER-RELATED PROBLEMS.

MODULES J AND M WERE DOWN DURING JULY TO REWIND THE BOOSTER FAN MOTOR.

8/83	J	100.0	87.8	87.8	42.7						
	K	100.0	85.1	85.1	41.4						
	L	100.0	87.0	87.0	42.3						
	M	.0	.0	.0	.0						
	SYSTEM	100.0	86.6	86.6	42.2			744	362	314	34.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN APPROXIMATELY 18 DAYS DURING AUGUST DUE TO BOILER-RELATED PROBLEMS.

MODULE M WAS DOWN DURING PART OF AUGUST TO REWIND A BOOSTER FAN MOTOR.

9/83	J	96.9	96.0	92.2	76.8						
	K	98.1	97.9	100.0	78.3						
	L	98.1	97.9	100.0	78.3						
	M	.0	.0	.0	.0						
	SYSTEM	97.7	97.3	97.4	77.8			720	576	560	67.0

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN APPROXIMATELY 6 DAYS DURING SEPTEMBER DUE TO BOOSTER-RELATED PROBLEMS.									
		MODULE M WAS DOWN DURING PART OF SEPTEMBER TO REPAIR A BOOSTER FAN MOTOR.									
10/83	J	100.0	97.1	92.9	92.9						
	K	100.0	98.0	93.8	93.8						
	L	87.0	85.0	93.5	81.3						
	M	.0	.0		.0						
	SYSTEM	95.7	93.4	93.4	89.3			744	712	665	77.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE M WAS DOWN DURING OCTOBER DUE TO A FAULTY BOOSTER FAN MOTOR.									
11/83	J	100.0	97.9	100.0	96.9						
	K	100.0	98.9	100.0	97.9						
	L	100.0	92.8	100.0	91.9						
	M	21.9	10.4	100.0	10.3						
	SYSTEM	100.0	100.0	100.0	99.0			720	713	713	86.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING NOVEMBER 1983.									
12/83	J	84.9	85.0	85.0	70.0						
	K	100.0	97.1	97.1	80.0						
	L	91.0	86.0	90.5	70.8						
	M	5.0	5.1	100.0	4.2						
	SYSTEM	93.6	91.0	100.0	75.0			744	613	558	67.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE M WAS DOWN DURING DECEMBER FOR BOOSTER FAN MOTOR REPAIRS.									
1/84	J	99.1	99.1	99.1	99.1						
	K	100.0	83.1	100.0	83.1						
	L	99.1	99.1	99.1	99.1						
	M	20.0	18.0	106.3	18.0						
	SYSTEM	100.0	99.7	100.0	99.7			744	744	742	84.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE M WAS DOWN DURING THE MONTH TO REPAIR A BOOSTER FAN.									
2/84	J	100.0	100.0	100.0	100.0						
	K	99.0	99.0	99.0	99.0						
	L	100.0	100.0	100.0	100.0						
	M	.0	.0		.0						
	SYSTEM	99.7	99.7	99.7	99.7			696	696	694	92.6
3/84	J	98.5	94.0	100.0	93.5						
	K	98.5	82.0	100.0	81.6						
	L	93.5	65.0	100.0	64.7						
	M	22.8	20.0	33.9	19.9						
	SYSTEM	100.0	87.0	100.0	86.6			744	740	644	83.4

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 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										
		MODULE M OUTAGE TIME DURING THE FIRST QUARTER OF 1984 WAS DUE, IN PART, TO COLLAPSED MIST ELIMINATOR PADS.									
4/84	J	99.0	99.0	100.0	99.0						
	K	6.9	6.0	86.0	6.0						
	L	99.0	99.0	100.0	99.0						
	M	96.9	93.9	98.8	93.9						
	SYSTEM	100.0	99.3	100.0	99.3			720	720	715	90.6
5/84	J	94.0	93.0	100.0	93.0						
	K	32.0	31.0	88.8	31.0						
	L	97.0	93.0	100.0	93.0						
	M	96.0	79.0	100.0	79.0						
	SYSTEM	100.0	98.7	100.0	98.7			744	744	734	92.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE K WAS DOWN DURING PART OF APRIL AND MAY FOR ABSORBER WALL REPAIRS.									
6/84	J	21.9	9.1	98.0	6.7						
	K	73.5	86.9	86.9	63.8						
	L	73.3	90.0	90.0	66.0						
	M	72.6	89.0	98.1	65.3						
	SYSTEM	80.5	91.7	100.0	67.2			720	528	484	67.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MODULE J WAS DOWN DURING PART OF JUNE FOR ABSORBER WALL REPAIRS.									
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		INFORMATION WAS UNAVAILABLE FOR THE THIRD QUARTER OF 1984.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PUBLIC SERVICE OF NEW MEXICO	
PLANT NAME	SAN JUAN	
UNIT NUMBER	4	
CITY	WATERFLOW	
STATE	NEW MEXICO	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	21.	(.050 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	146.	(.340 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1560	
GROSS UNIT GENERATING CAPACITY - MW	534	
NET UNIT GENERATING CAPACITY W/FGD - MW	472	
NET UNIT GENERATING CAPACITY WO/FGD - MW	491	
EQUIVALENT SCRUBBED CAPACITY - MW	534	
** 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	963.05	(2040800 ACFM)
BOILER FLUE GAS TEMPERATURE - C	120.6	(249 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	8.5	(28.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	18841.	(8100 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8000-11628
AVERAGE ASH CONTENT - %	22.45	
RANGE ASH CONTENT - %	12.6-22.5	
AVERAGE MOISTURE CONTENT - %	14.82	
RANGE MOISTURE CONTENT - %	8.1-15.0	
AVERAGE SULFUR CONTENT - %	.80	
RANGE SULFUR CONTENT - %	0.6-1.3	
AVERAGE CHLORIDE CONTENT - %	.07	
RANGE CHLORIDE CONTENT - %	0.00-0.09	
*** PARTICLE CONTROL		
** ESP		
TYPE	HOT SIDE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	1932.7	(4095605 ACFM)
INLET FLUE GAS TEMPERATURE - C	382.2	(720 F)
PRESSURE DROP - KPA	.6	(2. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.9	
** PARTICLE SCRUBBER		
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/BOTTOM-ENTRY PLUMB BOB	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
LINER GENERIC MATERIAL	INORGANIC	
LINER SPECIFIC MATERIAL	PREFIRED BRICK/SHAPES	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	SALEABLE PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	WELLMAN LORD	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	DAVY MCKEE	
A-E FIRM	DAVY MCKEE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 4 (CONT.)

UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	3.6
CURRENT STATUS	1
COMMERCIAL START-UP	7/82
INITIAL START-UP	5/82
CONTRACT AWARDED	8/78

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	4
NUMBER OF SPARES	1
GENERIC TYPE	TRAY TOWER
SPECIFIC TYPE	VALVE TRAY
TRADE NAME/COMMON TYPE	BUBBLE CAP TRAY TOWER
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	VALVE TRAY
L/G RATIO - L/CU.M	1.0 (7.5 GAL/1000 ACF)
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 VANE
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** REHEATER

GENERIC TYPE	INDIRECT HOT AIR
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

DESIGN	CENTRIFUGAL
FUNCTION	BOOSTER
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** FANS

NUMBER	2
NUMBER OF SPARES	0
DESIGN	CENTRIFUGAL
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	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK

** PUMPS

SERVICE	NUMBER
NR	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SALEABLE BYPRODUCTS

NATURE	SULFURIC ACID

*** SLUDGE

** TREATMENT

METHOD	N/A
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	N/A
TYPE	NONE
SITE TREATMENT	N/A

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	STACK OUTLET GAS
CHEMICAL PARAMETERS	NOX, SO2, O2, OPACITY
MONITOR TYPE	KVB
MONITOR LOCATION	STACK
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	CLOSED

** 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
5/82	N	.0	.0		.0						
	P	86.8	54.6		42.3						
	R	71.8	47.7		37.0						
	S	.0	.0		.0						
	SYSTEM	87.0	66.0	87.0	51.0			744	577	383	66.0

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
6/82	N	48.6	44.3		41.8						
	P	23.8	24.3		22.9						
	R	53.2	34.6		32.6						
	S	10.0	10.2		9.6						
	SYSTEM	67.8	56.7		53.5			720	679	385	80.0
7/82	N	99.1	93.5		91.1						
	P	.0	.0		.0						
	R	.0	.0		.0						
	S	.0	.0		.0						
	SYSTEM	49.5	46.8		45.6			744	725	339	91.0
8/82	N	96.6	77.3		68.1						
	P	99.7	88.3		77.8						
	R	.0	.0		.0						
	S	42.2	14.9		13.2						
	SYSTEM	100.0	90.2		79.6			744	656	592	76.0
9/82	N	56.7	51.4		28.1						
	P	56.3	85.0		46.4						
	R	30.0	41.5		22.6						
	S	34.9	3.1		1.7						
	SYSTEM	88.9	90.5		49.4			720	393	356	

** PROBLEMS/SOLUTIONS/COMMENTS

FGD SYSTEM OPERATION COMMENCED DURING MAY 1982.

MODULES N AND S WERE UNAVAILABLE DURING MAY DUE TO ABSORBER WALL REPAIRS.

MODULE R WAS OFF-LINE FOR FOUR DAYS TO REPAIR THE PLUMB BOB IN THE VENTURI SCRUBBER.

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM JUNE 8 TO JUNE 10 DUE TO BOILER RELATED PROBLEMS.

MODULE N WAS DOWN FROM JUNE 1 TO JUNE 16 TO REPAIR THE ABSORBER CELL WALLS. MODULE S WAS DOWN FROM JUNE 1 TO JUNE 4, ALSO FOR ABSORBER CELL WALL REPAIRS.

MODULES P, R AND S WERE DOWN AT VARIOUS TIMES DURING THE PERIOD OF JUNE 6 TO JUNE 30 FOR BOOSTER FAN MOTOR REPAIRS.

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES P, R AND S WERE DOWN DURING JULY FOR BOOSTER FAN MOTOR REPAIRS.

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM AUGUST 11 TO AUGUST 13 TO REPAIR A BOILER TUBE LEAK.

MODULES R, S AND N WERE DOWN AT VARIOUS TIMES DURING AUGUST TO REPAIR BOOSTER FAN MOTORS.

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN DURING PART OF SEPTEMBER DUE TO A CHEMICAL PLANT OUTAGE.

MODULE R BECAME AVAILABLE AFTER THE BOOSTER FAN REPAIRS ON SEPTEMBER 9.

THE OPERATION OF MODULES N AND S WAS LIMITED DURING THE LATTER PART OF SEPTEMBER BECAUSE THEY WERE NOT NEEDED TO KEEP THE UNIT IN COMPLIANCE.

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
10/82	N	.0	.0		.0						
	P	56.3	36.4		34.1						
	R	74.9	54.2		50.8						
	S	67.3	37.3		34.9						
	SYSTEM	99.3	64.0		59.9			744	697	446	87.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM RESUMED OPERATION ON OCTOBER 7 FOLLOWING A CHEMICAL PLANT OUTAGE.

11/82	N	3.3	1.3		.8						
	P	60.4	87.4		56.0						
	R	.0	.0		.0						
	S	70.0	84.6		54.2						
	SYSTEM	66.9	86.7		55.5			720	461	400	57.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM NOVEMBER 1 TO NOVEMBER 12 FOR A SCHEDULED OUTAGE.

BOTTOM DEMISTERS WERE REPLACED IN MODULES N, P AND S DURING NOVEMBER. MODULES P AND S WERE BACK IN SERVICE ON NOVEMBER 13.

MODULE N REMAINED SHUT DOWN TO REPAIR LEAKS ON A PLUMB BOB IN THE VENTURI SCRUBBER.

DURING NOVEMBER MODULE R AWAITED REPLACEMENT OF A BOTTOM DEMISTER.

12/82	N	100.0	90.9		90.3						
	P	99.7	83.4		82.8						
	R	32.7	5.5		5.5						
	S	99.7	91.3		90.7						
	SYSTEM	100.0	100.0		100.0			744	739	744	92.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE R WAS OUT OF SERVICE FROM DECEMBER 1 TO DECEMBER 19 TO REPLACE SECTIONS OF A BOTTOM DEMISTER.

1/83	N	42.6	38.1		37.5						
	P	99.7	82.4		81.2						
	R	97.4	89.2		87.9						
	S	94.9	68.8		67.7						
	SYSTEM	100.0	92.8		91.4			744	733	680	86.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN ON JANUARY 1 AND JANUARY 6 DUE TO ELECTRICAL PROBLEMS.

AS OF JANUARY 1, 1983 THE NUMBER OF MODULES COMPRISING THE TOTAL FGD SYSTEM CHANGED FROM TWO TO THREE.

2/83	N		.9		.9						
	P	97.9	97.9		97.9						
	R	99.0	99.0		99.0						
	S	97.9	97.9		97.9						
	SYSTEM	98.3	98.6		98.6			672	672	662	90.0

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 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

MODULE N WAS DOWN DURING PART OF FEBRUARY TO REPAIR A BOOSTER FAN MOTOR.

3/83	N										
	P	98.9	99.3		96.0						
	R	98.9	99.3		96.0						
	S	100.0	99.3		96.0						
	SYSTEM	99.3	99.3		96.0			744	719	714	87.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM MARCH 22 TO MARCH 23 DUE TO ELECTRICAL PROBLEMS.

MODULE N WAS DOWN DURING MARCH TO REPAIR A BOOSTER FAN MOTOR.

4/83	N	.0	.0		.0						
	P	99.0	100.0		96.0						
	R	100.0	100.0		96.0						
	S	98.1	100.0		95.0						
	SYSTEM	99.0	100.0		95.7			720	655	720	81.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN DURING PART OF APRIL TO REPAIR A BOILER STEAM LEAK.

THE MODULE N BOOSTER FAN MOTOR WAS BEING REPAIRED DURING THE MONTH OF APRIL.

5/83	N	.0	.0		.0						
	P	98.9	98.9		98.9						
	R	98.9	98.9		98.9						
	S	98.0	98.0		98.0						
	SYSTEM	98.6	98.6		98.6			744	744	744	82.0

** PROBLEMS/SOLUTIONS/COMMENTS

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

6/83	N	3.1	1.0		1.0						
	P	100.0	96.2		95.0						
	R	100.0	96.2		95.0						
	S	100.0	96.2		95.0						
	SYSTEM	100.0	96.5		95.3			720	711	720	77.0

** PROBLEMS/SOLUTIONS/COMMENTS

A UNIT TRIP OCCURRED FROM JUNE 5 TO JUNE 6 DUE TO A LOW BOILER DRUM LEVEL.

MODULE N WAS DOWN DURING PART OF JUNE TO REPAIR A FAN.

7/83	N	100.0	79.9	100.0	68.5						
	P	100.0	95.9	100.0	82.3						
	R	100.0	95.0	100.0	81.5						
	S	20.0	.0	.0	.0						
	SYSTEM	100.0	90.3	100.0	77.4			744	638	576	71.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FOR APPROXIMATELY 5 DAYS DURING JULY TO REPLACE EXPANSION JOINTS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			THE UNIT WAS DOWN FROM JULY 30 TO JULY 31 DUE TO BOILER-RELATED PROBLEMS.								
			MODULE S WAS DOWN DURING PART OF JULY TO REPAIR AN ABSORBER TRAY SUPPORT BEAM.								
8/83	N	84.9	66.6		65.1						
	P	100.0	98.2		96.0						
	R	98.0	63.4		62.0						
	S	98.0	63.4		62.0						
	SYSTEM	100.0	97.2		95.0			744	727	707	85.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			A UNIT TRIP OCCURRED FROM AUGUST 4 TO AUGUST 5 DUE TO BOILER/TURBINE RELATED PROBLEMS.								
			MODULE N WAS DOWN DURING PART OF AUGUST FOR BOOSTER FAN MOTOR REWIRING.								
			MODULES R AND S WERE DOWN DURING PART OF AUGUST TO INSTALL NEW SUMP LEVEL CONTROLS.								
9/83	N	99.0	99.0		99.0						
	P	70.0	51.9		51.9						
	R	79.0	46.9		46.9						
	S	99.0	99.0		99.0						
	SYSTEM	100.0	99.0		99.0			720	720	713	85.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE P WAS DOWN DURING PART OF SEPTEMBER TO INSPECT A CHLORIDE PRESCRUBBER SPRAY HEADER.								
			MODULE R WAS DOWN DURING PART OF SEPTEMBER TO REMOVE A CHLORIDE PRESCRUBBER SPRAY HEADER.								
10/83	N	100.0	97.0	97.0	96.5						
	P	79.0	78.6	78.6	78.2						
	R	99.5	97.0	97.0	96.5						
	S	.0	.0		.0						
	SYSTEM	92.8	90.9	90.9	90.4			744	740	673	83.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE S WAS DOWN DURING OCTOBER DUE TO ABSORBER SUMP BRICK WALL LINER FAILURE.								
11/83	N	96.0	95.0	95.0	95.0						
	P	26.9	25.0	25.0	25.0						
	R	96.9	96.9	96.9	96.9						
	S	.0	.0		.0						
	SYSTEM	73.3	72.3	72.3	72.3			720	720	521	85.0
12/83	N	98.9	98.9	98.9	98.9						
	P	.0	.0	.0	.0						
	R	98.9	98.9	98.9	98.9						
	S	.0	.0	.0	.0						
	SYSTEM	65.9	65.9	65.9	65.9			744	744	491	86.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULES P AND S WERE DOWN DURING NOVEMBER AND DECEMBER DUE TO ABSORBER BRICK WALL LINER FAILURES.								
1/84	N	93.0	94.4	95.0	92.1						

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	P	.0	.0	.0	.0						
	R	93.0	94.4	95.0	92.1						
	S	.0	.0		.0						
	SYSTEM	62.0	63.0	63.3	61.4			744	725	457	83.9
2/84	N	81.3	92.0	92.0	79.6						
	P	.0	.0	.0	.0						
	R	78.7	88.1	88.0	76.1						
	S	.0	.0	.0	.0						
	SYSTEM	53.4	60.0	60.0	51.9			696	602	361	73.6
3/84	N	96.2	79.9	100.0	79.3						
	P	.0	.0	.0	.0						
	R	70.4	57.0	73.9	56.6						
	S	24.7	21.0	86.1	20.8						
	SYSTEM	63.8	52.6	86.7	52.2			744	739	389	86.9

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES P AND S WERE DOWN DURING THE FIRST QUARTER OF 1984 TO REPAIR ABSORBER SUMP WALLS.

4/84	N	41.4	80.9	80.9	33.5						
	P	.0	.0	.0	.0						
	R	.0	.0	.0	.0						
	S	41.4	70.1	70.1	29.0						
	SYSTEM	27.6	50.3	50.3	20.8			720	298	150	34.4

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES P AND R WERE DOWN DURING APRIL TO REBUILD ABSORBER WALLS.

5/84	N	.0	.0		.0						
	P	1.6	30.2	30.0	1.6						
	R	.9	17.6	17.5	.9						
	S	1.2	22.6	22.5	1.2						
	SYSTEM	1.3	23.5	23.3	1.3			744	40	9	2.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED A UNIT OUTAGE DURING MAY.

MODULES P, R AND S WERE DOWN DURING MAY FOR ABSORBER WALL REPAIRS.

6/84	N	48.8	47.9	100.0	38.9						
	P	67.8	38.6	74.1	31.4						
	R	81.8	87.5	87.5	71.1						
	S	81.8	82.4	82.4	66.9						
	SYSTEM	93.4	85.5	100.0	69.4			720	585	500	69.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES N AND P WERE DOWN DURING JUNE FOR ABSORBER WALL REPAIRS.

7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 4 (CONT.)

PERFORMANCE DATA											
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 THIRD QUARTER OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SALT RIVER PROJECT	
PLANT NAME	CORONADO	
UNIT NUMBER	1	
CITY	ST. JOHNS	
STATE	ARIZONA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	344.	(.800 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	700	
GROSS UNIT GENERATING CAPACITY - MW	400	
NET UNIT GENERATING CAPACITY W/FGD - MW	350	
NET UNIT GENERATING CAPACITY WO/FGD - MW	355	
EQUIVALENT SCRUBBED CAPACITY - MW	320	
** 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	1226.94	(2600000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	387.8	(730 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	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25121.	(10800 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8000-12000
AVERAGE ASH CONTENT - %	15.00	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	16.00	
RANGE MOISTURE CONTENT - %	12.0-20.0	
AVERAGE SULFUR CONTENT - %	.55	
RANGE SULFUR CONTENT - %	0.4-1.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	2	
NUMBER OF SPARES	0	
TYPE	HOT SIDE	
SUPPLIER	WESTERN PREC. DIVISION, JOY	
INLET FLUE GAS CAPACITY - CU.M/S	1321.3	(2800000 ACFM)
INLET FLUE GAS TEMPERATURE - C	404.4	(760 F)
PRESSURE DROP - KPA	.8	(3. 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		

SALT RIVER PROJECT: CORONADO 1 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	M.W. KELLOGG
A-E FIRM	BECHTEL, SALT RIVER PROJECT
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.87
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	82.00
ENERGY CONSUMPTION - %	1.3
CURRENT STATUS	1
COMMERCIAL START-UP	12/79
INITIAL START-UP	11/79
CONTRACT AWARDED	6/76

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	1.00	
DESIGN COAL HEAT CONTENT - J/G	19305.8	(8300 BTU/LB)
SPACE REQUIREMENTS - SQ M	6066.4	(65300 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	164.0	

** QUENCHER/PRESATURATOR

NUMBER	2	
TYPE	QUENCH DUCT	
SUPPLIER	PULLMAN KELLOGG	
INLET GAS FLOW - CU. M/S	260.02	(551000 ACFM)
INLET GAS TEMPERATURE - C	148.9	(300 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** ABSORBER

NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN CROSSCURRENT SPRAY	
TRADE NAME/COMMON TYPE	HORIZONTAL SPRAY CHAMBER	
SUPPLIER	PULLMAN KELLOGG	
DIMENSIONS - FT	120.0 X 28.0 X 17.0	
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	DUDICK	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	4	
LIQUID RECIRCULATION RATE - LITER/S	2520.	(40000 GPM)
L/G RATIO - L/CU.M	9.7	(72.6 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.4	(1.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	6.6	(21.6 FT/S)
INLET GAS FLOW - CU. M/S	260.02	(551000 ACFM)
INLET GAS TEMPERATURE - C	148.9	(300 F)
SO2 REMOVAL EFFICIENCY - %	98.0	

** 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	HEIL	
CONFIGURATION	VERTICAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	3	
FREEBOARD DISTANCE - M	8.84	(29.0 FT)
DISTANCE BETWEEN STAGES - CM	1.78	(.7 IN)

SALT RIVER PROJECT: CORONADO 1 (CONT.)

DISTANCE BETWEEN VANES - CM	3.0	(1.20 IN)
PRESSURE DROP - KPA	.1	(.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	4.6	(15.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	COOLING TOWER BLOWDOWN	
WASH RATE - L/S	39.4	(625 GAL/MIN)

** REHEATER

GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
LOCATION	OUTLET DUCT	
PERCENT GAS BYPASSED - AVG	20.0	
TEMPERATURE INCREASE - C	27.8	(50 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL; INORGANIC [LINED]	
CONSTRUCTION MATERIAL SPECIFIC TYPE	HYDRAULICALLY-BONDED MORTAR	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FAN	
FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	304.32	(644880 ACFM)
FLUE GAS TEMPERATURE - C	127.2	(261 F)
PRESSURE DROP - KPA	1.9	(6.2 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	ANDCO
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	SCRUBBER INLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	15.6 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

** DUCTWORK

LOCATION	SCRUBBER OUTLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	33.0 X 18.0
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

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR

SALT RIVER PROJECT: CORONADO 1 (CONT.)

MANUFACTURER	MINE & SMELTER CORP.
NUMBER	2
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	11.8 (13 TPH)
PRODUCT QUALITY - % SOLIDS	20.0

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	2
MAKEUP WATER	1
MIST ELIMINATOR WASH	2
SEAL WATER	1
REAGENT PREP PRODUCT	1
WASTE SLURRY BLEED	1

** PUMPS

SERVICE	NUMBER
SLURRY RECIRCULATION	10
SLUDGE DISPOSAL	4
SLURRY PURGE	4
ALKALI MAKEUP	1
PROCESS WATER	2
SEAL WATER	1
HIGH PRESSURE SEAL WATER	2
MIST ELIMINATOR WASH	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
DIMENSIONS - FT	105.0 DIA X 12.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	POLYVINYL CHLORIDE
FEED STREAM SOURCE	ABSORBER BLEED
FEED STREAM CHARACTERISTICS	10% SOLIDS
OUTLET STREAM CHARACTERISTICS	30 PERCENT SOLIDS, PH 7.0
OUTLET STREAM DISPOSITION	TO UNDERFLOW TANKS & REACTION MIX TANKS
OVERFLOW STREAM DISPOSITION	TO QUENCHER, BALL MILLS, REACTION MIX TANK & PUM

*** SLUDGE

** TREATMENT

METHOD	THICKENED
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	300 ACRES
SITE SERVICE LIFE - YRS	35

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	SO2 INLET CONCENTRATION GAS FLOW, PH
PHYSICAL VARIABLES	INLET GAS FLOW
CONTROL LEVELS	PH 6.2 AT ABSORBER OUTLET
MONITOR TYPE	UNILOC FLOW-THROUGH PH PROBES; LEAR SIEGLER FM-1
MONITOR LOCATION	INLET DUCT, 1ST & 4TH STAGES [PH]
PROCESS CONTROL MANNER	MANUAL [PH], AUTOMATIC [SO2]
PROCESS CHEMISTRY MODE	FEEDBACK

SALT RIVER PROJECT: CORONADO 1 (CONT.)

** WATER BALANCE

WATER LOOP TYPE	OPEN	
EVAPORATION WATER LOSS - LITER/S	13.2	(210 GPM)
POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	0	
MAKEUP WATER ADDITION - LITERS/S	17.0	(270 GPM)
SOURCE OF MAKEUP WATER	COOLING TOWER BLOWDOWN	

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	91% CACO3
UTILIZATION - %	87.0
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0
MIST ELIMINATOR - %	.0
FAN - %	.0
THICKENER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0
MIST ELIMINATOR	.0
FAN	.0
THICKENER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
33/	SYSTEM							720			
5/80	SYSTEM							744			
6/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

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

7/80	SYSTEM							744			
8/80	SYSTEM							744			
9/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY WILL NOT AUTHORIZE THE RELEASE OF FGD PERFORMANCE DATA AT THIS TIME, BUT NOTED THAT THE SYSTEM IS TO SHUT DOWN ON NOVEMBER 1, 1980 FOR A MAJOR OVERHAUL.

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

** PROBLEMS/SOLUTIONS/COMMENTS

ON NOVEMBER 8, 1980 THE UNIT WAS TAKEN OFF LINE FOR A MAJOR OVERALL THAT IS EXPECTED TO LAST FOR APPROXIMATELY 45 DAYS.

THE PERFORMANCE DATA ARE NOT YET AVAILABLE FOR RELEASE.

1/81	SYSTEM							744			

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
					PERFORMANCE DATA						
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 A FEW MINOR PROBLEMS WERE ENCOUNTERED DUE TO A LINING FAILURE.

THE PERFORMANCE NUMBERS ARE NOT AVAILABLE FOR PUBLICATION 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			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY HAS REPORTED PROBLEMS WITH THE PREKRETE LINERS IN THE PRE-SATURATORS AND BYPASS DUCTS OF BOTH UNITS 1 AND 2. THE STRUCTURAL SUPPORT UPON WHICH THE MATERIAL IS APPLIED IS INADEQUATE. PIECES OF MATERIAL FROM THE TOP AND SIDES OF THE DUCTWORK DROP AWAY. SPARE FGD SYSTEM CAPACITY HAS KEPT THIS FROM LIMITING BOILER AVAILABILITY.

THERE HAVE BEEN CONTINUING PROBLEMS WITH THE PVC LINERS IN THE THICKENERS. THICKENER SPARE CAPACITY HAS KEPT THIS FROM AFFECTING AVAILABILITY OF THE FGD SYSTEM. THE LINERS ARE PATCHED AS NEEDED.

10/81	SYSTEM							744			
11/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER AND NOVEMBER THE SYSTEM WAS OFF-LINE FOR A SCHEDULED MAINTENANCE OUTAGE.

12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE PREKRETE LINE PROBLEMS CONTINUED THROUGHOUT THE QUARTER.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			
4/82	SYSTEM							720			
5/82	SYSTEM							744			

SALT RIVER PROJECT: CORONADO 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
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 JANUARY 1982 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 1982 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										
	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			

SALT RIVER PROJECT: CORONADO 1 (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 NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST THREE QUARTERS OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SALT RIVER PROJECT	
PLANT NAME	CORONADO	
UNIT NUMBER	2	
CITY	ST. JOHNS	
STATE	ARIZONA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	344.	(.800 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	700	
GROSS UNIT GENERATING CAPACITY - MW	400	
NET UNIT GENERATING CAPACITY W/FGD - MW	350	
NET UNIT GENERATING CAPACITY WO/FGD - MW	355	
EQUIVALENT SCRUBBED CAPACITY - MW	320	
** 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	1226.94	(2600000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	387.8	(730 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	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25121.	(10800 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8000-12000
AVERAGE ASH CONTENT - %	15.00	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	16.00	
RANGE MOISTURE CONTENT - %	12.0-20.0	
AVERAGE SULFUR CONTENT - %	.55	
RANGE SULFUR CONTENT - %	0.4-1.0	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	2	
NUMBER OF SPARES	0	
TYPE	HOT SIDE	
SUPPLIER	WESTERN PREC. DIVISION, JOY	
INLET FLUE GAS CAPACITY - CU.M/S	1321.3	(2800000 ACFM)
INLET FLUE GAS TEMPERATURE - C	404.4	(760 F)
PRESSURE DROP - KPA	.8	(3. 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		

SALT RIVER PROJECT: CORONADO 2 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	M.W. KELLOGG
A-E FIRM	BECHTEL, SALT RIVER PROJECT
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.87
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	82.00
ENERGY CONSUMPTION - %	1.3
CURRENT STATUS	1
COMMERCIAL START-UP	10/81
INITIAL START-UP	7/80
CONTRACT AWARDED	6/76

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	1.00	
DESIGN COAL HEAT CONTENT - J/G	19305.8	(8300 BTU/LB)
SPACE REQUIREMENTS - SQ M	6066.4	(65300 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	164.0	

** QUENCHER/PRESATURATOR

NUMBER	2	
TYPE	QUENCH DUCT	
SUPPLIER	PULLMAN KELLOGG	
INLET GAS FLOW - CU. M/S	260.02	(551000 ACFM)
INLET GAS TEMPERATURE - C	148.9	(300 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** ABSORBER

NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN CROSSCURRENT SPRAY	
TRADE NAME/COMMON TYPE	HORIZONTAL SPRAY CHAMBER	
SUPPLIER	PULLMAN KELLOGG	
DIMENSIONS - FT	120.0 X 28.0 X 17.0	
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	DUDICK	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	4	
LIQUID RECIRCULATION RATE - LITER/S	2520.	(40000 GPM)
L/G RATIO - L/CU.M	9.7	(72.6 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.4	(1.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	6.6	(21.6 FT/S)
INLET GAS FLOW - CU. M/S	260.02	(551000 ACFM)
INLET GAS TEMPERATURE - C	148.9	(300 F)
SO2 REMOVAL EFFICIENCY - %	98.0	

** 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	HEIL	
CONFIGURATION	VERTICAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	3	
FREEBOARD DISTANCE - M	8.84	(29.0 FT)
DISTANCE BETWEEN STAGES - CM	1.78	(.7 IN)

SALT RIVER PROJECT: CORONADO 2 (CONT.)

DISTANCE BETWEEN VANES - CM	3.0	(1.20 IN)
PRESSURE DROP - KPA	.1	(.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	4.6	(15.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	COOLING TOWER BLOWDOWN	
WASH RATE - L/S	39.4	(625 GAL/MIN)

** REHEATER

GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
LOCATION	OUTLET DUCT	
PERCENT GAS BYPASSED - AVG	20.0	
TEMPERATURE INCREASE - C	27.8	(50 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL; INORGANIC [LINED]	
CONSTRUCTION MATERIAL SPECIFIC TYPE	HYDRAULICALLY-BONDED MORTAR	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	GREEN FAN	
FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	304.32	(644880 ACFM)
FLUE GAS TEMPERATURE - C	127.2	(261 F)
PRESSURE DROP - KPA	1.9	(6.2 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	ANDCO
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	SCRUBBER INLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	15.6 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

** DUCTWORK

LOCATION	SCRUBBER OUTLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	33.0 X 18.0
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

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR

SALT RIVER PROJECT: CORONADO 2 (CONT.)

MANUFACTURER	MINE & SMELTER CORP.
NUMBER	2
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	11.8 (13 TPH)
PRODUCT QUALITY - % SOLIDS	20.0

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	2
MAKEUP WATER	1
MIST ELIMINATOR WASH	2
SEAL WATER	1
REAGENT PREP PRODUCT	1
WASTE SLURRY BLEED	1

** PUMPS

SERVICE	NUMBER
SLURRY RECIRCULATION	10
SLUDGE DISPOSAL	4
SLURRY PURGE	4
ALKALI MAKEUP	1
PROCESS WATER	2
SEAL WATER	1
HIGH PRESSURE SEAL WATER	2
MIST ELIMINATOR WASH	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
DIMENSIONS - FT	105.0 DIA X 12.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	POLYVINYL CHLORIDE
FEED STREAM SOURCE	ABSORBER BLEED
FEED STREAM CHARACTERISTICS	10% SOLIDS
OUTLET STREAM CHARACTERISTICS	30 PERCENT SOLIDS, PH 7.0
OUTLET STREAM DISPOSITION	TO UNDERFLOW TANKS & REACTION MIX TANKS
OVERFLOW STREAM DISPOSITION	TO QUENCHER, BALL MILLS, REACTION MIX TANK & PUM

*** SLUDGE

** TREATMENT

METHOD	THICKENED
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	300 ACRES
SITE SERVICE LIFE - YRS	35

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	SO2 INLET CONCENTRATION GAS FLOW, PH
PHYSICAL VARIABLES	INLET GAS FLOW
CONTROL LEVELS	PH 6.2 AT ABSORBER OUTLET
MONITOR TYPE	UNILOC FLOW-THROUGH PH PROBES; LEAR SIEGLER FM-1
MONITOR LOCATION	INLET DUCT, 1ST & 4TH STAGES [PH]
PROCESS CONTROL MANNER	MANUAL [PH], AUTOMATIC [SO2]
PROCESS CHEMISTRY MODE	FEEDBACK

SALT RIVER PROJECT: CORONADO 2 (CONT.)

** WATER BALANCE

WATER LOOP TYPE	OPEN	
EVAPORATION WATER LOSS - LITER/S	13.2	(210 GPM)
POND SEEPAGE/RUNOFF WATER LOSS - LITERS/S	0	
MAKEUP WATER ADDITION - LITERS/S	17.0	(270 GPM)
SOURCE OF MAKEUP WATER	COOLING TOWER BLOWDOWN	

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	91% CACO3
UTILIZATION - %	87.0
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0
MIST ELIMINATOR - %	.0
FAN - %	.0
THICKENER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0
MIST ELIMINATOR	.0
FAN	.0
THICKENER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/80	SYSTEM							744			
9/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATION OF THE FGD SYSTEM AT THE CORONADO 2 STATION COMMENCED IN JULY, 1980.

DURING THE THIRD QUARTER 1980 A BEARING INSPECTION WAS CONDUCTED. THE UNIT IS PRESENTLY IN THE PROCESS OF BEGINNING COMMERCIAL OPERATION.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE PERFORMANCE DATA ARE NOT YET AVAILABLE FOR RELEASE.

1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

THE PERFORMANCE DATA ARE NOT YET AVAILABLE FOR RELEASE AT THIS TIME.

4/81	SYSTEM							720			
5/81	SYSTEM							744			

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY HAS REPORTED PROBLEMS WITH THE PREKRETE LINERS IN THE PRE-SATURATORS AND BYPASS DUCTS OF BOTH UNITS 1 AND 2. THE STRUCTURAL SUPPORT UPON WHICH THE MATERIAL IS APPLIED IS INADEQUATE. PIECES OF MATERIAL FROM THE TOP AND SIDES OF THE DUCTWORK DROP AWAY. SPARE FGD SYSTEM CAPACITY HAS KEPT THIS FROM LIMITING BOILER AVAILABILITY.

THERE HAVE BEEN CONTINUING PROBLEMS WITH THE PVC LINERS IN THE THICKENERS. THICKENER SPARE CAPACITY HAS KEPT THIS FROM AFFECTING AVAILABILITY OF THE FGD SYSTEM. THE LINERS ARE PATCHED AS NEEDED.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER AND DECEMBER THE SYSTEM WAS TAKEN OFF-LINE FOR A SCHEDULED MAINTENANCE OUTAGE.

DURING THE FOURTH QUARTER THE PREKRETE LINER PROBLEMS CONTINUED.

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			

SALT RIVER PROJECT: CORONADO 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 1982 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 1982 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

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			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST THREE QUARTERS OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SAN MIGUEL ELECTRIC	
PLANT NAME	SAN MIGUEL	
UNIT NUMBER	1	
CITY	SAN MIGUEL	
STATE	TEXAS	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.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	400	
GROSS UNIT GENERATING CAPACITY - MW	400	
NET UNIT GENERATING CAPACITY W/FGD - MW	380	
NET UNIT GENERATING CAPACITY WO/FGD - MW	400	
EQUIVALENT SCRUBBED CAPACITY - MW	400	

** 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	943.80	(2000000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	151.7	(305 F)
STACK HEIGHT - M	137.	(450 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	11630.	(5000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		4200-6350
AVERAGE ASH CONTENT - %	28.00	
RANGE ASH CONTENT - %	25.0-45.0	
AVERAGE MOISTURE CONTENT - %	30.00	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	2.39	
RANGE SULFUR CONTENT - %	1.5-3.0	
AVERAGE CHLORIDE CONTENT - %	.06	
RANGE CHLORIDE CONTENT - %	0.01-0.25	

*** PARTICLE CONTROL

** ESP

NUMBER	1	
TYPE	COLD SIDE	
SUPPLIER	BABCOCK & WILCOX	
INLET FLUE GAS CAPACITY - CU.M/S	943.8	(2000000 ACFM)
INLET FLUE GAS TEMPERATURE - C	151.7	(305 F)
PRESSURE DROP - KPA	.2	(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

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	BABCOCK & WILCOX
A-E FIRM	TIPPETT & GEE

SAN MIGUEL ELECTRIC: SAN MIGUEL 1 (CONT.)

DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	86.00	
ENERGY CONSUMPTION - %	5.0	
CURRENT STATUS	1	
COMMERCIAL START-UP	10/81	
INITIAL START-UP	8/81	
CONTRACT AWARDED	0/75	
** DESIGN AND OPERATING PARAMETERS		
SPACE REQUIREMENTS - SQ M	18209.8	(196015 SQ FT)
** QUENCHER/PRESATURATOR		
NUMBER	4	
TYPE	ABSORBER INLET	
INLET GAS FLOW - CU. M/S	314.62	(666700 ACFM)
INLET GAS TEMPERATURE - C	151.7	(305 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	4	
NUMBER OF SPARES	1	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	SIEVE TRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	BABCOCK & WILCOX	
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	NR	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR	
GAS CONTACTING DEVICE TYPE	PLASTIC/RUBBER MOBILE BALLS	
NUMBER OF CONTACTING ZONES	2	
LIQUID RECIRCULATION RATE - LITER/S	1250.	(19840 GPM)
L/G RATIO - L/CU.M	6.0	(45.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	3.5	(14.0 IN-H2O)
INLET GAS FLOW - CU. M/S	208.06	(440900 ACFM)
INLET GAS TEMPERATURE - C	54.4	(130 F)
SO2 REMOVAL EFFICIENCY - %	86.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
NUMBER OF STAGES	2	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** REHEATER		
GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER	
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** FANS		
NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	AXIAL	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	1016.47	(2154000 ACFM)
FLUE GAS TEMPERATURE - C	151.7	(305 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

SAN MIGUEL ELECTRIC: SAN MIGUEL 1 (CONT.)

** FANS	
NUMBER	2
NUMBER OF SPARES	0
DESIGN	AXIAL
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
** DAMPERS	
NUMBER	4
FUNCTION	SHUT-OFF
GENERIC TYPE	NR
SPECIFIC TYPE	NR
** DAMPERS	
NUMBER	4
FUNCTION	SHUT-OFF
GENERIC TYPE	NR
SPECIFIC 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	NR
DEVICE TYPE	NR
** PUMPS	
SERVICE	NUMBER
---	---
NR	****
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
OUTLET STREAM CHARACTERISTICS	30% SOLIDS
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	VACUUM FILTER
FEED STREAM SOURCE	THICKENER
FEED STREAM CHARACTERISTICS	30% SOLIDS
OUTLET STREAM CHARACTERISTICS	60 % SOLIDS
*** SLUDGE	
** TREATMENT	
METHOD	STABILIZATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	RESEARCH-COTTRELL
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
LOCATION	OFF-SITE
SITE TREATMENT	NONE
** PROCESS CONTROL AND INSTRUMENTATION	
CHEMICAL PARAMETERS	PH,SOLIDS
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
MAKEUP WATER ADDITION - LITERS/S	37.8 (600 GPM)

SAN MIGUEL ELECTRIC: SAN MIGUEL 1 (CONT.)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	95% CACO3
CONSUMPTION	24 TPH

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE SAN MIGUEL FGD SYSTEM BEGAN OPERATIONS ON AUGUST 13 WHEN ONE OF THE FOUR MODULES WAS STARTED UP.

THE FGD SYSTEM WAS REMOVED FROM SERVICE FOR ONE WEEK AT THE END OF AUGUST TO CORRECT VALVE PROBLEMS. THE VALVES WERE DESIGNED FOR SINGLE DIRECTIONAL FLOW, HOWEVER, SOME BI-DIRECTIONAL FLOWS WERE OCCURRING WHICH WAS RESULTING IN VALVE FAILURE.

9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

SINCE INITIAL STARTUP, TWO OF THE THREE MODULES HAVE BEEN OPERATED ON AN ALTERNATING BASIS. THE LIMITED OPERATION HAS RESULTED FROM BOILER PROBLEMS ENCOUNTERED. THE BOILER WILL BE SHUT DOWN ON OCTOBER 16 FOR ONE MONTH SO THAT CORRECTIVE MAINTENANCE CAN BE PERFORMED.

PROBLEMS HAVE BEEN ENCOUNTERED WITH THE LIMESTONE FEED SYSTEM. THE PROBLEMS HAVE BEEN ATTRIBUTED TO EXCESSIVE RAINFALL WHICH HAS CAUSED CLUMPING OF THE MATERIAL.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS SHUTDOWN FROM MID-OCTOBER THRU NOVEMBER DUE TO BOILER-RELATED PROBLEMS. THE UNIT OPERATED APPROXIMATELY 50% DURING DECEMBER.

THE FGD SYSTEM HAS EXPERIENCED ABSORBER PLUGGING PARTICULARLY IN THE MIST ELIMINATOR AND SPRAY NOZZLES.

THE UTILITY HAS EXPERIENCED PROBLEMS WITH THE LIMESTONE SLURRY PREPARATION SYSTEM.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY HAS REPORTED PROBLEMS WITH THE SUPPORT BRACING ON ALL FOUR ABSORBER TANKS. VIBRATIONS CAUSED BY THE AGITATORS COUPLED WITH INADEQUATE TANK BRACING HAS CAUSED THE TANKS TO LEAK. EACH TANK MUST NOW BE DRAINED AND REBRACED BY B&W. THE REPAIR PROCESS WILL TAKE APPROXIMATELY 2-4 WEEKS FOR EACH TANK. SPARE FGD SYSTEM CAPACITY HAS KEPT THIS FROM LIMITING BOILER AVAILABILITY. THE UNIT WAS SHUTDOWN FOR 2-WEEKS IN MARCH FOR A SCHEDULED OUTAGE.

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

THE UTILITY IS ALSO EXPERIENCING PROBLEMS WITH DUCTWORK CORROSION. THE AREA IN QUESTION IS WHERE THE COMMON PLENUM FROM ABSORBERS AND INDIRECT HOT AIR REHEAT DUCT MEET (MIXING CHAMBER). THE MICA-FLAKE LINER BECAME DETACHED FROM THE CARBON STEEL DUCTWORK DUE TO TEMPERATURE FLUCTUATIONS. THE REPLACEMENT LINER, SYNTHETIC RUBBER MATERIAL, IS PRESENTLY FAILING DUE TO POOR APPLICATION AROUND CONNECTING AREAS (DUCT JOINTS, BEFORE AND AFTER EXPANSION JOINTS AND DAMPERS).

4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY CONTINUES TO EXPERIENCE PROBLEMS WITH DUCTWORK CORROSION. THE TWO CONTRIBUTING FACTORS TO THE PROBLEM ARE THE HORIZONTAL DESIGN OF THE DUCTWORK WHICH ALLOWS POOLS OF MOISTURE TO COLLECT IN CORNERS AND AT THE BOTTOM OF THE DUCTWORK, AND LINEAR CRACKING AT DUCT RISERS AND CONNECTING AREAS WHICH ALLOWS MOISTURE TO SEEP THROUGH AND CORRODE THE DUCTWORK.

UTILITY ALSO REPORTS EXPERIENCING PROBLEMS IN ISOLATING MODULES BECAUSE THE DOUBLE LOUVRE SEAL AIR DAMPERS WILL NOT SEAL DUE TO SCALE AND FLYASH BUILDUP. MAINTENANCE CREWS MUST WEAR BREATHING APPARATUSES WHEN WORKING INSIDE THE MODULES.

THE UTILITY ALSO REPORTED A TWO DAY OUTAGE IN JUNE DUE TO A PROCESS CONTROLLER FAILURE WHICH OPERATES AND CONTROLS THE PUMPS, VALVES, ECT.

THE UTILITY REPORTED THAT FGD SYSTEM AVAILABILITY THROUGHOUT THE SECOND QUARTER WAS APPROXIMATELY 85%. THE UTILITY HAS SCHEDULED A MAJOR OUTAGE PERIOD IN THE FALL TO MAKE ALL REPAIRS.

7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FALL OUTAGE PERIOD, THE UTILITY ALSO REPORTED REPLACING 10 RUBBER EXPANSION JOINTS THAT HAD FAILED. THE REPLACEMENT JOINTS ARE CONSTRUCTED OF STAINLESS STEEL REINFORCED VITON.

THE UTILITY REPORTED THAT THE FGD SYSTEM AVAILABILITY THROUGHOUT THE LAST SIX MONTHS OF THE YEAR WAS APPROXIMATELY 75%.

THE UTILITY REPORTED THAT THE UNIT WAS DOWN MOST OF THE FALL MONTHS TO REBUILD THE INLET DAMPERS TO THE ABSORBER MODULES. THE UTILITY HAS EXPERIENCED CONTINUAL PROBLEMS WITH THE DAMPERS SEALING DUE TO SCALE AND FLYASH BUILDUP.

1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			

SAN MIGUEL ELECTRIC: SAN MIGUEL 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 THE UNIT WAS DOWN ALL OF MARCH TO BEGIN REPAIRS ON ABSORBER OUTLET DAMPERS. THE FRP COATED CARBON STEEL DAMPERS WERE CORRODING AT THE EDGES WHERE THE FRP HAD FLAKED OFF. THE EDGES OF THE BLADES WILL BE REPLACED WITH HASTELLOY C-276 AND RECOATED WITH FRP.

4/83	SYSTEM						720			
5/83	SYSTEM						744			
6/83	SYSTEM						720			

** PROBLEMS/SOLUTIONS/COMMENTS

REPAIRS TO THE ABSORBER OUTLET DAMPERS CONTINUED THROUGHOUT APRIL AND MAY.

THE UTILITY REPORTED EXPERIENCING SCALING PROBLEMS WITH THE FIRST TRAY OF THE ABSORBERS. ADIPIC ACID TESTS ARE SCHEDULED FOR AUGUST TO SEE IF THE MATERIAL WILL REDUCE SCALING AND ENHANCE SO2 REMOVAL. THE SYSTEM IS PRESENTLY NOT MEETING ITS DESIGNED REMOVAL EFFICIENCY OF 88%.

THE UTILITY PLANS TO REPAIR THE CHEMICAL RESISTANT GROUT IN THE ABSORBER OUTLET DUCTS DURING THE NEXT MAJOR OUTAGE PERIOD.

THE UTILITY REPORTED THAT THE FGD SYSTEM AVAILABILITY DURING THE PERIOD OF JANUARY THROUGH JUNE OF 1983 WAS APPROXIMATELY 60%.

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. FGD SYSTEM AVAILABILITY DURING THE PERIOD WAS APPROXIMATELY 100%.

THE UTILITY RECEIVED ITS FIRST LOAD OF ADIPIC ACID ON NOVEMBER 16. ALTHOUGH SCHEDULED FOR AUGUST, TESTING WILL COMMENCE IN LATE NOVEMBER OR EARLY DECEMBER.

THE UTILITY REPORTED EXPERIENCING MINOR SOFT SCALING PROBLEMS WITH THE MIST ELIMINATORS. THE UTILITY PLANS TO ADJUST OR MAKE CHANGES TO ITS MIST ELIMINATOR WASH SYSTEM IN ORDER TO CORRECT THE PROBLEM.

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 PERIOD. THE FGD SYSTEM AVAILABILITY FOR THE PERIOD WAS APPROXIMATELY 100 PERCENT.

ADIPIC ACID TESTING BEGAN IN DECEMBER. PRELIMINARY RESULTS INDICATE THAT THE USE OF A BUFFERING AGENT IS HIGHLY COST EFFECTIVE. SO2 REMOVAL EFFICIENCY IS UP AND SCALE FORMATIONS ARE MINIMAL. TESTING SHOWS LIMESTONE

SAN MIGUEL ELECTRIC: SAN MIGUEL 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
					UTILIZATION TO BE 95 PERCENT WITH ITS USE COMPARED TO 85 PERCENT WITHOUT. PRESENT LIMESTONE CONSUMPTION WITHOUT THE USE OF A BUFFERING AGENT IS 700 TONS/DAY. TESTS INDICATE THAT LIMESTONE CONSUMPTION MAY BE DECREASED AS MUCH AS 60 PERCENT. THE UTILITY HAS BEEN TESTING VARIOUS AMOUNTS OF BOTH DIBASIC AND MONOBASIC ACIDS FROM 2 TO 6 TONS/DAY. E. F. DUPONT IS ONE OF TWO PRESENT SUPPLIERS. DUE TO GOOD CRYSTAL GROWTH WITH THE USE OF A BUFFERING AGENT, THE UTILITY ALSO BELIEVES THAT FLOCCULANT CONSUMPTION WILL ALSO BE DECREASED. THE UNIT WAS DOWN FOR 10 DAYS IN OCTOBER DUE TO A PLUGGED SUPERHEATER. CLINKER, WHICH HAD PLUGGED THE SUPERHEATER, HAD TO BE REMOVED WITH EXPLOSIVES.							
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 UNAVAILABLE FOR THE FIRST THREE QUARTERS OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SEMINOLE ELECTRIC	
PLANT NAME	SEMINOLE	
UNIT NUMBER	1	
CITY	PALATKA	
STATE	FLORIDA	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	19.	(.045 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	284.	(.660 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1240	
GROSS UNIT GENERATING CAPACITY - MW	620	
NET UNIT GENERATING CAPACITY W/FGD - MW	600	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	620	
** 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	1006.09	(2132000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	130.6	(267 F)
STACK HEIGHT - M	206.	(675 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	28.3	(92.8 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	27214.	(11700 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		11000-12500
AVERAGE ASH CONTENT - %	10.00	
RANGE ASH CONTENT - %	6.0-10.0	
AVERAGE MOISTURE CONTENT - %	10.00	
RANGE MOISTURE CONTENT - %	9.0-11.0	
AVERAGE SULFUR CONTENT - %	2.75	
RANGE SULFUR CONTENT - %	1.5-3.0	
AVERAGE CHLORIDE CONTENT - %	.22	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** ESP		
NUMBER	2	
TYPE	COLD SIDE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	1006.1	(2132000 ACFM)
INLET FLUE GAS TEMPERATURE - C	130.6	(267 F)
PRESSURE DROP - KPA	.6	(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	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS	

SEMINOLE ELECTRIC: SEMINOLE 1 (CONT.)

A-E FIRM	BURNS & ROE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	86.00	
CURRENT STATUS	1	
COMMERCIAL START-UP	2/84	
INITIAL START-UP	5/83	
CONTRACT AWARDED	2/80	
** DESIGN AND OPERATING PARAMETERS		
SPACE REQUIREMENTS - SQ M	2013.6	(21675 SQ FT)
** 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	
SUPPLIER	PEABODY PROCESS SYSTEMS	
DIMENSIONS - FT	27.0 DIA X 89.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	ASTM A-283	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER; NATURAL RUBBER	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	5	
L/G RATIO - L/CU.M	7.1	(53.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.4	(5.6 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.7	(12.2 FT/S)
INLET GAS FLOW - CU. M/S	1006.09	(2132000 ACFM)
INLET GAS TEMPERATURE - C	51.7	(125 F)
SO2 REMOVAL EFFICIENCY - %	86.0	
PARTICLE REMOVAL EFFICENCY - %	.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		
NUMBER	0	
GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	NR	
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	

SEMINOLE ELECTRIC: SEMINOLE 1 (CONT.)

** DUCTWORK

LOCATION	ID FAN OUTLET
DIMENSIONS	13.0 X 12.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-242
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	FGD OUTLET
DIMENSIONS	13.0 X 12.0
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

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	NR
DEVICE TYPE	NR

** TANKS

SERVICE	NUMBER
REAGENT PREP PRODUCT	1
ABSORBER RECYCLE	5
NR	****
THICKENER OVERFLOW	****
EMERGENCY DELUGE	1

** PUMPS

SERVICE	NUMBER
MILL RECYCLE	2
REAGENT SLURRY TRANSFER	2
ABSORBER RECIRCULATION	5
WASH SLURRY	2
WASTE SLURRY	3
SUPERNATANT	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NA

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION
DEVICE	NA
PROPRIETARY PROCESS	CONVERSION SYSTEMS [POZ-O-TEC]

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
SITE TREATMENT	NR

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	DENSITY, PH
PROCESS CONTROL MANNER	MANUAL-EQUIP. START STOP; AUTO-PROCESS CONTROL
PROCESS CHEMISTRY MODE	FEEDBACK

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM COMMENCED OPERATION IN MAY AND IS CURRENTLY IN THE STARTUP PHASE OF OPERATION.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM OPERATED APPROXIMATELY 30 TO 40 DAYS SINCE START-UP IN MAY 1983.

OUTAGE TIME DURING THE THIRD QUARTER OF 1983 WAS DUE PRIMARILY TO TURBINE-RELATED PROBLEMS.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM OPERATED INEFFICIENTLY DURING THE FOURTH QUARTER DUE TO MIST ELIMINATOR PLUGGING 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			

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE PERIOD OF JANUARY THROUGH JULY, 1984.

8/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

A MODULE OUTAGE LASTING 11 HOURS OCCURRED DURING AUGUST DUE TO A BROKEN SUPERNATE HEADER.

THE UTILITY REPORTED THAT DURING AUGUST EACH MODULE WAS TAKEN OUT IN ROTATION FOR MIST ELIMINATOR SCALE CLEANING.

SEMINOLE ELECTRIC: SEMINOLE 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		THE UTILITY REPORTED THAT THE MODULE "CHARLIE" WAS DOWN PART OF AUGUST DUE TO REPAIRS ON A FIBERGLASS STORAGE TANK.									
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR SEPTEMBER.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SEMINOLE ELECTRIC	
PLANT NAME	SEMINOLE	
UNIT NUMBER	2	
CITY	PALATKA	
STATE	FLORIDA	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	19.	(.045 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	284.	(.660 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1240	
GROSS UNIT GENERATING CAPACITY - MW	620	
NET UNIT GENERATING CAPACITY W/FGD - MW	600	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	620	
** 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	1006.09	(2132000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	130.6	(267 F)
STACK HEIGHT - M	206.	(675 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	28.3	(92.8 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	27214.	(11700 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		11000-12500
AVERAGE ASH CONTENT - %	8.50	
RANGE ASH CONTENT - %	6.0-10.0	
AVERAGE MOISTURE CONTENT - %	10.00	
RANGE MOISTURE CONTENT - %	9.0-11.0	
AVERAGE SULFUR CONTENT - %	2.75	
RANGE SULFUR CONTENT - %	1.5-3.0	
AVERAGE CHLORIDE CONTENT - %	.22	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** ESP		
NUMBER	2	
TYPE	COLD SIDE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	1006.1	(2132000 ACFM)
INLET FLUE GAS TEMPERATURE - C	130.6	(267 F)
PRESSURE DROP - KPA	.6	(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	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	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
PROCESS ADDITIVES	NONE	
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS	

SEMINOLE ELECTRIC: SEMINOLE 2 (CONT.)

A-E FIRM	BURNS & ROE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	86.00	
CURRENT STATUS	1	
COMMERCIAL START-UP	1/85	
INITIAL START-UP	9/84	
CONTRACT AWARDED	2/80	
** DESIGN AND OPERATING PARAMETERS		
SPACE REQUIREMENTS - SQ M	2013.6	(21675 SQ FT)
** 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	
SUPPLIER	PEABODY PROCESS SYSTEMS	
DIMENSIONS - FT	27.0 DIA X 89.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	ASTM A-283	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER; NATURAL RUBBER	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR; BLACK NATURAL RUBBER	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	5	
L/G RATIO - L/CU.M	7.1	(53.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.4	(5.6 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.7	(12.2 FT/S)
INLET GAS FLOW - CU. M/S	1006.09	(2132000 ACFM)
INLET GAS TEMPERATURE - C	51.7	(125 F)
SO2 REMOVAL EFFICIENCY - %	86.0	
PARTICLE REMOVAL EFFICENCY - %	.0	
** MIST ELIMINATOR		
PRE-MIST ELIMINATOR/MIST ELIMINATOR	NR	
NUMBER PER SYSTEM	5	
GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** REHEATER		
GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	NR	
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	

SEMINOLE ELECTRIC: SEMINOLE 2 (CONT.)

** DUCTWORK

LOCATION	ID FAN OUTLET
DIMENSIONS	13.0 X 12.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	ASTM A-242
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DUCTWORK

LOCATION	FGD OUTLET
DIMENSIONS	13.0 X 12.0
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

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	NR
DEVICE TYPE	NR

** TANKS

SERVICE	NUMBER
REAGENT PREP PRODUCT	1
ABSORBER RECYCLE	5
NR	****
THICKENER OVERFLOW	****
EMERGENCY DELUGE	1

** PUMPS

SERVICE	NUMBER
MILL RECYCLE	2
REAGENT SLURRY TRANSFER	2
ABSORBER RECIRCULATION	5
WASH SLURRY	2
WASTE SLURRY	3
SUPERNATANT	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NA

*** SLUDGE

** TREATMENT

METHOD	FIXATION
DEVICE	NA
PROPRIETARY PROCESS	CONVERSION SYSTEMS [POZ-O-TEC]

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
SITE TREATMENT	NR

** PROCESS CONTROL AND INSTRUMENTATION

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/84	SYSTEM							720			

SEMINOLE ELECTRIC: SEMINOLE 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

THE UTILITY REPORTED THAT INITIAL START UP AT SEMINOLE 2 COMMENCED IN SEPTEMBER 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SIKESTON BRD OF MUNICIPAL UTIL	
PLANT NAME	SIKESTON	
UNIT NUMBER	1	
CITY	SIKESTON	
STATE	MISSOURI	
REGULATORY CLASSIFICATION	D	
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	207	
GROSS UNIT GENERATING CAPACITY - MW	235	
NET UNIT GENERATING CAPACITY W/FGD - MW	207	
NET UNIT GENERATING CAPACITY WO/FGD - MW	211	
EQUIVALENT SCRUBBED CAPACITY - MW	235	
** 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	353.17	(748390 ACFM)
BOILER FLUE GAS TEMPERATURE - C	142.2	(288 F)
STACK HEIGHT - M	137.	(450 FT)
STACK SHELL	CARBON STEEL	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26377.	(11340 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		9435-11692
AVERAGE ASH CONTENT - %	11.20	
RANGE ASH CONTENT - %	9.9-15.2	
AVERAGE MOISTURE CONTENT - %	9.50	
RANGE MOISTURE CONTENT - %	8.7-19.5	
AVERAGE SULFUR CONTENT - %	2.80	
RANGE SULFUR CONTENT - %	2.3-3.3	
AVERAGE CHLORIDE CONTENT - %	.08	
RANGE CHLORIDE CONTENT - %	0.06-0.12	
*** PARTICLE CONTROL		
** ESP		
NUMBER	2	
TYPE	COLD SIDE	
SUPPLIER	BABCOCK & WILCOX	
INLET FLUE GAS CAPACITY - CU.M/S	398.7	(844824 ACFM)
INLET FLUE GAS TEMPERATURE - C	153.9	(309 F)
PRESSURE DROP - KPA	.2	(1. IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.6	
** PARTICLE SCRUBBER		
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/SIDE-MOVABLE BLOCKS	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	NR	
SHELL SPECIFIC MATERIAL	NR	
LINER GENERIC MATERIAL	NR	
LINER SPECIFIC MATERIAL	NR	
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	BABCOCK & WILCOX	
A-E FIRM	PHIPS-HOGLAND, PHILLIPS, BURNS & MCD	
DEVELOPMENT LEVEL	FULL SCALE	

SIKESTON BRD OF MUNICIPAL UTIL: SIKESTON 1 (CONT.)

NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.17
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	80.00
ENERGY CONSUMPTION - %	1.7
CURRENT STATUS	1
COMMERCIAL START-UP	9/81
INITIAL START-UP	6/81
CONTRACT AWARDED	11/77

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

NUMBER	3	
INLET GAS TEMPERATURE - C	153.9	(309 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** ABSORBER

NUMBER	3	
NUMBER OF SPARES	1	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	NR	
SUPPLIER	BABCOCK & WILCOX	
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	
L/G RATIO - L/CU.M	8.0	(60.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	2.7	(11.0 IN-H2O)
INLET GAS FLOW - CU. M/S	437.45	(927000 ACFM)
INLET GAS TEMPERATURE - C	142.8	(289 F)
SO2 REMOVAL EFFICIENCY - %	80.0	
PARTICLE REMOVAL EFFICENCY - %	99.6	

** 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	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

NUMBER	4	
DESIGN	AXIAL	
SUPPLIER	BABCOCK & WILCOX	
FUNCTION	NR	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	389.32	(825000 ACFM)
FLUE GAS TEMPERATURE - C	142.2	(288 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

SIKESTON BRD OF MUNICIPAL UTIL: SIKESTON 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	WET BALL MILL
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	KOPPERS

** TANKS

SERVICE	NUMBER
NR	****

** PUMPS

SERVICE	NUMBER
NA	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NR

*** SLUDGE

** TREATMENT

METHOD	BLEED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
SITE TREATMENT	NONE
SITE DIMENSIONS	54 ACRES
SITE SERVICE LIFE - YRS	8

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS CONTROL MANNER	AUTOMATIC & MANUAL
PROCESS CHEMISTRY MODE	FEED FORWARD

** WATER BALANCE

WATER LOOP TYPE	OPEN	
MAKEUP WATER ADDITION - LITERS/S	11.7	(186 GPM)

** FGD SPARE CAPACITY INDICES

ABSORBER - %	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
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD OPERATION COMMENCED ON JUNE 30, 1981. THE SYSTEM IS IN THE STARTUP PHASE OF OPERATION.

7/81	SYSTEM							744			

SIKESTON BRD OF MUNICIPAL UTIL: SIKESTON 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE SIKESTON 1 FGD SYSTEM DID NOT OPERATE DURING THE THIRD QUARTER 1981. THE BOILER WAS OPERATIONAL; HOWEVER, FULL SCALE OPERATION OF THE FGD SYSTEM IS NOT EXPECTED UNTIL JANUARY 1982.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM OPERATED IN A START-UP PHASE DURING DECEMBER. COMPLIANCE TESTING IS SCHEDULED FOR MID-JANUARY.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM TESTED OUT WELL DURING TWO SEPARATE COMPLIANCE TESTS WHICH WERE CONDUCTED DURING THE FIRST QUARTER OF 1982.

4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER EXCEPT FOR A BROKEN PVC MAKEUP WATER PIPELINE THAT FORCED THE UNIT OFF-LINE FOR APPROXIMATELY 1 WEEK IN JUNE. THE FGD AVAILABILITY FOR THE PERIOD WAS APPROXIMATELY 95%.

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			

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 1982 THROUGH MARCH 1983.

4/83	SYSTEM							720			
5/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE MONTHS OF APRIL AND MAY, 1983.

6/83	A	79.4	65.6	65.6	65.6						
	B	85.9	81.5	81.5	81.5						
	C	79.5	20.1	20.1	20.1						
	SYSTEM	100.0	83.6	83.6	83.6			720	720	602	100.0

** PROBLEMS/SOLUTIONS/COMMENTS

OUTAGE TIME DURING THE MONTH OF JUNE WAS DUE IN PART TO MAINTENANCE AND REPAIR OF DUCTWORK.

A BEARING FAILURE IN THE SLUDGE SUMP PUMP ALSO CONTRIBUTED TO DOWN TIME DURING JUNE.

THE ABSORBER LINER WAS REPLACED DURING JUNE FORCING THE FGD SYSTEM OUT OF SERVICE.

A PLUGGED SUMP DRAIN SCREEN CAUSED ADDITIONAL OUTAGE TIME DURING THE MONTH.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED EXPERIENCING SEVERAL SMALL OUTAGES DURING THE THIRD QUARTER DUE TO DUCTWORK LINER FAILURE AND RELATED CORROSION.

EXPANSION JOINT FAILURES WERE REPORTED DURING THE PERIOD AT THE MODULE OUTLET TO THE STACK.

THE UTILITY REPORTED A DRAIN LINE CORROSION PROBLEM AT THE BOTTOM OF THE WET STACK.

THE FGD SYSTEM WAS DOWN FOR 2 WEEKS DURING THE THIRD QUARTER TO REPLACE THE LINER ON A SPENT SLURRY SUMP PUMP. A RUBBER LINER WAS REPLACED WITH URETHANE.

10/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS DOWN FROM OCTOBER 17 TO OCTOBER 18 DUE TO PROBLEMS WITH THE WET STACK DRAIN.

11/83	SYSTEM							720			

SIKESTON BRD OF MUNICIPAL UTIL: SIKESTON 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 A MAJOR OUTAGE FROM OCTOBER 8 TO NOVEMBER 13 FOR REPAIR OF EXPANSION JOINTS IN THE WET STACK DUCTWORK.

12/83 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED A 4 HOUR OUTAGE ON DECEMBER 25 DUE TO ESP PROBLEMS. THE EXTREME COLD WEATHER CAUSED LOW OIL LEVELS IN THE ESP TRANSFORMERS FORCING THEM TO BE JUMPED.

A 4 HOUR OUTAGE OCCURRED ON DECEMBER 14 DUE TO PROBLEMS WITH THE DRIVE LINKAGE ON A DAMPER.

ON DECEMBER 26, THE WET STACK DRAIN FROZE AND BROKE DUE TO EXTREME LOW TEMPERATURES.

THE UTILITY REPORTED PROBLEMS WITH FROZEN AND RUPTURED MIST ELIMINATOR FLANGES ON DECEMBER 26.

A BROKEN SHEAR PIN WAS REPORTED ON MODULE B DURING DECEMBER.

1/84 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN FROM DECEMBER 31 1983 TO JANUARY 3 1984 DUE TO OVER HEATED BEARINGS IN A LIMESTONE SILO BIN DISCHARGER. THE BEARINGS WERE REPLACED AND GREASED.

MODULE B WAS NOT AVAILABLE ON JANUARY 20 DUE TO TANKS BEING DRAINED FOLLOWING CLEANING.

MODULE C WAS DOWN SEVEN HOURS ON JANUARY 20 DUE TO VIBRATION PROBLEMS WITH AN ABSORBER MIXER. VIBRATIONS HAD LOOSENED THE MOUNTING BOLTS.

A SEAL WATER LINE ON THE MODULE B SLUDGE PUMP WAS REPLACED AND RESUPPORTED DURING A UNIT OUTAGE FROM JANUARY 25 TO 30.

A BROKEN CHAIN AND BEARINGS WERE REPLACED ON THE LIMESTONE FEEDER DURING THE FIVE DAY UNIT OUTAGE IN JANUARY.

A VENT STACK DRAIN LINE WAS REPLACED WITH A LARGER PVC LINE DURING THE JANUARY UNIT OUTAGE.

2/84 SYSTEM 696

** PROBLEMS/SOLUTIONS/COMMENTS

AN EIGHT HOUR OUTAGE WAS REPORTED ON FEBRUARY 8 DUE TO BAD BEARINGS ON THE LIMESTONE SILO BIN DISCHARGER. NEW BEARINGS AND GREASE WERE INSTALLED.

3/84 SYSTEM 744

4/84 SYSTEM 720

** PROBLEMS/SOLUTIONS/COMMENTS

QUENCHER PUMP VIBRATION PROBLEMS WERE REPORTED ON APRIL 30. ONLY ONE MODULE WAS KEPT IN SERVICE FOR FOUR HOURS.

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

ON APRIL 30, AN INLET DAMPER SHEAR PIN AT MODULE A BROKE AND WAS REPLACED.

5/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

VIBRATION PROBLEMS WERE REPORTED AT THE MODULE C QUENCHER PUMP ON MAY 15. THE MANUFACTURER SUGGESTED RE-GREASING THE PUMP MOTOR. QUENCHER PUMPS ARE NOW BEING INSPECTED REGULARLY.

6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN APPROXIMATELY ONE WEEK DURING THE THIRD QUARTER TO REPLACE BEARINGS ON A SLUDGE PUMP. THE UTILITY HAS MADE MODIFICATIONS TO ALLOW THE REPAIR OF ONE PUMP WITHOUT TAKING THE SCRUBBER DOWN.

THE UTILITY REPORTED PROBLEMS WITH CONTINUOUS EMISSION MONITORS DURING THE FIRST THREE QUARTERS OF 1984. THE FAILURE OF A COMPUTER COOLING FAN AND A SHORT IN A SAMPLING HEAT TRACE LINE WERE THE SPECIFIC PROBLEMS.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SOUTH CAROLINA PUBLIC SERVICE	
PLANT NAME	CROSS	
UNIT NUMBER	2	
CITY	CROSS	
STATE	SOUTH CAROLINA	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	13.	(.030 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	258.	(.600 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	*****	
GROSS UNIT GENERATING CAPACITY - MW	450	
NET UNIT GENERATING CAPACITY W/FGD - MW	450	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	450	
** 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	915.49	(1940000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	135.0	(275 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	6.7	(22.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26051.	(11200 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10800-12000
AVERAGE ASH CONTENT - %	16.50	
RANGE ASH CONTENT - %	12.0-20.0	
AVERAGE MOISTURE CONTENT - %	7.50	
RANGE MOISTURE CONTENT - %	6.0-10.0	
AVERAGE SULFUR CONTENT - %	1.80	
RANGE SULFUR CONTENT - %	1.0-2.3	
AVERAGE CHLORIDE CONTENT - %	.13	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** FABRIC FILTER		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
TYPE	COLD SIDE	
PARTICLE REMOVAL EFFICENCY - %	99.0	
** 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		

SOUTH CAROLINA PUBLIC SERVICE: CROSS 2 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS
A-E FIRM	BURNS & ROE
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.83
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	85.80
CURRENT STATUS	1
COMMERCIAL START-UP	5/84
INITIAL START-UP	10/83
CONTRACT AWARDED	1/80

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

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

** 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	INDIRECT HOT AIR
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

DESIGN	NR
FUNCTION	NR
APPLICATION	NR
SERVICE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR

** 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

SOUTH CAROLINA PUBLIC SERVICE: CROSS 2 (CONT.)

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	NR
DEVICE TYPE	NR

** PUMPS

SERVICE	NUMBER
NA	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NA

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION
DEVICE	NR
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
10/83	SYSTEM							744			
11/83	SYSTEM							720			
12/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM AT CROSS 2 BECAME OPERATIONAL IN OCTOBER 1983. COMMERCIAL START-UP IS SCHEDULED FOR MAY 1984. DURING THE FOURTH QUARTER, THE SYSTEM WAS IN THE SHAKEDOWN/DEBUGGING PHASE OF OPERATION.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS STILL IN THE START UP PHASE OF OPERATION DURING THE FIRST QUARTER OF 1984. CERTIFICATION TESTING WAS CONDUCTED AND A LIER SIEGLER IN-LINE MONITOR WAS INSTALLED.

4/84	SYSTEM							720			
5/84	SYSTEM							744			

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		COMMERCIAL OPERATIONS COMMENCED DURING MAY, 1984.									
6/84	SYSTEM							720			
7/84	A	95.6	.0		.0						
	B	99.9	99.8	99.8	99.2						
	C	99.9	98.9	99.0	98.3						
	SYSTEM	100.0	99.4	99.4	98.7			744	739	735	
8/84	SYSTEM							740			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY HAS BEEN BURNING SMALL AMOUNTS OF OIL ON START UP AND SHUT DOWN DUE TO FLAME SENSING PROBLEMS. SINCE THE SYSTEM SUPPLIER WILL NOT WARRANTY THE ABSORBER LINER DURING THIS ACTIVITY, THE UTILITY IS OPERATING UNDER THE FOLLOWING STIPULATIONS:
(1) BOTH ESP'S WILL BE ON DURING OIL BURNS.
(2) OIL BURNING WILL BE MINIMAL TO NONEXISTENT.

THE UTILITY REPORTED THAT MECHANICAL PROBLEMS WITH THE DAMPERS HAVE OCCURRED SINCE START UP.

THE UTILITY REPORTED THAT MIST ELIMINATOR PLUGGAGE HAS BEEN A PROBLEM SINCE COMMERCIAL START UP. THE SYSTEM SUPPLIER IS MODIFYING THE CHEVRON SPACES AND THE WASH SLURRY SYSTEM TO HELP MINIMIZE PLUGGAGE.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SOUTH CAROLINA PUBLIC SERVICE	
PLANT NAME	WINYAH	
UNIT NUMBER	2	
CITY	GEORGETOWN	
STATE	SOUTH CAROLINA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	519	
GROSS UNIT GENERATING CAPACITY - MW	280	
NET UNIT GENERATING CAPACITY W/FGD - MW	258	
NET UNIT GENERATING CAPACITY WO/FGD - MW	261	
EQUIVALENT SCRUBBED CAPACITY - MW	140	
** 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	384.14	(814030 ACFM)
BOILER FLUE GAS TEMPERATURE - C	132.2	(270 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	4.9	(16.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26749.	(11500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	14.00	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	6.5-7.0	
AVERAGE SULFUR CONTENT - %	1.00	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** 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	384.1	(814030 ACFM)
INLET FLUE GAS TEMPERATURE - C	132.2	(270 F)
PRESSURE DROP - KPA	.1	(1. IN-H2O)
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	
*** FGD SYSTEM		

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 2 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	BABCOCK & WILCOX
A-E FIRM	BURNS & ROE
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.40
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	45.00
ENERGY CONSUMPTION - %	1.1
CURRENT STATUS	1
COMMERCIAL START-UP	7/77
INITIAL START-UP	7/77

** DESIGN AND OPERATING PARAMETERS

OPER. & MAINT. REQUIREMENT - MANHR/DAY	80.0

** QUENCHER/PRESATURATOR

NUMBER	1	
TYPE	VARIABLE THROAT VENTURI	
SUPPLIER	BABCOCK & WILCOX	
INLET GAS FLOW - CU. M/S	192.06	(407000 ACFM)
INLET GAS TEMPERATURE - C	135.6	(276 F)
PRESSURE DROP - KPA	.7	(3.0 IN-H2O)
LIQUID RECIRCULATION RATE - LITERS/S	369.	(5860 GPM)
L/G RATIO - L/CU. M	1.9	(14.4 GAL/1000 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** ABSORBER

NUMBER	1	
NUMBER OF SPARES	0	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	SIEVE TRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	BABCOCK & WILCOX	
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	NATURAL RUBBER	
LINER MATERIAL TRADE NAME/COMMON TYPE	BLACK NATURAL RUBBER	
GAS CONTACTING DEVICE TYPE	PERFORATED TRAY [TYPE 316L STAINLESS STEEL; ONE	
NUMBER OF CONTACTING ZONES	2	
LIQUID RECIRCULATION RATE - LITER/S	863.	(13700 GPM)
L/G RATIO - L/CU.M	5.4	(40.5 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.2	(5.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.2	(10.5 FT/S)
INLET GAS FLOW - CU. M/S	159.50	(338000 ACFM)
INLET GAS TEMPERATURE - C	52.2	(126 F)
SO2 REMOVAL EFFICIENCY - %	69.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	1	
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	3	
PRESSURE DROP - KPA	.2	(1.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	BLENDED [50% RETURN, 50% FRESH]	
WASH FREQUENCY	ONCE PER 2 MINUTES	

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 2 (CONT.)

WASH RATE - L/S	11.4	(180 GAL/MIN)

** REHEATER

GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
LOCATION	100 FT BELOW INLET OF SCRUBBED GAS BREECHING IN	
PERCENT GAS BYPASSED - AVG	50.0	
TEMPERATURE INCREASE - C	38.9	(70 F)
INLET FLUE GAS FLOW RATE - CU. M/S	192.07	(407015 ACFM)
INLET FLUE GAS TEMPERATURE - C	52.2	(126 F)
OUTLET FLUE GAS TEMPERATURE - C	91.1	(196 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	1	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	WESTINGHOUSE	
FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	192.06	(407000 ACFM)
FLUE GAS TEMPERATURE - C	132.2	(270 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
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	1
FUNCTION	SHUT-OFF
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	ORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER

** DAMPERS

NUMBER	1
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

** DUCTWORK

LOCATION	SCRUBBER 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	SCRUBBER OUTLET TO DAMPER
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	GLASS FLAKE-FILLED POLYESTER; HYDRAULICALLY-BOND

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 2 (CONT.)

** DUCTWORK	
LOCATION	SCRUBBER OUTLET DAMPER TO STACK
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	HIGH STRENGTH LOW ALLOY (HSLA)
LINER GENERIC MATERIAL TYPE	HIGH ALLOY
LINER SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-MOLYBDENUM
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	KOPPERS
NUMBER	1
NUMBER OF SPARES	0
PRODUCT QUALITY - % SOLIDS	35.0
** TANKS	
SERVICE	NUMBER
---	---
VENTURI RECYCLE	****
ABSORBER RECYCLE	****
SLURRY STORAGE	****
RECYCLE WATER	****
MILL PRODUCT SUMP	****
GRIT SEPARATOR	****
** PUMPS	
SERVICE	NUMBER
---	---
VENTURI RECIRCULATION	1
ABSORBER RECIRCULATION	1
SLURRY FEED	****
MILL PRODUCT	****
RECYCLE WATER	****
*** SLUDGE	
** TREATMENT	
METHOD	NONE
DEVICE	N/A
PROPRIETARY PROCESS	N/A
** DISPOSAL	
NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	NONE
SITE DIMENSIONS	35 ACRES, 12-15 FT
SITE CAPACITY - CU.M	574810 (470.0 ACRE-FT)
** WATER BALANCE	
WATER LOOP TYPE	OPEN
MAKEUP WATER ADDITION - LITERS/S	6.3 (100 GPM)
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	90% CACO3, 2.5% MGCO3
CONSUMPTION	46 TPD
UTILIZATION - %	87.0
POINT OF ADDITION	BALL MILL
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
MIST ELIMINATOR - %	.0
FAN - %	.0
BALL MILL - %	.0

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 2 (CONT.)

** FGD SPARE COMPONENT INDICES

ABSORBER	.0
MIST ELIMINATOR	.0
FAN	.0
BALL MILL	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/77	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATION OF THE WINYAH 2 FGD SYSTEM TOOK PLACE IN JULY.

8/77	SYSTEM	90.0						744			
9/77	SYSTEM	90.0						720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS REPORTEDLY AVAILABLE 90% OF THE AUGUST-SEPTEMBER PERIOD. SOME MINOR PROBLEMS HAVE BEEN EXPERIENCED WITH THE SO2 AND NO2 MONITORS.

10/77	SYSTEM	100.0						744			
11/77	SYSTEM	100.0						720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE OCTOBER-NOVEMBER PERIOD THE FGD SYSTEM WAS AVAILABLE 100% OF THE TIME. FREQUENT PLUGGING OF SAMPLE LINES HAS BEEN CAUSING RECURRING INSTRUMENTATION PROBLEMS.

12/77	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

AN ACCEPTANCE TEST WAS RUN IN DECEMBER; HOWEVER, THE RESULTS WERE REJECTED DUE TO IMPROPER SAMPLE COLLECTION AND STORAGE TECHNIQUES.

1/78	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

IN EARLY JANUARY THE SYSTEM WENT DOWN TO FOR TWO DAYS TO CHECK THE INSTRUMENTATION.

THE SO2 MONITORS HAVE AGAIN MALFUNCTIONED.

ALL THE SAMPLE LINES HAVE BEEN REPLACED AND NEW HEAT TRACINGS HAVE BEEN INSTALLED AROUND THEM.

2/78	SYSTEM							672			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS BYPASSED FOR SERVERAL DAYS IN FEBRUARY TO ALLOW SYSTEM CLEANING IN PREPARATION FOR TESTING BY BABCOCK AND WILCOX.

3/78	SYSTEM							744			
4/78	SYSTEM							720			
5/78	SYSTEM							744			

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SOME MINOR SCALING WAS ENCOUNTERED DURING THE APRIL-MAY PERIOD BUT IT DID NOT CAUSE AN OUTAGE.									
6/78	SYSTEM		100.0		94.3			720	679	679	
7/78	SYSTEM		100.0		97.0			744	722	722	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ONE SCHEDULED BOILER OUTAGE OCCURRED IN JUNE FOR THE INSTALLATION OF A TEST PANEL. IN JULY, TWO BOILER OUTAGES OCCURRED. NO FORCED FGD OUTAGES WERE REPORTED.									
8/78	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED NO FORCED FGD OUTAGES DURING AUGUST.									
9/78	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SO2 ANALYZERS PERFORMED WELL DURING A TWO WEEK CERTIFICATION TEST THAT TOOK PLACE IN SEPTEMBER.									
10/78	SYSTEM				.0			744	0	0	.0
11/78	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN FROM OCTOBER 1 TO NOVEMBER 15 FOR A TURBINE INSPECTION. DURING THIS TIME THE FGD SYSTEM WAS CLEANED AND INSPECTED.									
12/78	SYSTEM	84.8	82.6	82.6	82.1			744	740	611	89.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		SO2 MONITOR PROBLEMS CONTINUED THROUGH DECEMBER.									
		AN OUTAGE WAS NECESSARY FOR AN ABSORBER PUMP BELT RENEWAL.									
		FEED SLURRY FLOWMETER PROBLEMS WERE ENCOUNTERED DURING DECEMBER.									
		THE LIMESTONE MILL OIL PUMP PROBLEMS TRIPPED THE MILL OFF LINE A NUMBER OF TIMES IN DECEMBER.									
		A MINOR OUTAGE WAS CAUSED BY PLUGGING OF THE SLURRY DELIVERY LINE.									
		QUENCHER PROBLEMS OCCURRED DURING DECEMBER.									
1/79	SYSTEM	99.7	99.7	99.7	99.7			744	744	742	89.3
2/79	SYSTEM	96.6	96.3	96.4	92.7			672	647	623	75.4
3/79	SYSTEM	96.5	96.4	96.4	92.7			744	716	690	75.3

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 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

AN OUTAGE WAS REQUIRED TO RENEW QUENCHER PUMP BELTS AND FOR REPAIRS TO A QUENCHER SUCTION VALVE.

OUTAGES WERE REQUIRED TO REPAIR A HOLE IN THE FEED SLURRY LINE, TO INSPECT THE MODULE FOR PLUGGING, AND BECAUSE OF A BOOSTER FAN TRIP.

THE OPERATING VALUES SHOWN ARE THE FIGURES FOR FEBRUARY AND MARCH COMBINED.

4/79	SYSTEM	99.4	99.4	99.4	99.4			720	720	716	67.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE SO2 MONITOR HAS PASSED THE STATE CERTIFICATION TEST BUT REQUIRES CONTINUING MAINTENANCE TO KEEP IT OPERATING.

A MALFUNCTION OF THE RECIRCULATION TANK LEVEL INDICATOR RESULTED IN A LOW LIQUID LEVEL WHICH FORCED THE SCRUBBER OUT OF SERVICE.

5/79	SYSTEM	98.4	98.7	100.0	95.6			744	721	711	75.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE SO2 MONITOR SAMPLE PUMP REQUIRES MAINTENANCE ALMOST EVERY 24 HOURS.

A BOILER OUTAGE ALLOWED TIME FOR CLEANING ABSORBER TRAYS, UNPLUGGING FOUR NOZZLES, CLEANING THE SUMP BOTTOM, AND REPAIRING A SPRAY WASH VALVE.

6/79	SYSTEM	92.4	92.3	92.1	91.6			720	716	660	79.8

** PROBLEMS/SOLUTIONS/COMMENTS

FOUR OUTAGES IN JUNE WERE DUE TO PLUGGED ABSORBER NOZZLES. THE PRIMARY CAUSE APPEARED TO BE THAT A SCREEN IN THE ABSORBER SIDE OF THE SUMP BOTTOM WAS LEFT OUT DURING THE PREVIOUS OUTAGE.

A HEAVY SCALE BUILD-UP IN THE SUMP BELOW THE VENTURI WAS NOTED.

THE UTILITY REPORTED THAT MGO TESTING HAS BEGUN.

7/79	SYSTEM	98.4	98.4	98.4	97.8			744	740	727	81.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE ABSORBER WAS FORCED OFF-LINE ONCE DURING JULY DUE TO QUENCHER PUMP PACKING PROBLEMS.

SOME PLUGGING WAS ENCOUNTERED WITH ONE OF THE ABSORBER NOZZLES.

SOME OUTAGE TIME WAS NEEDED TO INSTALL A QUENCHER WALL WASH NOZZLE.

TESTS WITH THE ADDITION OF MGO DURING THE MONTH SHOWED IMPROVED SO2 REMOVAL EFFICIENCIES OF APPROXIMATELY 10%, ALTHOUGH LOW SO2 INLET READINGS PREVENTED CONCLUSIVE TEST RESULTS.

8/79	SYSTEM	99.4	99.0	99.4	98.1			744	737	730	88.0

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

** PROBLEMS/SOLUTIONS/COMMENTS

A FOUR HOUR OUTAGE RESULTED FROM BOOSTER FAN CONTROL PROBLEMS.

A NEW PORT FOR THE SCRUBBER OUTLET GAS SAMPLE PROBE HAD TO BE INSTALLED. THIS REQUIRED ONE HOUR OF SCHEDULED DOWN TIME.

9/79	SYSTEM							720			
10/79	SYSTEM							744			
11/79	SYSTEM							720			
12/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO INFORMATION WAS AVAILABLE FOR THIS REPORT PERIOD.

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

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER OF 1980 NO MAJOR FGD RELATED PROBLEMS WERE REPORTED.

4/80	SYSTEM	100.0	100.0	100.0	85.3			720	614	614	60.2
5/80	SYSTEM	95.8	94.9	94.9	77.7			744	609	578	61.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OFF LINE THROUGH PART OF MAY TO WASH DOWN THE ABSORBER MODULES.

6/80	SYSTEM	100.0	100.0	100.0	99.6			720	718	718	76.6

** PROBLEMS/SOLUTIONS/COMMENTS

NUMEROUS LEAKS IN THE FGD SYSTEM WERE REPAIRED THROUGHOUT THE PERIOD WHILE THE BOILER AND SCRUBBER WERE IN SERVICE. NO MAJOR OPERATIONAL PROBLEMS WERE REPORTED FOR APRIL, MAY, OR JUNE.

7/80	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	75.3

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED DURING JULY.

8/80	SYSTEM	99.7	99.7	99.7	88.3			744	659	657	74.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE GRIT SEPARATOR PLUGGED CAUSING A TWO HOUR OUTAGE. THE FGD SYSTEM WAS AVAILABLE THROUGH ALL OF AUGUST EXCEPT FOR THIS SHORT OUTAGE.

9/80	SYSTEM	96.5	100.0	100.0	87.2			720	629	629	73.4

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 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 BOILER AND FGD SYSTEM WENT DOWN FOR A SCHEDULED MAINTENANCE OVERHAUL ON SEPTEMBER 30, 1980. WORK SCHEDULED TO BE DONE INCLUDED INSTALLING A SECOND TRAY IN THE ABSORBER MODULE, RENEWING DEMISTER WASH SYSTEM WITH ALLOY 20 PIPING, AND CLEANING SCALE DEPOSITS FROM QUENCHER THROAT.

10/80	SYSTEM	13.9	94.0	93.4	13.9			744	111	103	10.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAY AND THE NEW MIST ELIMINATOR WASH SYSTEM WERE COMPLETED.

DURING THE SCHEDULED OVERHAUL THE MODULE WAS INSPECTED AND THE RUBBER LINING TESTED.

THE MODULE WAS REMOVED FROM SERVICE TO REPACK THE QUENCHER PUMP AND TO INSPECT THE BELTS.

11/80	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	86.5
12/80	SYSTEM	98.9	98.9	98.9	98.9			744	744	736	95.7

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER THE SYSTEM WAS REMOVED FROM SERVICE DUE TO A LIMESTONE FEEDER FAILURE.

OUTAGE TIME DURING THE MONTH WAS ALSO CAUSED BY NECESSARY REPAIRS OF THE SEAL WATER LINE TO THE HOLDING TANK PUMPS.

1/81	SYSTEM	99.1	99.1	99.1	99.1			744	744	737	92.3
2/81	SYSTEM	97.0	97.0	97.0	97.0			672	672	652	88.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE EXPANSION JOINT ON THE QUENCHER DISCHARGE PUMP FAILED CAUSING APPROXIMATELY 20 HOURS OF OUTAGE TIME.

3/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	70.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR PROBLEMS OTHER THAN THE EXPANSION JOINT FAILURE, OCCURRED DURING THE FIRST QUARTER 1981.

4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 IS NOT AVAILABLE AT THIS TIME.

7/81	SYSTEM	89.4	92.8	96.1	44.2			744	355	329	33.3

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 OFF THREE TIMES DURING JULY AS A RESULT OF BOILER TUBE LEAKS.

THE FGD SYSTEM WAS REMOVED FROM SERVICE FOR PART OF THE MONTH TO REPAIR LEAKING NOZZLES ON THE QUENCHER PUMP.

8/81	SYSTEM	98.0	98.0	98.0	98.0			744	744	730	73.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS REMOVED FROM SERVICE ONCE DURING THE MONTH TO REPLACE THE BOOSTER FAN EXPANSION JOINT.

9/81	SYSTEM	96.0	98.0	95.6	88.3			720	649	636	62.2

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTH, MAINTENANCE WAS PERFORMED ON THE QUENCHER SUCTION AND DISCHARGE LINES.

10/81	SYSTEM	31.5	71.0	72.3	30.3			744	318	226	32.4

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT WAS SHUT DOWN FOR SCHEDULED MAINTENANCE FROM OCTOBER 1 THRU OCTOBER 21.

DURING THE UNIT OUTAGE THE MODULES WERE TAKEN OUT OF SERVICE FOR MAINTENANCE WHICH INCLUDED THE FOLLOWING:
- REPLACING AND UNPLUGGING OF THE ABSORBER NOZZLES
- REPAIR LEAKING VENTURI NOZZLES
- REPAIR CYCLONE SEPARATOR

11/81	SYSTEM	82.4	88.2	88.1	81.6			720	666	588	74.7

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER OUTAGE TIME DURING NOVEMBER WAS DUE TO A TUBE LEAK.

QUENCHER PUMP BELT PROBLEMS WERE ENCOUNTERED.

A HOLE IN THE SLURRY FEED PUMP DISCHARGE LINE CAUSED SOME SYSTEM DOWN TIME.

12/81	SYSTEM	80.8	81.6	81.1	64.7			744	589	481	58.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER THE UNIT OUTAGE TIME WAS FOR ACID CLEANING.

A LEAK IN THE DISCHARGE LINE OF THE ABSORBER PUMP CAUSED SOME SYSTEM OUTAGE TIME.

PROBLEMS WERE ENCOUNTERED WITH THE QUENCHER PUMP NOT STARTING.

1/82	SYSTEM	49.8	53.0	53.9	49.5			744	695	369	70.2

** PROBLEMS/SOLUTIONS/COMMENTS

A SEVEN DAY OUTAGE OF THE FGD SYSTEM OCCURRED DURING JANUARY DUE TO THE REPAIR OF A QUENCHER PUMP.

FROZEN WATER LINES CREATED PROBLEMS IN MAKING SLURRY DURING JANUARY.

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/82	SYSTEM	85.3	85.3	85.3	85.3			672	672	573	68.7

** PROBLEMS/SOLUTIONS/COMMENTS

A LEAKING CYCLONE SEPARATOR ALSO CREATED PROBLEMS FOR THE FGD SYSTEM DURING JANUARY.

THE UNIT WAS DOWN DURING JANUARY DUE TO A BOILER TUBE LEAK.

3/82	SYSTEM	64.8	64.8	64.8	64.8			744	744	482	69.4

** PROBLEMS/SOLUTIONS/COMMENTS

PLUGGED QUENCHER AND VENTURI NOZZLES WERE CLEANED DURING FEBRUARY CAUSING OUTAGE TIME FOR THE FGD SYSTEM.

THE REPACKING OF A QUENCHER PUMP CREATED ADDITIONAL DOWN TIME DURING THE MONTH.

THE REPAIR OF A HOLE IN THE ABSORBER DISCHARGE LINE ALSO RESULTED IN DOWN TIME DURING THE MONTH.

4/82	SYSTEM	74.4	71.2	71.5	65.4			720	662	471	68.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE REPAIR OF LEAKS IN A CYCLONE SEPARATOR RESULTED IN OUTAGE TIME FOR THE FGD SYSTEM DURING MARCH.

LEAKS WERE ALSO REPAIRED IN THE ABSORBER HEADER AND ABSORBER DISCHARGE LINES CREATING ADDITIONAL OUTAGE TIME.

A SIX DAY OUTAGE DURING MARCH WAS THE RESULT OF MAINTENANCE ON AN ABSORBER PUMP THAT DEVELOPED ELECTRICAL PROBLEMS.

5/82	SYSTEM	85.3	67.2	67.9	20.5			744	227	152	21.9

** PROBLEMS/SOLUTIONS/COMMENTS

ONE SYSTEM OUTAGE DURING APRIL WAS DUE TO A LOSS OF POWER IN A LINE TO THE SYSTEM.

THE SYSTEM WAS TAKEN OFF-LINE TWICE DURING THE MONTH DUE TO QUENCHER PUMP PROBLEMS.

AN ABSORBER DISCHARGE HEADER LEAK REQUIRED SOME DOWN TIME DURING THE MONTH.

ONE OF THE RECYCLE PUMP BEARINGS FAILED AND HAD TO BE REPLACED.

THE MODULE DOWNCOMER WAS REPAIRED DURING THE MONTH.

6/82	SYSTEM	64.0	14.0	14.0	14.0			720	717	101	71.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF-LINE FOR THREE WEEKS DURING MAY FOR A SCHEDULED OUTAGE.

DURING THE MONTH THE SYSTEM WAS SHUT DOWN PART OF THE TIME DUE TO A LOSS OF POWER AND A LEAK IN THE MODULE.

** PROBLEMS/SOLUTIONS/COMMENTS

A LOSS OF A TRANSFORMER WHICH POWERS THE FGD SYSTEM FORCED SOME OUTAGE TIME TO CORRECT THE PROBLEM.

THE MILL PRODUCT AND QUENCHER PUMPS WERE REPACKED DURING JUNE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			THE LIMESTONE FEEDER MALFUNCTIONED CAUSING SYSTEM DOWN TIME DURING THE MONTH.								
7/82	SYSTEM	94.8	94.8	94.8	94.8			744	744	706	78.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JULYU.								
8/82	SYSTEM	89.5	94.9	97.0	86.8			744	681	646	61.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE FGD SYSTEM WAS OUT OF SERVICE FOR THREE DAYS DURING AUGUST DUE TO MAINTENANCE OF AN INDUCED DRAFT BOOSTER PAN.								
9/82	SYSTEM	53.3	54.5	54.4	53.3			720	704	383	68.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE CLEANING OF PLUGGED NOZZLES CREATED OUTAGE TIME DURING SEPTEMBER.								
			THE REPLACEMENT OF ABSORBER AND QUENCHER PUMP SUCTION VALVES ALSO RESULTED IN DOWN TIME DURING THE MONTH.								
			MAINTENANCE OF QUENCHER AND RECYCLE PUMPS RESULTED IN OUTAGE TIME FOR THE FGD SYSTEM DURING SEPTEMBER.								
			MAINTENANCE OF A MILL PRODUCT TANK ALSO CONTRIBUTED TO DOWN TIME FOR THE SYSTEM DURING THE MONTH.								
10/82	SYSTEM	83.4	83.1	83.2	82.9			744	742	617	77.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MAINTENANCE OF MILL PRODUCT AND SLURRY TRANSFER PUMPS RESULTED IN OUTAGE TIME FOR THE FGD SYSTEM DURING OCTOBER.								
11/82	SYSTEM	77.0	77.0	77.0	77.0			720	720	555	76.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MAINTENANCE OF SLURRY TRANSFER AND QUENCHER PUMPS CREATED DOWN TIME DURING NOVEMBER.								
			MAINTENANCE OF A CYCLONE SEPARATOR RESULTED IN OUTAGE TIME DURING THE MONTH.								
			SPENT SLURRY LINES WERE UNPLUGGED DURING NOVEMBER CAUSING ADDITIONAL OUTAGE TIME FOR THE FGD SYSTEM.								
			MAINTENANCE OF A SPENT SLURRY FRESH WATER VALVE CONTRIBUTED TO DOWN TIME DURING THE MONTH.								
12/82	SYSTEM	78.9	79.2	79.2	78.9			744	742	587	69.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
			FGD SYSTEM OUTAGES DURING DECEMBER WERE REQUIRED TO UNPLUG SPENT SLURRY LINES.								
			MAINTENANCE OF QUENCHER, ABSORBER AND MILL PRODUCT PUMPS RESULTED IN DOWN TIME DURING THE MONTH.								

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/83	SYSTEM	64.0	56.7	56.7	41.0			744	537	305	46.9
2/83	SYSTEM	58.9	62.0	65.6	43.2			672	469	291	44.3
3/83	SYSTEM	63.7	74.2	77.1	63.7			744	639	474	56.1
4/83	SYSTEM	.0			.0			720	0	0	
5/83	SYSTEM	59.6	62.0	63.2	59.6			744	716	444	71.0

MAINTENANCE OF AN ABSORBER TANK AGITATOR ALSO CONTRIBUTED TO OUTAGE TIME FOR THE FGD SYSTEM IN DECEMBER.

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OUT OF SERVICE FROM JANUARY 3 TO JANUARY 12 FOR A SCHEDULED OUTAGE.

A LOSS OF POWER TO THE SCRUBBER OCCURRED DURING THE MONTH CREATING AN FGD SYSTEM OUTAGE.

A BROKEN ABSORBER TANK AGITATOR RESULTED IN OUTAGE TIME DURING JANUARY.

A LOSS OF SEAL WATER TO ALL PUMPS CONTRIBUTED TO FGD SYSTEM OUTAGES DURING THE MONTH.

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OUT OF SERVICE FROM FEBRUARY 2 TO FEBRUARY 4, FEBRUARY 6 TO FEBRUARY 8 AND FEBRUARY 11 TO FEBRUARY 17 FOR SCHEDULED OUTAGES.

A BROKEN ABSORBER TANK AGITATOR CAUSED AN FGD SYSTEM OUTAGE DURING FEBRUARY.

A SLURRY DISPOSAL LINE BURST CREATED ADDITIONAL OUTAGE TIME FOR THE FGD SYSTEM IN FEBRUARY.

MAINTENANCE OF ABSORBER PUMPS RESULTED IN DOWN TIME DURING THE MONTH.

MAINTENANCE OF LIMESTONE FEEDERS RESULTED IN AN FGD SYSTEM OUTAGE DURING FEBRUARY.

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS TAKEN OUT OF SERVICE ON MARCH 27 FOR A TURBINE INSPECTION.

MAINTENANCE OF AN ABSORBER PUMP REQUIRED FGD DUTAGE TIME DURING MARCH.

MAINTENANCE OF A BALL MILL CLASSIFIER ALSO CONTRIBUTED TO DOWN TIME DURING THE MONTH.

MAINTENANCE OF A MODULE OUTLET TEMPERATURE INDICATOR RESULTED IN AN FGD SYSTEM OUTAGE DURING MARCH.

A BROKEN ABSORBER TANK AGITATOR CONTRIBUTED TO THE OUTAGE TIME IN MARCH.

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OUT OF SERVICE DURING APRIL DUE TO A TURBINE GENERATOR INSPECTION. MAINTENANCE ON THE FGD SYSTEM WAS PERFORMED DURING THE UNIT OUTAGE.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE TURBINE INSPECTION OUTAGE CONTINUED THROUGH MAY 2, 1983. THE FGD SYSTEM OUTAGE WAS CONTINUED UNTIL MAY 8 TO COMPLETE MAINTENANCE ON VARIOUS SYSTEM COMPONENTS.

MAINTENANCE WORK WAS PERFORMED ON THE CYCLONE SEPARATOR DURING THE OUTAGE.

MAINTENANCE WAS ALSO NEEDED ON RECYCLE PUMPS.

SLURRY LINE FLANGE LEAKS WERE REPAIRED DURING THE OUTAGE IN MAY.

A BOOSTER FAN REQUIRED MAINTENANCE DURING THE FGD SYSTEM OUTAGE IN MAY.

6/83	SYSTEM	77.0	76.5	77.0	46.7			720	439	336	40.6

** PROBLEMS/SOLUTIONS/COMMENTS

A QUENCHER PUMP BEARING WAS REPLACED AND THE PUMP REPACKED DURING JUNE.

A SCHEDULED UNIT OUTAGE OCCURRED FROM JUNE 7 TO JUNE 18.

AN ABSORBER PUMP MOTOR REQUIRED MAINTENANCE DURING THE MONTH OF JUNE.

A FORCED UNIT OUTAGE TOOK PLACE FROM JUNE 27 TO JUNE 29.

7/83	SYSTEM	94.4	94.5	94.3	90.6			744	713	674	69.7
8/83	SYSTEM	98.6	98.0	98.5	94.5			744	717	703	68.4
9/83	SYSTEM	97.3	96.8	97.2	95.2			720	708	685	70.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT HIGH AVAILABILITY DURING THE THIRD QUARTER OF 1983 CAN BE ATTRIBUTED TO PERSONNEL CHANGES MADE AT UNITS 2, 3, AND 4. A SEPARATE CREW HAS BEEN ASSIGNED TO THE FGD SYSTEM AND CREW MEMBERS ARE MORE CLOSELY SUPERVISED.

10/83	SYSTEM	86.3	95.7	96.5	86.3			744	671	642	61.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OUT OF SERVICE FROM OCTOBER 14 TO OCTOBER 17 TO ALLOW FOR A CLEANING OF THE CHEVRON MIST ELIMINATORS.

11/83	SYSTEM	97.6	91.0	91.2	25.3			720	200	182	15.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS DOWN FOR SCHEDULED OUTAGES FROM NOVEMBER 5 TO NOVEMBER 17 AND AGAIN FROM NOVEMBER 21 TO THE END OF THE MONTH.

12/83	SYSTEM	89.4	84.6	85.0	59.8			744	527	445	44.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN FROM DECEMBER 25 TO DECEMBER 27 DUE TO FROZEN WATER AND LIMESTONE SLURRY LINES.

1/84	SYSTEM	99.9	99.4	99.9	86.1			744	645	641	47.3
2/84	SYSTEM	98.3	98.3	98.3	98.3			696	696	684	65.2

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
3/84	SYSTEM	99.0	97.3	98.6	69.3			744	530	515	46.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE FIRST QUARTER.										
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 UNAVAILABLE FOR THE SECOND AND THIRD QUARTER OF 1984.										

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SOUTH CAROLINA PUBLIC SERVICE	
PLANT NAME	WINYAH	
UNIT NUMBER	3	
CITY	GEORGETOWN	
STATE	SOUTH CAROLINA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	519	
GROSS UNIT GENERATING CAPACITY - MW	280	
NET UNIT GENERATING CAPACITY W/FGD - MW	252	
NET UNIT GENERATING CAPACITY WO/FGD - MW	258	
EQUIVALENT SCRUBBED CAPACITY - MW	280	
** 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	394.51	(836000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	132.2	(270 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26749.	(11500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	14.00	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	6.5-7.0	
AVERAGE SULFUR CONTENT - %	1.00	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
TYPE	COLD SIDE	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	394.5	(836000 ACFM)
INLET FLUE GAS TEMPERATURE - C	132.2	(270 F)
PARTICLE REMOVAL EFFICENCY - %	99.3	
** 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	

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 3 (CONT.)

PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	BABCOCK & WILCOX
A-E FIRM	BURNS & ROE
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.30
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	2.1
CURRENT STATUS	1
COMMERCIAL START-UP	7/80
INITIAL START-UP	7/80
CONTRACT AWARDED	11/78

** DESIGN AND OPERATING PARAMETERS

OPER. & MAINT. REQUIREMENT - MANHR/DAY	80.0

** QUENCHER/PRESATURATOR

NUMBER	2	
TYPE	VARIABLE THROAT VENTURI	
SUPPLIER	BABCOCK & WILCOX	
INLET GAS FLOW - CU. M/S	394.51	(836000 ACFM)
INLET GAS TEMPERATURE - C	132.2	(270 F)
LIQUID RECIRCULATION RATE - LITERS/S	781.	(12400 GPM)
L/G RATIO - L/CU. M	2.0	(14.8 GAL/1000 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** ABSORBER

NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	SIEVE TRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	BABCOCK & WILCOX	
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	NATURAL RUBBER	
LINER MATERIAL TRADE NAME/COMMON TYPE	BLACK NATURAL RUBBER	
GAS CONTACTING DEVICE TYPE	PERFORATED TRAY	
NUMBER OF CONTACTING ZONES	2	
L/G RATIO - L/CU.M	6.5	(48.9 GAL/1000 ACF)
SUPERFICAL GAS VELOCITY - M/SEC	3.2	(10.5 FT/S)
SO2 REMOVAL EFFICIENCY - %	90.0	

** 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	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	2	
NUMBER OF PASSES PER STAGE	3	
PRESSURE DROP - KPA	.2	(1.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	BLENDED (50% RETURN, 50% FRESH)	
WASH FREQUENCY	ONCE PER 2 MINUTES	
WASH RATE - L/S	11.4	(180 GAL/MIN)

** REHEATER

NUMBER	1
NUMBER OF SPARES	0
GENERIC TYPE	INDIRECT HOT AIR
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 3 (CONT.)

LOCATION	EXTERNAL
PERCENT GAS BYPASSED - AVG	.0
TEMPERATURE INCREASE - C	16.7 (30 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL; COPPER [FINS]
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110

** FANS

NUMBER	2
NUMBER OF SPARES	0
DESIGN	CENTRIFUGAL
FUNCTION	BOOSTER
APPLICATION	FORCED DRAFT
SERVICE	DRY
FLUE GAS TEMPERATURE - C	132.2 (270 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** DAMPERS

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

GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	INERT FLAKE-FILLED VINYL ESTER

** 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
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	INERT FLAKE-FILLED VINYL ESTER

** 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

** DUCTWORK

LOCATION	REHEAT
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	KOPPERS
NUMBER	2
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	3.6 (4 TPH)
PRODUCT QUALITY - % SOLIDS	30.0

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 3 (CONT.)

** TANKS

SERVICE	NUMBER
QUENCHER RECIRCULATION	****
ABSORBER RECYCLE	****
SLURRY TRANSFER	****
RECYCLE WATER	****
MILL PRODUCT	****
MIST ELIMINATOR WASH	****

** PUMPS

SERVICE	NUMBER
QUENCHER RECIRCULATION	****
ABSORBER RECIRCULATION	****
SLURRY FEED	****
MILL PRODUCT	****
RECYCLE WATER	****
THICKENER UNDERFLOW	****
THICKENER SUMP	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	2
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
FEED STREAM SOURCE	ABSORBER BLEED
FEED STREAM CHARACTERISTICS	13% SOLIDS
OUTLET STREAM CHARACTERISTICS	35% SOLIDS
OUTLET STREAM DISPOSITION	TO POND
OVERFLOW STREAM DISPOSITION	TO CLARIFIED RECYCLE TANK

*** SLUDGE

** TREATMENT

METHOD	THICKENED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	NONE
SITE SERVICE LIFE - YRS	15

** WATER BALANCE

WATER LOOP TYPE	CLOSED

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
CONSUMPTION	4 TPH [8 TPH DESIGN VALUE]
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0
MIST ELIMINATOR - %	.0
FAN - %	.0
BALL MILL - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0
MIST ELIMINATOR	.0

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 3 (CONT.)

FAN	.0
BALL MILL	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/80	SYSTEM	60.0	60.0	60.0	46.6			720	559	336	59.5

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL FGD OPERATIONS BEGAN JUNE 3, 1980.

THE INLET DAMPER LOCKED UP FORCING THE FGD SYSTEM OUT OF SERVICE FOR PART OF JUNE.

THERE HAVE BEEN CONTINUING PROBLEMS WITH THE THICKENER SUMP RESULTING FROM IT'S LOCATION. THESE PROBLEMS FORCED THE FGD SYSTEM OUT OF SERVICE FOR APPROXIMATELY 7 DAYS.

7/80	A	12.8	12.8	12.8	12.8						
	B	12.8	12.8	12.8	12.8						
	SYSTEM	12.8	12.8	12.8	12.8			744	744	95	79.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE THICKNER RAKE DRIVE MECHANISM WAS REPAIRED DURING JULY.

THE LARGE BELT DRIVEN PUMP HAS BEGUN TO SHOW SIGNS OF RAPID WEAR.

THE FGD SYSTEM WAS OUT OF SERVICE BECAUSE OF COMPUTER LOGIC PROBLEMS CAUSED BY A BAD CABLE.

THE THICKNER SUMP PUMP AND MIXER MOTORS WERE FLOODED OUT CAUSING THE FGD SYSTEM TO GO DOWN.

8/80	A	18.0	20.4	20.4	18.0						
	B	18.0	20.4	20.4	18.0						
	SYSTEM	18.0	20.4	20.4	18.0			744	658	134	79.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE THICKNER SUMP PUMP AND MIXER MOTORS CONTINUED TO HAVE PROBLEMS BECAUSE OF THE FLOODING LAST MONTH.

THE SCRUBBER OUTLET DAMPER WOULD NOT CLOSE PROPERLY WHICH REQUIRED WORK DURING AUGUST.

THE ABSORBER TRAY STRAP WAS BROKEN IN SEVERAL AREAS AND REQUIRED REPAIR WORK DURING THE MONTH.

9/80	A	.0	.0	.0	.0						
	B	.0	.0	.0	.0						
	SYSTEM	.0	.0	.0	.0			720	647	0	84.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OUT OF SERVICE THROUGH ALL OF SEPTEMBER BECAUSE OF REPAIRS BEING MADE ON THE THICKNER.

10/80	A	89.2	87.0	87.0	86.0						
	B	97.2	95.0	95.0	94.0						
	SYSTEM	92.4	91.0	91.0	90.0			744	736	670	89.7

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
11/80	A	72.5	72.7	72.7	72.5						
	B	73.2	73.4	73.4	73.2						
	SYSTEM	72.8	73.1	73.1	72.8			720	718	524	90.2
12/80	A	95.7	97.6	97.6	95.7						
	B	94.9	96.8	96.8	94.9						
	SYSTEM	95.3	97.2	97.2	95.3			744	730	709	89.5
1/81	A	62.4	75.5	75.5	62.4						
	B	69.2	83.7	83.7	69.2						
	SYSTEM	65.9	79.7	79.7	65.9			744	615	490	69.1
2/81	A	83.8	85.2	85.2	80.2						
	B	88.1	89.8	89.8	84.5						
	SYSTEM	86.0	87.6	87.6	82.4			672	633	554	79.2
3/81	A	84.9	100.0	100.0	80.9						
	B	84.9	100.0	100.0	80.9						
	SYSTEM	84.9	100.0	100.0	80.9			744	602	602	69.4
4/81	SYSTEM							720			
5/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER SOME OF THE FGD SYSTEM OUTAGE TIME WAS DUE TO PLUGGING OF THE THICKENER UNDERFLOW LINE.

THE THICKENER RAKE DRIVE MECHANISM WAS REPAIRED DURING OCTOBER.

SOME OUTAGE TIME DURING THE MONTH WAS CAUSED BY THE REPLACEMENT OF THE BROKEN BELTS ON THE QUENCHER PUMP.

THE UNIT EXPERIENCED FOUR TRIPS DURING THE MONTH OF OCTOBER.

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER REPAIRS WERE MADE TO THE QUENCHER DISCHARGE LINE, ABSORBER PUMP BELTS AND QUENCHER HEADER CAUSING THE FGD SYSTEM TO BE DOWN. OUTAGE TIME WAS ALSO NEEDED TO UNPLUG THE QUENCHER NOZZLES.

THE FGD SYSTEM WAS OUT OF SERVICE FOR APPROXIMATELY SIX DAYS DUE TO COMPUTER LOGIC PROBLEMS WHICH WERE CAUSED BY A FAULTY LOGIC CARD HOLDER.

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER OUTAGE TIME WAS NECESSARY FOR REPAIRS TO THE MODULE B QUENCHER PUMP DISCHARGE VALVE.

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY PROBLEMS WITH THE BALL MILL WERE ENCOUNTERED CAUSING THE SYSTEM TO SHUT DOWN.

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY COMPUTER PROBLEMS CAUSED THE THICKENER SUMP TO FLOOD.

THE INLET DAMPER CAUSED PROBLEMS DURING THE MONTH.

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS SHUT DOWN ON MARCH 27 DUE TO A SCHEDULED UNIT OUTAGE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 IS NOT AVAILABLE AT THIS TIME.

7/81	A	86.2	83.5	85.3	82.8						
	B	90.6	81.3	83.1	80.6						
	SYSTEM	88.4	82.5	84.2	81.8			744	738	608	75.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE WINYAH 3 BOILER TRIPPED OFF TWICE DURING THE MONTH.

THE QUENCHER PUMPS TRIPPED ONCE DURING THE MONTH ON THE "A" MODULE AS A RESULT OF WATER SEEPING INTO THE SWITCHING APPARATUS.

8/81	A	81.3	80.5	78.2	67.2						
	B	81.9	88.2	85.8	73.7						
	SYSTEM	81.6	84.3	82.0	70.4			744	621	524	43.2

** PROBLEMS/SOLUTIONS/COMMENTS

MISCELLANEOUS OUTAGES DURING THE MONTH INCLUDED MAINTENANCE REQUIRED ON THE "A" QUENCHER PUMP AND FLOODING OF THE THICKENER UNDERFLOW SUMP.

9/81	A	97.2	95.3	97.0	85.1						
	B	98.8	96.9	98.6	86.5						
	SYSTEM	98.0	96.0	97.7	85.8			720	643	618	50.1

** PROBLEMS/SOLUTIONS/COMMENTS

ONE OUTAGE WAS REQUIRED DURING THE MONTH AS A RESULT OF THE INABILITY TO START THE BALL MILLS.

THERE WERE FOUR UNIT OUTAGES DURING THE MONTH AS A RESULT OF OPACITY AND PRECIPITATOR PROBLEMS.

10/81	A	95.5	95.7	97.0	95.5						
	B	95.6	95.8	97.1	95.6						
	SYSTEM	95.6	95.7	97.0	95.6			744	742	711	78.2

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER THE SPRAY NOZZLES AND MODULES INTERNALS WERE CLEANED. THIS WAS DONE SO THAT TESTS COULD BE PERFORMED.

11/81	A	98.1	96.2	97.0	85.8						
	B	94.4	92.0	92.7	82.0						
	SYSTEM	96.3	94.0	94.8	83.9			720	642	604	70.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN PART OF NOVEMBER DUE TO A TUBE LEAK.

MODULE B WAS SHUT DOWN ABOUT 40 HOURS DUE TO ABSORBER PUMP MAINTENANCE.

12/81	A	96.7	96.7	96.7	96.7						
	B	97.5	97.5	97.5	97.5						
	SYSTEM	97.1	97.1	97.1	97.1			744	744	723	77.6

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 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										
		DURING DECEMBER MODULE A WAS TAKEN OFF-LINE PART OF THE TIME DUE TO ABSORBER PUMP MAINTENANCE.									
1/82	A	84.7	86.0	86.1	84.7						
	B	81.4	82.5	82.6	81.4						
	SYSTEM	83.1	84.3	84.3	83.1			744	734	618	69.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER DOWN TIME DURING JANUARY WAS TO REPAIR THE MODULE B FD FAN.									
		BOTH MODULES WERE TAKEN OUT OF SERVICE PART OF THE MONTH FOR ESP MAINTENANCE.									
		MODULE B OUTLET DAMPERS MALFUNCTIONED CAUSING ADDITIONAL OUTAGE TIME.									
		THE MILL PRODUCT DISCHARGE LINE TO THE CLASSIFIERS INLET VALVE FROZE CAUSING ADDITIONAL DOWN TIME.									
2/82	A	43.8	54.6	55.0	43.8						
	B	62.1	77.4	77.9	62.1						
	SYSTEM	52.9	66.0	66.4	52.9			672	539	356	46.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS DOWN FOR FIVE DAYS IN FEBRUARY TO WORK ON THE ID FAN DAMPERS.									
		BOTH MODULES WERE OFF-LINE PART OF THE TIME TO CLEAN THE SPRAY NOZZLES.									
		BOTH MODULES EXPERIENCED INLET DAMPER PROBLEMS.									
		SOME MINOR PROBLEMS EXPERIENCED DURING THE MONTH INCLUDED THE SUMP DRAINS PLUGGING AND A DOWNCOMER LEAK.									
3/82	A	82.9	82.9	82.9	82.9						
	B	87.7	87.7	87.7	87.7						
	SYSTEM	85.3	85.3	85.3	85.3			744	744	635	67.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		MOST OF THE OUTAGE TIME DURING MARCH WAS TO CLEAN THE PLUGGED SPRAY NOZZLES.									
		THE DOWNCOMERS ON BOTH MODULES HAD TO BE PATCHED DURING THE MONTH.									
		ADDITIONAL OUTAGE TIME DURING MARCH WAS NECESSARY TO REPACK THE PUMPS.									
		PROBLEMS WERE ENCOUNTERED WITH OPENING THE INLET AND OUTLET DAMPERS DURING THE MONTH.									
4/82	A	22.2	74.4	68.3	22.2						
	B	25.9	86.7	79.7	25.9						
	SYSTEM	24.1	80.6	74.0	24.1			720	215	173	19.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS SHUT DOWN FOR THREE WEEKS IN APRIL FOR A SCHEDULED OUTAGE.									
		DURING THE MONTH THE MODULE WAS DOWN PART OF THE TIME TO TIGHTEN AND CLEAN THE SPRAY NOZZLES.									

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

GENERAL MAINTENANCE WAS PERFORMED ON THE MIST ELIMINATOR DURING THE MONTH.

5/82	A	87.8	90.0	90.3	88.9						
	B	88.5	91.3	91.7	90.3						
	SYSTEM	88.1	90.7	91.0	89.6			744	736	667	79.7

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY PROBLEMS WERE ENCOUNTERED WITH THE DAMPERS.

THE SPRAY NOZZLES PLUGGED FORCING THE MODULES OFF-LINE FOR CLEANING.

6/82	A	75.8	78.0	100.0	74.8						
	B	88.8	91.6	100.0	87.8						
	SYSTEM	82.3	84.8	100.0	81.3			720	690	585	72.6

** PROBLEMS/SOLUTIONS/COMMENTS

DAMPER PROBLEMS EXPERIENCED IN MAY CONTINUED THROUGHOUT JUNE.

DURING JUNE THE RECYCLE TANK AND THE A MODULE THICKENER TANK WERE CLEANED.

SOME OF THE PUMPS WERE REPACKED DURING THE MONTH CAUSING ADDITIONAL SYSTEM DOWN TIME.

ADDITIONAL SYSTEM OUTAGES INCLUDED FAILURE OF THE WESTINGHOUSE LOGIC, SWITCHING PUMPS AND POWER OFF DUE TO RAPPING.

7/82	A	94.9	85.9	87.9	85.5						
	B	100.0	97.7	100.0	97.3						
	SYSTEM	97.5	91.8	93.9	91.4			744	741	680	80.1

** PROBLEMS/SOLUTIONS/COMMENTS

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

8/82	A	94.7	94.1	94.5	91.1						
	B	74.4	73.1	73.4	70.8						
	SYSTEM	84.5	83.6	83.9	81.0			744	720	603	76.4

** PROBLEMS/SOLUTIONS/COMMENTS

MAINTENANCE OF ABSORBER AND QUENCHER PUMPS RESULTED IN DOWN TIME FOR THE FGD SYSTEM DURING AUGUST.

OUTAGE TIME WAS ALSO ATTRIBUTED TO MAINTENANCE OF A RECYCLE TANK LEVEL TRANSMITTER.

PATCHING OF A VENTURI LEAK RESULTED IN DOWN TIME DURING AUGUST.

A CLEANING OF THE QUENCHER NOZZLES ALSO CONTRIBUTED TO OUTAGE TIME DURING THE MONTH.

THE PURGING OF WATER FROM A CONTROL AIR SYSTEM RESULTED IN DOWN TIME FOR THE FGD SYSTEM DURING AUGUST.

9/82	A	72.5	80.3	80.3	72.4						
	B	76.6	84.6	84.7	76.4						
	SYSTEM	74.6	82.4	82.5	74.4			720	650	536	67.5

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 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 PATCHING OF LEAKS IN A QUENCHER WALL RESULTED IN DOWN TIME DURING SEPTEMBER.

REPAIR OF LEAKS IN THE MILL PRODUCT PUMPS ALSO CAUSED OUTAGE TIME DURING THE MONTH.

WALL WASH HEADER LEAK REPAIRS RESULTED IN DOWN TIME DURING SEPTEMBER.

THE CLEANING OF PLUGGED NOZZLES CREATED OUTAGE TIME DURING THE MONTH.

SCRUBBER OUTAGES WERE ALSO ATTRIBUTED TO THE CLEANING OF PLUGGED SLURRY SUPPLY LINES.

THE MAINTENANCE OF ABSORBER AND QUENCHER PUMPS LED TO DOWN TIME FOR THE FGD SYSTEM DURING SEPTEMBER.

MAINTENANCE OF AN INLET DAMPER DRIVE RESULTED IN DOWN TIME DURING THE MONTH.

SPENT SLURRY VALVE REPAIRS CREATED OUTAGE TIME FOR THE FGD SYSTEM DURING SEPTEMBER.

10/82	A	94.6	94.3	94.5	94.3						
	B	92.8	93.8	94.0	93.8						
	SYSTEM	93.7	94.0	94.2	94.1			744	744	700	78.9

** PROBLEMS/SOLUTIONS/COMMENTS

QUENCHER LEAK REPAIRS RESULTED IN DOWN TIME DURING OCTOBER.

MAINTENANCE OF ABSORBER PUMPS LED TO OUTAGE TIME DURING THE MONTH.

11/82	A	99.1	99.3	99.5	99.1						
	B	87.7	87.8	88.1	87.7						
	SYSTEM	93.4	93.5	93.8	93.4			720	719	672	74.6

** PROBLEMS/SOLUTIONS/COMMENTS

OUTAGES WERE ATTRIBUTED TO MAINTENANCE OF ABSORBER PUMPS DURING NOVEMBER.

QUENCHER HEADER REPAIRS LED TO FGD SYSTEM DOWN TIME DURING THE MONTH.

12/82	A	93.4	91.8	93.5	77.2						
	B	58.6	65.9	67.1	55.4						
	SYSTEM	76.0	78.9	80.3	66.3			744	625	493	49.4

** PROBLEMS/SOLUTIONS/COMMENTS

MAINTENANCE OF A THICKENER CONE LEAK RESULTED IN OUTAGE TIME DURING DECEMBER.

ABSORBER PUMP REPAIRS LED TO FGD SYSTEM OUTAGES DURING THE MONTH.

MAINTENANCE OF MODULE LEAKS RESULTED IN DOWN TIME DURING DECEMBER.

THE UNIT WAS OUT OF SERVICE FROM DECEMBER 2 TO DECEMBER 6 FOR A SCHEDULED OUTAGE.

1/83	A	67.0	57.3	57.3	44.3						
	B	96.0	94.8	94.8	73.3						
	SYSTEM	81.5	76.0	76.0	58.8			744	575	437	43.1

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
2/83	A	85.9	80.1	81.0	73.1						
	B	89.5	91.8	93.1	83.7						
	SYSTEM	87.7	86.0	87.1	78.4			672	613	527	53.5
3/83	A	22.6	83.0	83.0	14.4						
	B	21.4	30.3	30.3	5.3						
	SYSTEM	22.0	56.6	56.6	9.8			744	129	73	9.4
4/83	A	89.9	88.8	89.3	87.6						
	B	96.7	95.8	96.3	94.4						
	SYSTEM	93.3	92.3	92.8	91.0			720	710	655	59.9
5/83	A	26.2	62.6	65.8	26.2						
	B	30.2	71.9	75.7	30.2						
	SYSTEM	28.2	67.2	70.8	28.2			744	312	210	24.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OUT OF SERVICE FROM JANUARY 23 TO JANUARY 31 FOR A SCHEDULED OUTAGE.

MAINTENANCE OF VENTURI LEAKS CONTRIBUTED TO THE OUTAGES DURING JANUARY.

MAINTENANCE OF ABSORBER AND QUENCHER PUMPS RESULTED IN OUTAGE TIME DURING THE MONTH.

OUTAGES WERE ALSO THE RESULT OF REMOVAL OF FLYASH FROM THE SLURRY RECYCLE TANKS.

THE UNPLUGGING OF QUENCHER NOZZLES RESULTED IN FGD SYSTEM OUTAGES DURING JANUARY.

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM FEBRUARY 17 TO FEBRUARY 18 FOR A SCHEDULED OUTAGE.

MAINTENANCE OF AN ABSORBER PUMP DISCHARGE VALVE RESULTED IN OUTAGE TIME DURING THE MONTH.

OUTAGE TIME WAS ALSO THE RESULT OF UNPLUGGING QUENCHER NOZZLES.

A TRIPPED PROGRAMMABLE LOGIC CONTROLLER LED TO AN FGD SYSTEM OUTAGE DURING FEBRUARY.

MAINTENANCE OF A QUENCHER PUMP RESULTED IN DOWN TIME DURING THE MONTH.

THE REPAIR OF A LOW PRESSURE WATER LINE LEAK PRODUCED AN FGD SYSTEM OUTAGE DURING FEBRUARY.

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OUT OF SERVICE FROM MARCH 1 TO MARCH 24 FOR A BOILER INSPECTION.

THE UNIT WAS DOWN FROM MARCH 28 TO MARCH 31 FOR A SCHEDULED OUTAGE.

MODULE B WAS TAKEN OUT OF SERVICE TO DRAIN THE FLYASH CONTAMINATED SLURRY FROM THE RECYCLE TANK.

** PROBLEMS/SOLUTIONS/COMMENTS

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

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 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										
		SCHEDULED UNIT OUTAGES OCCURRED FROM MAY 6 TO MAY 9 AND AGAIN FROM MAY 11 TO MAY 27.									
		RECYCLE PUMPS WERE REPAIRED DURING THE PERIOD OF MAY 5 TO MAY 27.									
		SEVERAL FGD SYSTEM OUTAGES TOOK PLACE DURING MAY DUE TO MAINTENANCE OF ESP'S.									
		MAINTENANCE WORK WAS NEEDED ON A SPENT SLURRY VALVE DURING THE MONTH.									
6/83	A	92.2	82.3	87.1	58.6						
	B	95.3	86.8	91.9	61.8						
	SYSTEM	93.7	84.5	89.5	60.2			720	513	433	42.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.									
7/83	A	96.5	95.8	96.3	91.6						
	B	95.5	94.5	95.0	90.4						
	SYSTEM	96.0	95.1	95.6	91.0			744	712	677	60.9
8/83	A	96.0	93.8	96.4	70.3						
	B	95.0	91.3	93.9	68.5						
	SYSTEM	95.5	92.6	95.2	69.4			744	558	516	53.1
9/83	A	99.6	98.9	99.6	94.8						
	B	99.0	98.2	98.9	94.1						
	SYSTEM	99.3	98.5	99.3	94.5			720	690	680	61.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT HIGH AVAILABILITY DURING THE THIRD QUARTER OF 1983 CAN BE ATTRIBUTED TO PERSONNEL CHANGES MADE AT UNITS 2, 3, AND 4. A SEPARATE CREW HAS BEEN ASSIGNED TO THE FGD SYSTEM AND CREW MEMBERS ARE MORE CLOSELY SUPERVISED.									
10/83	A	93.5	95.0	96.4	77.0						
	B	93.6	94.8	96.2	76.8						
	SYSTEM	93.6	94.9	96.3	76.9			744	603	572	49.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING OCTOBER 1983.									
11/83	A	97.0	95.8	96.8	90.9						
	B	98.8	97.7	98.7	92.7						
	SYSTEM	97.9	96.8	97.7	91.8			720	683	661	63.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT SCHEDULED UNIT OUTAGES OCCURRED FROM NOVEMBER 4 TO NOVEMBER 5 AND FROM NOVEMBER 18 TO NOVEMBER 19.									
12/83	A	88.2	86.6	87.0	78.7						
	B	88.2	86.5	87.0	78.6						
	SYSTEM	88.2	86.6	87.0	78.7			744	676	585	60.5

UTILITY FGD SURVEY: OCTOBER 1983 - SEPTEMBER 1984

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 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										
		A SCHEDULED UNIT OUTAGE TOOK PLACE FROM DECEMBER 21 TO DECEMBER 24, 1983.									
		THE FGD SYSTEM WAS OUT OF SERVICE FROM DECEMBER 25 TO DECEMBER 28 DUE TO FROZEN WATER LINES.									
1/84	A	99.4	98.7	98.8	86.6						
	B	99.1	98.3	98.4	86.3						
	SYSTEM	99.3	98.5	98.6	86.4			744	653	643	49.0
2/84	A	96.9	97.0	97.2	96.4						
	B	98.7	98.8	99.0	98.2						
	SYSTEM	97.8	97.9	98.1	97.3			696	692	677	696.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JANUARY AND FEBRUARY.									
3/84	A	33.6	96.1	96.2	33.5						
	B	31.8	90.9	91.0	31.7						
	SYSTEM	32.7	93.5	93.6	32.6			744	259	243	16.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE YEARLY SCHEDULED BOILER OUTAGE OCCURRED BETWEEN MARCH 11 AND MARCH 31.									
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 UNAVAILABLE FOR THE SECOND AND THIRD QUARTER OF 1984.									

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SOUTH CAROLINA PUBLIC SERVICE	
PLANT NAME	WINYAH	
UNIT NUMBER	4	
CITY	GEORGETOWN	
STATE	SOUTH CAROLINA	
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	*****	
GROSS UNIT GENERATING CAPACITY - MW	280	
NET UNIT GENERATING CAPACITY W/FGD - MW	252	
NET UNIT GENERATING CAPACITY WO/FGD - MW	258	
EQUIVALENT SCRUBBED CAPACITY - MW	280	
** 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	********	(******* 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	26749.	(11500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	********	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	1.0-1.2	
AVERAGE SULFUR CONTENT - %	1.70	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** 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	N/A	
*** FGD SYSTEM		
** GENERAL DATA		
SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT	
SO2 REMOVAL MODE	WET SCRUBBING	
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	AMERICAN AIR FILTER	
A-E FIRM	BURNS & ROE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	80.00	
ENERGY CONSUMPTION - %	2.1	
CURRENT STATUS	1	
COMMERCIAL START-UP	9/81	

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 4 (CONT.)

INITIAL START-UP	7/81
CONTRACT AWARDED	1/79

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

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

** 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	INDIRECT HOT AIR
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE
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

** PUMPS

SERVICE	NUMBER
---	---
NR	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NA

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 4 (CONT.)

*** SLUDGE

** TREATMENT

METHOD	NR
DEVICE	NR
PROPRIETARY PROCESS	NR

** DISPOSAL

NATURE	NR
TYPE	NR
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
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD OPERATION COMMENCED IN JULY 1981. HOWEVER, ONLY ONE OF THE TWO ABSORBER MODULES IS OPERATIONAL. A MAJOR FIRE HAS DELAYED THE SCHEDULED START-UP OF THE OTHER MODULE UNTIL FEBRUARY 1982.

10/81	SYSTEM							744			
11/81	A	.0	.0		.0						
	B	51.9	52.8	54.1	51.9						
	SYSTEM	51.9	52.8	54.1	51.9			720	709	374	79.1

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS STILL UNDER CONSTRUCTION IN NOVEMBER.

DURING THE MONTH PROBLEMS WERE ENCOUNTERED WITH THE CL PRESCRUBBER NOZZLES PLUGGING AND WATER IN THE AIR SYSTEM.

DURING NOVEMBER THE CL PRESCRUBBER SECTION WAS COATED AND DEFLECTORS WERE INSTALLED.

THE CL PRESCRUBBER PUMP WAS REPACKED.

12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE MONTHS OF OCTOBER AND DECEMBER WAS NOT AVAILABLE.

1/82	A	24.6	28.7	27.1	24.6						
	B	.0	.0	.0	.0						
	SYSTEM	12.3	14.3	13.6	12.3			744	638	92	55.6

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE B WAS OUT OF SERVICE DURING PART OF JANUARY DUE TO REPAIR OF THE CHLORIDE PRESCRUBBER.

MODULE A WAS TAKEN OUT OF SERVICE ON JANUARY 8, 1982 DUE TO BADLY LEAKING

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

DOOR FRAMES TO THE CHLORIDE PRESCRUBBER.

A SCHEDULED OUTAGE FOR THE UNIT OCCURRED DURING JANUARY.

ONLY ONE MODULE WAS USED FROM JANUARY, 1982 TO MARCH 30, 1982 DUE TO A FIRE IN MODULE B.

2/82	A	56.7	62.1	66.0	56.7						
	B	.0	.0	.0	.0						
	SYSTEM	28.3	31.1	33.0	28.3			672	613	190	46.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS OUT OF SERVICE DURING PART OF FEBRUARY FOR MAINTENANCE.

REPAIR ON A HOLE IN THE CL PRESCRUBBER PUMP RESULTED IN OUTAGE TIME DURING THE MONTH.

THE DEVELOPMENT OF WATER IN THE AIR SYSTEM CREATED DOWN TIME DURING FEBRUARY.

MODULE A WAS ALSO DOWN DURING THE MONTH FOR A CLEANING OF THE CHLORIDE PRESCRUBBER NOZZLES.

PLUGGED BLEED LINES RESULTED IN OUTAGE TIME FOR MODULE A DURING THE MONTH.

A LEAK IN THE CHLORIDE PRESCRUBBER PRODUCED AN OUTAGE DURING FEBRUARY.

THE UNIT WAS DOWN DURING THE MONTH FOR PRECIPITATOR MAINTENANCE.

THE MODULE A SURGE PUMPS WERE ALSO OUT OF SERVICE DURING FEBRUARY AND LED TO ADDITIONAL OUTAGE TIME.

3/82	A	17.3	20.3	20.3	17.3						
	B	3.2	3.8	3.8	3.2						
	SYSTEM	10.3	12.1	12.1	10.3			744	634	77	49.1

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A SURGE PUMPS WERE OUT OF SERVICE DURING MARCH RESULTING IN OUTAGE TIME.

MODULE B WAS UNDER CONSTRUCTION DURING THE MONTH AND LATER PLACED BACK IN SERVICE ON MARCH 30. THE UNIT WAS ALSO BROUGHT DOWN WHILE THE REPAIR WORK ON MODULE B CONTINUED.

A LEAK IN THE CHLORIDE PRESCRUBBER FORCED MODULE A OUT OF SERVICE DURING THE MONTH.

A UNIT TRIP ALSO OCCURRED DURING MARCH RESULTING IN DOWN TIME.

4/82	A	45.0	45.4	45.3	45.0						
	B	51.4	51.9	61.8	51.4						
	SYSTEM	48.2	48.7	53.6	48.2			720	713	347	68.2

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL MIST ELIMINATOR TRAYS WERE INSTALLED IN MODULE B.

MODULE B WAS OFF-LINE PART OF THE MONTH TO CLEAN PLUGGED NOZZLES AND DUE TO A LOW PH.

THE SYSTEM WAS OFF-LINE APPROXIMATELY 11 DAYS TO CLEAN THE THICKENER OVERFLOW TANKS.

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PROBLEMS WERE EXPERIENCED WITH THE REACTION TANK LEVEL CONTROLLER CAUSING MODULE A DOWN TIME.									
		DURING APRIL THE RECYCLE PUMPS FOR MODULE A WERE REPACKED.									
		THE SPRAY NOZZLES ON MODULE A WERE PLUGGED AND REQUIRED THE MODULE TO BE SHUT DOWN FOR CLEANING.									
		MODULE A EXPERIENCED A LEAK IN THE CHLORIDE PRESCRUBBER.									
5/82	A	48.7	49.3	49.3	48.7						
	B	43.6	44.2	44.2	43.6						
	SYSTEM	46.1	46.7	46.7	46.1			744	735	344	71.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY THE SPRAY NOZZLES PLUGGED REQUIRING DOWN TIME FOR CLEANING.									
		SOME OF THE PUMPS WERE REPACKED DURING THE MONTH.									
		THE UTILITY REPORTED EXPERIENCING DAMPER PROBLEMS IN MAY.									
		THE THICKENER TANKS AND THE QUENCHER TANKS REQUIRED DOWN TIME IN MAY TO BE CLEANED.									
6/82	A	26.6	26.6	27.0	26.6						
	B	64.9	64.2	65.2	64.2						
	SYSTEM	45.7	45.4	46.1	45.4			720	719	327	65.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DAMPER PROBLEMS CONTINUED IN JUNE WITH THE A MODULE INLET DAMPER MAL-FUNCTIONING.									
		BOTH SURGE PUMPS WERE OUT OF SERVICE AT ONE POINT IN JUNE.									
		LOW QUENCHER FLOW CAUSED ADDITIONAL DOWN TIME FOR THE SYSTEM DURING MAY AND JUNE.									
7/82	A	63.2	62.3	62.4	61.7						
	B	78.9	78.1	78.2	77.4						
	SYSTEM	71.1	70.2	70.3	69.6			744	738	518	71.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A CLEANING OF THE CL PRESCRUBBER NOZZLES AND HEADER RESULTED IN OUTAGE TIME FOR THE FGD SYSTEM DURING JULY.									
		MAINTENANCE OF AN INLET DAMPER CONTRIBUTED TO THE OUTAGES DURING JULY.									
		MAINTENANCE OF ADDITIVE FEED PUMPS ALSO LED TO DOWN TIME DURING THE MONTH.									
		THE REPLACEMENT OF MIST ELIMINATOR WASH NOZZLES TOOK PLACE DURING JULY AND CAUSED ADDITIONAL OUTAGE TIME.									
		THE REPAIR OF CL PRESCRUBBER LEAKS PRODUCED OUTAGES DURING THE MONTH.									
		THE UNPLUGGING OF A MASS ADDITIVE FLOW CONTROLLER REQUIRED DOWN TIME FOR THE FGD SYSTEM DURING JULY.									
		THE DRAINING AND CLEANING OF SLURRY HOLD TANKS CONTRIBUTED TO FGD SYSTEM OUTAGES DURING THE MONTH.									
8/82	A	53.5	53.4	53.3	52.3						

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	45.6	45.6	45.5	44.7						
	SYSTEM	49.5	49.5	49.4	48.5			744	728	361	68.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE CLEANING OF ADDITIVE SUPPLY PUMP SUCTION LINES RESULTED IN DOWN TIME FOR THE FGD SYSTEM DURING AUGUST.

THE REMOVAL OF PLUGGAGE FROM A CL PRESCRUBBER TROUGH CAUSED SOME OUTAGE TIME DURING THE MONTH.

THE REPAIR OF CL PRESCRUBBER FLOOR LEAKS CONTRIBUTED TO OUTAGES DURING AUGUST.

MAINTENANCE OF SLURRY HEADER LEAKS ALSO LED TO FGD SYSTEM OUTAGE TIME.

MAINTENANCE OF THICKENER SURGE PUMPS RESULTED IN DOWN TIME FOR THE FGD SYSTEM DURING AUGUST.

THE CLEANING OF CL PRESCRUBBER NOZZLES CAUSED ADDITIONAL OUTAGE TIME DURING THE MONTH.

9/82	A	22.9	34.9	34.9	21.0						
	B	21.0	35.0	35.0	21.0						
	SYSTEM	22.0	34.9	34.9	21.0			720	433	151	42.4

** PROBLEMS/SOLUTIONS/COMMENTS

PUMP MAINTENANCE WAS A PRIMARY CAUSE OF FGD SYSTEM OUTAGES DURING SEPTEMBER.

AN INSPECTION OF REACTION TANK MIXERS RESULTED IN DOWN TIME DURING THE MONTH.

THE UNIT WAS TAKEN OUT OF SERVICE ON OCTOBER 19 FOR A SCHEDULED OUTAGE. A TURBINE INSPECTION WAS MADE.

10/82	A	.0	.0	.0	.0						
	B	.0	.0	.0	.0						
	SYSTEM	.0	.0	.0	.0			744	71	0	4.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCHEDULED TURBINE INSPECTION OUTAGE CONTINUED UNTIL OCTOBER 27, 1982. THE OUTAGE WAS CONTINUED THROUGHOUT THE MONTH FOR MAINTENANCE ON VARIOUS COMPONENTS OF THE FGD SYSTEM.

11/82	A	64.5	73.2	73.2	64.5						
	B	46.1	52.3	52.3	46.1						
	SYSTEM	55.3	62.8	62.8	55.3			720	634	398	54.5

** PROBLEMS/SOLUTIONS/COMMENTS

MAINTENANCE OF CL PRESCRUBBER LEAKS TOOK PLACE DURING NOVEMBER AND CONTRIBUTED TO OUTAGE TIME.

MAINTENANCE OF THICKENER SURGE PUMPS RESULTED IN DOWN TIME DURING THE MONTH.

12/82	A	71.3	77.1	77.1	56.7						
	B	70.4	72.5	72.5	53.3						
	SYSTEM	70.9	74.8	74.8	55.0			744	548	409	43.9

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 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										
		CL PRESCRUBBER NOZZLES WERE CLEANED DURING DECEMBER LEADING TO OUTAGE TIME.									
		THE UNIT WAS TAKEN OUT OF SERVICE FROM DECEMBER 24, 1982 TO JANUARY 2, 1983 FOR A SCHEDULED OUTAGE.									
1/83	A	89.3	88.6	89.3	85.9						
	B	85.9	84.9	85.6	82.3						
	SYSTEM	87.6	86.8	87.4	84.1			744	721	626	57.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OUT OF SERVICE JANUARY 1 AND 2 FOR A SCHEDULED OUTAGE.									
		PROBLEMS CONTROLLING PH WERE EXPERIENCED DURING JANUARY.									
		MAINTENANCE ON THE MODULE B INLET DAMPER CONTRIBUTED TO THE OUTAGE TIME DURING THE MONTH.									
		THE SYSTEM EXPERIENCED CL PRESCRUBBER FLOW PROBLEMS DURING JANUARY.									
		MAINTENANCE OF RECYCLE PUMPS RESULTED IN DOWN TIME DURING THE MONTH.									
2/83	A	50.1	69.8	70.5	49.9						
	B	21.9	30.6	30.9	21.9						
	SYSTEM	36.0	50.2	50.7	35.9			672	481	241	42.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OUT OF SERVICE FROM FEBRUARY 8 TO FEBRUARY 11 AND AGAIN FROM FEBRUARY 23 TO FEBRUARY 28 FOR SCHEDULED OUTAGES.									
		MAINTENANCE OF AN INLET PRESSURE TRANSMITTER TOOK PLACE DURING FEBRUARY.									
		THE SYSTEM EXPERIENCED CL PRESCRUBBER FLOW PROBLEMS DURING THE MONTH.									
		MAINTENANCE OF RECYCLE PUMPS TOOK PLACE DURING FEBRUARY.									
		A CL PRESCRUBBER HEADER LEAK OCCURRED DURING THE MONTH.									
		PROBLEMS CONTROLLING PH WERE EXPERIENCED DURING FEBRUARY.									
3/83	A	79.3	63.7	65.6	42.7						
	B	31.4	25.3	26.1	17.0						
	SYSTEM	55.4	44.5	45.8	29.9			744	499	222	43.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS OUT OF SERVICE FROM MARCH 1 TO MARCH 3 AND AGAIN FROM MARCH 8 TO MARCH 13 FOR SCHEDULED OUTAGES.									
		MODULE B WAS OUT OF SERVICE DURING MARCH DUE TO MAINTENANCE OF AN INLET DAMPER.									
		CHLORIDE PRESCRUBBER PROBLEMS OCCURRED DURING THE MONTH.									
4/83	A	87.6	84.6	85.7	77.5						
	B	49.3	48.2	48.8	44.2						
	SYSTEM	68.4	66.4	67.2	60.8			720	659	438	58.6

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE B WAS OUT OF SERVICE FROM APRIL 1 TO APRIL 15 DUE TO INLET DAMPER MAINTENANCE.								
			LEAKS WERE REPAIRED IN THE CL PRESCRUBBER DOOR AND HEADER DURING APRIL.								
			QUENCHER NOZZLES WERE UNPLUGGED DURING THE MONTH.								
			MAINTENANCE WAS REQUIRED ON SLURRY RECYCLE PUMPS DURING APRIL.								
5/83	A	85.3	82.5	83.0	78.2						
	B	88.1	85.2	85.7	80.7						
	SYSTEM	86.7	83.9	84.3	79.4			744	705	591	65.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE A EXPERIENCED PH CONTROL PROBLEMS DURING MAY.								
			A MODULE INSPECTION WAS PERFORMED DURING MAY ACCOUNTING FOR OUTAGE TIME.								
			SPRAY NOZZLE MODIFICATIONS WERE MADE DURING THE MONTH RESULTING IN OUTAGE TIME.								
			CL PRESCRUBBER FLOW PROBLEMS WERE ENCOUNTERED DURING MAY MAKING IT NECESSARY TO DRAIN THE TANK.								
			A COMMON BLEED DISCHARGE LINE HAD TO BE UNPLUGGED DURING MAY ACCOUNTING FOR OUTAGE TIME.								
6/83	A	84.7	84.7	84.7	84.7						
	B	86.3	86.3	86.3	86.3						
	SYSTEM	85.5	85.5	85.5	85.5			720	720	616	57.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
			AN INSPECTION OF THE B MODULE INTERNAL COMPONENTS WAS PERFORMED DURING JUNE.								
			REPAIRS WERE MADE ON A LEAK IN THE CL PRESCRUBBER DUCTWORK.								
			RUPTURED SEAL WATER LINES WERE REPAIRED DURING THE MONTH OF JUNE.								
7/83	A	79.4	77.1	77.5	70.8						
	B	97.6	96.9	97.3	88.9						
	SYSTEM	88.5	87.0	87.4	79.9			744	683	594	59.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
			MODULE A WAS OUT OF SERVICE FROM JULY 11 TO JULY 16 FOR MODIFICATION OF THE INTERNAL MODULE COMPONENTS.								
8/83	A	98.9	99.3	99.3	98.8						
	B	98.2	98.5	98.5	98.1						
	SYSTEM	98.6	98.9	98.9	98.4			744	741	732	68.2
9/83	A	98.8	98.1	98.7	94.9						
	B	99.1	98.5	99.1	95.2						
	SYSTEM	99.0	98.3	98.9	95.1			720	696	685	59.5

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
10/83	A	24.3	99.2	99.2	24.3						
	B	24.3	99.2	99.2	24.3						
	SYSTEM	24.3	99.2	99.2	24.3			744	183	181	15.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT HIGH AVAILABILITY DURING THE THIRD QUARTER OF 1983 CAN BE ATTRIBUTED TO PERSONNEL CHANGES MADE AT UNITS 2, 3, AND 4. A SEPARATE CREW HAS BEEN ASSIGNED TO THE FGD SYSTEM AND CREW MEMBERS ARE MORE CLOSELY SUPERVISED.

11/83	A	84.1	73.9	90.3	73.9						
	B	86.4	76.1	93.0	76.1						
	SYSTEM	85.2	75.0	91.7	75.0			720	720	540	48.5

** PROBLEMS/SOLUTIONS/COMMENTS

A SCHEDULED ANNUAL MAINTENANCE OUTAGE FOR THE UNIT AND FGD SYSTEM OCCURRED FROM OCTOBER 8 TO THE END OF THE MONTH.

THE ANNUAL MAINTENANCE OUTAGE WHICH BEGAN IN OCTOBER CONTINUED UNTIL NOVEMBER 3, 1983.

A SCHEDULED UNIT OUTAGE TOOK PLACE FROM NOVEMBER 8 TO NOVEMBER 11, 1983.

SLURRY PUMP TRIPS ACCOUNTED FOR ABSORBER OUTAGE TIME DURING NOVEMBER.

AN ACCIDENTAL BREAKAGE OF THE AIR LINE TO AN INLET DAMPER CYLINDER CAUSED ADDITIONAL DOWN TIME DURING THE MONTH.

REPAIR OF A SPRAY HEADER LEAK ACCOUNTED FOR ABSORBER DOWN TIME DURING NOVEMBER.

THE UNPLUGGING OF CHLORIDE PRESCRUBBER SPRAY NOZZLES AND CHEVRONS CONTRIBUTED TO FGD SYSTEM OUTAGES DURING THE MONTH.

12/83	A	89.2	87.7	88.8	81.3						
	B	89.0	86.6	87.7	80.3						
	SYSTEM	89.1	87.1	88.2	80.8			744	690	601	58.9

** PROBLEMS/SOLUTIONS/COMMENTS

BOILER TUBE LEAKS ACCOUNTED FOR A FORCED UNIT OUTAGE FROM DECEMBER 24 TO DECEMBER 27, 1983.

FROZEN WATER LINES RESULTED IN AN ABSORBER OUTAGE FROM DECEMBER 27 TO DECEMBER 28, 1983.

1/84	A	95.6	95.5	95.5	92.4						
	B	96.3	96.2	96.2	93.1						
	SYSTEM	96.0	95.9	95.8	92.8			744	720	690	60.9
2/84	A	100.0	92.7	95.8	21.1						
	B	100.0	92.7	95.8	21.1						
	SYSTEM	100.0	92.7	95.8	21.1			696	158	147	11.2
3/84	A	94.4	90.7	92.3	67.5						
	B	95.5	92.1	93.8	68.6						
	SYSTEM	94.9	91.4	93.1	68.1			744	554	506	45.8

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 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

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE FIRST QUARTER OF 1984.

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 UNAVAILABLE FOR THE SECOND AND THIRD QUARTER OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SOUTH MISSISSIPPI ELEC PWR	
PLANT NAME	R.D. MORROW, SR.	
UNIT NUMBER	1	
CITY	PURVIS	
STATE	MISSISSIPPI	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	400	
GROSS UNIT GENERATING CAPACITY - MW	200	
NET UNIT GENERATING CAPACITY W/FGD - MW	190	
NET UNIT GENERATING CAPACITY WO/FGD - MW	195	
EQUIVALENT SCRUBBED CAPACITY - MW	124	
** 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	335.76	(711500 ACFM)
BOILER FLUE GAS TEMPERATURE - C	132.2	(270 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	3.3	(10.7 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	28493.	(12250 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		11500-12500
AVERAGE ASH CONTENT - %	10.00	
RANGE ASH CONTENT - %	8.0-12.0	
AVERAGE MOISTURE CONTENT - %	6.50	
RANGE MOISTURE CONTENT - %	6.0-7.0	
AVERAGE SULFUR CONTENT - %	1.64	
RANGE SULFUR CONTENT - %	1.0-1.8	
AVERAGE CHLORIDE CONTENT - %	.12	
RANGE CHLORIDE CONTENT - %	0.10-0.13	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	HOT SIDE	
SUPPLIER	BUELL DIVISION, ENVIROTECH	
INLET FLUE GAS CAPACITY - CU.M/S	579.5	(1228000 ACFM)
INLET FLUE GAS TEMPERATURE - C	426.7	(800 F)
PRESSURE DROP - KPA	.1	(0. 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		

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 1 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	ENVIRONEERING, RILEY STOKER
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 - %	2.5
CURRENT STATUS	1
COMMERCIAL START-UP	8/78
INITIAL START-UP	8/78
CONTRACT AWARDED	5/75

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	1.30	
DESIGN COAL HEAT CONTENT - J/G	27912.0	(12000 BTU/LB)
DESIGN COAL ASH CONTENT - %	15.00	
DESIGN MOISTURE CONTENT - %	6.50	
DESIGN CHLORIDE CONTENT - %	.01	
OPER. & MAINT. REQUIREMENT - MANHR/DAY	88.0	

** QUENCHER/PRESATURATOR

** ABSORBER

NUMBER	1	
NUMBER OF SPARES	0	
GENERIC TYPE	PACKED TOWER	
SPECIFIC TYPE	ROD DECK	
TRADE NAME/COMMON TYPE	VENTRI-SORBER	
SUPPLIER	ENVIRONEERING, RILEY STOKER	
DIMENSIONS - FT	51.5 WIDE X 47.7 HIGH X 22.0 DEEP	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC; HIGH ALLOY	
LINER SPECIFIC MATERIAL	SYNTHETIC RUBBER; NICKEL BASE/CHROMIUM-IRON-MOLY	
LINER MATERIAL TRADE NAME/COMMON TYPE	CHLOROBUTYL; HASTELLOY C-276	
GAS CONTACTING DEVICE TYPE	ROD DECKS	
NUMBER OF CONTACTING ZONES	4	
LIQUID RECIRCULATION RATE - LITER/S	1260.	(20000 GPM)
L/G RATIO - L/CU.M	6.0	(45.2 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	2.0	(8.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	208.58	(442000 ACFM)
INLET GAS TEMPERATURE - C	132.2	(270 F)
SO2 REMOVAL EFFICIENCY - %	85.0	
PARTICLE REMOVAL EFFICENCY - %	.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	1	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
MANUFACTURER	ENVIRONEERING	
CONFIGURATION	VERTICAL	
NUMBER OF STAGES	2	
NUMBER OF PASSES PER STAGE	3	
DISTANCE BETWEEN STAGES - CM	91.44	(36.0 IN)
DISTANCE BETWEEN VANES - CM	53.3	(21.00 IN)
PRESSURE DROP - KPA	.9	(3.5 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	SUPERNATANT FOR FIRST STAGE; MAKEUP FOR SECOND S	

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 1 (CONT.)

WASH FREQUENCY	INTERMITTENT	
WASH RATE - L/S	15.8	(250 GAL/MIN)

** REHEATER

GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	38.0	
TEMPERATURE INCREASE - C	28.9	(52 F)
INLET FLUE GAS FLOW RATE - CU. M/S	190.65	(404000 ACFM)
INLET FLUE GAS TEMPERATURE - C	52.2	(126 F)
OUTLET FLUE GAS TEMPERATURE - C	86.7	(188 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL; HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; NICKEL BASE/CHROMIUM-IRON-COPPER-MOLY	

** 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	201.03	(426000 ACFM)
FLUE GAS TEMPERATURE - C	148.9	(300 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	RILEY STOKER
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	1
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	RILEY STOKER
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	1
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	DAMPER DESIGN
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY [SEALS]
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-MOLYBDENUM-NICKEL-COPPER
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	NATURAL RUBBER

** DAMPERS

NUMBER	1
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	RILEY STOKER
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	1
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	RILEY STOKER
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	SCRUBBER 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	SCRUBBER OUTLET TO STACK
CONFIGURATION	RECTANGULAR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	HIGH ALLOY
LINER SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	TUBE MILL
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	7.3 (8 TPH)
PRODUCT QUALITY - % SOLIDS	35.0

** TANKS

SERVICE	NUMBER
REAGENT PREP PRODUCT	1
ABSORBER RECYCLE	1
MILL SUMP	1
THICKENER SUPPLY SUMP	1
THICKENER OVERFLOW	1
ME WASH	1

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	3
SLURRY TRANSFER	2
MILL SLURRY	2
ME WASH	2
CLEAR WATER TRANSFER [SUPERNATANT]	2
THICKENER UNDERFLOW	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	1
NUMBER OF SPARES	0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	EPOXY
BELT GENERIC MATERIAL TYPE	ORGANIC
BELT SPECIFIC MATERIAL TYPE	NYLON
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	40% SOLIDS
OUTLET STREAM CHARACTERISTICS	70% SOLIDS

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 1 (CONT.)

OUTLET STREAM DISPOSITION	TO PUG MILL AND DISPOSAL
OVERFLOW STREAM DISPOSITION	TO THICKENER

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
DIMENSIONS - FT	60.0 DIA X 11.0
CAPACITY	230000
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	70-100 GPM PER UNIT, 15% SOLIDS
OUTLET STREAM CHARACTERISTICS	40% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	<5% SOLIDS
OUTLET STREAM DISPOSITION	TO VACUUM FILTER
OVERFLOW STREAM DISPOSITION	TO MILL SLURRY TANK, ABSORBER ME TANK, AND RECYC

*** SLUDGE

FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	3.6 (4.0 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	20.0
% CASO3 - DRY	20.0
% CASO4 - DRY	70.0
% CAOH2 - DRY	5.0
% CACO3 - DRY	5.0
% ASH - DRY	5.0
% OTHER COMPOUNDS - DRY	1.0

** TREATMENT

METHOD	FIXATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	NONE
INLET QUALITY - %	70.0

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	TRUCK/CONVEYED
SITE TREATMENT	CLAY LINING [NATURAL]
SITE DIMENSIONS	13 ACRES X 30 FEET
SITE CAPACITY - CU.M	476970 (390.0 ACRE-FT)
SITE SERVICE LIFE - YRS	6

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	ABSORBER RECYCLE, FLUE GAS
CHEMICAL PARAMETERS	PH, SO2
PHYSICAL VARIABLES	DENSITY, FLOW
CONTROL LEVELS	PH 5.4-5.6, SO2 - 1.2 LB/MM BTU
MONITOR TYPE	L & N, LEAR SIEGLER
MONITOR LOCATION	RECYCLE TANK/INLET DUCT
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	CLOSED

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	>85% CACO3
SOURCE/SUPPLIER	CALERA QUARRY
CONSUMPTION	70 TONS/DAY [2 UNITS AT FULL LOAD]
UTILIZATION - %	80.0
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0
MIST ELIMINATOR - %	.0
FAN - %	.0
BALL MILL - %	.0
THICKENER - %	.0
VACUUM FILTER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0
MIST ELIMINATOR	.0
FAN	.0
BALL MILL	.0
THICKENER	.0
VACUUM FILTER	.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			
9/78	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

A FORCED BOILER OUTAGE OCCURRED DURING THE PERIOD AS A RESULT OF BOILER TUBE LEAKS. THE UNIT IS EXPECTED TO START UP AGAIN IN EARLY NOVEMBER.

10/78	SYSTEM				.0			744	0	0	.0
11/78	SYSTEM				.0			720	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

OPERATION OF THE UNIT WAS INTERMITTENT DUE TO CONTINUING BOILER TUBE PROBLEMS. THE BOILER WAS SHUT DOWN NOVEMBER 1 AS A RESULT OF BOILER TUBE PROBLEMS. RESUMPTION OF OPERATION IS SCHEDULED FOR MARCH 1979.

THE FGD SYSTEM WAS BYPASSED ENTIRELY IN OCTOBER DUE TO SERIOUS CONTROL VALVE PLUGGING.

12/78	SYSTEM				.0			744	0	0	.0
1/79	SYSTEM				.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT HAS NOT YET BEEN RESTARTED SINCE THE NOVEMBER SHUTDOWN.

2/79	SYSTEM				.0			672	0	0	.0
3/79	SYSTEM				.0			744	0	0	.0
4/79	SYSTEM							720	631		

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER RETURNED TO SERVICE ON APRIL 1 AFTER COMPLETION OF REPAIRS TO THE BOILER TUBES.

NO FGD SYSTEM RELATED PROBLEMS WERE REPORTED BY THE UTILITY FOR APRIL.

5/79	SYSTEM							744			
6/79	SYSTEM							720			

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 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 THE SYSTEM OPERATED MOST OF MAY AND JUNE WITH NO MAJOR PROBLEMS.

7/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST WEEK OF JULY THE UNIT WAS REMOVED FROM SERVICE DUE TO SEVERE PROBLEMS WITH THE FGD SYSTEM. THE UTILITY NOTED THAT ABOUT HALF OF THE MODULE HEADERS WERE PLUGGED, HOLES WERE NOTED IN THE MODULE SHELL, THE UPPER ROD BANK CORRODED AWAY FROM THE SHELL, AND EXTENSIVE PLUGGING OF THE MIST ELIMINATOR OCCURRED. LINER FAILURE AT THE OUTLET DUCTWORK WAS ALSO EXPERIENCED. THE UTILITY PLANS TO REPLACE THE DUCTWORK WITH HASTALLOY. THE FGD SYSTEM IS EXPECTED TO BE OFF LINE FOR SEVERAL MONTHS FOR REPAIRS TO BE COMPLETED.

8/79	SYSTEM	.0				.0		744	0	0	.0
9/79	SYSTEM	.0				.0		720	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT REMAINED OFF LINE DURING THE MONTHS OF AUGUST AND SEPTEMBER AS MAINTENANCE AND REPAIR WORK CONTINUED.

10/79	SYSTEM	.0	.0	.0	.0			744	282	0	23.0
11/79	SYSTEM	.0	.0	.0	.0			720		0	
12/79	SYSTEM	.0	.0	.0	.0			744		0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER HAS REMAINED OFF LINE THROUGH THE REPORT PERIOD DUE TO THE LINING FAILURE. RELINING SHOULD BE COMPLETED AND THE UNIT ON LINE IN MARCH.

1/80	SYSTEM	.0		.0	.0			740	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT REMAINED OFF LINE DURING JANUARY AS RELINING OF THE SCRUBBERS WAS COMING TO COMPLETION.

THE PRESATURATOR AREAS, BYPASS DUCTS, AND THE SECTIONS OF DUCT FROM ABSORBER EXITS AT POINTS WHERE BYPASSED GAS MIXES WITH WET GAS ALL THE WAY TO THE STACK ARE BEING LINED WITH HASTELLOY G (A 1/8 INCH LINING IS BEING WELDED TO THE EXISTING CARBON STEEL).
THE MAIN BODY OF THE ABSORBER MODULES IMMEDIATELY ABOVE THE PRESATURATOR SECTIONS ALL THE WAY TO THE ABSORBER EXIT IS BEING LINED WITH CHLOROBUTYL RUBBER (ON THE EXISTING CARBON STEEL).

2/80	SYSTEM	.0		.0	.0			696	0	0	.0
3/80	SYSTEM	41.5	95.1	100.0	39.5			744	309	294	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE UNIT 1 FGD SYSTEM RETURNED TO SERVICE OPERATING 294 HOURS.

4/80	SYSTEM	100.0	99.0	100.0	99.0			720	720	713	

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THERE WERE NO OPERATIONAL PROBLEMS RELATED TO THE FGD SYSTEM DURING APRIL. FOUR INSPECTIONS WERE PERFORMED WHICH REQUIRED THE FGD SYSTEM TO BE OUT OF SERVICE FOR SEVEN HOURS.									
5/80	SYSTEM	99.7	99.8	100.0	88.7			744	660	658	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS SCHEDULED TO BE OUT OF SERVICE FOR 84 HOURS TO CLEAN THE AIR PREHEATERS. THE BOILER OPERATED THE REMAINING HOURS IN MAY.									
		THE FGD SYSTEM WAS SCHEDULED TO BE OUT OF SERVICE FOR 1.5 HOURS FOR ROUTINE MODULE INSPECTION. THE FGD SYSTEM WAS AVAILABLE 99.7% DURING MAY.									
6/80	SYSTEM	99.2	97.0	99.0	93.0			720	690	668	68.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JUNE OPERATIONS CAME TO A HAULT FOR APPROXIMATELY SIX HOURS TO CLEAN THE MIST ELIMINATORS. OTHER OUTAGE TIME DURING THE MONTH WAS CAUSED BY BOILER-RELATED PROBLEMS.									
7/80	SYSTEM	94.1	99.3	99.3	94.1			744	705	700	67.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JULY THE SCRUBBER WAS INSPECTED FOR SCALE ACCUMULATION AND A TRIP TEST WAS CONDUCTED ON THE SCRUBBER CONTROLS TO CHECK ON EARLIER MODIFICATIONS.									
		THE MAJORITY OF OUTAGE TIME WAS CAUSED BY A MALFUNCTION OF THE BALL MILL. THIS RESULTED IN A LOSS OF LIMESTONE SUPPLY IN THE STORAGE TANK.									
		A LEAK IN THE FEED WATER LINE CAUSED ADDITIONAL OUTAGE TIME DURING THE MONTH.									
8/80	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	77.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF AUGUST.									
9/80	SYSTEM	99.2	99.6	99.6	99.2			720	717	714	70.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING SEPTEMBER THE SCRUBBER WAS INSPECTED CAUSING TWO HOURS OF OUTAGE TIME.									
		A BRIEF FGD OUTAGE OF 12 MINUTES WAS CAUSED BY AN ELECTRICAL SHORT.									
		THE UNIT AND FGD SYSTEM WERE OUT OF SERVICE FOR APPROXIMATELY 3 1/2 HOURS DUE TO ESP PROBLEMS.									
10/80	SYSTEM	62.6	94.4	94.4	25.1			744	198	187	18.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING OCTOBER THE FGD SYSTEM WAS OFF LINE FOR 278 HOURS SO THAT GENERAL SYSTEM REPAIRS COULD BE MADE.									

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 1 (CONT.)

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

BOILER TUBE LEAKS CAUSED A BOILER OUTAGE OF 38 HOURS DURING THE MONTH.

ESP PROBLEMS ENCOUNTERED IN OCTOBER CAUSED APPROXIMATELY 241 HOURS OF OUTAGE TIME.

11/80	SYSTEM	24.9	41.9	41.9	10.8			720	185	78	20.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER THE FGD SYSTEM WAS SHUTDOWN FOR APPROXIMATELY 516 HOURS TO MAKE REPAIRS TO THE HASTELLOY G MATERIAL IN THE SCRUBBER.

A BOILER TUBE LEAK CAUSED ADDITIONAL OUTAGE TIME DURING THE MONTH.

12/80	SYSTEM	99.9	99.4	99.4	64.0			744	479	476	49.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER A FIRE IN THE BOILER CAUSED TWO BALL MILLS TO EXPLODE RESULTING IN APPROXIMATELY 267 HOURS OF OUTAGE TIME.

A DUCT VOLTAGE TEST WAS CONDUCTED DURING DECEMBER.

1/81	SYSTEM	100.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER REMAINED OUT SERVICE DUE TO A BALL MILL EXPLOSION.

2/81	SYSTEM	100.0	91.5	100.0	11.5			672	84	77	9.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER REMAINED OFF LINE 576 HOURS IN FEBRUARY DUE TO THE MILL EXPLOSION.

3/81	SYSTEM	86.0	80.3	80.3	26.8			744	248	199	25.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE RECYCLE PUMPS TRIPPED CAUSING APPROXIMATELY A HALF HOUR OF OUTAGE TIME.

A COMPUTER POWER FAILURE AND AN INSPECTION CAUSED AN ADDITIONAL TWO HOUR OUTAGE.

THE LIMESTONE BALL TUBE MILL NEEDED REPAIR DURING MARCH.

4/81	SYSTEM	49.7	94.1	33.6	26.3			720	202	189	19.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE FGD SYSTEM WAS UNAVAILABLE APPROXIMATELY 362 HOURS DUE TO A LIMESTONE BALL MILL OUTLET SCREEN AND SCRUBBER DUCT INSPECTION.

5/81	SYSTEM	.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE BOILER DID NOT OPERATE DUE TO SOME NECESSARY REPAIR TO THE SCRUBBER DUCTWORK.

AN EXPLOSION IN THE BALL TUBE MILL ALSO PREVENTED OPERATIONS DURING THE MONTH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
6/81	SYSTEM	91.0	91.3	91.3	90.7			720	715	653	76.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE A BALL MILL EXPLOSION AND REPAIRS TO THE DUCT WORK CAUSED 58 HOURS OF DOWN TIME.

A BALL TUBE MILL BEARING WAS REPLACED CAUSING SIX HOURS OF DOWN TIME.

7/81	SYSTEM	100.0	98.7	98.7	93.5			744	705	696	77.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY, THE FGD SYSTEM WAS AVAILABLE FOR OPERATION 100 PERCENT OF THE TIME. THERE WERE FOUR MINOR UNIT OUTAGES DURING THE MONTH ATTRIBUTED TO PROBLEMS WITH THE BOILER.

8/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	83.1
9/81	SYSTEM	99.4	99.0	99.0	98.2			720	707	700	68.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTH, THERE WAS A MINOR OUTAGE (11 HOURS) FOR REPAIR OF THE PRIMARY AIR DUCT.

10/81	SYSTEM	75.2	99.3	99.3	72.2			744	541	538	51.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER 184 HOURS OF DOWN TIME WAS DUE TO AN INSPECTION OF THE SCRUBBER DUCT.

A SUPERHEATER SECTION TUBE LEAK ACCOUNTED FOR APPROXIMATELY 22 HOURS OF OUTAGE TIME.

11/81	SYSTEM	100.0	99.4	99.4	98.0			720	710	706	76.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER THE RECYCLE PUMP TRIPPED CAUSING A MINOR OUTAGE.

A BOILER CONTROL CARD FAILURE CAUSED APPROXIMATELY FIVE HOURS OF DOWN TIME.

NINE HOURS OF OUTAGE TIME WAS NECESSARY TO REPAIR THE FEED WATER VALVE.

12/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	70.7

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER THE UTILITY REPORTED THAT NO FGD-RELATED PROBLEMS OCCURRED.

1/82	SYSTEM	100.0	98.5	98.5	32.6			744	246	242	22.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY, A FROZEN DRUM LEVEL TRANSMITTER AND COLD REHEAT PIPING CAUSED APPROXIMATELY 500 HOURS OF OUTAGE TIME.

2/82	SYSTEM	100.0	99.8	100.0	99.8			672	672	670	74.5
3/82	SYSTEM	74.2	99.8	74.2	74.2			744	553	552	58.4

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 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 MARCH APPROXIMATELY 192 HOURS OF OUTAGE TIME WAS DUE TO ABSORBER DUCT LINING REPAIRS.									
		DURING THE FIRST QUARTER 1982 APPROXIMATELY 3 HOURS OF DOWN TIME WAS CAUSED BY LOSS OF BOILER SEAL AIR.									
4/82	SYSTEM	.0			.0			720	0	0	.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING APRIL THE UNIT AND SYSTEM WERE SHUT DOWN TO PERFORM ABSORBER DUCT REPAIRS.									
5/82	SYSTEM	44.1	94.7	94.7	43.9			744	345	327	33.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY THE SYSTEM WAS SHUT DOWN FOR APPROXIMATELY 413 HOURS TO REPAIR THE ABSORBER DUCTWORK LINING.									
		A BREAK IN THE MIST ELIMINATOR PIPING CAUSED ABOUT ONE HOUR OF OUTAGE TIME.									
		ADDITIONAL OUTAGE TIME WAS DUE TO A MIST ELIMINATOR NOZZLE PROBLEM.									
6/82	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	79.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE EXPERIENCED DURING JUNE.									
7/82	SYSTEM	98.0	97.5	97.6	91.2			744	696	678	78.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A 15 HOUR OUTAGE OCCURRED DURING JULY DUE TO A HOLE IN A SLURRY STORAGE TANK.									
		A BOILER TUBE LEAK CAUSED A 51 HOUR OUTAGE DURING JULY.									
8/82	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	84.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST.									
9/82	SYSTEM	99.9	99.9	99.9	99.9			720	720	720	74.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A 30 MINUTE OUTAGE RESULTED FROM LOSS OF POWER TO THE SCRUBBER CONTROLS.									
10/82	SYSTEM	76.1	100.0	100.0	76.1			744	566	566	61.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A 177 HOUR OUTAGE OCCURRED DURING OCTOBER DUE TO AN INSPECTION OF DUCTWORK.									
11/82	SYSTEM	99.9	99.9	99.9	99.9			720	720	720	71.6

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
	** PROBLEMS/SOLUTIONS/COMMENTS										
			A LOSS OF WATER TO THE MIST ELIMINATOR SECTION PRODUCED A 25 MINUTE OUTAGE DURING NOVEMBER.								
12/82	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	76.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER.								
1/83	SYSTEM	97.0	97.8	96.9	96.0			744	731	714	73.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE FGD SYSTEM WAS OUT OF SERVICE FOR APPROXIMATELY 23 HOURS DURING JANUARY DUE TO A PLUGGING PROBLEM IN THE DEMIST SECTION. A 7 HOUR OUTAGE OCCURRED DURING THE MONTH AS A RESULT OF BOILER AND TURBINE PROBLEMS.									
2/83	SYSTEM	48.0	97.6	48.0	48.0			672	330	322	32.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
			APPROXIMATELY 350 HOURS OF DOWN TIME RESULTED FROM WORK BEING DONE ON THE DUCTWORK OF THE FGD SYSTEM. RECYCLE PUMP PROBLEMS ALSO CONTRIBUTED TO THE OUTAGE TIME DURING FEBRUARY.									
3/83	SYSTEM	95.9	95.9	95.9	95.9			744	744	714	81.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
			A LOSS OF POWER TO THE FGD SYSTEM PRODUCED AN 11 HOUR OUTAGE DURING MARCH. THE FAILURE OF A LIMESTONE MILL TO PRODUCE SUFFICIENT SLURRY RESULTED IN APPROXIMATELY 19 HOURS OF DOWN TIME FOR THE FGD SYSTEM DURING MARCH. A POOR GRADE OF LIMESTONE WAS REPORTED AS THE REASON FOR FAILURE.									
4/83	SYSTEM	100.0	99.0	100.0	93.0			720	677	670	63.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UTILITY REPORTED A UNIT OUTAGE DURING APRIL LASTING 50 HOURS AND 26 MINUTES. THE OUTAGE WAS DUE TO BOILER-RELATED PROBLEMS.								
5/83	SYSTEM	100.0	99.7	100.0	99.6			744	744	741	69.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE FGD SYSTEM WAS OFF-LINE FOR 1.7 HOUR DURING MAY DUE TO BOILER PRESSURE EXCURSION. A BRIEF 1.7 HOUR OUTAGE DURING THE MONTH OCCURRED DUE TO THE CHANGING OF TAPS ON THE UNIT'S MAIN TRANSFORMER.									
6/83	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	73.0

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 1 (CONT.)

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

** PROBLEMS/SOLUTIONS/COMMENTS

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

7/83	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 JULY.

8/83	SYSTEM	100.0	99.7	100.0	99.3			744	741	739

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN APPROXIMATELY 3 HOURS DURING AUGUST DUE TO ELECTRICAL PROBLEMS NOT RELATED TO THE FGD SYSTEM.

9/83	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 SEPTEMBER.

10/83	SYSTEM	40.8	99.3	40.8	40.8			744	305	303

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF LINE APPROXIMATELY 441 HOURS DURING OCTOBER FOR ABSORBER DUCT WORK REPAIRS.

11/83	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 NOVEMBER 1983.

12/83	SYSTEM	91.2	87.3	80.7	68.8			744	587	512

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF LINE APPROXIMATELY 157 HOURS DURING DECEMBER DUE TO BOILER RELATED PROBLEMS.

THE FGD SYSTEM WAS OUT OF SERVICE APPROXIMATELY 65 HOURS DURING DECEMBER DUE TO FROZEN LIMESTONE.

1/84	SYSTEM	100.0	100.0	100.0	100.0			744	744	744
2/84	SYSTEM	100.0	100.0	100.0	100.0			696	696	696

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JANUARY AND FEBRUARY.

3/84	SYSTEM	100.0	100.0	100.0	22.4			744	166	166

UTILITY FGD SURVEY: OCTOBER 1983 - SEPTEMBER 1984

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 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 UNIT WAS OFF LINE 24 DAYS FOR MAINTENANCE AND ACID CLEANING.										
4/84	SYSTEM	100.0	99.7	100.0	95.5			720	690	688	
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE ABSORBER WAS OFF FOR 32 HOURS DUE TO BOILER TUBE LEAKS.										
5/84	SYSTEM	100.0	99.6	100.0	95.9			744	716	713	
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE ABSORBER WAS OFF 1.25 DAYS DURING MAY DUE TO BOILER RELATED PROBLEMS.										
6/84	SYSTEM	100.0	99.7	100.0	95.5			720	690	688	
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UNIT WAS OFF LINE 30 HOURS DUE TO A SUPERHEAT TUBE LEAK IN THE BOILER.										
7/84	SYSTEM	100.0	99.8	100.0	93.7			744	698	697	
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UNIT WAS OFF LINE 45 HOURS BECAUSE OF A BOILER TUBE LEAK.										
8/84	SYSTEM							744			
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR AUGUST AND SEPTEMBER 1984.										

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SOUTH MISSISSIPPI ELEC PWR	
PLANT NAME	R.D. MORROW, SR.	
UNIT NUMBER	2	
CITY	PURVIS	
STATE	MISSISSIPPI	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	400	
GROSS UNIT GENERATING CAPACITY - MW	200	
NET UNIT GENERATING CAPACITY W/FGD - MW	190	
NET UNIT GENERATING CAPACITY WO/FGD - MW	195	
EQUIVALENT SCRUBBED CAPACITY - MW	124	
** 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	335.76	(711500 ACFM)
BOILER FLUE GAS TEMPERATURE - C	132.2	(270 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	3.3	(10.7 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	28493.	(12250 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		11500-12500
AVERAGE ASH CONTENT - %	10.00	
RANGE ASH CONTENT - %	8.0-12.0	
AVERAGE MOISTURE CONTENT - %	6.50	
RANGE MOISTURE CONTENT - %	6.0-7.0	
AVERAGE SULFUR CONTENT - %	1.64	
RANGE SULFUR CONTENT - %	1.0-1.8	
AVERAGE CHLORIDE CONTENT - %	.12	
RANGE CHLORIDE CONTENT - %	0.10-0.13	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
NUMBER OF SPARES	0	
TYPE	HOT SIDE	
SUPPLIER	BUELL DIVISION, ENVIROTECH	
INLET FLUE GAS CAPACITY - CU.M/S	579.5	(1228000 ACFM)
INLET FLUE GAS TEMPERATURE - C	426.7	(800 F)
PRESSURE DROP - KPA	.1	(0. 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		

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 2 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	ENVIRONEERING, RILEY STOKER
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 - %	2.5
CURRENT STATUS	1
COMMERCIAL START-UP	6/79
INITIAL START-UP	6/79
CONTRACT AWARDED	5/75

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	1.30	
DESIGN COAL HEAT CONTENT - J/G	27912.0	(12000 BTU/LB)
DESIGN COAL ASH CONTENT - %	15.00	
DESIGN MOISTURE CONTENT - %	6.50	
DESIGN CHLORIDE CONTENT - %	.01	
OPER. & MAINT. REQUIREMENT - MANHR/DAY	88.0	

** QUENCHER/PRESATURATOR

** ABSORBER

NUMBER	1	
NUMBER OF SPARES	0	
GENERIC TYPE	PACKED TOWER	
SPECIFIC TYPE	ROD DECK	
TRADE NAME/COMMON TYPE	VENTRI-SORBER	
SUPPLIER	ENVIRONEERING, RILEY STOKER	
DIMENSIONS - FT	51.5 WIDE X 47.7 HIGH X 22.0 DEEP	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC; HIGH ALLOY	
LINER SPECIFIC MATERIAL	SYNTHETIC RUBBER; NICKEL BASE/CHROMIUM-IRON-MOLY	
LINER MATERIAL TRADE NAME/COMMON TYPE	CHLOROBUTYL; HASTELLOY C-276	
GAS CONTACTING DEVICE TYPE	ROD DECKS	
NUMBER OF CONTACTING ZONES	4	
LIQUID RECIRCULATION RATE - LITER/S	1260.	(20000 GPM)
L/G RATIO - L/CU.M	6.0	(45.2 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	2.0	(8.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	208.58	(442000 ACFM)
INLET GAS TEMPERATURE - C	132.2	(270 F)
SO2 REMOVAL EFFICIENCY - %	85.0	
PARTICLE REMOVAL EFFICENCY - %	.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	1	
NUMBER OF SPARES PER SYSTEM	0	
NUMBER PER MODULE	1	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
MANUFACTURER	ENVIRONEERING	
CONFIGURATION	VERTICAL	
NUMBER OF STAGES	2	
NUMBER OF PASSES PER STAGE	3	
DISTANCE BETWEEN STAGES - CM	91.44	(36.0 IN)
DISTANCE BETWEEN VANES - CM	53.3	(21.00 IN)
PRESSURE DROP - KPA	.9	(3.5 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH WATER SOURCE	SUPERNATANT FOR FIRST STAGE; MAKEUP FOR SECOND S	

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 2 (CONT.)

WASH FREQUENCY	INTERMITTENT	
WASH RATE - L/S	15.8	(250 GAL/MIN)

** REHEATER

GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	38.0	
TEMPERATURE INCREASE - C	28.9	(52 F)
INLET FLUE GAS FLOW RATE - CU. M/S	190.65	(404000 ACFM)
INLET FLUE GAS TEMPERATURE - C	52.2	(126 F)
OUTLET FLUE GAS TEMPERATURE - C	86.7	(188 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL; HIGH ALLOY	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; NICKEL BASE/CHROMIUM-IRON-COPPER-MOLY	

** 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	201.03	(426000 ACFM)
FLUE GAS TEMPERATURE - C	148.9	(300 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	RILEY STOKER
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	1
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	RILEY STOKER
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	1
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	DAMPER DESIGN
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY (SEALS)
CONSTRUCTION MATERIAL SPECIFIC TYPE	NICKEL BASE/CHROMIUM-MOLYBDENUM-NICKEL-COPPER
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	NATURAL RUBBER

** DAMPERS

NUMBER	1
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	RILEY STOKER
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	1
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	PARALLEL BLADE MULTILOUVER
MANUFACTURER	RILEY STOKER
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	SCRUBBER 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	SCRUBBER OUTLET TO STACK
CONFIGURATION	RECTANGULAR
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	HIGH ALLOY
LINER SPECIFIC MATERIAL TYPE	NICKEL BASE/CHROMIUM-IRON-COPPER-MOLYBDENUM

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	TUBE MILL
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	7.3 (8 TPH)
PRODUCT QUALITY - % SOLIDS	35.0

** TANKS

SERVICE	NUMBER
REAGENT PREP PRODUCT	1
ABSORBER RECYCLE	1
MILL SUMP	1
THICKENER SUPPLY SUMP	1
THICKENER OVERFLOW	1
ME WASH	1

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	3
SLURRY TRANSFER	2
MILL SLURRY	2
ME WASH	2
CLEAR WATER TRANSFER [SUPERNATANT]	2
THICKENER UNDERFLOW	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	1
NUMBER OF SPARES	0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	EPOXY
BELT GENERIC MATERIAL TYPE	ORGANIC
BELT SPECIFIC MATERIAL TYPE	NYLON
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	40% SOLIDS
OUTLET STREAM CHARACTERISTICS	70% SOLIDS

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 2 (CONT.)

OUTLET STREAM DISPOSITION	TO PUG MILL AND DISPOSAL
OVERFLOW STREAM DISPOSITION	TO THICKENER

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
DIMENSIONS - FT	60.0 DIA X 11.0
CAPACITY	230000
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	70-100 GPM PER UNIT, 15% SOLIDS
OUTLET STREAM CHARACTERISTICS	40% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	<5% SOLIDS
OUTLET STREAM DISPOSITION	TO VACUUM FILTER
OVERFLOW STREAM DISPOSITION	TO MILL SLURRY TANK, ABSORBER ME TANK, AND RECYC

*** SLUDGE

FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	3.6	(4.0 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	20.0	
% CASO3 - DRY	20.0	
% CASO4 - DRY	70.0	
% CAOH2 - DRY	5.0	
% CACO3 - DRY	5.0	
% ASH - DRY	5.0	
% OTHER COMPOUNDS - DRY	1.0	

** TREATMENT

METHOD	FIXATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	NONE
INLET QUALITY - %	70.0

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	TRUCK/CONVEYED
SITE TREATMENT	CLAY LINING [NATURAL]
SITE DIMENSIONS	13 ACRES X 30 FEET
SITE CAPACITY - CU.M	476970 (390.0 ACRE-FT)
SITE SERVICE LIFE - YRS	6

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	ABSORBER RECYCLE, FLUE GAS
CHEMICAL PARAMETERS	PH, SO2
PHYSICAL VARIABLES	DENSITY, FLOW
CONTROL LEVELS	PH 5.4-5.6, SO2 - 1.2 LB/MM BTU
MONITOR TYPE	L & N, LEAR SIEGLER
MONITOR LOCATION	RECYCLE TANK/INLET DUCT
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	CLOSED

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	>85% CACO3
SOURCE/SUPPLIER	CALERA QUARRY
CONSUMPTION	70 TONS/DAY [2 UNITS AT FULL LOAD]
UTILIZATION - %	80.0
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0
MIST ELIMINATOR - %	.0
FAN - %	.0
BALL MILL - %	.0
THICKENER - %	.0
VACUUM FILTER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0
MIST ELIMINATOR	.0
FAN	.0
BALL MILL	.0
THICKENER	.0
VACUUM FILTER	.0

PERFORMANCE DATA

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

** PROBLEMS/SOLUTIONS/COMMENTS

R.D. MORROW 2 BEGAN SCRUBBER OPERATIONS IN THE LATTER PART OF JUNE. OPERATIONAL DATA ARE NOT YET AVAILABLE.

7/79	SYSTEM							744			
8/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO INFORMATION WAS AVAILABLE FOR THE JULY-AUGUST 1979 PERIOD.

9/79	SYSTEM	4.7	100.0	4.7	4.7			720	34	34	2.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER THE UNIT WAS TAKEN OFF LINE DUE TO FAILURE OF LINERS AND PLUGGING IN THE MIST ELIMINATOR SECTIONS.

10/79	SYSTEM	.0		.0	.0			744	477	0	52.5
11/79	SYSTEM	.0		.0	.0			720		0	
12/79	SYSTEM	.0		.0	.0			744		0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBER HAS REMAINED OFF LINE THROUGH THE REPORT PERIOD DUE TO THE LINING FAILURES. RELINING SHOULD BE COMPLETED AND THE UNIT ON SHOULD BE BACK ON LINE IN MAY.

1/80	SYSTEM	.0		.0	.0			744	743	0	75.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT REMAINED OFF LINE DURING JANUARY WHILE SCRUBBER LINER REPAIRS CONTINUED.

THE PRESATURATOR AREAS, BYPASS DUCTS, AND THE SECTIONS OF DUCT FROM ABSORBER EXITS AT POINTS WHERE BYPASSED GAS MIXES WITH WET GAS ALL THE WAY TO THE STACK ARE BEING LINED WITH HASTELLOY G (A 1/8 INCH LINING IS BEING WELDED TO THE EXISTING CARBON STEEL).
THE MAIN BODY OF THE ABSORBER MODULES IMMEDIATELY ABOVE THE PRESATURATOR SECTIONS ALL THE WAY TO THE ABSORBER EXIT IS BEING LINED WITH CHLOROBUTYL

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 2 (CONT.)

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

RUBBER (ON THE EXISTING CARBON STEEL).

2/80	SYSTEM	.0	.0	.0	.0			696	698	0	75.0
3/80	SYSTEM	.0	.0	.0	.0			744	486	0	
4/80	SYSTEM	.0			.0			720	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM REMAINED OFF LINE THROUGH APRIL AS SCRUBBER LINER REPAIRS CONTINUED. THE UNIT IS EXPECTED BACK ON LINE AT THE END OF MAY.

5/80	SYSTEM	2.4	14.2	14.2	2.4			744	127	18	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT REMAINED OFF LINE DURING MOST OF MAY TO COMPLETE SCRUBBER AND STACK LINING MODIFICATIONS.

THE BOILER OPERATED 127 HOURS IN MAY; HOWEVER, THE FGD SYSTEM OPERATED ONLY 18 HOURS BECAUSE OF COMPUTER CONTROL PROBLEMS.

6/80	SYSTEM	99.3	90.0	99.1	78.0			720	625	561	68.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM COMPUTER LOST POWER DURING JUNE CAUSING THE UNIT TO BE SHUT DOWN FOR 25 MINUTES.

DURING JUNE OPERATIONS CAME TO A HAULT FOR APPROXIMATELY FIVE HOURS TO CLEAN THE MIST ELIMINATORS. OTHER OUTAGE TIME DURING THE MONTH WAS CAUSED BY BOILER RELATED PROBLEMS.

7/80	SYSTEM	79.8	80.7	80.7	79.8			744	736	594	73.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY BALL MILL REPAIRS ACCOUNTED FOR THE MAJOR PORTION OF THE FGD-RELATED OUTAGE TIME.

THE SCRUBBER WAS INSPECTED FOR SCALE ACCUMULATION AND A TRIP TEST WAS CONDUCTED ON THE SCRUBBER CONTROLS TO CHECK ON EARLIER MODIFICATIONS.

THE SCRUBBING SYSTEM WENT OFF LINE DUE TO AN ALARM TRIGGERED BY HIGH TEMPERATURE, WHICH WAS DETERMINED TO BE A FALSE ALARM.

A POSSIBLE TUBE LEAK SHUT THE BOILER DOWN ON JULY 27. THE UNIT WENT BACK ON LINE WITHOUT FINDING THE LEAK. THE BOILER WAS THEN TAKEN OFF LINE ON JULY 28 TO FIND THE LEAK AND MAKE THE NECESSARY REPAIRS.

PROBLEMS WITH THE BURNER MANAGEMENT CONTROL SYSTEM ALSO CAUSED A BOILER-RELATED OUTAGE.

8/80	SYSTEM	98.8	99.5	99.5	98.8			744	739	735	74.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE APPROXIMATELY FIVE HOURS DURING AUGUST DUE TO A BOILER TUBE LEAK.

AFTER THE REPAIRS TO THE BOILER TUBE AN ADDITIONAL FOUR HOURS OF OUTAGE TIME WAS NECESSARY TO START UP THE FGD SYSTEM.

9/80	SYSTEM	99.8	99.5	99.5	88.3			720	639	636	62.4

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING SEPTEMBER THE BOILER WAS TAKEN OUT OF SERVICE FOR APPROXIMATELY 83 HOURS DUE TO A TUBE LEAK.									
		A BOILER INSPECTION AND AN ELECTRICAL SHORT IN THE CONTROLS CAUSED THE FGD SYSTEM TO SHUT DOWN WITH THE BOILER FOR APPROXIMATELY 1 1/2 HOURS.									
10/80	SYSTEM	79.8	98.9	98.9	79.5			744	598	591	68.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		PITTING OF THE HASTELLOY G MATERIAL IN THE SCRUBBER WAS DETECTED DURING A SCRUBBER INSPECTION.									
		DURING OCTOBER FURNACE DRAFT PROBLEMS ACCOUNTED FOR APPROXIMATELY FOUR HOURS OF DOWN TIME.									
11/80	SYSTEM	80.2	95.3	95.3	74.8			720	565	538	67.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING NOVEMBER THE FGD SYSTEM WAS OFF LINE APPROXIMATELY 131 HOURS TO REPAIR DUCTWORK.									
		AN ADDITIONAL 8 HOURS OF OUTAGE TIME WAS REQUIRED FOR NOZZLE CLEANING.									
12/80	SYSTEM	49.7	92.7	92.7	49.7			744	399		39.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER REPAIRS TO THE SCRUBBER DUCT CAUSED APPROXIMATELY 348 HOURS OF DOWN TIME.									
		THE RECYCLE NOZZLES PLUGGED CAUSING THE SYSTEM TO SHUTDOWN FOR APPROXIMATELY 24 HOURS.									
		A ONE HOUR OUTAGE WAS CAUSED BY A MODULE HIGH TEMPERATURE ALARM.									
1/81	SYSTEM	89.4	97.6	97.6	87.2			744	665	649	86.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE BOILER WAS OUT OF SERVICE APPROXIMATELY 79 HOURS DURING JANUARY DUE TO A BOILER TUBE LEAK.									
		ADDITIONAL OUTAGE TIME WAS DUE TO THE REPAIRING OF THE MIST ELIMINATOR DRAIN PIPING.									
		THE SYSTEM WAS UNAVAILABLE APPROXIMATELY TWO HOURS DUE TO THE CLEANING OF THE RECYCLE NOZZLES.									
		THE LIMESTONE MAKE-UP LINE BROKE CAUSING 12 HOURS OF ADDITIONAL OUTAGE TIME.									
2/81	SYSTEM	100.0	99.9	100.0	85.6			672	576	575	74.9
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING FEBRUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.									
3/81	SYSTEM	85.5	86.6	86.6	58.4			744	502	434	49.5

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 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

DURING MARCH THE FGD SYSTEM WAS OUT OF SERVICE APPROXIMATELY THREE HOURS TO CLEAN THE RECYCLE NOZZLES.

AN ADDITIONAL TWO HOURS OF OUTAGE TIME WAS DUE TO A LEAK IN THE SLURRY SUPPLY PIPING.

THE FGD SYSTEM WAS OUT OF SERVICE APPROXIMATELY 102 HOURS DUE TO REPAIRS TO THE LIMESTONE BALL MILL.

4/81	SYSTEM	99.5	98.0	99.5	87.1			720	640	627	71.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOILER WAS OUT OF SERVICE APPROXIMATELY 80 HOURS DUE TO A SUPERHEATER TUBE LEAK.

SOME MINOR OUTAGES ENCOUNTERED DURING THE MONTH INCLUDED A RECYCLE PUMP TRIP, A LOOSE CONNECTION ON A TEMPERATURE PROBE AND A SCRUBBER INSPECTION.

5/81	SYSTEM	100.0	99.1	100.0	93.1			744	699	693	77.4

** PROBLEMS/SOLUTIONS/COMMENTS

DUE TO A TUBE LEAK IN THE SUPERHEAT AND REHEAT SECTIONS, THE SYSTEM WAS OFF LINE 45 HOURS IN MAY.

ADDITIONAL OUTAGE TIME WAS CAUSED BY A TURBINE TRIP.

6/81	SYSTEM	97.8	97.3	97.3	97.0			720	718	699	99.7

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE TWO OUTAGE CAUSED BY THE BALL MILL. ON ONE OCCASION A BEARING HAD TO BE REPLACED AND ANOTHER TIME WAS FOR GENERAL REPAIRS.

TEN HOURS OF DOWN TIME WAS CAUSED BY PROBLEMS WITH THE CONTROL CIRCUIT IN THE ESP.

7/81	SYSTEM	100.0	97.1	99.6	93.4			744	716	695	80.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY, TWO UNIT OUTAGES TOTALLING 48 HOURS OCCURRED. THERE WERE NO FGD RELATED PROBLEMS REPORTED.

8/81	SYSTEM	100.0	99.9	100.0	96.4			744	718	717	82.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING AUGUST, BOILER TUBE LEAKS CAUSED A 25 HOUR UNIT OUTAGE.

9/81	SYSTEM	98.1	98.1	98.1	98.1			720	720	706	75.4

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE NO FGD RELATED PROBLEMS ENCOUNTERED DURING THE MONTH OF SEPTEMBER.

10/81	SYSTEM	99.9	99.9	99.9	99.9			744	744	743	67.5

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
	** PROBLEMS/SOLUTIONS/COMMENTS										
			A PLANNED OUTAGE FOR GENERAL REPAIRS ACCOUNTED FOR APPROXIMATELY ONE HALF HOUR DOWNTIME DURING OCTOBER.								
11/81	SYSTEM	32.4	98.8	98.8	32.3			720	236	233	19.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING NOVEMBER 486 HOURS OF OUTAGE TIME WAS DUE TO EXPANSION JOINT AND RECYCLE TANK REPAIRS.								
			PROBLEMS WERE ALSO ENCOUNTERED WITH THE ESP.								
12/81	SYSTEM	100.0	99.1	99.1	93.6			744	702	696	63.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING DECEMBER THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS OCCURRED.								
1/82	SYSTEM	98.7	98.7	98.7	91.9			744	693	684	72.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING JANUARY THE RECYCLE PUMP TRIPPED THREE TIMES AMOUNTING TO ABOUT 4 HOURS OF OUTAGE TIME.								
			A REHEATER TUBE LEAK AMOUNTED TO APPROXIMATELY 41 HOURS OF DOWNTIME.								
			THE FLUSH VALVE FOR THE RECYCLE PUMP WAS REPLACED DURING THE MONTH.								
			THE DRUM LEVEL TRANSMITTER SIGNAL WAS UNOPERABLE FOR 10 HOURS IN JANUARY DUE TO COLD WEATHER.								
2/82	SYSTEM	23.4	99.8	23.4	23.4			672	157	157	15.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING FEBRUARY THE FGD SYSTEM WAS DOWN FOR 515 HOURS FOR RELINING OF THE RECYCLE TANK AND DUCT LINING REPAIRS.								
3/82	SYSTEM	28.2	97.1	28.2	28.2			744	216	209	21.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE DUCTWORK REPAIRS STARTED IN FEBRUARY CONTINUED INTO MARCH.								
4/82	SYSTEM	99.9	99.9	99.9	99.9			720	720	719	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING APRIL TWO OUTAGES OCCURRED WHICH SHUT THE SYSTEM DOWN FOR APPROXIMATELY ONE HALF HOUR. ONE OUTAGE WAS DUE TO A LOSS OF POWER SUPPLY AND THE OTHER OUTAGE WAS CAUSED BY A RECYCLE PUMP TRIP.								
5/82	SYSTEM	99.9	99.2	99.2	86.6			744	650	645	65.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING MAY THE UNIT WAS OFF-LINE FOR 27 MINUTES DUE TO AN ELECTRICAL SWITCHING PROBLEM.								

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PROBLEMS WERE ENCOUNTERED WITH THE BOILER FEED PUMP CONTROLS.							
				DURING THE MONTH THE TURBINE SCREENS HAD TO BE REMOVED.							
6/82	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	63.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
				THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.							
7/82	SYSTEM	96.5	96.2	96.2	96.0			744	743	715	85.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
				A 3 HOUR OUTAGE RESULTED FROM BOILER-RELATED PROBLEMS DURING JULY.							
				THE SCRUBBER WAS OUT OF SERVICE FOR 26 HOURS DURING THE MONTH AS A RESULT OF A HOLE IN A SLURRY STORAGE TANK.							
8/82	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	83.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
				THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST.							
9/82	SYSTEM	98.5	98.5	98.5	98.5			720	720	709	75.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
				THE SCRUBBER WAS DOWN FOR 11 HOURS DURING SEPTEMBER DUE TO STACK MONITORING TESTS.							
10/82	SYSTEM	71.9	99.1	99.1	71.6			744	537	532	57.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
				A 214 HOUR OUTAGE OCCURRED DURING OCTOBER DUE TO AN INSPECTION OF DUCTWORK.							
				A 32 HOUR OUTAGE RESULTED FROM A BOILER TUBE RUPTURE.							
11/82	SYSTEM	100.0	99.0	99.0	89.8			720	653	647	63.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
				A 73 HOUR OUTAGE OCCURRED DURING NOVEMBER DUE TO BOILER TUBE LEAKS.							
12/82	SYSTEM	77.6	99.4	99.9	77.6			744	581	578	57.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
				AN OUTAGE LASTING 166 HOURS OCCURRED DURING DECEMBER DUE TO BOILER REPAIR WORK.							
				A 25 MINUTE OUTAGE RESULTED FROM A POWER FAILURE TO THE FGD SYSTEM.							
1/83	SYSTEM	100.0	100.0	100.0	95.0			744	713	707	72.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
				BOILER AND TURBINE PROBLEMS WERE EXPERIENCED DURING JANUARY.							
2/83	SYSTEM	85.6	100.0	85.6	85.6			672	575	575	63.4

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
				PERFORMANCE DATA							
** PROBLEMS/SOLUTIONS/COMMENTS											
				DUCTWORK REPAIRS CAUSED A 97 HOUR OUTAGE FOR THE FGD SYSTEM IN FEBRUARY. PROBLEMS WITH A RECYCLE TANK ALSO CONTRIBUTED TO THE DOWN TIME DURING FEBRUARY.							
3/83	SYSTEM	44.3	95.5	40.6	38.1			744	297	284	25.2
** PROBLEMS/SOLUTIONS/COMMENTS											
				A BOILER TUBE LEAK PRODUCED 46 HOURS OF DOWN TIME FOR THE UNIT DURING THE MONTH. APPROXIMATELY 401 HOURS OF DOWN TIME OCCURRED DURING MARCH AS A RESULT OF REPAIRS BEING MADE ON DUCTWORK. DUE TO A POOR GRADE OF LIMESTONE, A LIMESTONE MILL FAILED TO GRIND A PROPER AMOUNT OF THE MATERIAL. APPROXIMATELY 14 HOURS OF OUTAGE TIME RESULTED.							
4/83	SYSTEM	100.0	99.2	100.0	87.9			720	638	633	57.8
** PROBLEMS/SOLUTIONS/COMMENTS											
				THE UNIT WAS OFF-LINE FOR 86.8 HOURS DURING APRIL TO WORK ON A PRECIPITATOR.							
5/83	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	70.6
6/83	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	72.6
** PROBLEMS/SOLUTIONS/COMMENTS											
				THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MAY AND JUNE, 1983.							
7/83	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 JULY.							
8/83	SYSTEM	100.0	100.0	100.0	90.9			744	676	676	
** PROBLEMS/SOLUTIONS/COMMENTS											
				THE UNIT WAS DOWN APPROXIMATELY 2 HOURS DURING AUGUST DUE TO PROBLEMS WITH THE TURBINE HYDRAULIC OIL. THE UNIT WAS DOWN APPROXIMATELY 65 HOURS DURING THE MONTH DUE TO RUPTURED BOILER TUBING.							
9/83	SYSTEM	100.0	99.7	100.0	99.6			720	719	717	
** PROBLEMS/SOLUTIONS/COMMENTS											
				A BRIEF 1-HOUR OUTAGE OCCURRED DURING SEPTEMBER DUE TO ELECTRICAL PROBLEMS NOT RELATED TO THE FGD SYSTEM.							
10/83	SYSTEM	61.4	100.0	100.0	61.4			744	457	457	

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 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										
			THE UNIT WAS OFF LINE APPROXIMATELY 287 HOURS DURING OCTOBER FOR MAINTENANCE.								
11/83	SYSTEM	100.0	99.5	100.0	94.2			720	681	678	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UNIT WAS OFF LINE APPROXIMATELY 39 HOURS DURING NOVEMBER FOR BOILER AND DUCTWORK REPAIRS.								
12/83	SYSTEM	91.3	90.8	90.8	90.6			744	742	674	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE FGD SYSTEM WAS OUT OF SERVICE APPROXIMATELY 65 HOURS DURING DECEMBER DUE TO FROZEN LIMESTONE.								
1/84	SYSTEM	100.0	99.7	100.0	94.9			744	708	706	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UNIT WAS DOWN FOR REPAIR OF THE BOILER BURNER FRONT AND PRECIPITATOR.								
2/84	SYSTEM	100.0	100.0	100.0	100.0			696	696	696	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			NO MAJOR FGD-RELATEDD PROBLEMS WERE REPORTED DURING FEBRUARY.								
3/84	SYSTEM	100.0	100.0	100.0	80.4			744	598	598	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UNIT WAS OFF LINE 6 DAYS FOR MAINTENANCE AND ACID CLEANING.								
4/84	SYSTEM	100.0	99.0	100.0	65.9			720	479	475	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE ABSORBER WAS DOWN 9 DAYS FOR A SCHEDULED OUTAGE, A BOILER FEED PUMP TRIP, AND FOR REPAIR OF BOILER TUBE LEAKS.								
5/84	SYSTEM	100.0	99.9	100.0	99.4			744	741	740	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE ABSORBER WAS DOWN 4 HOURS DUE TO A LACK OF VOLTAGE.								
6/84	SYSTEM	99.9	99.6	99.9	97.9			720	708	705	
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE UNIT WAS DOWN 12 HOURS DUE TO A WATER WALL TUBE LEAK AND A GENERATOR VOLTAGE REGULATOR PROBLEM. THE ABSORBER WAS DOWN 40 MINUTES DUE TO A POWER LOSS.								
7/84	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 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 MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JULY.

8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR AUGUST AND SEPTEMBER 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SOUTHERN ILLINOIS POWER	
PLANT NAME	MARION	
UNIT NUMBER	4	
CITY	MARION	
STATE	ILLINOIS	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.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	272	
GROSS UNIT GENERATING CAPACITY - MW	184	
NET UNIT GENERATING CAPACITY W/FGD - MW	161	
NET UNIT GENERATING CAPACITY WO/FGD - MW	165	
EQUIVALENT SCRUBBED CAPACITY - MW	184	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	CYCLONE	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	297.30	(630000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	148.9	(300 F)
STACK HEIGHT - M	122.	(400 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	6.4	(21.0 FT)
** FUEL DATA		
FUEL TYPE	COAL/REFUSE	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25586.	(11000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		8500-11400
AVERAGE ASH CONTENT - %	16.80	
RANGE ASH CONTENT - %	7.5-23.0	
AVERAGE MOISTURE CONTENT - %	12.20	
RANGE MOISTURE CONTENT - %	1.5-20.0	
AVERAGE SULFUR CONTENT - %	3.75	
RANGE SULFUR CONTENT - %	2.9-4.4	
AVERAGE CHLORIDE CONTENT - %	.10	
RANGE CHLORIDE CONTENT - %	0.00-0.12	
*** 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	326.3	(691500 ACFM)
INLET FLUE GAS TEMPERATURE - C	148.9	(300 F)
PRESSURE DROP - KPA	.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		

SOUTHERN ILLINOIS POWER: MARION 4 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	BABCOCK & WILCOX
A-E FIRM	BURNS & MCDONNELL
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	.00
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	89.40
ENERGY CONSUMPTION - %	2.2
CURRENT STATUS	1
COMMERCIAL START-UP	6/79
INITIAL START-UP	4/79
CONTRACT AWARDED	1/76

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

NUMBER	2	
TYPE	VENTURI	
SUPPLIER	BABCOCK & WILCOX	
INLET GAS FLOW - CU. M/S	165.16	(350000 ACFM)
INLET GAS TEMPERATURE - C	148.9	(300 F)
LIQUID RECIRCULATION RATE - LITERS/S	338.	(5360 GPM)
L/G RATIO - L/CU. M	2.0	(15.3 GAL/1000 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** ABSORBER

NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	SIEVE TRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	BABCOCK & WILCOX	
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 1103	
GAS CONTACTING DEVICE TYPE	SIEVE TRAYS	
NUMBER OF CONTACTING ZONES	2	
LIQUID RECIRCULATION RATE - LITER/S	827.	(13120 GPM)
L/G RATIO - L/CU.M	5.9	(44.3 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.5	(6.0 IN-H2O)
INLET GAS FLOW - CU. M/S	139.68	(296000 ACFM)
INLET GAS TEMPERATURE - C	53.9	(129 F)
SO2 REMOVAL EFFICIENCY - %	89.4	

** 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	3
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER
WASH WATER SOURCE	BLENDED FOR UNDERSPRAY AND FRESH FOR OVERSPRAY
WASH FREQUENCY	CONTINUOUS UNDERSPRAY AND ONCE PER 2 HOURS OVERS

SOUTHERN ILLINOIS POWER: MARION 4 (CONT.)

** REHEATER

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

** FANS

NUMBER	2
NUMBER OF SPARES	0
DESIGN	CENTRIFUGAL
SUPPLIER	BUFFALO FORGE
FUNCTION	BOOSTER
APPLICATION	FORCED DRAFT
SERVICE	DRY
FLUE GAS FLOW RATE - CU.M/S	165.16 (350000 ACFM)
FLUE GAS TEMPERATURE - C	148.9 (300 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** DAMPERS

NUMBER	2
FUNCTION	ISOLATION
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
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	ISOLATION
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
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	1
FUNCTION	ISOLATION
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; 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	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
LINER SPECIFIC MATERIAL TYPE	NR

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED

SOUTHERN ILLINOIS POWER: MARION 4 (CONT.)

DEVICE TYPE	NR
MANUFACTURER	KOPPERS
PRODUCT QUALITY - % SOLIDS	30.0

** TANKS

SERVICE	NUMBER
MIST ELIMINATOR WASH	1
ABSORBER RECYCLE	2
POND RETURN	1
REAGENT PREP PRODUCT	2
CENTRATE SUMP	****
WASTE SLURRY SUMP	****

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	5
QUENCHER RECIRCULATION	2
MIST ELIMINATOR WASH	2
WASTE SLURRY	2
RECLAIMED WATER	2
MILL PRODUCT	2
LIMESTONE SLURRY TRANSFER	2
SLUDGE TRANSFER	3
CENTRATE	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
DIMENSIONS - FT	125.0 DIA X 9.0
CAPACITY	826000 GAL
SHELL GENERIC MATERIAL TYPE	INORGANIC
SHELL SPECIFIC MATERIAL TYPE	HYDRAULICALLY-BONDED CONCRETE
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	BITUMASTIC
FEED STREAM SOURCE	ABSORBER BLEED
FEED STREAM CHARACTERISTICS	8% SOLIDS
OUTLET STREAM CHARACTERISTICS	30% SOLIDS
OUTLET STREAM DISPOSITION	TO CENTRIFUGE
OVERFLOW STREAM DISPOSITION	TO RECIRCUALTION TANK AND BALL MILL

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	CENTRIFUGE
NUMBER	2
NUMBER OF SPARES	0
CAPACITY	125 GPM
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	30% SOLIDS
OUTLET STREAM CHARACTERISTICS	55% SOLIDS
OUTLET STREAM DISPOSITION	PUG MILL FOR SLUDGE STABILIZATION
OVERFLOW STREAM DISPOSITION	THICKENER

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	NONE
INLET QUALITY - %	55.0

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	CONVEYED

SOUTHERN ILLINOIS POWER: MARION 4 (CONT.)

SITE TREATMENT	NONE
** PROCESS CONTROL AND INSTRUMENTATION	
CHEMICAL PARAMETERS	PH
CONTROL LEVELS	PH 5-6
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
SOURCE OF MAKEUP WATER	LAKE EGYPT
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	CACO3
UTILIZATION - %	69.0
POINT OF ADDITION	BALL MILL
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
MIST ELIMINATOR - %	.0
FAN - %	.0
THICKENER - %	.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.0
MIST ELIMINATOR	.0
FAN	.0
THICKENER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/79	SYSTEM							744			
6/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT BEGAN OPERATION IN MAY. HOWEVER, THE UNIT IS NOW DOWN AND HAS SUFFERED TWO PREVIOUS OUTAGES. THE PREVIOUS OUTAGES WERE DUE TO CENTRIFUGE AND THICKENER PROBLEMS. THE PRESENT OUTAGE IS DUE TO BEARING FAILURES ON THE PUG MILL AND IMPROPER FIT OF THE SLUDGE CONVEYING BELT.

7/79	SYSTEM							744			
8/79	SYSTEM							744			
9/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE THIRD QUARTER A ROUTINE INSPECTION OF THE SCRUBBER INTERNALS SHOWED NO SCALE FORMATION.

THE UTILITY REPORTED THAT THE FGD SYSTEM HAS ACHIEVED A 0.7 LB/MMBTU OF SO2 EMISSION LEVEL. THE UNIT IS SUBJECT TO THE 1.2 LB/MMBTU SO2 EMISSION STANDARD.

THE CONTINUOUS MONITORS HAVE NOT BEEN OPERATING ACCEPTABLY.

A TURBINE OVERHAUL/INSPECTION IS SCHEDULED FOR OCTOBER 1, 1979.

10/79	SYSTEM				.0			744	0	0	.0
11/79	SYSTEM			100.0	26.7			720	192	192	
12/79	SYSTEM			100.0	71.0			744	528	528	

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM OCTOBER 1 THROUGH NOVEMBER 17 FOR A BOILER/TURBINE INSPECTION. NO MAJOR FGD RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER OF 1979 OTHER THAN SOME FREEZE-UPS CAUSED BY THE WINTER WEATHER.

1/80	SYSTEM		100.0		10.0			744	72	72	
2/80	SYSTEM		100.0		31.0			696	216	216	
3/80	SYSTEM		100.0		48.4			744	360	360	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE LOW BOILER AND SCRUBBER HOURS WERE A RESULT OF AN 18 DAY BOILER OUTAGE NEEDED FOR CORRECTION OF TUBE PROBLEMS. BOILER OUTAGES DUE TO TUBE PROBLEMS WERE ALSO EXPERIENCED IN FEBRUARY AND MARCH.

THE ONLY REPORTED FGD-RELATED PROBLEM DURING THE FIRST QUARTER OF 1980 WAS MAINTAINING THE BELT ALIGNMENT IN THE SLUDGE DISPOSAL SYSTEM.

4/80	SYSTEM	66.7	66.7	66.7	66.7			720	720	480	81.3

** PROBLEMS/SOLUTIONS/COMMENTS

SHAFT BREAKAGE WITHIN THE RECLAIM WATER PUMP CAUSED FGD SYSTEM OUTAGE TIME DURING APRIL.

5/80	SYSTEM	77.4	58.8	58.8	32.3			744	408	240	49.6

** PROBLEMS/SOLUTIONS/COMMENTS

A BOILER OUTAGE CAUSED THE FGD SYSTEM NOT TO OPERATE FOR TWO WEEKS.

SHAFT BREAKAGE WITHIN THE WATER RECLAIM PUMP CONTINUED THROUGH MAY.

6/80	SYSTEM	50.0	50.0	50.0	50.0			720	720	360	82.3

** PROBLEMS/SOLUTIONS/COMMENTS

SHAFT BREAKAGE WITHIN THE WATER RECLAIM PUMP CONTINUED TO CAUSE FGD OUTAGE TIME. A SOLUTION HAS BEEN PROPOSED TO SIPCO BY THEIR ENGINEERING CONSULTANT FOR CONSIDERATION.

7/80	SYSTEM	96.7	100.0	100.0	95.9			744	714	714	82.0

** PROBLEMS/SOLUTIONS/COMMENTS

AFTER REVIEW OF THE PROPOSED SOLUTION OF THE SHAFT BREAKAGE PROBLEM WITHIN THE RECLAIM WATER PUMP, SIPCO AUTHORIZED THEIR CONSULTANT TO PROCEED WITH THE WORK TO CORRECT THE PROBLEM.

8/80	SYSTEM	100.0	100.0	100.0	90.5			744	673	673	89.6

** PROBLEMS/SOLUTIONS/COMMENTS

PROBLEMS WITH THE SHAFT BREAKAGE IN THE RECLAIM WATER PUMPS CONTINUED THROUGH AUGUST. A REPLACEMENT PUMP HAS BEEN PURCHASED TO SOLVE THE PROBLEM.

9/80	A	100.0	100.0	100.0	100.0						

SOUTHERN ILLINOIS POWER: MARION 4 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	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						
	SYSTEM	100.0	100.0	100.0	100.0			720	720	720	100.0

** PROBLEMS/SOLUTIONS/COMMENTS

SUMMARY OF GENERAL PROBLEMS TO DATE

THE MAJOR CAUSES OF SCRUBBER OUTAGES HAVE CENTERED AROUND COLD WEATHER-RELATED CONVEYOR BELT AND PIPING PROBLEMS, PUG MILL BEARING FAILURES, AND RECLAIM WATER PUMP SHAFT FAILURES. OTHER PROBLEMS HAVE BEEN RELATED TO PROCESS CHEMISTRY CONTROL. THE UTILITY REPORTED THAT NUMEROUS SMALL PROBLEMS ALSO HAVE OCCURRED BUT HAVE GENERALLY BEEN CORRECTED SOON AFTER THEIR DISCOVERY. DETAILS OF THE PRIMARY SCRUBBER PROBLEMS ARE OUTLINED BELOW:

COLD WEATHER PROBLEMS

THE MOST SEVERE FREEZING PROBLEM CONCERNS THE SLUDGE CONVEYOR SYSTEM. WHEN THE AMBIENT TEMPERATURE DROPS BELOW 30 F THE CONVEYOR SYSTEM BECOMES INOPERABLE. THE UTILITY HAS ATTEMPTED TO REMOVE THE FROZEN SLUDGE USING VARIOUS COMMERCIAL AND COMPANY-BUILT SCRAPERS WITH LITTLE SUCCESS. THE UTILITY ALSO INSTALLED HEATERS AT THE VARIOUS TRANSFER POINTS TO THAW THE SLUDGE. THIS PROVED UNSUCCESSFUL AS WELL. THE PROBLEM HAS NOT YET BEEN SOLVED.

AN ADDITIONAL PROBLEM WITH THE CONVEYOR SYSTEM HAS BEEN THE FAILURE OF THE BELT TO TRACK CORRECTLY. ON SEVERAL OCCASIONS THE BELT HAS TOUCHED THE STRUCTURAL STEEL SUPPORTS RESULTING IN BELT DAMAGE. HOWEVER, BY REDUCING THE CONVEYOR SPEED THE UTILITY HAS INCREASED THE ESTIMATED BELT LIFE FROM FIVE TO 10 YEARS.

THE OTHER COLD WEATHER PROBLEM IS RELATED TO THE SCRUBBER VESSEL PIPING SYSTEM. ON SEVERAL OCCASIONS WATER LINE FREEZE UPS HAVE RESULTED IN SCRUBBER OUTAGES. WHEN THE PROBLEM WAS DISCOVERED, THE UTILITY INSTALLED EXTENSIVE HEAT TRACING ON EXPOSED WATER LINES. ALTHOUGH THERE HAS BEEN NO COLD WEATHER SINCE THE HEAT TRACING INSTALLATION, THE UTILITY BELIEVES THAT THE PROBLEM IS SOLVED.

PUG MILL PROBLEM

SEVERAL BEARING FAILURES HAVE OCCURRED ON THE PUG MILL. THE UTILITY HAS INCREASED THE MAINTENANCE ON THE MILL SYSTEM TO LESSEN THE LIKELIHOOD OF ANOTHER FAILURE. THE UTILITY REPORTED THAT IF THIS PROCEDURE MODIFICATION DOES NOT INCREASE THE PUG MILL RELIABILITY TO AN ACCEPTABLE LEVEL OTHER ACTION WILL BE TAKEN.

RECLAIM WATER PUMP SHAFT FAILURE

THE RECLAIM WATER PUMPS PRODUCE A VERY FLAT OUTPUT PRESSURE CURVE BUT THEY FEED A SYSTEM COMPOSED OF MANY AUTOMATICALLY CONTROLLED DIAPHRAGM VALVES. THE OPENING AND CLOSING OF THESE VALVES EXPOSES THE PUMPS TO A WIDE VARIABILITY IN WATER REQUIREMENTS. MOTOR SHAFT FATIGUE RESULTS WHEN THE PUMPS ATTEMPT TO RESPOND TO THE VARIABLE DEMAND. THE SYSTEM SUPPLIER IS CURRENTLY SUPPLYING THE UTILITY WITH INFORMATION ON THE OPERATION OF THE DIAPHRAGM VALVES. THE UTILITY'S CONSULTANT ENGINEERING FIRM WILL REVIEW THE MATERIAL AND SUGGEST POSSIBLE CONTROL VALVE CHANGES. THE UTILITY REPORTED THAT IF THIS IS NOT POSSIBLE OR DOES NOT WORK, A DESIGN CHANGE TO A DIFFERENT PUMP TYPE WILL BE CONSIDERED. WHILE THE PROBLEM CONTINUES, THE UTILITY IS KEEPING A COMPLETE SHAFT AND IMPELLER ON SITE.

PROCESS CHEMISTRY

THE UTILITY HAS LOST CONTROL OF THE PROCESS CHEMISTRY SEVERAL TIMES. THE SLURRY SOLIDS LEVEL HAS CONSEQUENTLY INCREASED TO THE POINT THAT

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

THE THICKENER RAKE HAS BECOME INOPERABLE. TO SOLVE THE PROBLEM THE UTILITY HAS BEEN IMPROVING THE CHEMISTRY MONITORING SYSTEM. IN THE INTERIM, WHERE EXISTING MONITORS ARE OUT OF SERVICE, LAB PERSONNEL PERFORM MANUAL TESTS TO MAINTAIN PROCESS CHEMISTRY CONTROL.

THE BOILER AND THE FGD SYSTEM OPERATED THE ENTIRE MONTH OF SEPTEMBER WITH NO PROBLEMS.

10/80	SYSTEM	100.0	100.0	100.0	57.7			744	429	429	42.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS TAKEN OFF LINE ON OCTOBER 18 FOR A SCHEDULED ANNUAL OVERHAUL, DURING WHICH TIME THE FGD SYSTEM REMAINED AVAILABLE.

11/80	A	90.2	.0	.0	.0						
	B	90.2	.0	.0	.0						
	SYSTEM	90.2	.0	.0	.0			720	71	0	11.2

** PROBLEMS/SOLUTIONS/COMMENTS

DUE TO PROBLEMS ENCOUNTERED WITH THE BOILER, THE SCHEDULED MAINTENANCE OUTAGE WAS CONTINUED THROUGH NOVEMBER 26.

WHEN THE UTILITY ATTEMPTED TO START THE FGD SYSTEM, A LEAK WAS DETECTED IN THE HIGH PRESSURE LUBRICATION LINE ON THE BALL MILL CAUSING THE SYSTEM TO REMAIN OUT OF SERVICE THROUGH NOVEMBER.

12/80	A	79.7	78.1	78.1	72.2						
	B	79.4	77.8	77.8	71.9						
	SYSTEM	79.6	77.9	77.9	72.0			744	688	536	88.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE BALL MILL LUBRICATION PROBLEM CONTINUED INTO DECEMBER CAUSING APPROXIMATELY 150 HOURS OF OUTAGE TIME.

ON DECEMBER 30 THE B MODULE WAS TAKEN OFF LINE FOR APPROXIMATELY THREE HOURS TO REPAIR A WALL LEAK IN THE QUENCHER SECTION. MODULE A WAS TAKEN OFF LINE LATER THAT DAY DUE TO THE SAME PROBLEM.

1/81	A	40.0	33.9	33.9	33.6						
	B	77.4	65.3	74.9	64.6						
	SYSTEM	59.0	50.0	53.0	49.0			744	737	366	97.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES A AND B WERE OUT OF SERVICE APPROXIMATELY 159 HOURS DUE TO THE CONVEYOR SYSTEM FREEZING. MODULES A AND B WERE OFFLINE AN ADDITIONAL TWO HOURS DUE TO A LEAK IN THE WASH WALL HEADER.

AN ADDITIONAL 278 HOURS OF OUTAGE TIME TO MODULE A WAS DUE TO A LEAK IN THE CONTINUOUS MIST ELIMINATOR SUPPLY LINE. THE REPAIR OF THIS FIBERGLAS LINE WAS HAMPERED BY THE COLD WEATHER.

2/81	A	64.3	64.3	64.3	64.3						
	B	70.1	70.1	70.1	70.1						
	SYSTEM	67.3	67.3	67.3	67.3			672	672	452	95.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE FGD SYSTEM EXPERIENCED INTERMITTENT OPERATION DUE TO A BELT FREEZING. BOTH MODULES WERE OFF LINE APPROXIMATELY 141 HOURS.

SOUTHERN ILLINOIS POWER: MARION 4 (CONT.)

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

A HOLE IN THE OUTLET DUCTWORK BETWEEN THE ISOLATION DAMPER AND THE STACK CAUSED MODULES A AND B TO BE OFFLINE APPROXIMATELY 59 HOURS.

MODULE B WAS TAKEN OFF LINE FOR APPROXIMATELY THREE HOURS TO REPAIR A LEAK IN THE WALLWASH HEADER.

MODULE A WAS TAKEN OFF LINE TO REPAIR A PINHOLE IN THE ABSORBER DISCHARGE SECTION. THE REPAIR WAS COMPLETED, BUT A MALFUNCTION OF THE OUTLET GUILLOTINE DAMPER CAUSED THE MODULE 11 HOURS OF OUTAGE TIME.

DURING FEBRUARY A BOOSTER FAN TRIPPED OFF LINE THREE TIMES DUE TO HIGH VIBRATION CAUSING APPROXIMATELY 38 HOURS OF OUTAGE TIME.

3/81	A	30.6	46.3	50.3	30.6						
	B	98.6	96.7	97.9	64.0						
	SYSTEM	64.6	72.3	74.9	47.3			744	492	352	93.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS TAKEN OFF LINE ON MARCH 21, 1981 FOR AN ANNUAL MAINTENANCE INSPECTION, AND REMAINED OFF LINE THE REST OF THE MONTH.

MODULE A WAS OFF LINE APPROXIMATELY ONE HOUR DUE TO HIGH VIBRATIONS OF THE BOOSTER FAN. ON MARCH 10 A SHORT IN THE BOOSTER FAN MOTOR CAUSED MODULE A TO BE OUT OF SERVICE FOR THE REST OF THE MONTH.

MODULE B WAS OUT OF SERVICE A TOTAL OF 10 HOURS FOR REPAIRS TO THE LEAKS IN THE WALL WASH HEADERS.

4/81	A	76.3	59.6	83.9	51.9						
	B	85.0	82.8	82.8	72.1						
	SYSTEM	81.0	71.0	83.0	62.0			720	627	447	77.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL MODULE A WAS UNAVAILABLE APPROXIMATELY 206 HOURS DUE TO THE INSTALLATION OF THE REBUILT FAN MOTOR.

ADDITIONAL OUTAGE TIME WAS DUE TO THE REPACKING OF THE QUENCHER PUMP.

APPROXIMATELY FOUR HOURS OF OUTAGE TIME WAS NECESSARY TO REPAIR A WALL WASH HEADER LEAK.

MODULE B WAS OUT OF SERVICE APPROXIMATELY 91 HOURS DUE TO THE INSTALLATION OF A HYDROCLONE HEAD IN THE QUENCHER.

5/81	A	99.5	99.5	99.6	99.5						
	B	68.4	68.4	91.2	68.4						
	SYSTEM	84.0	84.0	96.0	84.0			744	744	625	82.7

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY MODULES A AND B EXPERIENCED WALL WASH HEADER LEAKS CAUSING SOME OUTAGE TIME.

MODULE B WAS OUT OF SERVICE APPROXIMATELY 227 HOURS DUE TO THE REPLACEMENT OF THE IMPELLER AND RUBBER LINERS ON THE ENGINE AND SUCTION SIDES OF THE PUMP.

6/81	A	89.5	89.5	89.5	89.5						
	B	47.2	47.2	54.0	47.2						
	SYSTEM	68.4	68.4	71.8	68.4			720	720	493	94.7

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

** PROBLEMS/SOLUTIONS/COMMENTS

ON JUNE 3 BOTH MODULES WERE OFF-LINE TO ALLOW REPAIR OF WALL WASH HEADER LEAKS. UPON ATTEMPED STARTUP ON JUNE 3, IT WAS DISCOVERED THAT SEVERAL OF THE ABSORBER PUMP DISCHARGE VALVES WOULD NOT FUNCTION CORRECTLY. THIS CAUSED THE SYSTEM TO REMAIN DOWN THROUGH JUNE 5.

THE BEARING ON MODULE B QUENCHER PUMP FAILED RESULTING IN AN OUTAGE.

MODULE A WAS TAKEN OFF-LINE ON JUNE 24 FOR FOUR HOURS TO REPAIR THE WALL WASH HEADER.

7/81	A	75.1	75.1	91.5	75.1						
	B	73.4	73.4	95.8	73.4						
	SYSTEM	74.3	74.3	93.6	74.3			744	744	553	66.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE A AND B MODULES WERE OFF THREE AND FOUR TIMES, RESPECTIVELY, DURING THE MONTH FOR REPAIR OF WALL WASH HEADER LEAKS.

8/81	A	46.1	42.5	54.3	42.5						
	B	58.7	50.9	65.2	50.9						
	SYSTEM	52.4	46.8	59.9	46.8			744	744	348	75.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM DID NOT OPERATE DURING THE FIRST PART OF THE MONTH AS A RESULT OF A THICKENER OVERLOAD.

OTHER MISCELLANEOUS OUTAGES DURING THE MONTH OCCURRED TO CHANGE A WALL WASH HEADER GASKET ON MODULE B AND TO CORRECT HIGH BOOSTER FAN VIBRATION ON MODULE A.

9/81	A	100.0	79.4	100.0	46.8						
	B	100.0	58.2	100.0	34.3						
	SYSTEM	100.0	68.8	100.0	40.6			720	424	292	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER THE FGD SYSTEM WAS OPERATIONAL FOR 100% OF THE TIME IT WAS NEEDED. THERE WERE, HOWEVER, 302.5 HOURS WHEN ONLY ONE MODULE WAS NECESSARY TO HANDLE THE BOILER LOAD.

10/81	A	100.0	92.5	100.0	63.4						
	B	100.0	86.1	100.0	59.0						
	SYSTEM	100.0	89.3	100.0	61.2			744	510	456	
11/81	A	100.0	93.1	100.0	92.5						
	B	100.0	78.6	100.0	78.1						
	SYSTEM	100.0	85.9	100.0	85.3			720	715	614	
12/81	A	97.6	94.3	99.3	80.2						
	B	76.5	89.9	96.1	76.5						
	SYSTEM	87.0	92.1	97.7	78.3			744	633	583	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER 1981.

1/82	A	89.9	89.9	92.1	89.9						

SOUTHERN ILLINOIS POWER: MARION 4 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	78.2	68.9	89.3	68.9						
	SYSTEM	84.0	79.4	90.7	79.4			744	744	591	
2/82	A	86.9	80.4	84.3	69.6						
	B	92.4	89.8	100.0	77.8						
	SYSTEM	89.6	85.1	92.1	73.7			672	582	496	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE EXPERIENCED DURING JANUARY AND FEBRUARY.

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			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE PERIOD OF MARCH 1982 THROUGH SEPTEMBER 1982.

10/82	A	5.4	85.0	100.0	4.6						
	B	5.4	.0		.0						
	SYSTEM	5.4	42.5	100.0	2.3			744	40	17	1.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OUT OF SERVICE DURING MOST OF OCTOBER DUE TO A SCHEDULED OUTAGE.

11/82	A	100.0	84.4	100.0	84.4						
	B	99.6	91.7	100.0	91.7						
	SYSTEM	99.8	88.1	100.0	88.1			720	720	634	70.3

** PROBLEMS/SOLUTIONS/COMMENTS

DUE TO LOW LOADS, ONLY ONE MODULE WAS REQUIRED DURING NOVEMBER.

12/82	A	100.0	88.7	100.0	88.7						
	B	100.0	98.4	100.0	98.4						
	SYSTEM	100.0	93.5	100.0	93.5			744	744	696	66.3

** PROBLEMS/SOLUTIONS/COMMENTS

DUE TO LOW LOADS, ONLY ONE MODULE WAS REQUIRED DURING DECEMBER.

1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			

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 JANUARY 1983 THROUGH MARCH 1983.									
4/83	A	100.0	86.9	100.0	41.3						
	B	100.0	81.8	100.0	38.9						
	SYSTEM	100.0	84.4	100.0	40.1			720	343	289	
5/83	A	100.0	86.9	100.0	41.2						
	B	100.0	81.8	100.0	38.8						
	SYSTEM	100.0	84.4	100.0	40.0			744	353	298	
6/83	A	100.0	86.9	100.0	41.3						
	B	100.0	81.8	100.0	38.9						
	SYSTEM	100.0	84.4	100.0	40.1			720	343	289	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS DOWN 1146 HOURS DURING THE SECOND QUARTER OF 1983.									
7/83	A	98.4	98.4	98.4	98.4						
	B	99.1	97.4	99.2	97.4						
	SYSTEM	98.7	97.9	98.8	97.9			744	744	729	93.6
8/83	A	98.9	96.5	98.9	96.0						
	B	97.6	95.4	98.7	94.9						
	SYSTEM	98.3	95.9	98.8	95.4			744	740	710	91.3
9/83	A	39.6	100.0	98.2	37.5						
	B	40.0	95.2	100.0	35.7						
	SYSTEM	39.8	97.6	100.0	36.6			720	270	264	31.8
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT THE UNIT WAS DOWN 450 HOURS DURING SEPTEMBER FOR A SCHEDULED FALL OUTAGE.									
10/83	A	97.0	94.1	98.2	94.1						
	B	97.7	92.2	100.0	92.2						
	SYSTEM	97.4	93.1	99.2	93.1			744	744	693	
11/83	A	96.9	94.0	98.1	94.0						
	B	97.6	92.1	100.0	92.1						
	SYSTEM	97.3	93.1	99.1	93.1			720	720	670	
12/83	A	97.0	94.1	98.2	94.1						
	B	97.7	92.2	100.0	92.2						
	SYSTEM	97.4	93.1	99.2	93.1			744	744	693	
1/84	A	99.2	97.9	100.0	95.6						
	B	93.7	90.5	98.4	88.3						
	SYSTEM	96.4	94.2	100.0	91.9			744	726	684	
2/84	A	99.7	97.8	100.0	96.1						
	B	94.3	90.4	98.3	88.8						
	SYSTEM	97.0	94.1	100.0	92.5			696	684	644	
3/84	A	99.2	97.9	100.0	95.6						
	B	93.7	90.5	98.4	88.3						
	SYSTEM	96.4	94.2	100.0	91.9			744	726	684	

SOUTHERN ILLINOIS POWER: MARION 4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
4/84	A	38.9	85.3	100.0	32.4						
	B	37.8	85.7	100.0	32.5						
	SYSTEM	38.3	85.5	100.0	32.4			720	273	234	
5/84	A	38.7	85.1	100.0	32.3						
	B	37.8	85.5	100.0	32.4						
	SYSTEM	38.2	85.3	100.0	32.3			744	282	241	
6/84	A	38.9	85.3	100.0	32.4						
	B	37.8	85.7	100.0	32.5						
	SYSTEM	38.3	85.5	100.0	32.4			720	273	234	

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD RELATED OUTAGES WERE REPORTED FOR THE PERIOD OF OCTOBER 1983 THROUGH JUNE 1984.

7/84	SYSTEM	744
8/84	SYSTEM	744
9/84	SYSTEM	720

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE THIRD QUARTER OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SOUTHERN INDIANA GAS & ELEC	
PLANT NAME	A.B. BROWN	
UNIT NUMBER	1	
CITY	WEST FRANKLIN	
STATE	INDIANA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	250	
GROSS UNIT GENERATING CAPACITY - MW	265	
NET UNIT GENERATING CAPACITY W/FGD - MW	250	
NET UNIT GENERATING CAPACITY WO/FGD - MW	252	
EQUIVALENT SCRUBBED CAPACITY - MW	265	
** 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	429.43	(910000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	154.4	(310 F)
STACK HEIGHT - M	152.	(498 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	4.4	(14.5 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25819.	(11100 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10100-11600
AVERAGE ASH CONTENT - %	9.40	
RANGE ASH CONTENT - %	8.4-11.4	
AVERAGE MOISTURE CONTENT - %	13.30	
RANGE MOISTURE CONTENT - %	10.1-21.1	
AVERAGE SULFUR CONTENT - %	3.35	
RANGE SULFUR CONTENT - %	2.8-4.5	
AVERAGE CHLORIDE CONTENT - %	.05	
RANGE CHLORIDE CONTENT - %	0.01-0.08	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** FABRIC FILTER		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	1	
TYPE	COLD SIDE	
SUPPLIER	BUELL DIVISION, ENVIROTECH	
INLET FLUE GAS CAPACITY CU.M/S	372.8	(790036 ACFM)
INLET FLUE GAS TEMPERATURE - C	145.0	(293 F)
PRESSURE DROP - KPA	.8	(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	

SOUTHERN INDIANA GAS & ELEC: A.B. BROWN 1 (CONT.)

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	DUAL ALKALI
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	FMC
A-E FIRM	MID-VALLEY
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	85.00
ENERGY CONSUMPTION - %	.8
CURRENT STATUS	1
COMMERCIAL START-UP	4/79
INITIAL START-UP	3/79
CONTRACT AWARDED	12/76

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	2	
NUMBER OF SPARES	0	
GENERIC TYPE	IMPINGEMENT TOWER	
SPECIFIC TYPE	FIXED BAFFLE	
TRADE NAME/COMMON TYPE	DISC CONTACTOR	
SUPPLIER	FMC	
DIMENSIONS - FT	30.5 DIA X 61.0	
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	FULL DIAMETER CONE-SPLASH RING CASCADES	
NUMBER OF CONTACTING ZONES	3	
LIQUID RECIRCULATION RATE - LITER/S	315.	(5000 GPM)
L/G RATIO - L/CU.M	1.3	(10.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.0	(4.0 IN-H2O)
INLET GAS FLOW - CU. M/S	237.84	(504000 ACFM)
INLET GAS TEMPERATURE - C	145.0	(293 F)
SO2 REMOVAL EFFICIENCY - %	85.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	2	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	1	
DISTANCE BETWEEN STAGES - CM	1.78	(.7 IN)
PRESSURE DROP - KPA	.5	(2.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPHENYLENE	
WASH WATER SOURCE	FRESH	
WASH FREQUENCY	INTERMITTENT	

** REHEATER

GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	15.0	
TEMPERATURE INCREASE - C	11.1	(20 F)

SOUTHERN INDIANA GAS & ELEC: A.B. BROWN 1 (CONT.)

** 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	237.84	(504000 ACFM)
FLUE GAS TEMPERATURE - C	145.0	(293 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		
LOCATION	SCRUBBER INLET	
DIMENSIONS	9.5 X 12.3	
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	
DIMENSIONS	12.0 X 8.0	
SHELL GENERIC MATERIAL TYPE	CARBON STEEL	
SHELL SPECIFIC MATERIAL TYPE	AISI 1110	
LINER GENERIC MATERIAL TYPE	ORGANIC	
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER	
** REAGENT PREPARATION EQUIPMENT		
FUNCTION	SLAKER	
DEVICE	NR	
DEVICE TYPE	NR	
MANUFACTURER	WALLACE & TIERNAN	
NUMBER	3	
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	3.6	(4 TPH)
PRODUCT QUALITY - % SOLIDS	20.0	

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	2
WASTE SLURRY BLEED	2

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	4
THICKENER UNDERFLOW	6
REGENERATION RETURN	2

** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	VACUUM FILTER
NUMBER	3
NUMBER OF SPARES	1
CAPACITY	340 TON/DAY
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
OUTLET STREAM CHARACTERISTICS	60% SOLIDS
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER	1

SOUTHERN INDIANA GAS & ELEC: A.B. BROWN 1 (CONT.)

NUMBER OF SPARES	0
DIMENSIONS - FT	100.0 DIA X 16.0
CAPACITY	800,000 GAL
SHELL GENERIC MATERIAL TYPE	CARBON STEEL

*** SLUDGE

** TREATMENT

METHOD	DEWATERED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	NONE
SITE DIMENSIONS	1400 FT X 1400 FT X 35 FT DEEP
SITE CAPACITY - CU.M	1834500 (1500.0 ACRE-FT)
SITE SERVICE LIFE - YRS	20

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	SCRUBBER MODULE PH, LIME REACTOR PH
CONTROL LEVELS	SCRUBBER MODULE 6.3-6.8, LIME REACTOR 8.0-10.0
MONITOR LOCATION	ABSORBER RECIR. LINE-LIME REACTOR OVERFLOW
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

WATER LOOP TYPE	OPEN/CLOSED

** CHEMICALS AND CONSUMPTION

NAME	LIME
CONSUMPTION	6.3 TPH

** FGD SPARE CAPACITY INDICES

ABSORBER - %	20.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.3

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/79	SYSTEM							744			
4/79	SYSTEM							720			29.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM BEGAN OPERATIONS ON MARCH 18, 1979. NO OPERATIONAL DATA ARE YET AVAILABLE.

5/79	SYSTEM							744			54.7
6/79	SYSTEM							720			65.4

** PROBLEMS/SOLUTIONS/COMMENTS

OPERATING HOURS ARE NOT YET AVAILABLE. HOWEVER, THE UNIT HAS BEEN RUNNING INTERMITTENTLY AS A RESULT OF PUMP LINER AND FRP PIPING DESIGN PROBLEMS.

7/79	SYSTEM		62.8		54.8			744	650	408	48.1
8/79	SYSTEM		94.3		94.2			744	743	701	51.7

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 FGD SYSTEM WAS FORCED OFF LINE FOR 43 HOURS DUE TO PROBLEMS WITH THE RECYCLE PUMP IMPELLERS.

9/79	SYSTEM		74.6		74.2			720	716	534	62.5

** PROBLEMS/SOLUTIONS/COMMENTS

IN SEPTEMBER 52 HOURS OF SCHEDULED OUTAGE WERE USED TO INSTALL A WATER FILTER. THE SCRUBBER WAS ALSO TAKEN OFF LINE FOR 72 HOURS FOR PRECIPITATOR TESTING. THE ONLY FORCED OUTAGE DURING THE MONTH BEGAN ON SEPTEMBER 28 AND LASTED THROUGH THE END OF THE MONTH AS A RESULT OF POOR FILTER CAKE QUALITY. THIS HAS RESULTED FROM PROBLEMS WITH THE VACUUM FILTERS AS WELL AS CHEMICAL PROBLEMS.

10/79	A	88.6	96.8	100.0	84.5						
	B	87.3	98.5	98.5	86.0						
	SYSTEM	88.0	97.7	99.3	85.3			744	649	634	49.6
11/79	A	91.0	97.1	98.2	89.4						
	B	91.0	94.4	95.5	86.9						
	SYSTEM	91.0	95.8	96.9	88.2			720	663	635	62.1
12/79	A	80.9	80.9	80.9	80.8						
	B	81.2	81.3	81.2	81.2						
	SYSTEM	81.1	81.1	81.1	81.0			744	743	603	53.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FOURTH QUARTER PROBLEMS WERE ENCOUNTERED WITH THE LIME SLAKER FEED.

THE THICKENER RAKE FROZE CAUSING 9 DAYS OUTAGE TIME.

THE ISOLATION DAMPER HAS CAUSED SOME PROBLEMS THIS QUARTER. THE UTILITY HAS NOT YET SOLVED THIS PROBLEM.

1/80	A	99.0	96.5	99.1	96.4						
	B	99.0	99.0	99.1	99.0						
	SYSTEM	99.0	98.0	99.1	97.7			744	744	727	65.8

** PROBLEMS/SOLUTIONS/COMMENTS

SEVEN HOURS OF FGD SYSTEM FORCED OUTAGE TIME DURING JANUARY WERE CAUSED BY A THICKENER RAKE STALL.

2/80	A	99.1	70.3	98.8	69.4						
	B	98.4	70.0	97.8	68.7						
	SYSTEM	98.8	70.2	98.3	69.1			696	687	481	75.5

** PROBLEMS/SOLUTIONS/COMMENTS

SOME OUTAGE TIME IN FEBRUARY RESULTED FROM A WET SLUDGE PRODUCT. A CHEMICAL IMBALANCE CAUSED THE SLUDGE PROBLEM.

3/80	A	98.7	64.8	95.2	26.5						
	B	99.2	51.6	96.3	21.1						
	SYSTEM	99.0	58.2	95.8	23.8			744	304	177	23.8

SOUTHERN INDIANA GAS & ELEC: A.B. BROWN 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 MARCH, BOILER DOWN TIME WAS DUE TO A SCHEDULED UNIT OUTAGE, DURING WHICH TIME MAINTENANCE WAS PERFORMED ON THE SCRUBBER.									
4/80	A	100.0	96.8	100.0	92.9						
	B	100.0	99.7	100.0	95.7						
	SYSTEM	100.0	98.3	100.0	94.3			720	691	679	58.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING APRIL, THERE WERE NO OPERATIONAL PROBLEMS WITH THE FGD SYSTEM. THE SYSTEM WAS AVAILABLE 100% OF THE TIME.									
5/80	A	100.0	100.0	100.0	82.8						
	B	100.0	100.0	100.0	82.8						
	SYSTEM	100.0	100.0	100.0	82.8			744	604	616	53.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MAY NO FORCED OUTAGES WERE EXPERIENCED WITH THE FGD SYSTEM. THE BOILER WAS OFF LINE FOR 140 HOURS DURING THE MONTH FOR GENERAL MAINTENANCE, DURING WHICH TIME SOME GENERAL FGD SYSTEM MAINTENANCE WAS ALSO PERFORMED.									
6/80	A	100.0	100.0	100.0	98.2						
	B	100.0	100.0	100.0	98.2						
	SYSTEM	100.0	100.0	100.0	98.2			720	706	707	55.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO FGD RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF JUNE. THE FGD SYSTEM OPERATED 100% OF THE TIME THE BOILER WAS ON LINE.									
7/80	A	98.1	97.9	97.9	92.5						
	B	86.8	87.7	87.7	82.9						
	SYSTEM	92.4	92.8	92.8	87.7			744	703	653	62.6
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE B MODULE RECIRCULATION PUMPS WERE THE MAJOR CAUSE OF DOWNTIME. TWO PIECES OF THE CHEVRON MIST ELIMINATOR FELL CAUSING THE SUCTION LINES TO PLUG.									
		ADDITIONAL PROBLEMS WITH THE PUMP WERE CAUSED BY THE THRUST BEARING. THIS WAS CORRECTED BY THE MANUFACTURER.									
		THE UNAVAILABILITY OF THE VACUUM FILTERS AND ASSOCIATED EQUIPMENT REQUIRED THE SCRUBBER TO SHUTDOWN TO AVOID A STOPPAGE OF THE THICKENER RAKE. THIS SITUATION ACCOUNTED FOR APPROXIMATELY 15 HOURS OF SYSTEM OUTAGE TIME DURING JULY.									
8/80	A	94.5	94.5	94.5	94.5						
	B	94.8	94.8	94.8	94.8						
	SYSTEM	94.6	94.6	94.6	94.6			744	744	704	61.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE MAJOR CAUSE OF UNAVAILABLITY FOR AUGUST WAS PROBLEMS WITH SOLIDS DISPOSAL, INCLUDING PROBLEMS WITH PRIMARY LIQUID-SOLID SEPARATION UP TO AND INCLUDING FINAL LANDFILLING.									
9/80	A	100.0	99.6	99.6	99.6						

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	100.0	99.6	99.6	99.6						
	SYSTEM	100.0	99.6	99.6	99.6			720	720	717	59.8

** PROBLEMS/SOLUTIONS/COMMENTS

SLUDGE DISPOSAL REMAINS THE MOST PREVALENT PROBLEM DUE TO MECHANICAL BREAKDOWN OF THE DISPOSAL TRUCKS AND UNDERFLOW PUMPS, IN ADDITION TO THE HIGH MAINTENANCE REQUIREMENTS OF THE ROTARY VACUUM FILTERS.

THE MONTH OF SEPTEMBER ALSO SAW AN EXTREMELY HIGH RATE OF FAILURE OF RECIRCULATION PUMPS, WITH DAMAGE TO THE RUBBER LINED CASINGS AND IMPELLERS. THE CAUSE OF THIS PROBLEM IS UNKNOWN TO THE UTILITY AT THIS POINT.

10/80	A	98.4	98.2	98.2	98.2						
	B	100.0	93.8	93.8	93.8						
	SYSTEM	99.2	96.0	96.0	96.0			744	744	714	59.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM UNAVAILABILITY DURING THE MONTH WAS CAUSED BY TWO SEPARATE INSTANCES OF REGULATOR VALVE FAILURE.

NO MAJOR FGD RELATED PROBLEMS WERE REPORTED FOR OCTOBER; HOWEVER, SEVERAL PROCESS LINES HAD LOW FLOWS AT TIMES DUE TO BLOCKAGES CAUSED BY PIECES OF BROKEN MIST ELIMINATOR.

11/80	A	97.5	83.8	85.2	54.6						
	B	97.5	83.8	85.2	54.6						
	SYSTEM	97.5	83.8	85.2	54.6			720	469	393	38.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS DOWN FROM NOVEMBER 7 TO NOVEMBER 17.

THE FGD SYSTEM WAS SHUTDOWN ON NOVEMBER 6 DUE TO DEPLETION OF THE SODA ASH INVENTORY WHICH RESULTED IN A LOW CHEMICAL CONCENTRATION.

THE TRANSITION DUCTWORK FROM ONE MODULE TO THE STACK WAS REPLACED WITH 317L SS WHILE THE OTHER SIDE RECEIVED A FLOUROELASTOMER COATING.

THE CHEVRONS WERE CAKED WITH AN EXTREMELY HARD AND HEAVY MATERIAL CONSISTING PRIMARILY OF SODIUM CARBONATES AND SULFATES.

THE MIST ELIMINATORS WERE RE-TIED DURING NOVEMBER TO PREVENT FURTHER SECTIONS FROM FALLING.

12/80	A	100.0	97.4	97.4	94.3						
	B	98.2	95.0	95.0	92.1						
	SYSTEM	99.2	96.2	96.2	93.2			744	721	694	52.4

** PROBLEMS/SOLUTIONS/COMMENTS

A MAJOR EQUIPMENT PROBLEM WITH THE LIME SLAKERS WAS ENCOUNTERED DURING DECEMBER. THE PH AND LEVEL CONTROLS CAUSED ERRATIC OPERATION SEVERAL TIMES DURING THE MONTH, ADDING TO THE CONTINUAL WATER BALANCE PROBLEMS.

1/81	A	99.3	98.9	98.9	98.9						
	B	99.3	98.8	98.8	98.8						
	SYSTEM	99.3	98.9	98.9	98.9			744	744	736	61.8

SOUTHERN INDIANA GAS & ELEC: A.B. BROWN 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 JANUARY OUTAGE TIME OCCURRED DUE TO ELECTRICAL MALFUNCTIONS OF THE SLAKE FEEDER.

ADDITIONAL PROBLEMS WERE ENCOUNTERED WITH DRIFTING OF THE PH MEASUREMENT SYSTEM.

2/81	A	99.0	99.0	99.0	99.0						
	B	99.6	99.6	99.6	99.6						
	SYSTEM	99.3	99.3	99.3	99.3			672	672	667	56.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY MODULES A AND B WERE DOWN FOR THREE HOURS DUE TO LIME TRANSFER SYSTEM PROBLEMS.

MODULE A REQUIRED AN ADDITIONAL FOUR HOURS OF DOWNTIME DUE TO PROBLEMS WITH THE RECIRCULATION PUMPS AND ASSOCIATED DISCHARGE VALVES.

MAINTENANCE WAS NECESSARY ON THE VACUUM FILTERS AND THE SLUDGE DISPOSAL TRUCKS DURING THE MONTH.

3/81	A	89.4	79.5	83.4	78.1						
	B	97.9	92.7	92.7	91.1						
	SYSTEM	93.6	86.1	88.2	84.6			744	731	630	59.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH A LOW CHEMICAL CONCENTRATION IN THE FGD SYSTEM CAUSED BY PREPARATION FOR A FIVE WEEK TURBINE OVERHAUL RESULTED IN SOME OUTAGE TIME.

ADDITIONAL DOWN TIME WAS DUE TO PROBLEMS ENCOUNTERED WITH THE ID FAN.

MODULE A EXPERIENCED SOME OUTAGE TIME DUE TO FAILURE OF THE RECIRCULATION PUMP LINING.

4/81	A	100.0	.0		.0						
	B	100.0	.0		.0						
	SYSTEM	100.0	.0		.0			720	87	0	5.5

** PROBLEMS/SOLUTIONS/COMMENTS

IN PREPARATION FOR A SCHEDULED FIVE-WEEK TURBINE/GENERATOR OUTAGE, THE SODA ASH PLANT WAS SHUTDOWN AT THE END OF MARCH. THE BOILER REMAINED ON LINE FOR 87 HOURS AT THE BEGINNING OF APRIL; HOWEVER, THE FGD SYSTEM WAS NOT OPERATED DUE TO THE LACK OF SODA ASH, PRECLUDING THE POSSIBILITY OF MEETING EMISSION LIMITATIONS.

DURING THE OVERHAUL THE LINING WAS REPLACED IN THE BYPASS DUCT, A SLAKER GRIT REMOVAL SLUICING SYSTEM WAS INSTALLED AND A DRAIN RECOVERY SYSTEM WAS ADDED.

THE MIST ELIMINATORS WERE REPLACED CAUSING INTERNAL AND EXTERNAL PIPING CHANGES FOR THE MIST ELIMINATOR WASH HEADERS.

5/81	A	86.7	79.5	80.9	49.6						
	B	88.7	82.5	84.0	51.5						
	SYSTEM	87.7	81.0	82.4	50.5			744	464	376	35.9

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	A	99.9	99.2	99.2	99.6						
	B	99.8	98.1	99.1	96.5						
	SYSTEM	99.9	98.6	99.1	97.0			720	708	699	63.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE TURBINE-GENERATOR OUTAGE, WHICH LASTED UNTIL MAY 12, THE CAST-IRON TEES ADJACENT TO THE DOWNSTREAM SIDE OF THE REGENERATION PUMP DISCHARGE VALVES WERE REPLACED WITH A HIGH DENSITY PLASTIC MATERIAL. THIS ACCOUNTED FOR 46 HOURS OF DOWN TIME.

TWO INSTANCES ACCOUNTING FOR SOME ADDITIONAL OUTAGE TIME WAS CAUSED BY A MALFUNCTION OF THE LIME TRANSFER SYSTEM.

A PROBLEM WITH THE LIME REACTOR PH MEASUREMENT SYSTEM AND THE REPAIR OF A RECIRCULATION PUMP ACCOUNTED FOR ADDITIONAL SYSTEM DOWN TIME.

7/81	A	100.0	91.3	96.3	91.3						
	B	82.8	77.4	78.9	77.4						
	SYSTEM	91.4	84.3	87.4	84.3			744	744	627	62.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE RECIRCULATION PUMP TRIPS ACCOUNTED FOR THE UNAVAILABILITY.

THE LIME SLAKERS, THE LIME TRANSFER SYSTEM AND THE ROTARY VACUUM FILTERS WERE CONSTANT PROBLEMS DURING THE MONTH BUT THE SPARE CAPACITY ENABLED CONTINUED OPERATION.

8/81	A	99.9	97.0	97.0	96.6						
	B	84.7	81.8	81.8	81.5						
	SYSTEM	92.3	89.4	89.4	89.0			744	741	662	52.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY, THE B MODULE WAS UNAVAILABLE FOR 128 HOURS AS A RESULT OF PROBLEMS WITH THE RECIRCULATION PUMPS. REPLACEMENT LINERS HAD NOT BEEN RECEIVED.

9/81	A	97.5	97.3	97.3	90.3						
	B	97.5	97.3	90.3	90.3						
	SYSTEM	97.5	97.3	90.3	90.3			720	668	650	45.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNAVAILABILITY OF THE B MODULE DURING THE MONTH RESULTED FROM CONTINUING PROBLEMS WITH THE RECIRCULATION PUMP LINERS.

FREQUENT BREAKDOWNS OF THE LIME PROCESSING EQUIPMENT (SLAKER AND PNEUMATIC TRANSFER SYSTEM) LED TO NUMEROUS SHORT TERM PERIODS DURING THE MONTH WHEN THE FLUE GAS WAS NOT TREATED.

10/81	A	98.2	94.4	94.4	85.0						
	B	98.2	93.0	93.8	83.8						
	SYSTEM	98.2	93.7	94.1	84.4			744	670	628	53.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS TAKEN OFF LINE ON THE WEEKEND OF SEPTEMBER 18 TO FIX SEVERAL STEAM LEAKS. THE UNIT CAME BACK ON LINE ON SEPTEMBER 21, BUT THE LIME REACTOR AGITATOR MOTOR WOULD NOT OPERATE AND REQUIRED REPLACEMENT. THIS ACCOUNTED FOR THE FGD SYSTEM UNAVAILABILITY DURING THE MONTH.

SOUTHERN INDIANA GAS & ELEC: A.B. BROWN 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 OCTOBER NUMEROUS INSTANCES OF LIME SLAKER AND LIME TRANSFER SYSTEM PROBLEMS OCCURRED.								
11/81	A	96.0	92.9	92.9	92.9						
	B	90.3	88.9	88.9	88.9						
	SYSTEM	92.6	90.9	90.9	90.9			720	720	654	49.2
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING NOVEMBER PROBLEMS WERE ENCOUNTERED WITH THE THICKENER RAKE.								
			ADDITIONAL OUTAGE TIME DURING THE MONTH WAS CAUSED BY RECIRCULATION PUMP FAILURES.								
			ISOLATION DAMPER PROBLEMS CAUSED THREE HOURS OF DOWN TIME.								
12/81	A	95.0	67.4	67.4	41.3						
	B	100.0	57.9	57.9	35.5						
	SYSTEM	97.5	62.7	62.7	38.4			744	456	286	32.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
			DURING DECEMBER THE BOILER WAS SHUT DOWN FOR APPROXIMATELY TWO WEEKS.								
			ISOLATION DAMPER PROBLEMS CONTINUED TO BE A PROBLEM DURING DECEMBER.								
			FGD SYSTEM OPERATION WAS INTERRUPTED SEVERAL TIMES BY THE PNEUMATIC LIME TRANSFER SYSTEM.								
1/82	A	89.5	81.8	81.8	81.7						
	B	89.5	76.0	76.0	75.9						
	SYSTEM	89.5	78.9	78.9	78.8			744	743	586	46.7
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE 78 HOURS OF UNAVAILABLE TIME IN JANUARY WAS DUE TO FROZEN WATER SUPPLY LINES FOR THE LIME SLAKERS.								
2/82	A	94.0	84.6	84.6	68.4						
	B	100.0	93.7	93.7	75.7						
	SYSTEM	97.0	89.2	89.2	72.1			672	543	484	38.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
			THE FGD SYSTEM WAS OUT OF SERVICE FOR 107 HOURS DURING FEBRUARY DUE TO A LEAK IN THE PLANT IN-COMING WATER SUPPLY PIPE.								
3/82	A	100.0	98.2	98.2	71.6						
	B	100.0	78.3	78.3	56.2						
	SYSTEM	100.0	89.0	89.0	63.9			744	534	475	35.5
	** PROBLEMS/SOLUTIONS/COMMENTS										
			A SCHEDULED UNIT OUTAGE BEGAN ON MARCH 23 AND IS SCHEDULED THRU APRIL. NO MAJOR WORK IS REQUIRED ON THE FGD SYSTEM.								
4/82	A	92.5	90.2	90.2	81.9						
	B	96.3	93.2	93.2	84.6						
	SYSTEM	94.4	91.7	91.7	83.2			720	654	599	55.0

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
5/82	A	100.0	97.6	97.6	89.0						
	B	100.0	100.0	100.0	92.2						
	SYSTEM	100.0	98.8	98.8	90.6			744	678	674	43.9
6/82	A	97.4	96.8	96.8	96.0						
	B	97.4	96.8	96.8	96.0						
	SYSTEM	97.4	96.8	96.8	96.0			720	714	691	42.0
7/82	N	99.2	97.3	97.3	96.0						
	S	99.2	99.2	99.2	97.8						
	SYSTEM	99.2	98.2	98.2	96.9			744	734	721	44.2
8/82	N	100.0	100.0	100.0	100.0						
	S	97.6	85.6	97.3	85.6						
	SYSTEM	98.8	92.8	98.6	92.8			744	744	690	45.3
9/82	N	98.9	97.3	97.3	42.4						
	S	98.2	95.7	95.7	41.7						
	SYSTEM	98.5	96.5	96.5	42.1			720	314	303	20.8
10/82	N	100.0	100.0	100.0	100.0						
	S	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	57.1
11/82	N	100.0	100.0	100.0	100.0						
	S	96.4	96.4	100.0	96.4						
	SYSTEM	98.2	98.2	100.0	98.2			720	720	707	87.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE SYSTEM WAS FORCED DOWN PART OF THE TIME DUE TO A BROKEN OIL DRAIN LINE ON THE THICKENER.

OUTAGE TIME WAS DUE TO AN INLET ISOLATION DAMPER AND BOOSTER FAN INLET DAMPER PROBLEM.

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

** PROBLEMS/SOLUTIONS/COMMENTS

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

** PROBLEMS/SOLUTIONS/COMMENTS

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

** PROBLEMS/SOLUTIONS/COMMENTS

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FROM SEPTEMBER 10 TO SEPTEMBER 27 FOR A SCHEDULED OUTAGE.

** PROBLEMS/SOLUTIONS/COMMENTS

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

SOUTHERN INDIANA GAS & ELEC: A.B. BROWN 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 NO MAJOR FGD-RELATED PROBLEMS DURING NOVEMBER.

12/82	N	96.9	96.9	96.9	96.9						
	S	96.4	96.4	96.4	96.4						
	SYSTEM	96.6	96.6	96.6	96.6			744	744	719	68.4

** PROBLEMS/SOLUTIONS/COMMENTS

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

1/83	N	98.9	98.9	98.9	98.9						
	S	98.7	98.7	98.7	98.7						
	SYSTEM	98.8	98.8	98.8	98.8			744	744	735	57.1

** PROBLEMS/SOLUTIONS/COMMENTS

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

2/83	N	100.0	100.0	100.0	100.0						
	S	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			672	672	672	51.3

** PROBLEMS/SOLUTIONS/COMMENTS

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

3/83	N	100.0	100.0	100.0	100.0						
	S	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	54.8

** PROBLEMS/SOLUTIONS/COMMENTS

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

4/83	SYSTEM	48.1	67.4	67.4	48.1			720	513	346	36.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS SHUT DOWN ONE WEEK PRIOR TO A BOILER OUTAGE IN APRIL. DURING THE SHUT-DOWN, A MAJOR REWORKING OF THE FGD SYSTEM WAS PERFORMED.

INCLUDED IN THE FGD SYSTEM REWORKING WAS THE INSTALLATION OF A HORIZONTAL BELT VACUUM FILTER.

A NEW THICKENER TANK WALL EXTENSION AND RAKE WERE INSTALLED DURING THE FGD SYSTEM REWORKING.

NEW UNDERFLOW, LIME SLURRY, AND SUMP PUMPS WERE INSTALLED DURING THE FGD SYSTEM REWORKING.

MODIFICATIONS WERE MADE TO THE LIME SLAKING AREA DURING THE FGD SYSTEM REWORKING.

5/83	N	62.5	80.7	80.7	62.5						
	S	62.5	80.7	80.7	62.5						
	SYSTEM	62.5	80.7	80.7	62.5			744	576	465	37.7

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE FGD SYSTEM REWORKING OUTAGE WAS COMPLETED DURING MAY, FIVE DAYS AFTER START-UP OF THE BOILER.									
6/83	N	99.9	99.9	99.9	98.3						
	S	94.6	94.5	94.5	93.1						
	SYSTEM	97.2	97.2	97.2	95.7			720	709	689	52.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.									
7/83	N	100.0	100.0	100.0	98.8						
	S	100.0	100.0	100.0	98.8						
	SYSTEM	100.0	100.0	100.0	98.8			744	735	735	61.0
8/83	N	100.0	100.0	100.0	100.0						
	S	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	61.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JULY AND AUGUST 1983.									
9/83	N	67.9	75.1	75.1	67.9						
	S	67.9	75.1	75.1	67.9						
	SYSTEM	67.9	75.1	75.1	67.9			720	651	489	59.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		A SCHEDULED FGD SYSTEM OUTAGE OCCURRED FROM SEPTEMBER 19 TO 28.									
		NEW EQUIPMENT AND PIPING TIE-INS WERE INSTALLED DURING SEPTEMBER TO MAINTAIN AVAILABILITY AND RELIABILITY.									
10/83	N	100.0	99.9	99.9	99.9						
	S	100.0	99.9	99.9	99.9						
	SYSTEM	100.0	99.9	99.9	99.9			744	744	743	70.1
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BOTH MODULES WERE FORCED OUT OF SERVICE DURING PART OF OCTOBER DUE TO PLUGGAGE AT THE THICKENER TANK UNDERFLOW LINE.									
11/83	N	100.0	100.0	100.0	99.6						
	S	100.0	100.0	100.0	99.6						
	SYSTEM	100.0	100.0	100.0	99.6			720	717	717	72.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING NOVEMBER 1983.									
12/83	N	26.6	16.4	16.4	7.3						
	S	28.5	16.4	16.4	7.3						
	SYSTEM	27.6	16.4	16.4	7.3			744	330	54	26.1

SOUTHERN INDIANA GAS & ELEC: A.B. BROWN 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/84	N	99.6	77.1	77.1	69.8						
	S	99.6	77.1	77.1	69.8						
	SYSTEM	99.6	77.1	77.1	69.8			744	673	519	55.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT EXPERIENCED PRECIPITATOR HOPPER FREEZING PROBLEMS DURING THE MONTH WHICH DELAYED FGD SYSTEM USAGE.

A MAJOR BOILER AND FGD OUTAGE OCCURRED IN DECEMBER. THE FGD SYSTEM EXPERIENCED A CHEMICAL IMBALANCE PROBLEM THAT CAUSED SOLID CARRYOVER TO THE ABSORBERS. THE PROBLEM WAS RESOLVED IN JANUARY 1984.

DAMPER FREEZING PROBLEMS WERE REPORTED DURING DECEMBER.

FREEZING UNDERFLOW IN THE THICKENER TANK RECIRCULATION LINE CONTRIBUTED TO FGD SYSTEM DOWN TIME DURING THE MONTH.

2/84	N	100.0	100.0	100.0	100.0						
	S	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			696	696	696	58.3

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED PROBLEMS WITH THE NEWLY INSTALLED MODULATING DAMPERS.

THE FGD SYSTEM WAS DOWN DURING THE FIRST PART OF JANUARY DUE TO A SOLID CARRYOVER PROBLEM IN THE ABSORBERS. THE RATIOS AND LEVELS OF CHEMICALS WERE SUCH THAT SOLID FORMATION WAS NOT SUFFICIENT TO ALLOW PROPER SETTLING.

3/84	N	99.7	99.7	99.7	99.7						
	S	99.7	99.7	99.7	99.7						
	SYSTEM	99.7	99.7	99.7	99.7			744	744	742	75.2

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING FEBRUARY.

4/84	N	43.1	99.7	100.0	42.9						
	S	42.9	99.4	99.7	42.8						
	SYSTEM	43.0	99.5	99.8	42.8			720	310	309	32.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH, BOTH FD FANS TRIPPED ON A FALSE HIGH BEARING TEMPERATURE ALARM.

5/84	N	.0			.0						
	S	.0			.0						
	SYSTEM	.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

A SPRING OUTAGE CONTINUED THROUGH APRIL DUE TO STACK LINER REPAIRS.

6/84	N	80.0	83.5	83.5	61.1						
	S	80.0	83.5	83.5	61.1						
	SYSTEM	80.0	83.5	83.5	61.1			720	527	440	49.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED A BOILER OUTAGE DURING MAY.

SOUTHERN INDIANA GAS & ELEC: A.B. BROWN 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
7/84	N	99.5	100.0	99.5	97.4						
	B	99.5	100.0	99.5	97.4						
	SYSTEM	99.5	100.0	99.5	97.4			744	722	725	56.9
8/84	N	97.3	97.3	97.3	97.3						
	S	99.6	99.6	99.6	99.6						
	SYSTEM	98.5	98.5	98.5	98.5			744	744	733	56.4

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD RELATED PROBLEMS WERE ENCOUNTERED IN JUNE THROUGH AUGUST.

9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR SEPTEMBER 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SPRINGFIELD CITY UTILITIES	
PLANT NAME	SOUTHWEST	
UNIT NUMBER	1	
CITY	SPRINGFIELD	
STATE	MISSOURI	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	173	
GROSS UNIT GENERATING CAPACITY - MW	194	
NET UNIT GENERATING CAPACITY W/FGD - MW	173	
NET UNIT GENERATING CAPACITY WO/FGD - MW	182	
EQUIVALENT SCRUBBED CAPACITY - MW	194	
** 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 - %	.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	.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		

SPRINGFIELD CITY UTILITIES: 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	9/77	
INITIAL START-UP	4/77	
CONTRACT AWARDED	8/73	

** 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 - %	.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

SPRINGFIELD CITY UTILITIES: SOUTHWEST 1 (CONT.)

NUMBER OF PASSES PER STAGE	3
DISTANCE BETWEEN STAGES - CM	1.52 (.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	NONE
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	.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	.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	.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

SPRINGFIELD CITY UTILITIES: 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

SPRINGFIELD CITY UTILITIES: 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

*** 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
FAN - %	.0
BALL MILL - %	.0
THICKENER - %	.0
VACUUM FILTER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.3
MIST ELIMINATOR	.3
FAN	.0
BALL MILL	.0
THICKENER	.0
VACUUM FILTER	.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 ELECTRICAL WORK). FOLLOWING AIR/WATER TESTS AND CHECKOUT OF LIMESTONE PREPARATION FACILITIES, THE FGD PLANT WAS STARTED UP IN EARLY APRIL 1977 FOR MECHANICAL SHAKEDOWN/DEBUGGING OPERATIONS WHICH CONTINUED THROUGHOUT THE SUMMER. COMPLIANCE TESTING AND CERTIFICATION OF COMMERCIAL AVAILABILITY WERE SUCCESSFULLY COMPLETED IN SEPTEMBER, JUST BEFORE A SCHEDULED 3-MONTH FALL SHUTDOWN. OPERATION OF THE SYSTEM HAS BEEN HAMPERED BY A NUMBER OF PROBLEMS: MIST ELIMINATOR PLUGGING (PIPING TO M.E. SPRAY SYSTEM HAS BEEN MODIFIED), 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 EXPERIENCING 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 INSPECTION.

10/77	SYSTEM							744			

SPRINGFIELD CITY UTILITIES: 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			

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

INSTRUMENTATION PROBLEMS WERE ENCOUNTERED DURING THE MONTH. PH PROBES WERE LOST, THE MAG-FLOW METER FOR LIMESTONE SLURRY FAILED, AND THE AUTOMATIC 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						
	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 WHICH 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 THE PROBES.

8/78	S-1	59.0	59.0	59.0	59.0						
	S-2	.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 OOWN 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						
	SYSTEM	11.1	14.3	14.3	11.1			720	557	80	49.1

SPRINGFIELD CITY UTILITIES: 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			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.

PERFORMANCE DATA

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						
	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						
	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

SPRINGFIELD CITY UTILITIES: SOUTHWEST 1 (CONT.)

PERFORMANCE DATA

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						
	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						
	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

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

** 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			744	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						
	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						

SPRINGFIELD CITY UTILITIES: 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 TAKING 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

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

** 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.

** 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.

** 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.

** 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 BECAUSE 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.

SPRINGFIELD CITY UTILITIES: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
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
9/80	S-1	78.5	85.8	87.4	78.5						
	S-2	57.5	.6	.2	.2						
	SYSTEM	68.0	43.2	43.8	39.4			720	658	283	80.3

** 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.

** 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 REPAIRS COULD BE MADE.

PROBLEMS WERE ENCOUNTERED WITH THE S-2 MODULE RECYCLE PUMP.

** 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.

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

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			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			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						
	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-

SPRINGFIELD CITY UTILITIES: 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

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE ONLY SIGNIFICANT FGD SYSTEM OUTAGE DURING JULY WAS NECESSARY FOR MODIFICATION 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 SYSTEM 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 END 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			720	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

SPRINGFIELD CITY UTILITIES: 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 APPROXIMATELY 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						
	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						
	S-2	.0			.0						
	SYSTEM	.0			.0			720	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 MAJOR 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

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

** 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 TIME 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 SEPTEMBER 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

SPRINGFIELD CITY UTILITIES: 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

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						
	S-2	.0			.0						
	SYSTEM	.0			.0			744	0	0	.0
2/83	S-1	.0			.0						
	S-2	.0			.0						
	SYSTEM	.0			.0			672	0	0	.0
3/83	S-1	.0			.0						
	S-2	.0			.0						
	SYSTEM	.0			.0			744	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

** 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

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

SPRINGFIELD CITY UTILITIES: 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										
		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						
	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 THE 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 WAS LATER REPLACED.									
9/84	SYSTEM							720			

UTILITY FGD SURVEY: OCTOBER 1983 - SEPTEMBER 1984

SPRINGFIELD CITY UTILITIES: SOUTHWEST 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

INFORMATION WAS UNAVAILABLE FOR SEPTEMBER 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SPRINGFIELD WATER, LIGHT & PWR	
PLANT NAME	DALLMAN	
UNIT NUMBER	3	
CITY	SPRINGFIELD	
STATE	ILLINOIS	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	350	
GROSS UNIT GENERATING CAPACITY - MW	205	
NET UNIT GENERATING CAPACITY W/FGD - MW	192	
NET UNIT GENERATING CAPACITY WO/FGD - MW	202	
EQUIVALENT SCRUBBED CAPACITY - MW	205	
** 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	401.11	(850000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	137.8	(280 F)
STACK HEIGHT - M	152.	(500 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL 1 [50%]	
FUEL GRADE	BITUMINOUS; BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26444.	(11369 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		NR; 10500-11500
AVERAGE ASH CONTENT - %	10.65	
RANGE ASH CONTENT - %	NR; 8.0-14.0	
AVERAGE MOISTURE CONTENT - %	11.75	
RANGE MOISTURE CONTENT - %	6.9-10.3; 13.6-17.5	
AVERAGE SULFUR CONTENT - %	3.05	
RANGE SULFUR CONTENT - %	NR; 2.5-4.0	
AVERAGE CHLORIDE CONTENT - %	.10	
RANGE CHLORIDE CONTENT - %	NR; .07-.16	
*** 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	AIR CORRECTION DIVISION, UOP	
INLET FLUE GAS CAPACITY - CU.M/S	413.9	(877127 ACFM)
INLET FLUE GAS TEMPERATURE - C	161.7	(323 F)
PRESSURE DROP - KPA	.5	(2. 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	

*** 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	BURNS & MCDONNELL
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	95.00
ENERGY CONSUMPTION - %	4.9
CURRENT STATUS	1
COMMERCIAL START-UP	1/81
INITIAL START-UP	10/80
CONTRACT AWARDED	12/77

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	3.30	
DESIGN COAL HEAT CONTENT - J/G	25586.0	(11000 BTU/LB)
DESIGN COAL ASH CONTENT - %	10.40	
DESIGN MOISTURE CONTENT - %	15.90	
DESIGN CHLORIDE CONTENT - %	.07	
OPER. & MAINT. REQUIREMENT - MANHR/DAY	64.0	

** QUENCHER/PRESATURATOR

NUMBER	2	
TYPE	QUENCHER	
SUPPLIER	RESEARCH-COTTRELL	
INLET GAS FLOW - CU. M/S	215.19	(456000 ACFM)
INLET GAS TEMPERATURE - C	137.8	(280 F)
PRESSURE DROP - KPA	.2	(1.0 IN-H2O)
LIQUID RECIRCULATION RATE - LITERS/S	416.	(6600 GPM)
L/G RATIO - L/CU. M	1.9	(14.5 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	COMBINATION TOWER	
SPECIFIC TYPE	SPRAY/PACKED	
TRADE NAME/COMMON TYPE	SPRAY/FIXED BED PACKING	
SUPPLIER	RESEARCH-COTTRELL	
DIMENSIONS - FT	30.0 DIA X 92.5	
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	2	
DISTANCE BETWEEN GAS CONTACTING ZONES - CM	61.0	(24.0IN)
LIQUID RECIRCULATION RATE - LITER/S	1600.	(25400 GPM)
L/G RATIO - L/CU.M	7.4	(55.7 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.2	(.7 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	2.8	(9.1 FT/S)
INLET GAS FLOW - CU. M/S	215.19	(456000 ACFM)
INLET GAS TEMPERATURE - C	137.8	(280 F)
SO2 REMOVAL EFFICIENCY - %	95.0	
PARTICLE REMOVAL EFFICENCY - %	.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
NUMBER PER SYSTEM	2
NUMBER OF SPARES PER SYSTEM	0
NUMBER PER MODULE	1

SPRINGFIELD WATER, LIGHT & PWR: DALLMAN 3 (CONT.)

GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
MANUFACTURER	RESEARCH-COTTRELL	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	2	
NUMBER OF PASSES PER STAGE	2	
FREEBOARD DISTANCE - M	1.83	(6.0 FT)
DISTANCE BETWEEN STAGES - CM	91.44	(36.0 IN)
DISTANCE BETWEEN VANES - CM	2.5	(1.00 IN)
VANE ANGLES - DEGREES	30	
PRESSURE DROP - KPA	.1	(.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	2.7	(9.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPROPYLENE	
WASH WATER SOURCE	FRESH	
WASH FREQUENCY	EVERY 8 HRS [UPPER], 15 MIN [LOWER]	
WASH RATE - L/S	14.5	(230 GAL/MIN)

** REHEATER

NUMBER	1	
NUMBER OF SPARES	0	
GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	10.0	
TEMPERATURE INCREASE - C	27.8	(50 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	AMERICAN STANDARD	
FUNCTION	BOOSTER	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	217.07	(460000 ACFM)
FLUE GAS TEMPERATURE - C	137.8	(280 F)
PRESSURE DROP - KPA	1.2	(4.0 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	217.07	(460000 ACFM)
FLUE GAS TEMPERATURE - C	137.8	(280 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	2	
FUNCTION	CONTROL	
GENERIC TYPE	LOUVER	
SPECIFIC TYPE	N/A	
MANUFACTURER	AMERICAN STANDARD	
MODULATION	OPEN	
SEAL AIR FLOW - CU. M/S	.00	(0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	
LINER GENERIC MATERIAL TYPE	ORGANIC	
LINER SPECIFIC MATERIAL TYPE	INERT FLAKE-FILLED VINYL ESTER	

** DAMPERS

NUMBER	2	
FUNCTION	SHUT-OFF	

SPRINGFIELD WATER, LIGHT & PWR: DALLMAN 3 (CONT.)

GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	ANDCO
MODULATION	OPEN
SEAL AIR FLOW - CU. M/S	.00 (0 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	INERT FLAKE-FILLED VINYL ESTER

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	ANDCO
CONSTRUCTION MATERIAL GENERIC TYPE	HIGH ALLOY [WROUGHT]
CONSTRUCTION MATERIAL SPECIFIC TYPE	IRON BASE/NICKEL-CHROMIUM-COPPER-MOLYBDENUM
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

NUMBER	1
FUNCTION	SHUT-OFF
GENERIC TYPE	LOUVER
SPECIFIC TYPE	N/A
MANUFACTURER	MOSSER
MODULATION	OPEN
SEAL AIR FLOW - CU. M/S	.00 (0 ACFM)
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	ABSORBER OUTLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	100.0 X 13.5 X 13.5
SHELL GENERIC MATERIAL TYPE	HIGH ALLOY
SHELL SPECIFIC MATERIAL TYPE	IRON BASE/CHROMIUM-MOLYBDENUM-NICKEL-COPPER
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	FIBER-REINFORCED POLYESTER

** DUCTWORK

LOCATION	ABSORBER INLET
CONFIGURATION	RECTANGULAR
DIMENSIONS	30.0 X 9.5 X 11.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

LOCATION	BYPASS
CONFIGURATION	RECTANGULAR
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	TUBE MILL
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	2
NUMBER OF SPARES	1
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	121.6 (134 TPH)
PRODUCT QUALITY - % SOLIDS	35.0

SPRINGFIELD WATER, LIGHT & PWR: DALLMAN 3 (CONT.)

** REAGENT PREPARATION EQUIPMENT

FUNCTION	GRIT REMOVAL (BALL MILL/REAGENT FEED TANK)
DEVICE	HYDROCYCLONE
MANUFACTURER	KREBS
NUMBER	4
NUMBER OF SPARES	2

** REAGENT PREPARATION EQUIPMENT

FUNCTION	CLASSIFICATION (ABSORBER FEED TANK)
DEVICE	HYDROCYCLONE
MANUFACTURER	KREBS
NUMBER	8

** TANKS

SERVICE	NUMBER
QUENCHER FEED	2
ABSORBER FEED	1
REAGENT PREP PRODUCT	1
MIST ELIMINATOR WASH	1
VACUUM FILTER FILTRATE	1
WASTE SLURRY BLEED	1
MILL SLURRY SUMP	2

** PUMPS

SERVICE	NUMBER
ABSORBER FEED	6
QUENCHER	4
DEMISTER WASH	2
SUMP	2
MILL SLURRY	4
VACUUM FILTER	2
FILTRATE	2
HYDROCLONE FEED	4
REAGENT FEED	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	2
NUMBER OF SPARES	1
DIMENSIONS - FT	4.1 X 4 X 20
CAPACITY	30
SHELL GENERIC MATERIAL TYPE	CAST IRON
SHELL SPECIFIC MATERIAL TYPE	NR
BELT GENERIC MATERIAL TYPE	ORGANIC
BELT SPECIFIC MATERIAL TYPE	POLYPROPYLENE; DACRON
FEED STREAM SOURCE	ABSORBER BLEED & QUENCHER HOLD TANK
FEED STREAM CHARACTERISTICS	55% SOLIDS
OUTLET STREAM CHARACTERISTICS	85% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	118GPM

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	HYDROCYCLONE
NUMBER	18
NUMBER OF SPARES	6
DIMENSIONS - FT	8.5 X 9
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	NATURAL RUBBER

*** SALEABLE BYPRODUCTS

NATURE	NONE

*** SLUDGE

SPRINGFIELD WATER, LIGHT & PWR: DALLMAN 3 (CONT.)

FULL LOAD SLUDGE QUANTITY - M.TONS/HR (DRY)	27.2	(30.0 TPH)
MOISTURE CONTENT - % TOTAL FREE WATER	85.0	

** TREATMENT	
METHOD	FORCED OXIDATION
DEVICE	SPARGER IN QUENCHER
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
LOCATION	OFF-SITE
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	CLAY LINING
SITE DIMENSIONS	50 ACRES
** PROCESS CONTROL AND INSTRUMENTATION	
CHEMICAL PARAMETERS	PH
CONTROL LEVELS	QUENCHER PUMP [PH 4.5]; ABSORBER FEED TANK PUMP
MONITOR TYPE	BECKMAN
MONITOR LOCATION	PUMP DISCHARGE
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
MAKEUP WATER ADDITION - LITERS/S	15.1 (239 GPM)
SOURCE OF MAKEUP WATER	LAKE WATER
** CHEMICALS AND CONSUMPTION	
FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	CALCIUM CARBONATE (CACO3)
SOURCE/SUPPLIER	CENTRAL STONE
CONSUMPTION	1.02 STOICHOMETRIC
UTILIZATION - %	67.0
POINT OF ADDITION	BALL MILL
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	20.0
BALL MILL - %	20.0
VACUUM FILTER - %	100.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.3
VACUUM FILTER	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

FGD SYSTEM OPERATION AT DALLMAN 3 COMMENCED IN OCTOBER 1980.

11/80	SYSTEM							720			
12/80	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

SINCE STARTUP NO MAJOR FGD-RELATED PROBLEMS HAVE BEEN ENCOUNTERED. THE UTILITY HAS REPORTED SOME CONDENSER TUBE PROBLEMS HAVE BEEN EXPERIENCED WITH THE BOILER.

1/81	A	93.5	93.5	93.5	93.5						

SPRINGFIELD WATER, LIGHT & PWR: DALLMAN 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	22.6	22.6	22.6	22.6						
	SYSTEM	58.1	58.1	58.1	58.1			744	744	432	79.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY SOME OUTAGE TIME WAS DUE TO PH EXCURSIONS IN THE QUENCHER SECTIONS THAT NECESSITATED THE INSPECTION OF BOTH MODULES.

ACCUMULATION OF FLY ASH AND SULFITE PARTICLES LED TO THE REPLACEMENT OF SOME PACKING MATERIAL IN MODULE B.

2/81	A	.0	.0	.0	.0						
	B	100.0	95.0	95.0	80.2						
	SYSTEM	50.0	47.6	47.6	40.2			672	567	270	68.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE BOILER WAS OUT OF SERVICE APPROXIMATELY 49 HOURS.

MODULE A REMAINED OUT OF SERVICE DUE TO INADEQUATE PACKING.

3/81	A	.0	.0		.0						
	B	100.0	91.5	91.5	38.7						
	SYSTEM	50.0	45.7	45.7	19.4			744	315	144	31.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH APPROXIMATELY 429 HOURS OF OUTAGE TIME WAS DUE TO THE CONDENSER TUBES BEING REPLACED.

MODULE A WAS NOT AVAILABLE DURING MARCH DUE TO INADEQUATE PACKING.

4/81	SYSTEM	.0	.0		.0			720	78	0	4.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOILER WAS OUT OF SERVICE APPROXIMATELY 642 HOURS DUE TO A SCHEDULED MAINTENANCE OVERHAUL.

THE FGD SYSTEM WAS UNAVAILABLE THE ENTIRE MONTH TO FACILITATE REPAIRS TO PROCESS PIPING, REPLACEMENT OF THE PACKING MATERIAL IN THE ABSORBER TOWERS, INSTALLATION OF THE STRAINER SYSTEMS ON ABSORBER FEED TANK AND MAKEUP WATER SYSTEM, AND REPAIR MINOR CORROSION DAMAGE.

5/81	A	39.5	33.5	33.5	27.3						
	B	40.7	3.6	3.6	3.0						
	SYSTEM	40.1	18.6	18.6	15.1			744	606	113	50.0

** PROBLEMS/SOLUTIONS/COMMENTS

FROM MAY 1 TO MAY 18 THE SYSTEM WAS UNAVAILABLE SO THAT THE HYDROCLONE FRP LINE COULD BE REPLACED WITH CARBON STEEL FOR MODULE B AND RUBBER FOR MODULE A.

6/81	A	53.1	58.2	58.2	53.1						
	B	39.2	42.9	42.9	39.2						
	SYSTEM	46.2	50.6	50.6	46.2			720	657	333	63.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS REMOVED FROM SERVICE TWICE DURING THE MONTH DUE TO PROBLEMS WITH THE ELECTROSTATIC PRECIPITATOR.

BOTH TOWERS WERE TAKEN OUT OF SERVICE ON JUNE 19 DUE TO WET WELL HYDROCLONE

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PROBLEMS.								
7/81	A	40.6	29.8	29.8	28.6						
	B	67.6	57.9	57.9	55.6						
	SYSTEM	54.1	43.9	43.9	42.1			744	715	313	69.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS REMOVED FROM SERVICE FOR PART OF THE MONTH FOR CLEANING THAT WAS NECESSITATED BY PLUGGED PACKING.

THE MODULE B DOWNTIME DURING THE MONTH WAS ATTRIBUTED TO INSPECTIONS AND CLEANING OF THE PACKING, NOZZLES, AND HEADERS.

8/81	SYSTEM	.0	.0	.0	.0			744	709	0	69.0

** PROBLEMS/SOLUTIONS/COMMENTS

BOTH MODULES WERE UNAVAILABLE DURING AUGUST AS THE PACKING WAS REPLACED IN BOTH TOWERS.

9/81	A	87.9	78.0	88.5	77.8						
	B	54.2	47.0	68.8	46.9						
	SYSTEM	71.1	62.5	80.0	62.4			720	718	449	55.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER DOWN TIME FOR MODULE A WAS DUE TO CELL PROBLEMS IN THE ESP.

A LEAK IN THE PIPELINE OF THE A MODULE HYDROCLONES RESULTED IN REPIPING CAUSING ADDITIONAL OUTAGE TIME.

MODULE B WAS OFF-LINE PART OF THE MONTH FOR CLEANING AND LATER IN THE MONTH FOR HYDROCLONE REPAIRS.

10/81	A	98.8	60.8	88.3	47.0						
	B	88.6	75.4	80.3	58.4						
	SYSTEM	93.7	68.0	83.6	52.7			744	576	392	51.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER DOWN TIME FOR MODULE A WAS DUE TO AN INSPECTION OF THE PACKING AND MAINTENANCE ON THE HYDROCLONE PUMPS.

MODULE B OUTAGE TIME DURING THE MONTH WAS FOR AN ABSORBER FEED PUMP INSPECTION, WORK ON THE ABSORBER FEED TANK HYDROCLONES AND MAINTENANCE ON THE QUENCHER PUMP.

11/81	SYSTEM	.0			.0			720	0	0	.0
12/81	A	45.3	63.0	63.0	45.3						
	B	1.1	1.5	3.0	1.1						
	SYSTEM	23.2	32.2	43.1	23.2			744	535	172	51.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER THRU DECEMBER 16 THE FGD SYSTEM WAS OFF-LINE FOR A SCHEDULED OUTAGE. DURING THIS TIME MODIFICATIONS WERE PERFORMED ON THE FORCED OXIDATION SYSTEM. OTHER WORK INCLUDED PIPING AND TESTING OF THE PRESSURE RELIEF VALVE ON THE OX-AIR RECEIVER, WIRING AND INSTRUMENTATION CONNECTIONS FOR TEMPERATURE TRANSMITTERS AND PRESSURE INDICATIONS, REWIRING OF HIGH TEMPERATURE ALARM THAT CAUSED A COMPRESSOR TRIP.

SPRINGFIELD WATER, LIGHT & PWR: DALLMAN 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/82	A	70.6	64.7	64.7	53.9						
	B	.0	.0	.0	.0						
	SYSTEM	35.3	32.3	35.8	26.9			744	620	200	67.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY MODULE B WAS OFF-LINE DUE TO THE CONTINUAL WORK TO INSTALL A PRESSURE REGULATING STATION FOR THE FORCED OXIDATION SYSTEM.

MODULE A FORCED OXIDATION SYSTEM COMPRESSOR ACCOUNTED FOR SOME OF THE OUTAGE TIME.

OUTAGE TIME WAS ALSO DUE TO PLUGGING IN THE MODULE A HYDROCLONE FEED PUMPS AND THE WET WELL HYDROCLONES.

MODULE A EXPERIENCED SEVERE SULFITE BUILDUP REQUIRING OUTAGE TIME FOR CLEANING.

MODULE A EXPERIENCED A BROKEN FLANGE IN THE FRP LINE OF THE OUTLET DUCT.

2/82	A	97.2	91.4	91.4	75.6						
	B	.1	.2	.2	.1						
	SYSTEM	48.7	45.9	47.0	37.9			672	556	255	65.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS UNAVAILABLE FOR 19 HOURS DUE TO REPAIRS ON AN ACID LINE.

THE INSTALLATION OF A FORCED OXIDATION PRESSURE REGULATING STATION FOR MODULE B CONTINUED THROUGHOUT FEBRUARY.

3/82	SYSTEM	100.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN THE ENTIRE MONTH OF MARCH DUE TO A VIOLENT STORM WHICH RESULTED IN THE UNBALANCING OF THE TURBINE GENERATOR. THE UTILITY HOPES TO HAVE THE UNIT BACK ON-LINE SOMETIME IN JUNE.

4/82	SYSTEM	100.0			.0			720	0	0	.0
5/82	SYSTEM	100.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL AND MAY THE TURBINE AND GENERATOR REPAIRS CONTINUED.

6/82	A	55.1	48.3	75.9	38.1						
	B	73.1	76.0	92.5	59.9						
	SYSTEM	64.1	62.1	84.2	49.0			720	567	352	53.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS SHUT DOWN ON JUNE 1 THRU JUNE 7 FOR A SCHEDULED OUTAGE AND TO TEST FOR VIBRATION.

MODULE A WAS OFF-LINE PART OF THE MONTH DUE TO PROBLEMS WITH THE DISCHARGE VALVES ON THE QUENCHER PUMPS.

ADDITIONAL PROBLEMS EXPERIENCED BY MODULE A DURING JUNE INCLUDED PACKING AND SEAL WATER PROBLEMS WITH THE MIXERS AND A LEAK IN THE MAKEUP WATER PUMP.

PERFORMANCE DATA

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

MODULE B WAS UNAVAILABLE FOR APPROXIMATELY 26 HOURS DUE TO A DENSITY PROBLEM IN THE ABSORBER.

MODULE A EXPERIENCED BYPASS DAMPER PROBLEMS DURING THE MONTH.

7/82	NORTH	100.0	91.2	91.2	86.6						
	SOUTH	100.0	55.0	98.7	52.2						
	SYSTEM	100.0	73.1	95.0	69.4			744	706	516	69.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN DURING JULY AS A RESULT OF EQUIPMENT PROBLEMS AND SUBSEQUENT STARTUP OF THE SCRUBBER TOWERS.

8/82	NORTH	74.2	66.2	78.7	66.2						
	SOUTH	100.0	51.7	72.5	51.7						
	SYSTEM	87.1	59.0	75.6	59.0			744	744	439	72.0

** PROBLEMS/SOLUTIONS/COMMENTS

ON AUGUST 13 THE NORTH MODULE WAS UNAVAILABLE APPROXIMATELY 11 HOURS DUE TO REPAIRS BEING MADE ON THE SEAL WATER LINE.

DURING THE LAST WEEK OF AUGUST THE NORTH MODULE WAS UNAVAILABLE 181 HOURS DUE TO PROBLEMS WITH A BOOSTER FAN MOTOR.

9/82	NORTH	.0	.0	.0	.0						
	SOUTH	100.0	95.7	95.7	95.1						
	SYSTEM	50.0	47.8	47.8	47.6			720	716	343	70.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER THE SOUTH MODULE WAS DOWN FOR 24 HOURS TO PREVENT PACKING DAMAGE FROM THE INCINERATION OF A POTASIUM BROMATE BOILER CLEANING SOLUTION.

ON SEPTEMBER 13 AND 14 THE SOUTH MODULE WAS DOWN 20 HOURS FOR TURBINE MAINTENANCE.

ON SEPTEMBER 20 THE SOUTH MODULE WAS DOWN FOR 1 HOUR DUE TO A FEEDER TRIP.

10/82	NORTH	.0	.0	.0	.0						
	SOUTH	.0	.0	.0	.0						
	SYSTEM	.0	.0	.0	.0			744	52	0	4.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN OCTOBER 2 THROUGH 29 FOR A SCHEDULED OUTAGE.

THE UNIT WAS DOWN AT DIFFERENT TIMES DURING THE PERIOD OF OCTOBER 29 TO 31 FOR TURBINE BALANCE TESTS.

11/82	NORTH	43.2	32.5	58.2	32.1						
	SOUTH	64.3	53.0	55.1	52.2						
	SYSTEM	53.8	42.7	56.7	42.2			720	710	304	61.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE NORTH MODULE WAS UNAVAILABLE DURING THE PERIOD OF NOVEMBER 1 THROUGH 16 DUE TO REPAIRS ON THE BOOSTER FAN MOTOR.

ELECTRICAL PROBLEMS WITH THE OX-AIR COMPRESSOR MOTOR AND ALARM CONTRIBUTED TO THE UNAVAILABLE TIME FOR THE NORTH MODULE DURING NOVEMBER 1 THROUGH 16.

SPRINGFIELD WATER, LIGHT & PWR: DALLMAN 3 (CONT.)

PERFORMANCE DATA

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

THE SOUTH MODULE WAS DOWN DURING NOVEMBER 1 THROUGH 16 FOR REPAIRS ON TWO SUCTION VALVES.

THE UNIT WAS DOWN DURING NOVEMBER DUE IN PART TO VACUUM PUMP REPAIRS AND CLOGGED MAKEUP WATER PUMPS.

A CHECK ON THE BYPASS DAMPER GAUGE CONTRIBUTED TO THE OUTAGES FOR THE UNIT DURING NOVEMBER.

12/82	NORTH	100.0	60.3	78.6	56.7						
	SOUTH	99.6	50.0	72.8	47.0						
	SYSTEM	99.8	55.2	75.7	51.8			744	699	385	57.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER, THE UNIT DEMONSTRATED LOW SCRUBBER RELIABILITY DUE TO A VARIETY OF PROBLEMS. ONE OF WHICH WAS THE USE OF WET COAL CREATING LOAD LIMITATION PROBLEMS.

REDUCED RELIABILITY WAS ALSO ATTRIBUTED TO VIBRATION DATA READINGS TAKEN DURING DECEMBER.

UNIT TRIPPING OCCURRED DURING THE MONTH LOWERING SCRUBBER RELIABILITY.

TUBE LEAK CHECKS ALSO CONTRIBUTED TO REDUCED RELIABILITY DURING DECEMBER.

APPROXIMATELY 15% OF THE BOILER HOURS DURING DECEMBER INVOLVED THE INJECTION OF OIL INTO THE BOILER. THE SCRUBBER CAN NOT OPERATE DURING THESE PERIODS DUE TO THE CLOGGING OF PACKING MATERIAL FROM OIL CARRYOVER.

1/83	NORTH	96.3	57.8	88.2	51.1						
	SOUTH	99.2	68.9	81.8	60.8						
	SYSTEM	97.7	63.4	85.0	55.9			744	657	416	57.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE NORTH MODULE WAS UNAVAILABLE FOR 21.5 HOURS ON JANUARY 9-10 DUE TO A BLOWN FUSE ON A BOOSTER FAN.

ON JANUARY 21, ICE AND WIND STORMS PRODUCED A LOSS OF VOLTAGE POWER TO THE NORTH AND SOUTH MODULES THAT LED TO A DISRUPTION OF EQUIPMENT OPERATION.

THE NORTH AND SOUTH MODULES WERE NOT OPERATING FOR 38.5 HOURS DURING JANUARY DUE TO THE INJECTION OF OIL INTO THE BOILER.

THE UNIT WAS DOWN AT DIFFERENT TIMES DURING THE PERIOD OF JANUARY 1 THROUGH 13 FOR TESTING AND BALANCING OF THE TURBINE. FULL SERVICE DID NOT COMMENCE UNTIL JANUARY 13.

2/83	NORTH	67.2	69.4	92.6	67.4						
	SOUTH	70.5	72.5	97.4	70.5						
	SYSTEM	68.8	70.9	95.0	68.9			672	653	463	72.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE NORTH MODULE WAS UNAVAILABLE FOR 1.5 HOURS DURING FEBRUARY TO FIX AN ABSORBER FEED DUMP SEAL WATER LEAK.

BOTH MODULES WERE DOWN FOR 36 HOURS DURING THE MONTH DUE TO THE INJECTION OF OIL INTO THE BOILER AT LOW MW LOADS.

A BOILER TRIP ON FEBRUARY 1 PRODUCED A BRIEF 30 MINUTE OUTAGE.

AN 18 HOUR OUTAGE ON FEBRUARY 26 RESULTED FROM PRECIPITATOR REPAIRS.

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/83	NORTH	100.0	56.8	84.8	44.0						
	SOUTH	96.8	71.5	91.3	55.4						
	SYSTEM	98.4	64.1	88.1	49.7			744	577	370	48.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE NORTH MODULE WAS UNAVAILABLE FOR 24 HOURS ON MARCH 16-17 DUE TO THE PLUGGING OF A STORM SEWER.

THE NORTH MODULE WAS DOWN FOR 20 HOURS DURING MARCH DUE TO THE INJECTION OF OIL INTO THE BOILER AT LOW LOADS.

THE SOUTH MODULE WAS DOWN FOR 12.5 HOURS DURING MARCH DUE TO OIL INJECTION OF THE BOILER AT LOW LOADS.

4/83	NORTH	5.5	56.8	56.8	5.5						
	SOUTH	.0	.0	.0	.0						
	SYSTEM	2.7	28.4	28.4	2.7			720	70	20	5.6

** PROBLEMS/SOLUTIONS/COMMENTS

A SCHEDULED BOILER OUTAGE TOOK PLACE DURING THE MONTH THROUGH APRIL 27. START-UP PROBLEMS WERE ENCOUNTERED UNTIL APRIL 28 AND OPERATIONS RESUMED ON APRIL 31.

BOTH MODULES WERE UNAVAILABLE DURING THE APRIL OUTAGE AS MAINTENANCE WORK WAS PERFORMED.

AT THE END OF APRIL, BOTH MODULES WERE UNAVAILABLE DUE TO PROBE PROBLEMS WITH THE TOWER SLURRY LEVEL SYSTEM.

5/83	NORTH	99.7	55.8	65.4	55.6						
	SOUTH	64.7	30.0	48.9	29.9						
	SYSTEM	82.2	42.9	57.1	42.8			744	743	318	62.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE SOUTH MODULE WAS UNAVAILABLE FROM MAY 9 TO MAY 19 DURING AN INSPECTION FOR PLUGGING. PACKING WAS CLEANED DURING THIS OUTAGE.

A CRACK IN THE SILENCER ON THE OX-AIR COMPRESSOR WAS WELDED DURING THE MAY 9 - MAY 19 OUTAGE.

A BRIEF OUTAGE OCCURRED ON MAY 21 TO CORRECT THE PH LEVEL AT THE SOUTH MODULE.

ON MAY 23 A LEAK WAS REPAIRED ON THE ABSORBER PRESSURE-INDICATING PROBE AT THE SOUTH MODULE.

THE SOUTH MODULE BOOSTER FAN WAS BEING REPAIRED FROM MAY 24 TO MAY 31, 1983.

A TWO-HOUR OUTAGE OCCURRED ON MAY 2 AT THE NORTH MODULE TO REPLACE PACKING IN THE ABSORBER FEED PUMPS.

6/83	NORTH	99.9	75.3	98.6	69.9						
	SOUTH	99.6	80.2	93.5	74.4						
	SYSTEM	99.7	77.8	96.1	72.2			720	668	520	65.0

SPRINGFIELD WATER, LIGHT & PWR: DALLMAN 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 NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JUNE.									
7/83	NORTH	86.2	88.3	97.9	88.0						
	SOUTH	90.5	92.0	98.6	91.8						
	SYSTEM	88.3	90.2	98.2	89.9			744	742	669	74.7
8/83	NORTH	100.0	92.3	100.0	85.8						
	SOUTH	100.0	93.6	100.0	86.9						
	SYSTEM	100.0	92.9	100.0	86.3			744	691	642	73.0
9/83	NORTH	100.0	98.1	100.0	75.9						
	SOUTH	100.0	97.0	99.4	75.1						
	SYSTEM	100.0	97.6	99.7	75.5			720	557	544	61.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF JULY THROUGH SEPTEMBER 1983.									
10/83	SYSTEM							744	0		.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS ON A SCHEDULED MAINTENANCE OUTAGE DURING THE MONTH OF OCTOBER.									
11/83	NORTH	100.0	91.8	96.1	73.5						
	SOUTH	100.0	93.9	99.6	75.3						
	SYSTEM	100.0	92.9	97.9	74.4			720	577	536	59.0
12/83	NORTH	99.5	97.7	99.5	95.2						
	SOUTH	98.0	95.3	97.9	92.9						
	SYSTEM	98.8	96.5	98.7	94.0			744	725	700	72.0
1/84	NORTH	96.8	97.9	99.7	92.7						
	SOUTH	95.2	96.7	100.2	91.5						
	SYSTEM	96.0	97.3	100.0	92.1			744	704	685	65.0
2/84	NORTH	100.0	95.4	100.0	95.4						
	SOUTH	100.0	94.5	100.0	94.5						
	SYSTEM	100.0	95.0	100.0	95.0			696	696	661	65.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE PERIOD OF NOVEMBER 1983 THROUGH FEBRUARY 1984.									
3/84	NORTH	8.9	100.0	100.0	8.9						
	SOUTH	8.9	100.0	100.0	8.9						
	SYSTEM	8.9	100.0	100.0	8.9			744	66	66	5.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UNIT WAS REMOVED FROM SERVICE ON MARCH 3 FOR A 10-WEEK MAINTENANCE OUTAGE.									
4/84	NORTH	.0			.0						
	SOUTH	.0			.0						
	SYSTEM	.0			.0			720	0	0	.0

UTILITY FGD SURVEY: OCTOBER 1983 - SEPTEMBER 1984

SPRINGFIELD WATER, LIGHT & PWR: DALLMAN 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 UNIT WAS OUT OF SERVICE FOR A MAINTENANCE OUTAGE DURING APRIL.										
5/84	NORTH	20.3	87.7	99.3	17.8						
	SOUTH	20.3	97.7	100.0	19.8						
	SYSTEM	20.3	92.7	99.6	18.8			744	151	140	13.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UNIT WAS STARTED MAY 25 AFTER ITS SPRING MAINTENANCE OUTAGE.										
6/84	NORTH	97.1	97.2	100.0	97.1						
	SOUTH	98.6	98.7		98.6						
	SYSTEM	97.8	98.0	100.0	97.8			720	719	705	77.0
7/84	NORTH	100.0	97.8	100.0	97.6						
	SOUTH	100.0	96.8	100.0	96.5						
	SYSTEM	100.0	97.3	100.0	97.0			744	742	722	75.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JUNE AND JULY.										
8/84	SYSTEM							744			
9/84	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION WAS UNAVAILABLE FOR AUGUST AND SEPTEMBER 1984.										

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SUNFLOWER ELECTRIC	
PLANT NAME	HOLCOMB	
UNIT NUMBER	1	
CITY	HOLCOMB	
STATE	KANSAS	
REGULATORY CLASSIFICATION	B	
PARTICULATE EMISSION LIMITATION - NG/J	13.	(.030 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	206.	(.480 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	280	
GROSS UNIT GENERATING CAPACITY - MW	347	
NET UNIT GENERATING CAPACITY W/FGD - MW	280	
NET UNIT GENERATING CAPACITY WO/FGD - MW	280	
EQUIVALENT SCRUBBED CAPACITY - MW	347	
** 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	632.35	(1340000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	126.7	(260 F)
STACK HEIGHT - M	145.	(475 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	5.0	(16.3 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	19336.	(8313 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		7880-8250
AVERAGE ASH CONTENT - %	5.56	
RANGE ASH CONTENT - %	6.0-8.0	
AVERAGE MOISTURE CONTENT - %	29.70	
RANGE MOISTURE CONTENT - %	30.0-32.5	
AVERAGE SULFUR CONTENT - %	.34	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	.02	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** FABRIC FILTER		
NUMBER	2	
SUPPLIER	JOY MANUFACTURING	
NUMBER OF COMPARTMENTS	14	
NUMBER OF SPARE COMPARTMENTS	2	
INLET FLUE GAS CAPACITY - CU.M/S	316.2	(670000 ACFM)
INLET FLUE GAS TEMPERATURE - C	81.7	(179 F)
PRESSURE DROP - KPA	7.5	(30.0 IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.0	
TYPICAL GAS/CLOTH RATIO - M/MIN	.6	(2.0 FT/MIN)
** ESP		
NUMBER	0	
TYPE	NONE	
** 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	

SUNFLOWER ELECTRIC: HOLCOMB 1 (CONT.)

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
A-E FIRM	UNITED ENGINEERS & CONSTRUCTORS
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.87
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	80.00
ENERGY CONSUMPTION - %	.0
CURRENT STATUS	1
COMMERCIAL START-UP	8/83
INITIAL START-UP	7/83
CONTRACT AWARDED	6/80

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	1.00	
DESIGN COAL HEAT CONTENT - J/G	18142.8	(7800 BTU/LB)
DESIGN COAL ASH CONTENT - %	12.00	

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	3	
NUMBER OF SPARES	1	
GENERIC TYPE	SPRAY DRYER	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	ROTARY ATOMIZER	
DIMENSIONS - FT	50.9 FT DIA. X 39.4 FT HT. X 60 DEG. CONE UNDER	
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	
INLET GAS FLOW - CU. M/S	316.17	(670000 ACFM)
INLET GAS TEMPERATURE - C	120.6	(249 F)
SO2 REMOVAL EFFICIENCY - %	80.0	
PARTICLE REMOVAL EFFICENCY - %	99.8	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	NONE
NUMBER PER SYSTEM	0
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	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
NUMBER OF SPARES	0
DESIGN	NR
FUNCTION	NR
APPLICATION	FORCED DRAFT

SUNFLOWER ELECTRIC: HOLCOMB 1 (CONT.)

SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	NR
** FANS	
NUMBER	2
NUMBER OF SPARES	0
DESIGN	NR
FUNCTION	NR
APPLICATION	INDUCED DRAFT
SERVICE	DRY
FLUE GAS TEMPERATURE - C	82.2 (180 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR
** 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	
LOCATION	BOILER TO ATOMIZER
DIMENSIONS	165.0 X 11.0 X 16.5
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	NR
MANUFACTURER	DENVER
NUMBER	4
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	2.7 (3 TPH)
PRODUCT QUALITY - % SOLIDS	20.0

** TANKS

SERVICE	NUMBER
REAGENT PREP PRODUCT	6

** PUMPS

SERVICE	NUMBER
LIME MILK TRANSFER	6
LIME MILK STORAGE	4
RECYCLE SLURRY TRANSFER	4

** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	NONE

*** SLUDGE

** TREATMENT	
METHOD	N/A
DEVICE	PUG MILL
PROPRIETARY PROCESS	N/A
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	NONE
SITE DIMENSIONS	35 ACRES
SITE SERVICE LIFE - YRS	35

** PROCESS CONTROL AND INSTRUMENTATION

CONTROL LEVELS	FINAL WASTE = 30% MOISTURE

** WATER BALANCE

WATER LOOP TYPE	CLOSED [DESIGN]
SOURCE OF MAKEUP WATER	6 DEEP WELLS

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIME
CONSUMPTION	2.3 TPH

** FGD SPARE CAPACITY INDICES

ABSORBER - %	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
7/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT INITIAL START-UP COMMENCED IN JULY, 1983.

8/83	SYSTEM							744			
9/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED TYPICAL PROBLEMS ASSOCIATED WITH START-UP DURING THE ENTIRE THIRD QUARTER. COMPUTER PROBLEMS WERE EXPERIENCED DURING THE LAST WEEK OF SEPTEMBER AND REQUIRED THE REPLACEMENT OF A DISK.

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			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN APPROXIMATELY FOUR WEEKS DURING THE LAST PART OF JANUARY AND THE FIRST PART OF FEBRUARY FOR ABSORBER CLEANING.

3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			

SUNFLOWER ELECTRIC: HOLCOMB 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT OVERALL FGD SYSTEM AVAILIBILITY DURING THE FIRST THREE QUARTERS OF 1984 WAS ESTIMATED AT 85%. NO MAJOR FGD-RELATED OUTAGES WERE REPORTED.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TENNESSEE VALLEY AUTHORITY	
PLANT NAME	PARADISE	
UNIT NUMBER	1	
CITY	PARADISE	
STATE	KENTUCKY	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	47.	(.110 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	387.	(.900 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	2558	
GROSS UNIT GENERATING CAPACITY - MW	704	
NET UNIT GENERATING CAPACITY W/FGD - MW	650	
NET UNIT GENERATING CAPACITY WO/FGD - MW	668	
EQUIVALENT SCRUBBED CAPACITY - MW	704	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	CYCLONE	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1014.58	(2150000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	148.9	(300 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	NR	
STACK TOP DIAMETER - M	7.9	(26.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	29075.	(12500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	17.30	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	10.00	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	3.20	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	.10	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** ESP		
NUMBER	1	
** PARTICLE SCRUBBER		
NUMBER	6	
NUMBER OF SPARES	1	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/TOP-ENTRY PLUMB BOB	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
LINER GENERIC MATERIAL	NONE	
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	GE ENVIRONMENTAL SERVICES	
A-E FIRM	IN-HOUSE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN PARTICLE PEMOVAL EFFICIENCY - %	94.20	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	84.00	
ENERGY CONSUMPTION - %	2.6	

TENNESSEE VALLEY AUTHORITY: PARADISE 1 (CONT.)

CURRENT STATUS	1
COMMERCIAL START-UP	7/83
INITIAL START-UP	5/83
CONTRACT AWARDED	3/79

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	6
NUMBER OF SPARES	1
GENERIC TYPE	COMBINATION TOWER
SPECIFIC TYPE	VENTURI/SPRAY
TRADE NAME/COMMON TYPE	N/A
SHELL GENERIC MATERIAL	STAINLESS STEEL
SHELL SPECIFIC MATERIAL	AUSTENITIC
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 317L
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	3
L/G RATIO - L/CU.M	11.4 (85.0 GAL/1000 ACF)
SO2 REMOVAL EFFICIENCY - %	84.2

** 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	WASTE HEAT RECOVERY
SPECIFIC TYPE	GAS-FLUID
TRADE NAME/COMMON TYPE	TUBE BUNDLE
TEMPERATURE INCREASE - C	27.8 (50 F)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC

** FANS

DESIGN	CENTRIFUGAL
FUNCTION	BOOSTER
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

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
NUMBER	3

TENNESSEE VALLEY AUTHORITY: PARADISE 1 (CONT.)

FULL LOAD DRY FEED CAPACITY - M.TONS/HR 3.6 (4 TPH)

** TANKS

SERVICE	NUMBER
REAGENT PREP PRODUCT	****
ABSORBER RECYCLE	****
SCRUBBER RECYCLE	****
NR	****

** PUMPS

SERVICE	NUMBER
NA	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	3
NUMBER OF SPARES	1
FEED STREAM CHARACTERISTICS	40% SOLIDS
OUTLET STREAM CHARACTERISTICS	80% SOLIDS

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
FEED STREAM CHARACTERISTICS	8% SOLIDS
OUTLET STREAM CHARACTERISTICS	40% SOLIDS

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION
DEVICE	REACTION TANK
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
SITE TREATMENT	NONE

** WATER BALANCE

WATER LOOP TYPE	CLOSED

** FGD SPARE CAPACITY INDICES

ABSORBER - %	20.0

** 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
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM COMMENCED OPERATION IN MAY AND IS CURRENTLY IN THE START UP PHASE OF OPERATION.

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

TENNESSEE VALLEY AUTHORITY: PARADISE 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

BOTH UNITS 1 AND 2 ARE CURRENTLY IN THE SHAKEDOWN/DEBUGGING PHASE OF OPERATION. THE UTILITY REPORTED THAT CONTRACT TESTING AND STATE CERTIFICATION TESTING ARE CURRENTLY BEING CONDUCTED.

THE UTILITY REPORTED BYPASS DAMPER PROBLEMS AT UNITS 1 AND 2 DURING THE THIRD QUARTER OF 1983.

DUCTWORK GAS TURNING VANES COLLAPSED DURING THE THIRD QUARTER.

PLUGGING PROBLEMS OCCURRED WITHIN THE FORCED-OX SYSTEM DURING THIS PERIOD. SLURRY WAS BACKING UP INTO THE SPARGER LINES FORCING A SHUT DOWN FOR CLEANING.

THICKENER PROBLEMS WERE ALSO EXPERIENCED DURING THE THIRD QUARTER. THE RAKE ARMS WERE BREAKING DUE TO UNEXPECTED HIGH PARTICLE SIZES AND THE RAPID SETTLING OF SOLIDS.

THE UTILITY REPORTED MIST ELIMINATOR PROBLEMS DURING THE PERIOD DUE TO PLUGGING PINCH VALVES AND IMPROPERLY WORKING DRAINS.

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. THE MIST ELIMINATOR AND THICKENER PROBLEMS EXPERIENCED DURING THE THIRD QUARTER WERE STILL PRESENT BUT TO A LESSER DEGREE.

THE MIST ELIMINATOR PLUGGING PROBLEMS EXPERIENCED DURING THE THIRD QUARTER WERE BELIEVED TO BE THE RESULT OF IMPROPER WASHING.

THE THICKENER RAKE ARM PROBLEM EXPERIENCED DURING THE THIRD QUARTER WAS SOLVED BY REMOVING SOLIDS FROM THE THICKENER MORE FREQUENTLY AND BY READJUSTING THE TORQUE MEASURING DEVICE TO RESPOND TO TORQUE ON THE RAKE ARM TRUSSES RATHER THAN THE RAKE ARMS. SOLIDS SETTLING IN A CONICAL SHAPE WERE NOT DISTRIBUTING AN EVEN LOAD TO THE RAKE ARMS AND THUS MAXIMUM TORQUE WAS NOT REACHED. AS A RESULT, THE RAKE ARMS WERE BREAKING.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER, ELECTRICAL PROBLEMS RESULTED IN RAW FLUE GAS ENTERING THE NOREL PLASTIC MIST ELIMINATORS WITHOUT QUENCHING. THE MIST ELIMINATOR MELTED AND FORCED THE UTILITY TO BYPASS.

4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			

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

** PROBLEMS/SOLUTIONS/COMMENTS

NEW MIST ELIMINATORS WERE INSTALLED DURING THE SECOND QUARTER OF 1984. THEY WERE SUPPLIED BY MUNTERS AND ARE CAPABLE OF WITHSTANDING RAW FLUE GAS TEMPERATURES OF 350 DEGREES F.

7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY EXPERIENCED PROBLEMS WITH CORROSION IN THE CARBON STEEL SECTION OF THE REHEAT U-TUBE BUNDLES. AIR TRAPPED WITHIN THE BUNDLES COULD NOT BE REMOVED AND THE RESULTING LOWERED TEMPERATURE CAUSED CORROSION. THE UTILITY ATTEMPTED TO REMOVE THE AIR BY PURGING THE TUBES WITH STEAM AND BACK FILLING WITH WATER. THEY ALSO TRIED PULLING A VACUUM ON THE TUBES AND BACK FILLING WITH WATER. THE TUBES HAVE SINCE BEEN REPLACED WITH STAINLESS STEEL AND HAVE VENTED WATER BOXES. THIS HAS ENABLED THEM TO INCREASE REHEAT TEMPERATURES FROM 150 TO 170 DEGREES F. TWO OF THE SIX MODULES AT UNIT 1 NOW HAVE STAINLESS STEEL U-TUBES WITH VENTED WATER BOXES.

PROBLEMS WERE EXPERIENCED WITH THE LOUVER TYPE BYPASS DAMPERS DURING THE FIRST THREE QUARTERS OF 1984. DUE TO HIGH FLUE GAS VELOCITY, THE STAINLESS STEEL SEAL STRIPS BROKE OFF. THE UTILITY MADE AN ATTEMPT TO WELD FIX PLATES TO THE DAMPERS WHICH WAS UNSUCCESSFUL. THE LOUVER TYPE DAMPERS WILL NOW BE REPLACED WITH THE GUILLOTINE TYPE.

THE UTILITY REPORTED THAT THE SLUDGE DEWATERING SYSTEM WILL BE CONVERTED TO A WET PUMP SYSTEM WITH WET STACKING SIMILAR TO THAT DEVELOPED AT WIDOWS CREEK. SLUDGE WILL BE PUMPED DIRECTLY TO A DISPOSAL AREA WITHOUT TREATMENT BY THICKENING OR VACUUM FILTRATION.

THE UTILITY REPORTED THAT NO MAJOR FGD SYSTEM OUTAGES OCCURRED DURING THE FIRST THREE QUARTERS OF 1984. MODULES ARE ROUTINELY TAKEN OUT OF SERVICE IN ROTATION FOR APPROXIMATELY ONE WEEK AND MAINTENANCE WORK OR MODIFICATIONS ARE MADE.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TENNESSEE VALLEY AUTHORITY	
PLANT NAME	PARADISE	
UNIT NUMBER	2	
CITY	PARADISE	
STATE	KENTUCKY	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	47.	(.110 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	387.	(.900 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	2558	
GROSS UNIT GENERATING CAPACITY - MW	704	
NET UNIT GENERATING CAPACITY W/FGD - MW	650	
NET UNIT GENERATING CAPACITY WO/FGD - MW	668	
EQUIVALENT SCRUBBED CAPACITY - MW	704	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	BABCOCK & WILCOX	
BOILER TYPE	CYCLONE	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	1014.58	(2150000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	148.9	(300 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	NR	
STACK TOP DIAMETER - M	7.9	(26.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	29075.	(12500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	10.00	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	10.00	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	3.20	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	.10	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** ESP		
NUMBER	1	
** PARTICLE SCRUBBER		
NUMBER	6	
NUMBER OF SPARES	1	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/TOP-ENTRY PLUMB BOB	
TRADE NAME/COMMON NAME	N/A	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
LINER GENERIC MATERIAL	NONE	
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	GE ENVIRONMENTAL SERVICES	
A-E FIRM	IN-HOUSE	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	94.20	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	84.00	
ENERGY CONSUMPTION - %	2.6	

TENNESSEE VALLEY AUTHORITY: PARADISE 2 (CONT.)

CURRENT STATUS	1
COMMERCIAL START-UP	12/83
INITIAL START-UP	7/83
CONTRACT AWARDED	3/79

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	6
NUMBER OF SPARES	1
GENERIC TYPE	COMBINATION TOWER
SPECIFIC TYPE	VENTURI/SPRAY
TRADE NAME/COMMON TYPE	N/A
SHELL GENERIC MATERIAL	STAINLESS STEEL
SHELL SPECIFIC MATERIAL	AUSTENITIC
SHELL MATERIAL TRADE NAME/COMMON TYPE	TYPE 317L
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	3
L/G RATIO - L/CU.M	11.4 (85.0 GAL/1000 ACF)
SO2 REMOVAL EFFICIENCY - %	84.2

** 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	WASTE HEAT RECOVERY
SPECIFIC TYPE	GAS-FLUID
TRADE NAME/COMMON TYPE	TUBE BUNDLE
TEMPERATURE INCREASE - C	27.8 (50 F)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC

** FANS

DESIGN	CENTRIFUGAL
FUNCTION	BOOSTER
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

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
NUMBER	3

TENNESSEE VALLEY AUTHORITY: PARADISE 2 (CONT.)

FULL LOAD DRY FEED CAPACITY - M.TONS/HR 3.6 (4 TPH)

** TANKS

SERVICE	NUMBER
REAGENT PREP PRODUCT	****
ABSORBER RECYCLE	****
SCRUBBER RECYCLE	****
NR	****

** PUMPS

SERVICE	NUMBER
NA	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	3
NUMBER OF SPARES	1
FEED STREAM CHARACTERISTICS	40% SOLIDS
OUTLET STREAM CHARACTERISTICS	80% SOLIDS

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
FEED STREAM CHARACTERISTICS	8% SOLIDS
OUTLET STREAM CHARACTERISTICS	40% SOLIDS

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION
DEVICE	REACTION TANK
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
SITE TREATMENT	NONE

** WATER BALANCE

WATER LOOP TYPE	CLOSED

** FGD SPARE CAPACITY INDICES

ABSORBER - %	20.0

** 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
7/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT INITIAL START-UP FOR THE FGD SYSTEM AT UNIT 2 COMMENCED IN JULY.

8/83	SYSTEM							744			
9/83	SYSTEM							720			

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

** PROBLEMS/SOLUTIONS/COMMENTS

THICKENER PROBLEMS WERE EXPERIENCED DURING THE THIRD QUARTER. THE RAKE ARMS WERE BREAKING DUE TO UNEXPECTED HIGH PARTICLE SIZES AND THE RAPID SETTLING OF SOLIDS.

PLUGGING PROBLEMS OCCURRED WITHIN THE FORCED-OX SYSTEM DURING THIS PERIOD. SLURRY WAS BACKING UP INTO THE SPARGER LINES FORCING A SHUT DOWN FOR CLEANING.

DUCTWORK GAS TURNING VANES COLLAPSED DURING THE THIRD QUARTER.

THE UTILITY REPORTED BYPASS DAMPER PROBLEMS AT UNITS 1 AND 2 DURING THE THIRD QUARTER OF 1983.

BOTH UNITS 1 AND 2 ARE CURRENTLY IN THE SHAKEDOWN/DEBUGGING PHASE OF OPERATION. THE UTILITY REPORTED THAT CONTRACT TESTING AND STATE CERTIFICATION TESTING ARE CURRENTLY BEING CONDUCTED.

THE UTILITY REPORTED MIST ELIMINATOR PROBLEMS DURING THE PERIOD DUE TO PLUGGING PINCH VALVES AND IMPROPERLY WORKING DRAINS.

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. THE MIST ELIMINATOR AND THICKENER PROBLEMS EXPERIENCED DURING THE THIRD QUARTER WERE STILL PRESENT BUT TO A LESSER DEGREE.

THE MIST ELIMINATOR PLUGGING PROBLEMS EXPERIENCED DURING THE THIRD QUARTER WERE BELIEVED TO BE THE RESULT OF IMPROPER WASHING.

THE THICKENER RAKE ARM PROBLEM EXPERIENCED DURING THIRD QUARTER OF 1983 WAS SOLVED BY REMOVING SOLIDS FROM THE THICKENER MORE FREQUENTLY AND BY READJUSTING THE TORQUE MEASURING DEVICE TO RESPOND TO TORQUE ON THE RAKE ARM TRUSSES RATHER THAN THE RAKE ARMS. SOLIDS SETTLING IN A CONICAL SHAPE WERE NOT DISTRIBUTING AN EVEN LOAD TO THE RAKE ARMS AND THEIR MAXIMUM TORQUE WAS NOT REACHED. AS A RESULT, THE ARMS WERE BREAKING.

THE UTILITY REPORTED THAT UNIT 2 WAS CERTIFIED IN COMPLIANCE DURING DECEMBER.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER, ELECTRICAL PROBLEMS RESULTED IN RAW FLUE GAS ENTERING THE NOREL PLASTIC MIST ELIMINATORS WITHOUT QUENCHING. THE MIST ELIMINATOR MELTED AND FORCED THE UTILITY TO BYPASS. NEW CEILCOTE MIST ELIMINATORS WILL BE INSTALLED AT UNIT 2 DURING THE LAST QUARTER OF 1984.

4/84	SYSTEM							720			
5/84	SYSTEM							744			

TENNESSEE VALLEY AUTHORITY: PARADISE 2 (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 EXPERIENCED PROBLEMS WITH CORROSION IN THE CARBON STEEL SECTION OF THE REHEAT U-TUBE BUNDLES. AIR TRAPPED WITHIN THE BUNDLES COULD NOT BE REMOVED AND THE RESULTING LOWERED TEMPERATURE CAUSED CORROSION. THE UTILITY ATTEMPTED TO REMOVE THE AIR BY PURGING THE TUBES WITH STEAM AND BACK FILLING WITH WATER. THEY ALSO TRIED PULLING A VACUUM ON THE TUBES AND BACK FILLING WITH WATER. THE TUBES HAVE SINCE BEEN REPLACED WITH STAINLESS STEEL AND HAVE VENTED WATER BOXES. THIS HAS ENABLED THEM TO INCREASE REHEAT TEMPERATURES FROM 150 TO 170 DEGREES F.

PROBLEMS WERE EXPERIENCED WITH THE LOUVER TYPE BYPASS DAMPERS DURING THE FIRST THREE QUARTERS OF 1984. DUE TO HIGH FLUE GAS VELOCITY, THE STAINLESS STEEL SEAL STRIPS BROKE OFF. THE UTILITY MADE AN ATTEMPT TO WELD FIX PLATES TO THE DAMPERS WHICH WAS UNSUCCESSFUL. THE LOUVER TYPE DAMPERS WILL NOW BE REPLACED WITH THE GUILLOTINE TYPE.

THE UTILITY REPORTED THAT THE SLUDGE DEWATERING SYSTEM WILL BE CONVERTED TO A WET PUMP SYSTEM WITH WET STACKING SIMILAR TO THAT DEVELOPED AT WIDOWS CREEK. SLUDGE WILL BE PUMPED DIRECTLY TO A DISPOSAL AREA WITHOUT TREATMENT BY THICKENING OR VACUUM FILTRATION.

THE UTILITY REPORTED THAT NO MAJOR FGD SYSTEM OUTAGES OCCURRED DURING THE FIRST THREE QUARTERS OF 1984. MODULES ARE ROUTINELY TAKEN OUT OF SERVICE IN ROTATION FOR APPROXIMATELY ONE WEEK AND MAINTENANCE WORK OF MODIFICATIONS ARE MADE.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TENNESSEE VALLEY AUTHORITY	
PLANT NAME	WIDOWS CREEK	
UNIT NUMBER	7	
CITY	BRIDGEPORT	
STATE	ALABAMA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	52.	(.120 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1978	
GROSS UNIT GENERATING CAPACITY - MW	575	
NET UNIT GENERATING CAPACITY W/FGD - MW	575	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	575	

** 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	25819.	(11100 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	17.00	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	3.70	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	

*** PARTICLE CONTROL

** ESP

NUMBER	1

** PARTICLE SCRUBBER

NUMBER	4
GENERIC TYPE	VENTURI TOWER
SPECIFIC TYPE	VARIABLE-THROAT/VERTICALLY-ADJUSTABLE ROD DECKS
TRADE NAME/COMMON NAME	ROD SCRUBBER
SHELL GENERIC MATERIAL	NR
SHELL SPECIFIC MATERIAL	NR
LINER GENERIC MATERIAL	NR
LINER SPECIFIC MATERIAL	NR
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	COMBUSTION ENGINEERING
A-E FIRM	IN-HOUSE
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	RETROFIT
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	80.00
CURRENT STATUS	1
COMMERCIAL START-UP	9/81
INITIAL START-UP	3/81

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 7 (CONT.)

CONTRACT AWARDED	10/77

** DESIGN AND OPERATING PARAMETERS

** 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
SUPPLIER	COMBUSTION ENGINEERING
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
INLET GAS TEMPERATURE - C	48.9 (120 F)

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRECOLLECTOR
NUMBER PER SYSTEM	4
GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONFIGURATION	HORIZONTAL
NUMBER OF STAGES	1
NUMBER OF PASSES PER STAGE	1
DISTANCE BETWEEN STAGES - CM	.76 (.3 IN)
VANE ANGLES - DEGREES	45
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER

** REHEATER

NUMBER	4
GENERIC TYPE	IN-LINE
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
TEMPERATURE INCREASE - C	27.8 (50 F)
INLET FLUE GAS TEMPERATURE - C	48.9 (120 F)
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

** 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
SCRUBBER RECYCLE	4
ABSORBER RECYCLE	5
REAGENT PREP PRODUCT	1

** PUMPS

SERVICE	NUMBER
LIMESTONE SLURRY FEED	4
SCRUBBER RECIRCULATION	8
ABSORBER RECIRCULATION	12

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NR

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION
DEVICE	NA
PROPRIETARY PROCESS	NA

** DISPOSAL

NATURE	FINAL
TYPE	POND
SITE TREATMENT	NONE

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

INITIAL OPERATIONS OF THE WIDOWS CREEK 7 FGD SYSTEM BEGAN IN MARCH, 1981. THE SYSTEM IS PRESENTLY IN A SHAKEDOWN/DEBUGGING PHASE WITH COMMERCIAL OPERATIONS EXPECTED IN EARLY SEPTEMBER.

4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL SHAKEDOWN/DEBUGGING OPERATIONS CONTINUED THROUGH THE SECOND QUARTER 1981.

7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 7 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
** PROBLEMS/SOLUTIONS/COMMENTS											
		ACCEPTANCE TESTING OF THE WIDOWS CREEK 7 FGD SYSTEM BEGAN IN MID-SEPTEMBER.									
10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			
** PROBLEMS/SOLUTIONS/COMMENTS											
		DURING THE FOURTH QUARTER THE SYSTEM WAS IN THE START UP DEBUGGING PHASE OF OPERATION. THE ACCEPTANCE TEST WAS PERFORMED DURING THIS PERIOD.									
		THE HELIX ON THE TROMMEL SCREEN, WHICH IS LOCATED AT THE DISCHARGE END OF THE BALL MILL, WAS INSTALLED DURING THE PERIOD.									
1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			
** PROBLEMS/SOLUTIONS/COMMENTS											
		MINOR MODIFICATIONS TO THE PIPING AND SYSTEM CONTROL WERE MADE DURING THE FIRST QUARTER OF 1982. THE ENTIRE WIDOWS CREEK PLANT HAS SEEN LIMITED OPERATION DUE TO LACK OF POWER DEMAND.									
		PRESENTLY, THE UTILITY IS GETTING A PERMIT TO CONDUCT FORCED OXIDATION TESTS. BOTH WET AND DRY GYPSUM STACKING WILL BE INVESTIGATED.									
4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			
** PROBLEMS/SOLUTIONS/COMMENTS											
		THE UTILITY REPORTED THAT NO MAJOR FGD RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER. THE BOILER WAS OPERATED AT LOW LOAD DURING THIS PERIOD DUE TO A LACK OF POWER DEMAND.									
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			
4/83	SYSTEM							720			

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

** PROBLEMS/SOLUTIONS/COMMENTS

SINCE JUNE 1982 THE WIDOWS CREEK 7 FGD SYSTEM HAS EXPERIENCED PLUGGING PROBLEMS IN THE MIST ELIMINATORS. ALTHOUGH TVA HAS NOT ISOLATED AN ULTIMATE CAUSE IT IS SUSPECTED THAT THE PROBLEM RESULTS FROM AN UNDER-DESIGNED MIST ELIMINATOR (WITH RESPECT TO GAS FLOW).

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

** PROBLEMS/SOLUTIONS/COMMENTS

MIST ELIMINATOR PLUGGING PROBLEMS CONTINUED DURING THE THIRD QUARTER OF 1983.

THE UTILITY REPORTED A SOLIDS BUILD-UP PROBLEM IN BOTH THE ABSORBER AND VENTURI VESSELS DUE TO A POORLY OPERATING OVERFLOW SYSTEM.

PROBLEMS WITH THE REAGENT MIXING SYSTEM WERE REPORTED DURING THE THIRD QUARTER. RADIAL TYPE MIXERS WERE REPLACED WITH THE AXIAL TYPE.

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			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY EXPERIENCED CORROSION PROBLEMS WITH THE REHEATER CARBON STEEL FIN TUBES AT UNIT 7. STAINLSS STEEL FIN TUBES ARE BEING CONSIDERED FOR REPLACEMENT.

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 7 (CONT.)

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

THE UTILITY REPORTED THAT A FORCED OXIDATION SYSTEM WILL BE EMPLOYED AT WIDOWS CREEK 7 AND 8 FOR SLUDGE TREATMENT. A SPARGER NETWORK AT THE BOTTOM OF THE THICKENER TANK WILL BE INSTALLED AND AN AGITATOR WILL BE UTILIZED FOR SOLID SUSPENSION.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TENNESSEE VALLEY AUTHORITY	
PLANT NAME	WIDOWS CREEK	
UNIT NUMBER	8	
CITY	STEVENSON	
STATE	ALABAMA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	52.	(.120 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	550	
NET UNIT GENERATING CAPACITY W/FGD - MW	516	
NET UNIT GENERATING CAPACITY WO/FGD - MW	542	
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	764.48	(1620000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	137.8	(280 F)
STACK HEIGHT - M	152.	(500 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	27470.	(11810 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		11360-12330
AVERAGE ASH CONTENT - %	11.70	
RANGE ASH CONTENT - %	9.2-12.7	
AVERAGE MOISTURE CONTENT - %	7.70	
RANGE MOISTURE CONTENT - %	5.1-9.5	
AVERAGE SULFUR CONTENT - %	3.30	
RANGE SULFUR CONTENT - %	1.3-3.8	
AVERAGE CHLORIDE CONTENT - %	.07	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** PARTICLE SCRUBBER		
NUMBER	4	
NUMBER OF SPARES	0	
INITIAL START-UP DATE	5/77	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	VARIABLE-THROAT/SIDE-MOVABLE BLADES	
TRADE NAME/COMMON NAME	N/A	
SUPPLIER	TVA/POLYCON	
DIMENSIONS - FT	23.0 X 28.0	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	HIGH STRENGTH LOW ALLOY [HSLA]	
LINER GENERIC MATERIAL	STAINLESS STEEL; INORGANIC [IN CONVERGENT SECTIO	
LINER SPECIFIC MATERIAL	AUSTENITIC; SILICON CARBIDE	
GAS CONTACTING DEVICE TYPE	VENTURI THROAT	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	212.9	(3380 GPM)
L/G RATIO - LITER/CU.M	1.1	(8.3 GAL/1000ACF)
PH CONTROL ADDITIVE	LIMESTONE	
PRESSURE DROP - KPA	2.5	(10.0 IN-H2O)
INLET GAS FLOW RATE - CU.M/S	191.1	(405000 ACFM)
INLET GAS TEMPERATURE - C	137.8	(280 F)
SO2 REMOVAL EFFICENCY - %	10.0	
PARTICLE REMOVAL EFFICIENCY - %	98.5	

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 8 (CONT.)

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	TENNESSEE VALLEY AUTHORITY
A-E FIRM	NONE
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	RETROFIT
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	98.50
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	80.00
ENERGY CONSUMPTION - %	4.7
CURRENT STATUS	1
COMMERCIAL START-UP	1/78
INITIAL START-UP	5/77
CONTRACT AWARDED	2/73

** DESIGN AND OPERATING PARAMETERS

OPER. & MAINT. REQUIREMENT - MANHR/DAY	56.0

** QUENCHER/PRESATURATOR

NUMBER	0

** ABSORBER

NUMBER	4	
NUMBER OF SPARES	0	
GENERIC TYPE	PACKED TOWER	
SPECIFIC TYPE	GRID PACKING	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	POLYCON	
DIMENSIONS - FT	30.0 X 16.0 X 34.0	
SHELL GENERIC MATERIAL	CARBON STEEL; STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	HIGH STRENGTH LOW ALLOY (HSLA); AUSTENITIC	
SHELL MATERIAL TRADE NAME/COMMON TYPE	COR-TEN; TYPE 316L	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	SYNTHETIC RUBBER	
LINER MATERIAL TRADE NAME/COMMON TYPE	NEOPRENE LS-576	
GAS CONTACTING DEVICE TYPE	FIXED GRIDS	
NUMBER OF CONTACTING ZONES	5	
LIQUID RECIRCULATION RATE - LITER/S	1310.	(20800 GPM)
L/G RATIO - L/CU.M	8.0	(60.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.5	(2.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	2.3	(7.5 FT/S)
INLET GAS FLOW - CU. M/S	163.61	(346700 ACFM)
INLET GAS TEMPERATURE - C	51.7	(125 F)
SO2 REMOVAL EFFICIENCY - %	70.0	

** 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	VERTICAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	4	
FREEBOARD DISTANCE - M	4.27	(14.0 FT)
DISTANCE BETWEEN VANES - CM	3.8	(1.50 IN)
PRESSURE DROP - KPA	.2	(1.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	2.7	(9.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC	
WASH WATER SOURCE	RIVER WATER	
WASH FREQUENCY	CONTINUOUS	

** REHEATER

NUMBER	4
NUMBER OF SPARES	0
NUMBER PER MODULE	1
GENERIC TYPE	INDIRECT HOT AIR
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE
TEMPERATURE INCREASE - C	27.8 (50 F)
INLET FLUE GAS TEMPERATURE - C	51.7 (125 F)
OUTLET FLUE GAS TEMPERATURE - C	79.4 (175 F)
NUMBER OF HEAT EXCHANGER BANKS	20
NUMBER OF TUBES PER BUNDLE	80
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL; COPPER [FINS]
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110

** FANS

NUMBER	4
NUMBER OF SPARES	0
DESIGN	CENTRIFUGAL
SUPPLIER	GREEN FUEL ECONOMIZER
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY
FLUE GAS FLOW RATE - CU.M/S	191.12 (405000 ACFM)
FLUE GAS TEMPERATURE - C	137.8 (280 F)
PRESSURE DROP - KPA	9.8 (32.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL; HIGH ALLOY [BLADE WEAR PLATES]

** DAMPERS

GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	BOTTOM-ENTRY GUILLOTINE
MODULATION	OPEN [INOPERATIVE]
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY [HSLA]; NICKEL BASE/CHRO
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	BOTTOM-ENTRY GUILLOTINE
MODULATION	OPEN [INOPERATIVE]
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY [HSLA]; NICKEL BASE/CHRO
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	BOTTOM-ENTRY GUILLOTINE
MODULATION	CLOSED [INOPERATIVE]
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/HIGH ALLOY
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY [HSLA]; NICKEL BASE/CHRO
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
SHELL GENERIC MATERIAL TYPE	STAINLESS STEEL
SHELL SPECIFIC MATERIAL TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 8 (CONT.)

** 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	40.0

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	4
SCRUBBER RECYCLE	4
REAGENT PREP PRODUCT	1
WASTE SLURRY BLEED	1
REHEATER DRAIN	****

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	10
POND RETURN	****
RIVER WATER TRANSFER	****
VENTURI RECIRCULATION	6

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION
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	110 ACRES X 30 FT DEEP
SITE CAPACITY - CU.M	4035900 (3300.0 ACRE-FT)
SITE SERVICE LIFE - YRS	5

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	INLET TO ABSORBER
CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	PERCENT SOLIDS, PRESSURE DROP, SO2
CONTROL LEVELS	PH SET AT 5.9, 10% SOLIDS IN ABSORBER
MONITOR LOCATION	PH-ABSORBER RECYCLE LINE

** WATER BALANCE

WATER LOOP TYPE	CLOSED

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	CACO3
UTILIZATION - %	65.0
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0
BALL MILL - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0
BALL MILL	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/77	SYSTEM	1.5	2.6		1.5			744	426	11	40.9

** PROBLEMS/SOLUTIONS/COMMENTS

STARTUP AND SHAKEDOWN PROCEDURES OFFICIALLY BEGAN ON APRIL 30, 1977. SCRUBBING OPERATIONS BEGAN ON MAY 16 WHEN FLUE GAS WAS PASSED THROUGH A AND B TRAINS.

6/77	SYSTEM	10.9	18.0		10.9			720	438	79	36.3

** PROBLEMS/SOLUTIONS/COMMENTS

C AND D TRAINS WERE STILL UNDERGOING PRESCRUBBING PREPARATIONS THROUGH JUNE. BECAUSE OF BOILER RELATED PROBLEMS SUFFICIENT STEAM WAS NOT AVAILABLE TO OPERATE THE FLUE GAS REHEATERS.

7/77	SYSTEM	24.7	28.1		24.7			744	654	184	49.6
8/77	A	20.0	22.8		20.0						
	B	40.0	45.7		40.0						
	C	36.7	42.0		36.7						
	D	8.3	9.5		8.3						
	SYSTEM	26.3	30.0		26.3			744	651	195	47.5

** PROBLEMS/SOLUTIONS/COMMENTS

27 SEPARATE INSTRUMENTATION FAILURES OCCURRED DURING THE PERIOD. THE PROBLEMS WERE ASSOCIATED WITH FLOW METERS, VARIABLE-SPEED CONTROLS, SO2 MONITORS, PH MONITORS, AND SOLIDS MONITORS. AUTOMATIC SCRUBBER CONTROLS WERE INOPERATIVE. SCRUBBING OPERATIONS HAVE BEEN CONDUCTED MANUALLY BASED ON PERIODIC SAMPLING.

MAJOR PROBLEMS HAVE BEEN ASSOCIATED WITH THE GUILLOTINE BYPASS AND DOUBLE LOUVER SEAL-OFF GAS DAMPERS. SO2 REACTS WITH RUBBER SEALS. DETERIORATION RESULTS IN SO2 AND FLYASH LEAKING. SUBSEQUENT FAILURE OF THE AUTOMATIC GEAR BOXES NECESSITATES MANUAL DAMPER OPERATIONS. IT HAS NOT BEEN POSSIBLE TO ENTIRELY ISOLATE MODULES FOR REPAIR WORK BECAUSE OF THIS LEAKAGE.

LOW ESP PARTICULATE REMOVAL EFFICIENCY HAS RESULTED IN HIGH FAN ROTOR EROSION, MOTOR BURNOUTS AND LUBRICATION PROBLEMS.

THERE WAS EVIDENCE OF SCALE ACCUMULATION IN THE SCRUBBING SYSTEM, HOWEVER, THIS WAS NOT SEVERE.

EROSION HAS OCCURRED IN THE CERAMIC VENTURI THROAT LININGS. THIS IS ALSO A RESULT OF THE POOR ESP EFFICIENCY.

RUBBER LINING FAILURES HAVE OCCURRED IN THE VENTURIS, ABSORBERS AND TANKS. IT IS BELIEVED THAT THESE WERE APPLICATION-RELATED FAILURES. THE RUBBER IN THE ABSORBER SECTION OF ALL FOUR TRAINS HAS DETACHED IN VARIOUS PLACES. THE SUPPLIER HAS REPAIRED THE DEFECTIVE SECTIONS.

SOFT SCALE FORMATION MAY RESULT FROM IMPROPER STOICHIOMETRIC RATIOS. STOICHIOMETRIC RATIOS OF 2.0, 3.0 AND 6.0 HAVE OCCURRED PERIODICALLY BECAUSE OF MANUAL CONTROL AND OPERATOR JUDGEMENTS. IDEALLY THE RATIO SHOULD FALL IN THE 1.4 TO 1.6 RANGE.

THE BALL MILL HAS NOT BEEN ABLE TO OPERATE AT DESIGN CAPACITY. THE BALL MILL HAS A DESIGN CAPACITY OF GRINDING 50 TPH BUT HAS ONLY BEEN ABLE TO

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 8 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
			PRODUCE 35 TPH OF LIMESTONE SLURRY.								
9/77	A	33.3	21.1		17.8						
	B	72.7	68.2		57.8						
	C	97.4	97.0		82.1						
	D	98.4	98.2		83.1						
	SYSTEM	75.5	71.1		60.2			720	609	433	45.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THIS MONTH THE BOILER WAS OPERATED AT A REDUCED LOAD OF ABOUT 300 MW. AT THIS REDUCED LOAD, ONLY 3 TRAINS WERE REQUIRED TO HANDLE ALL OF THE BOILER FLUE GAS.

SOME SCALING WAS DISCOVERED IN THE ABSORBER COLUMN AND ENTRAINMENT SEPARATOR OUTLET OF ONE TRAIN.

SERIOUS EROSION PROBLEMS CONTINUE WITH THE ID FAN ROTORS.

THE UNIT WENT OFF LINE SEPTEMBER 30 FOR A SCHEDULED OUTAGE TO REPAIR BOILER TUBES. DURING THE OUTAGE, AN ATTEMPT WILL BE MADE TO CORRECT MANY OF THE MECHANICAL PROBLEMS.

10/77	SYSTEM	100.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 8 WAS OFF-LINE FOR THE ENTIRE MONTH DURING A SCHEDULED OUTAGE FOR REPAIR OF BOILER TUBES. DURING THIS PERIOD, MANY MECHANICAL AND INSTRU- - MENTAL SCRUBBER PROBLEMS WERE CORRECTED.

11/77	A		85.5		49.0						
	B		89.8		51.5						
	C		99.8		57.2						
	D		75.8		43.5						
	SYSTEM	57.0	87.7		50.3			720	413	362	38.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS BROUGHT BACK IN SERVICE ON NOVEMBER 11 FOLLOWING THE SCHEDULED BOILER OUTAGE (AVAILABILITY WAS CALCUATED FROM NOVEMBER 11 THROUGH NOVEMBER 30).

ALL ID FANS HAVE BEEN REBUILT IN AN ATTEMPT TO CORRECT THE CORROSION AND DRIVE MOTOR PROBLEMS.

GAS LEAKAGE FROM THE DAMPERS WAS CORRECTED BY WELDING A COVER PLATE OVER THE SEAL DOORS. THE SUPPLIER IS CURRENTLY WORKING ON A NEW DESIGN FOR DAMPERS.

INSTRUMENTATION PROBLEMS CONTINUE TO HAMPER PROPER SCRUBBER OPERATION.

12/77	A	59.3	98.1		56.1						
	B	55.9	97.9		56.0						
	C	58.7	97.2		55.6						
	D	57.7	95.4		54.6						
	SYSTEM	57.9	97.2		56.0			744	426	414	42.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF-LINE FROM DECEMBER 20 TO DECEMBER 31 FOR REPAIRS OF A BOILER TUBE LEAK.

DURING THE BOILER OUTAGE, AN INSPECTION WAS MADE OF THE SCRUBBER MODULES.

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

THE RUBBER LINER WAS FOUND TO BE MISSING IN SEVERAL AREAS OF ALL FOUR MODULES AND WAS REPAIRED DURING THE OUTAGE.

1/78	A	90.2	98.5		81.9						
	B	86.7	94.5		78.5						
	C	84.6	91.9		76.4						
	D	88.8	97.0		80.6						
	SYSTEM	87.6	95.5		79.4			744	618	590	60.1

** PROBLEMS/SOLUTIONS/COMMENTS

ALL FOUR SCRUBBER MODULES RETURNED TO SERVICE THIS MONTH FOLLOWING REPAIR WORK ON THE RUBBER LINER DURING THE RECENT BOILER OUTAGE.

MINOR PROBLEMS WERE ENCOUNTERED WITH FREEZING AND BURSTING OF PIPING.

FEED HOPPERS AT THE LIMESTONE STORAGE AREA HAVE BEEN PLUGGING DUE TO FROZEN GRAVEL.

THE BALL MILL SUMP PUMP LINERS HAVE BEEN WEARING OUT.

SOME PLUGGING OF THE VENTURI SPRAY NOZZLES WAS ENCOUNTERED DURING JANUARY.

INSTRUMENTATION CONTINUES TO BE A MAJOR PROBLEM WITH OPERATION OF THE SCRUBBER.

2/78	A	25.5	29.3		25.5						
	B	69.4	68.4		59.7						
	C	67.8	63.1		55.1						
	D	56.5	53.6		46.8						
	SYSTEM	54.8	53.6		46.8			672	586	314	49.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE OUTAGE TIME FOR TRAINS A AND B WAS REQUIRED TO REPLACE THE RUBBER LINERS IN THE DOWNCOMER AREA WITH STAINLESS STEEL. C AND D TRAINS WILL WILL RECEIVE THE SAME MODIFICATION.

3/78	A	81.9	90.8		78.6						
	B	48.4	53.4		46.2						
	C	26.8	30.9		26.8						
	D	81.6	90.5		78.3						
	SYSTEM	59.7	66.4		57.5			744	644	428	43.7

** PROBLEMS/SOLUTIONS/COMMENTS

TRAIN B WAS OUT OF SERVICE MARCH 1 THROUGH MARCH 13 TO INSTALL STAINLESS STEEL IN THE ABSORBER AND VENTURI DOWNCOMER AREAS.

STAINLESS STEEL COVERS WERE INSTALLED AROUND TWO EXPANSION JOINTS ON TRAIN C IN ORDER TO PREVENT FLUE GAS LEAKAGE.

A STAINLESS STEEL PLATE WAS WELDED OVER THE ENTRY DOOR OPENINGS TO TRAIN C OUTLET AND BYPASS GUILLOTINE DAMPERS FOR THE PURPOSE OF ELIMINATING GAS LEAKAGE.

TRAIN C WAS OUT OF SERVICE MARCH 14 THROUGH MARCH 29 TO INSTALL STAINLESS STEEL ABSORBER AND VENTURI DOWNCOMER AREAS.

SEVERAL LIFTER BARS ON THE FEED AND DISCHARGE ENDS OF THE BALL MILL WERE FOUND TO BE BADLY WORN.

THE UTILITY HAS HAD WEAR PROBLEMS WITH THE SLURRY SUMP PUMP LINERS AT THE

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 8 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
			PERFORMANCE DATA								
			BALL MILL.								
4/78	A	80.0	88.8		66.6						
	B	67.7	85.8		64.4						
	C	90.0	100.0		80.0						
	D	38.1	50.8		38.1						
	SYSTEM	69.0	81.4		62.3			720	540	448	44.4

** PROBLEMS/SOLUTIONS/COMMENTS

DURING A BRIEF INSPECTION OF THE SCRUBBING SYSTEM IN EARLY APRIL, SOLIDS DEPOSITION WAS NOTICED IN THE MIST ELIMINATOR SECTION OF ALL TRAINS DUE TO PLUGGING THAT HAD OCCURRED IN SEVERAL OF THE MIST ELIMINATOR SPRAY NOZZLES TRAIN D WAS OUT OF SERVICE FOR 17 DAYS WHILE THE MIST ELIMINATOR WAS DISASSEMBLED AND CLEANED.

A STAINLESS STEEL LINER WAS INSTALLED ON THE SLOPING SECTIONS OF THE ABSORBER AND VENTURI OF TRAIN D.

STAINLESS STEEL PLATES WERE INSTALLED OVER THE ENTRY DOOR OPENINGS TO TRAIN D INLET, OUTLET AND BYPASS GUILLOTINE DAMPERS TO REDUCE GAS LEAKAGE

STAINLESS STEEL COVERS WERE INSTALLED AROUND THE FIVE EXPANSION JOINTS ON TRAIN D, TWO EXPANSION JOINTS ON TRAIN A, AND ONE EXPANSION JOINT ON TRAIN B TO REDUCE GAS LEAKAGE.

THERE CONTINUES TO BE A WEAR PROBLEM WITH PUMP LINERS AT THE BALL MILL. NO CAUSE OR SOLUTION OF THE PROBLEM HAS BEEN ASCERTAINED AS YET.

5/78	A		52.0		34.0						
	B		100.0		68.7						
	C		100.0		69.9						
	D		100.0		66.1						
	SYSTEM	97.2	88.0		59.7			744	486	444	44.4

** PROBLEMS/SOLUTIONS/COMMENTS

BEGINNING MAY 1978 AVAILABILITY CALCULATIONS EXCLUDED UNAVAILABLE HOURS RESULTING FROM THE ID FAN SINCE THE ID FAN IS INTENDED PRIMARILY FOR MAINTAINING BOILER FURNACE DRAFT. FGD SYSTEM AVAILABILITY CALCULATORS DO INCLUDE UNAVAILABLE HOURS RESULTING FROM THE LIMESTONE PREPARATION FACILITY.

ON MAY 29 A SMALL PERFORATION IN THE RIVERSIDE VERTICAL WALL OF THE ABSORBER VESSEL WAS DISCOVERED (LEAKING SLURRY). FURTHER EXAMINATION SHOWED THAT A STRIP OF LOOSE NEOPRENE HAD ALLOWED SLURRY TO CORRODE AND/OR ERODE THE BARE CARBON STEEL VESSEL. BECAUSE OF THE SMALL SIZE OF THE LEAK, NO ATTEMPT WILL BE MADE TO PROVIDE A PERMANENT PATCH UNTIL THE NEXT EXTENDED OUTAGE ON TRAIN A. THERE WAS NO EVIDENCE OF ANY CORROSIVE OR EROSIVE ATTACK ON THE NEWLY-APPLIED STAINLESS STEEL ON THE SLOPING PORTIONS OF THE VESSEL.

6/78	A		100.0		70.1						
	B		100.0		73.8						
	C		100.0		71.7						
	D		100.0		70.7						
	SYSTEM	91.7	100.0		71.6			720	472	518	39.8

** PROBLEMS/SOLUTIONS/COMMENTS

SEVERE FAILURE OF THE BALL MILL OUTBOARD FLANGED FOURNAL BOLTS RESULTED IN A LOSS OF SLURRY PRODUCTION SEVERAL TIMES DURING JUNE.

7/78	A		96.9		75.3						

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B		98.8		76.7						
	C		90.7		70.4						
	D		100.0		88.8						
	SYSTEM	91.7	96.6		77.8			744	578	579	53.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE BUCKET ELEVATOR SUPPLYING LIMESTONE TO THE BALL MILL FAILED ON JULY 21. APPARENTLY, THE CHAIN CARRYING THE BUCKETS GOT OFF TRACK DAMAGING SEVERAL BUCKETS BEFORE THE CONDITION WAS DISCOVERED. REPAIRS WERE NOT COMPLETED UNTIL JULY 24.

BECAUSE OF THE NECESSITY FOR KEEPING UNIT 8 ON-LINE, THE SCRUBBER WAS RUN WITHOUT LIMESTONE ADDITION(THERE IS AN APPROXIMATE 8-HOUR RESERVE OF GROUND LIMESTONE WHEN THE SLURRY STORAGE TANK IS FULL).

SINCE THERE IS NO RESERVE BUCKET ELEVATOR, AN OPENING WAS CUT IN THE TOP OF THE BALL MILL FEED HOPPER AND A CHUTE WAS INSTALLED EXTENDING OUTWARD FROM THE OPENING TO ALLOW LOADING A LIMESTONE INTO THE BALL MILL FEED HOPPER USING A CRANE WITH A CLAMSHELL LOADER. THIS WILL ALLOW CONTINUED OPERATION OF THE BALL MILL IN THE EVENT OF FUTURE BUCKET ELEVATOR FAILURES.

8/78	A		100.0		87.8						
	B		56.9		49.2						
	C		58.6		50.7						
	D		95.6		82.7						
	SYSTEM	91.4	77.8		67.6			744	643	503	44.6

** PROBLEMS/SOLUTIONS/COMMENTS

ABSORBER SPRAY NOZZLE CONES CONTINUE TO DROP TO THE TOP GRID, DISTORTING SPRAY PATTERNS. INSPECTIONS ON AUGUST 18 SHOWED CONSIDERABLE TOP GRID WEAR OF THE 316 STAINLESS STEEL GRIDS, PROBABLY AGGRAVATED BY LOSS OF NOZZLE CONES. FOUR SPRAYCO 1969F 5-INCH ORIFICE NOZZLES WERE BORROWED FROM THE SHAWNEE STEAM PLANT TEST FACILITY AND INSTALLED IN ABSORBER B ON AUGUST 18 FOR EVALUATION AS POSSIBLE CANDIDATES FOR REPLACING NOZZLES IN CURRENT USE. THESE SPRAYCO NOZZLES HAVE SUBSTANTIAL INTERNAL DEFLECTORS AND ARE EXPECTED TO DEMONSTRATE IMPROVED PERFORMANCE.

SPRAYING SYSTEMS COMPANY WILL ALSO LEND FOUR OF THEIR 5-INCH SCRUBBER NOZZLES FOR TESTING. THESE ARE EXPECTED TO ARRIVE IN SEPTEMBER.

9/78	A		100.0		76.1						
	B		100.0		82.9						
	C		29.0		20.6						
	D		83.9		59.4						
	SYSTEM	98.7	78.2		59.8			720	510	430	39.5

** PROBLEMS/SOLUTIONS/COMMENTS

REPAIRS ON THE BUCKET ELEVATOR WERE COMPLETED ON SEPTEMBER 24.

10/78	A		100.0		23.0						
	B		100.0		19.9						
	C		100.0		22.2						
	D		.0		.0						
	SYSTEM	22.4	75.0		16.3			744	146	121	10.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE LIMESTONE BUCKET ELEVATOR FAILED ON OCTOBER 4. THE ELEVATOR HAD BEEN LAST REPAIRED ON SEPTEMBER 24. THE BUCKET ELEVATOR FAILURES ARE CAUSED BY THE DRIVE SPROCKETS BECOMING LOOSE ALLOWING THE CHAINS TO WORK OFF OF THE SPROCKET AND THE HOUSING NOT BEING PLUMB.

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 8 (CONT.)

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

SHORT-TERM PLANS ARE TO REBUILD THE BUCKET ELEVATOR DURING THE SCHEDULED BOILER OUTAGE. THE LONG-TERM SOLUTION IS TO REPLACE THE BUCKET ELEVATOR WITH CONVEYORS.

11/78	SYSTEM				.0			720	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN FOR A SCHEDULED SCRUBBER/BOILER OUTAGE IN NOVEMBER.

A FIRE ON NOVEMBER 28 IN TRAIN A ABSORBER CAUSED BY WELDING DESTROYED THE TURBULENT CONTACT ABSORBER (TCA) SPHERES INSTALLED DURING THE PRESENT OUTAGE.

12/78	A			.0		.0					
	B			100.0		15.2					
	C			100.0		11.8					
	D			100.0		15.3					
	SYSTEM		67.7	75.0		10.6		744	37	79	2.4

** PROBLEMS/SOLUTIONS/COMMENTS

CLEANUP OF THE FIRE-DAMAGED TRAIN A ABSORBER WAS COMPLETED ON DECEMBER 5.

THE BUCKET ELEVATOR REPAIRS CONTINUED IN DECEMBER. A PORTABLE CONVEYOR IS BEING USED TO SUPPLY LIMESTONE UNTIL THE BUCKET ELEVATOR REPAIRS ARE COMPLETE.

1/79	SYSTEM		75.0			.0		744	0	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT REMAINED OUT OF SERVICE BECAUSE OF TURBINE ROTOR PROBLEMS.

FOLLOWING THE NOVEMBER 28 FIRE, THE DECISION WAS MADE NOT TO RESTORE THE DAMAGED NEOPRENE ABSORBER VESSEL LINING, BUT TO REPLACE IT WITH 316L STAINLESS STEEL. TWO PRINCIPAL REASONS FOR NOT RESTORING THE RUBBER WERE HIGH COST AND A STATEMENT BY THE RUBBER APPLICATOR THAT HE COULD NOT GUARANTEE ANY RUBBER APPLIED TO THE VESSELS WITH THE AMBIENT TEMPERATURE BELOW ABOUT 55 F. STAINLESS STEEL (TYPE 316L) IS CHEAPER (APPLIED COST) THAN RUBBER QUICKER TO APPLY, AND HAS BEEN DEMONSTRATED AT WIDOWS CREEK STEAM PLANT TO BE VERY DURABLE FOR APPLICATION WITHIN THE ABSORBER VESSEL.

AN ESTIMATED 4,200 SQUARE FEET OF DAMAGED RUBBER WAS REMOVED AND 3/16-INCH-THICK 316L STAINLESS STEEL WAS PURCHASED FOR REPLACEMENT. THIS ARRIVED AT THE PLANT ON JANUARY 16. PREPARATION OF THE ABSORBER VESSEL INTERIOR FOR INSTALLATION OF THE STAINLESS STEEL CONTINUED DURING JANUARY. SINCE TRAIN A ABSORBER STAINLESS STEEL GRID (DIRECTLY BELOW THE SPRAY NOZZLES) WAS DESTROYED BY THE FIRE, THE LOWER STAINLESS STEEL GRID FROM TRAIN B WAS REMOVED AND INSTALLED AS THE TOP GRID IN TRAIN A. A NEW COMPLEMENT OF FIBERGLASS-REINFORCED PLASTIC (FRP) ABSORBER VESSEL GRIDS WAS ORDERED AND WAS SCHEDULED TO ARRIVE ONSITE DURING FEBRUARY.

2/79	A			.0		.0					
	B			100.0		70.5					
	C			100.0		68.6					
	D			100.0		52.4					
	SYSTEM		66.4	75.0		47.9		672	314	323	25.6

** PROBLEMS/SOLUTIONS/COMMENTS

TRAIN D BECAME AVAILABLE FEBRUARY 10 FOR THE INSTALLATION OF FORCED-OXIDATION TEST EQUIPMENT. BY FEBRUARY 10, INSTALLATION WAS COMPLETED ON PUMPS, TANKS, VACUUM FILTERS, AND MODIFICATION OF THE ABSORBER AND VENTURI

PERFORMANCE DATA

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

AGITATOR CONTROL CIRCUITS. BY LATE FEBRUARY, ERECTION OF THE ELECTRICAL/ CONTROL BUILDING AND INSTALLATION OF FLOCCULENT PIPING WAS BEGUN. CONSTRUCTION OF THE FACILITY IS EXPECTED TO BE COMPLETED IN MARCH.

NEW AGITATORS WERE INSTALLED ON THE TRAIN D ABSORBER AND VENTURI CIRCULATION TANKS. THE NEW, MORE POWERFUL AGITATORS ARE NEEDED FOR THE FORCED-OXIDATION TESTS.

3/79	A			78.6	69.6						
	B			100.0	93.0						
	C			100.0	92.7						
	D			100.0	91.7						
	SYSTEM		99.6	94.7	86.8			744	659	646	62.1

** PROBLEMS/SOLUTIONS/COMMENTS

REPAIRS OF DAMAGE RESULTING FROM THE FIRE IN TRAIN A LAST NOVEMBER WERE COMPLETED BY MARCH 1, 1979. TRAIN A REMAINED OUT OF SERVICE UNTIL MARCH 8 TO REBUILD THE INDUCED-DRAFT FAN-A FLUID DRIVE.

BECAUSE THE REPLACEMENT FIBERGLASS-REINFORCED PLASTIC (FRP) GRATING DID NOT ARRIVE AT THE PLANT BY MARCH 1, 1979, ORDINARY CARBON STEEL FLOOR GRATING WAS INSTALLED FOR THE MARCH 8 STARTUP. INSPECTIONS LATE IN MARCH REVEALED THAT CORROSION AND EROSION HAD DESTROYED APPROXIMATELY 70-80% OF THE CARBON STEEL GRATING.

4/79	A			100.0	85.0						
	B			100.0	77.9						
	C			100.0	75.8						
	D			100.0	81.5						
	SYSTEM		96.4	100.0	80.1			720	519	577	46.8

** PROBLEMS/SOLUTIONS/COMMENTS

FOLLOWING THE BALLMILL TEST ON MARCH 21, 1979, WHERE SLURRY BEGAN TO OVERFLOW OUT THE FEED END OF THE MILL, THE CLASSIFIERS WERE EXAMINED FOR POSSIBLE PLUGGING. ONE CLASSIFIER LINER WAS WORN, AND THE CYCLONE INLET PIPE WAS PARTIALLY PLUGGED WITH SLURRY. REPAIRS WERE MADE, AND THE BALL MILL RESUMED OPERATION WITH NO OVERFLOW PROBLEMS. WHEN THE CYCLONE LINERS ARE WORN OR THE CYCLONES ARE PARTIALLY PLUGGED, TOO MUCH MATERIAL IS RETURNED TO THE MILL CAUSING OVERFLOW OF SLURRY OUT THE FED END OF THE MILL.

5/79	A		100.0	97.5	83.6						
	B		100.0	59.3	50.8						
	C		100.0	100.0	89.7						
	D		100.0	100.0	87.9						
	SYSTEM		100.0	89.2	78.0			744	638	580	54.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE VENTURI HEADERS AND NOZZLES HAVE PLUGGED WITH SCALE AND SOLIDS. A NEW VENTURI HEADER HAS BEEN INSTALLED AND IS BEING TESTED ON TRAIN B. THE NEW HEADER CONSISTS OF SIX 5-INCH FULL-CONE NOZZLES WITH A 3-INCH DISCHARGE ORIFICE. THE HEADER IS INSTALLED OVER THE VENTURI THROAT TO PROVIDE GOOD THROAT COVERAGE. IF THE NEW HEADER PROVES SUCCESSFUL, NEW HEADERS WILL BE INSTALLED IN ALL VENTURIS.

6/79	A		100.0	93.6	75.7						
	B		100.0	89.9	72.6						
	C		100.0	91.1	73.6						
	D		99.6	93.8	75.8						
	SYSTEM		99.9	92.1	74.4			720	582	536	51.4

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 8 (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 NEW HEADER IN TRAIN B PROVED SATISFACTORY SO NEW HEADERS WILL BE INSTALLED ON ALL FOUR VENTURIS.

OPTIMIZATION TESTS ON THE UNIT 8 SCRUBBER HAVE BEGUN AND WILL BE COMPLETED BY THE END OF OCTOBER. THE TESTS WILL INCLUDE TESTING THE ADDITIONAL FIBERGLASS REINFORCED PLASTIC GRIDS, NEW ABSORBER FULL-CONE SPRAY NOZZLES, POLYPROPYLENE GRID-TYPE PACKING, AND TURBULENT CONTACT ABSORBER SPHERES.

THE 99.5% PARTICLE REMOVAL EFFICIENCY REPORTED FOR JUNE WAS THE AVERAGE OF TWO EFFICIENCY TESTS RUN AS PART OF THE SCRUBBER OPTIMIZATION TESTS.

7/79	A	100.0	100.0	44.6						
	B	100.0	100.0	41.8						
	C	100.0	100.0	42.5						
	D	100.0	89.4	35.0						
	SYSTEM	100.0	100.0	41.0		744	291	305	23.7

** PROBLEMS/SOLUTIONS/COMMENTS

CORROSION WAS FOUND IN THE REHEAT TUBES IN TRAIN A. MATERIAL COLLECTED ON THE TUBES CONSISTED OF FLY ASH AND FERROUS CORROSION PRODUCTS. CHLORIDE AND SLURRY SOLIDS WERE ALSO DETECTED. THE CHLORIDE COULD HAVE BEEN DEPOSITED DURING THE FIRE IN TRAIN A IN NOVEMBER 1978. THE NEOPRENE SCRUBBER LINING CONTAINS CHLORIDE WHICH IS LIBERATED WHEN BURNED. A DETAILED ANALYSIS OF THE TUBE CORROSION IS BEING PERFORMED.

THE 99.01% PARTICLE REMOVAL EFFICIENCY REPORTED FOR JULY WAS AN AVERAGE OF THE EFFICIENCY TESTS RUN AS A PART OF THE SCRUBBER OPTIMIZATION TESTS.

8/79	A	99.2	100.0	74.3						
	B	100.0	100.0	80.6						
	C	96.2	94.9	70.2						
	D	96.1	100.0	74.9						
	SYSTEM	97.9	99.0	75.0		744	550	558	48.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE BALL MILL WAS OUT OF SERVICE BECAUSE OF BROKEN BOLTS WHICH SECURE THE INBOARD BEARING JOURNAL TO THE BALL MILL. THE BOLTS WERE REPLACED AND THE DISCHARGE END OF THE MILL WAS CLEANED. BOLT HOLES WERE REAMED TO ACCOMODATE THE LARGER DIAMETER BOLTS AND LOCK NUTS WERE USED.

THE SCRUBBER OPTIMIZATION TEST CONTINUED DURING AUGUST.

9/79	A	100.0	100.0	71.7						
	B	100.0	100.0	75.0						
	C	95.0	96.7	65.6						
	D	94.4	100.0	72.8						
	SYSTEM	97.4	99.2	71.3		720	488	513	43.8

** PROBLEMS/SOLUTIONS/COMMENTS

THE LIMESTONE BUCKET ELEVATOR, WHICH FEEDS LIMESTONE INTO THE BALL MILL SURGE HOPPER, FAILED ON SEPTEMBER 28. THE FAILURE, WHICH HAS OCCURRED BEFORE, WAS CAUSED BY LIMESTONE PARTICLE BUILDUP ON THE BUCKETS AND IN THE BOTTOM OF THE HOUSING, RESULTING IN THE ELEVATOR JAMMING AND BREAKING OF THE BUCKET GUIDE CHAINS. THE ELEVATOR WILL BE REPLACED WITH BELT CONVEYORS IN THE SUMMER OF 1980.

10/79	A	58.3	72.7	51.1						

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	B	100.0	95.8		67.3						
	C	100.0	95.2		66.9						
	D	93.4	100.0		70.3						
	SYSTEM	87.9	90.9		63.9			744	523	476	3.8

** PROBLEMS/SOLUTIONS/COMMENTS

A PORTABLE CONVEYOR WAS USED TO SUPPLY LIMESTONE TO THE BALL MILL WHILE THE BUCKET WAS BEING REPAIRED.

THE REPAIR OF THE BUCKET ELEVATOR CONSISTED OF THE REPLACEMENT OF 25 BUCKETS, REPLACEMENT OF 50 FEET OF DRIVE CHAIN ON EACH SIDE OF THE BUCKETS, AND REMOVAL OF LIMESTONE ACCUMULATIONS ON ALL SURFACES WITH HIGH-PRESSURE WATER. THE BUCKET ELEVATOR WAS RETURNED TO SERVICE ON OCTOBER 6, 1979.

11/79	A	96.9	87.5		63.9						
	B	100.0	100.0		78.6						
	C	90.0	83.3		60.8						
	D	80.3	92.2		67.4						
	SYSTEM	91.8	90.8		.67.7			720	526	487	36.3

** PROBLEMS/SOLUTIONS/COMMENTS

CONSTRUCTION OF AN ON-SITE AREA IN WHICH TO STACK GYPSUM WAS COMPLETED DURING EARLY NOVEMBER AND STACKING (LANDFILL) OPERATIONS BEGAN ON NOVEMBER 15. THE TRAIN D SCRUBBER SLUDGE IS OXIDIZED BY AIR SPARGING, DEWATERED, AND TRANSPORTED TO THE SITE IN TRUCKS. THE GYPSUM PILE IS FORMED WITH A BULLDOZER, AND RUNOFF AND LEACHATE ARE MONITORED FROM LEACHATE WELLS, A LEACHATE POND, AND A RUNOFF POND. THE GYPSUM IS TO BE STACKED AS HIGH AS 10 FEET.

12/79	A	87.6	83.6		67.7						
	B	100.0	100.0		85.6						
	C	100.0	64.0		51.9						
	D	95.8	65.7		53.2						
	SYSTEM	95.9	78.3		64.6			744	603	481	37.5

** PROBLEMS/SOLUTIONS/COMMENTS

ON DECEMBER 29, 1979 OPTIMIZATION TESTS WERE COMPLETED. THE DATA OBTAINED WILL BE ANALYZED TO DETERMINE THE BEST MODIFICATIONS THAT CAN BE INSTALLED TO INCREASE THE SO2 REMOVAL ON THE SCRUBBER.

1/80	A	70.4	79.8		39.2						
	B	83.5	100.0		56.3						
	C	100.0	100.0		55.5						
	D	28.3	54.7		26.9						
	SYSTEM	70.6	83.6		44.5			744	366	331	23.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE UNIT 8 BOILER EXPERIENCED LOW AVAILABILITY, CAUSING THE FORCED OXIDATION TESTS TO BE DISCONTINUED UNTIL AFTER THE SCHEDULED MAINTENANCE OUTAGE WHICH WILL BEGIN IN SEPTEMBER 1980. THE FORCED OXIDATION TESTS ARE EXPECTED TO RESUME IN JANUARY 1981.

2/80	A	80.0	88.6		72.7						
	B	86.5	90.2		74.0						
	C	91.1	97.6		80.0						
	D	87.6	98.2		80.6						
	SYSTEM	86.3	93.7		76.8			696	571	535	43.6

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 8 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
	** PROBLEMS/SOLUTIONS/COMMENTS										
		BY FEBRUARY 27, 1980, THE DIFFERENTIAL PRESSURE ACROSS THE TRAIN C ABSORBER HAD REACHED 19 INCHES WATER GAGE. THE HIGH ABSORBER DIFFERENTIAL PRESSURE WAS CAUSED BY PLUGGING OF TURBULENT CONTACT ABSORBER (TCA) SPHERES WHICH WERE INSTALLED DURING SCRUBBER OPTIMIZATION TESTS. THE TCA SPHERES WILL BE REMOVED IN MARCH.									
3/80	A	93.6	88.0		85.4						
	B	93.0	90.6		87.9						
	C	71.9	73.3		71.1						
	D	93.3	63.9		62.0						
	SYSTEM	86.0	79.0		76.6			744	722	570	50.4
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ON MARCH 3 THE TCA SPHERES INSTALLED IN TRAIN C AS PART OF THE OPTIMIZATION TESTS WERE REMOVED. THE SPHERES HAD BECOME PLUGGED, RESULTING IN AN ABSORBER DIFFERENTIAL PRESSURE OF 20 INCHES WATER GAGE. THE SPHERES HAD BEEN IN USE SINCE NOVEMBER 17, 1979.									
4/80	A	96.8	82.7		46.5						
	B	97.2	79.5		44.7						
	C	96.3	90.4		50.8						
	D	95.0	70.9		39.9						
	SYSTEM	96.3	80.9		45.5			720	405	328	30.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE SCRUBBER SLURRY SPRAY NOZZLES WERE CLEANED AS PART OF A SCHEDULED MAINTENANCE OUTAGE.									
		BALL MILL LINERS AND LIFTER BARS WERE REPLACED IN APRIL DURING A SCHEDULED MAINTENANCE OUTAGE.									
5/80	A	99.2	74.5		56.2						
	B	96.1	80.9		61.0						
	C	96.1	87.7		66.1						
	D	96.1	75.2		56.7						
	SYSTEM	96.9	79.6		60.0			744	561	447	38.3
	** PROBLEMS/SOLUTIONS/COMMENTS										
		ON MAY 16 THE LIMESTONE BUCKET ELEVATOR FAILED CAUSING UNIT 8 TO BE REMOVED FROM SERVICE FOR SIX HOURS.									
		THE SCRUBBER SLURRY SPRAY NOZZLES ON THE B, C AND D MODULES WERE CLEANED DURING MAY. THE CLEANING KEPT THE SYSTEM OFF LINE FOR 23 HOURS.									
		THE UNIT 8 BALL MILL MALFUNCTIONED ON MAY 28, DUE TO FAILURE OF INLET BEARING BOLTS.									
6/80	A	100.0	5.3	100.0	4.9						
	B	100.0	100.0	100.0	91.8						
	C	99.6	93.9	99.5	86.3						
	D	100.0	98.6	100.0	90.6						
	SYSTEM	99.9	74.5	99.8	68.3			720	661	492	44.0
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JUNE THE BALL MILL REMAINED OUT OF SERVICE FOR MAJOR REPAIRS THAT INCLUDED REPAIR OF THE BALL MILL SHELL (CRACKS PRESENT). THE UNIT 7 SCRUBBER BALL MILL WAS USED IN PLACE OF THE UNIT 8 BALL MILL.									

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
7/80	A	100.0	79.9	100.0	71.6						
	B	96.9	75.1	95.6	67.3						
	C	96.9	88.3	96.2	79.2						
	D	100.0	48.7	100.0	43.7						
	SYSTEM	98.5	73.0	98.0	65.5			744	667	487	43.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT 8 BALL MILL SHELL WAS SHIPPED TO THE FACTORY FOR REPAIRS ON JULY 24.

CLEANING OF THE SLURRY SPRAY NOZZLES REMAINS A SIGNIFICANT SCRUBBER MAINTENANCE ITEM.

8/80	SYSTEM							744			
9/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE MONTHS OF AUGUST AND SEPTEMBER IS NOT AVAILABLE AT THIS TIME.

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

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE FOURTH QUARTER 1980 IS NOT AVAILABLE AT THIS TIME.

1/81	SYSTEM							744	0		.0
2/81	SYSTEM							672	0		.0
3/81	SYSTEM							744	0		.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE BOILER WAS OUT OF SERVICE DUE TO A MAJOR OVERHAUL. THE UNIT IS EXPECTED TO BE ON LINE IN LATE MAY OR EARLY JUNE.

4/81	SYSTEM							720	0		.0
5/81	SYSTEM							744	0		.0
6/81	SYSTEM							720	0		.0

** PROBLEMS/SOLUTIONS/COMMENTS

MAJOR OVERHAUL OF BOILER (BOILER TUBE REPAIRS) CONTINUED THROUGHOUT THE SECOND QUARTER 1981.

7/81	SYSTEM							744	0		.0
8/81	SYSTEM							744	0		.0
9/81	SYSTEM							720	0		.0

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 8 (CONT.)

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

** PROBLEMS/SOLUTIONS/COMMENTS

WIDOWS CREEK UNIT 8 REMAINED OFF LINE THROUGHOUT THE THIRD QUARTER 1981 AS THE BOILER OVERHAUL CONTINUED.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FOURTH QUARTER THE UTILITY REPORTED THAT NO MAJOR PROBLEMS WERE ENCOUNTERED. SOME GENERAL MAINTENANCE WAS PERFORMED DURING THE PERIOD.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER OF 1982 THE UTILITY REPORTED THAT NO MAJOR PROBLEMS WERE ENCOUNTERED. SOME GENERAL MAINTENANCE WAS PERFORMED DURING THE PERIOD. THE ENTIRE WIDOWS CREEK PLANT HAS LATELY SEEN LIMITED OPERATION DUE TO LACK OF POWER DEMAND.

4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER. THE BOILER WAS OPERATED AT LOW LOAD DURING THIS PERIOD DUE TO A LACK OF POWER DEMAND.

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			
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

PERFORMANCE DATA

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

** PROBLEMS/SOLUTIONS/COMMENTS

SINCE JUNE 1982 THE WIDOWS CREEK 8 FGD SYSTEM HAS OPERATED WITH PROBLEMS EXPERIENCED ON PUMPS, NOZZELS, ETC. TVA HAS MANAGED TO KEEP THE DECAYING FGD SYSTEM OPERATING WITH EXTENSIVE OPERATING AND MAINTENANCE EFFORTS. HOWEVER, THE FGD SYSTEM WILL BE REMOVED FROM SERVICE MODULE BY MODULE BEGINING IN JULY FOR EXTENSIVE OVERHAUL AND REBUILDING WORK.

THE FORCED OXIDATION R&D WORK IS CONTINUING AT WIDOWS CREEK. A FULL SCALE GYPSUM STACKING PROJECT HAS BEEN UNDERWAY FOR SOME TIME AND THE RESULTS HAVE BEEN FAVORABLE FROM TVA'S PERSPECTIVE.

7/83 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

RUBBER PIPING LINERS WERE REPLACED DURING JULY.

8/83 SYSTEM 744

9/83 SYSTEM 720

** PROBLEMS/SOLUTIONS/COMMENTS

A MAJOR REWORKING TOOK PLACE AT UNIT 8 BEGINNING IN AUGUST 1983 AND CONTINUING THROUGH THE THIRD QUARTER.

INCLUDED IN THE REWORKING WAS THE REPLACEMENT OF VENTURI AND ABSORBER SPRAY HEADERS AND SPRAY NOZZLES.

PUMPS WERE ALSO REPLACED DURING THE PERIOD.

ABSORBER GRIDS WERE REPLACED AND STAINLESS STEEL ABSORBER VESSEL LINERS WERE INSTALLED DURING THE PERIOD. THE OUTER ABSORBER LAGGING WAS ALSO REPLACED WITH STAINLESS STEEL.

BYPASS DAMPERS AND THEIR ASSOCIATED DUCT WORK WERE REPLACED DURING THE PERIOD DUE TO LEAKING PROBLEMS.

NEW STEAM TRAPS WERE INSTALLED TO PREVENT LEAKS WITHIN THE INDIRECT REHEAT SYSTEM.

NEW ABSORBER FORCED DRAFT FANS WERE INSTALLED DURING THE THIRD QUARTER.

10/83 SYSTEM 744

11/83 SYSTEM 720

12/83 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT UNIT 8 WAS PLACED BACK IN SERVICE DURING THE FOURTH QUARTER AND THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

1/84 SYSTEM 744

2/84 SYSTEM 696

3/84 SYSTEM 744

4/84 SYSTEM 720

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 8 (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 UNIT 8 WAS TAKEN OUT OF SERVICE DURING APRIL 1984 DUE TO BURNT OUT BEARINGS IN THE TURBINE GENERATOR. THE OUTAGE CONTINUED THROUGH THE THIRD QUARTER. THE UNIT IS SCHEDULED TO BE PLACED BACK IN SERVICE DURING THE FOURTH QUARTER OF 1984.

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 FORCED OXIDATION SYSTEM WILL BE EMPLOYED AT WIDOWS CREEK 7 AND 8 FOR SLUDGE TREATMENT. A SPARGER NETWORK AT THE BOTTOM OF THE THICKENER TANK WILL BE INSTALLED AND AN AGITATOR WILL BE UTILIZED FOR SOLID SUSPENSION.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TEXAS MUNICIPAL POWER AGENCY	
PLANT NAME	GIBBONS CREEK	
UNIT NUMBER	1	
CITY	CARLOS	
STATE	TEXAS	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.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	400	
GROSS UNIT GENERATING CAPACITY - MW	443	
NET UNIT GENERATING CAPACITY W/FGD - MW	400	
NET UNIT GENERATING CAPACITY WO/FGD - MW	406	
EQUIVALENT SCRUBBED CAPACITY - MW	400	

** 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	766.13	(1623500 ACFM)
BOILER FLUE GAS TEMPERATURE - C	93.3	(200 F)
STACK HEIGHT - M	142.	(465 FT)
STACK SHELL	REINFORCED CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	11304.	(4860 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		3900-6500
AVERAGE ASH CONTENT - %	25.00	
RANGE ASH CONTENT - %	10.0-38.6	
AVERAGE MOISTURE CONTENT - %	35.00	
RANGE MOISTURE CONTENT - %	29.0-45.0	
AVERAGE SULFUR CONTENT - %	1.06	
RANGE SULFUR CONTENT - %	0.8-2.3	
AVERAGE CHLORIDE CONTENT - %	.01	
RANGE CHLORIDE CONTENT - %	0.00-0.07	

*** PARTICLE CONTROL

** ESP

NUMBER	2	
TYPE	COLD SIDE	
SUPPLIER	LODGE-COTTRELL	
INLET FLUE GAS CAPACITY - CU.M/S	766.1	(1623500 ACFM)
INLET FLUE GAS TEMPERATURE - C	148.3	(299 F)
PRESSURE DROP - KPA	.2	(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

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	COMBUSTION ENGINEERING
A-E FIRM	TIPPETT & GEE

TEXAS MUNICIPAL POWER AGENCY: GIBBONS CREEK 1 (CONT.)

DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	NEW	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.87	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	87.36	
ENERGY CONSUMPTION - %	1.4	
CURRENT STATUS	1	
COMMERCIAL START-UP	10/83	
INITIAL START-UP	11/82	
CONTRACT AWARDED	1/77	
** DESIGN AND OPERATING PARAMETERS		
SPACE REQUIREMENTS - SQ M	12949.5	(139392 SQ FT)
OPER. & MAINT. REQUIREMENT - MANHR/DAY	48.0	
** QUENCHER/PRESATURATOR		
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
** ABSORBER		
NUMBER	3	
NUMBER OF SPARES	1	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	COMBUSTION ENGINEERING	
DIMENSIONS - FT	29.0 X 37.0	
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	
LIQUID RECIRCULATION RATE - LITER/S	5393.	(85600 GPM)
GAS-SIDE PRESSURE DROP - KPA	.2	(.9 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.8	(12.6 FT/S)
INLET GAS FLOW - CU. M/S	766.13	(1623500 ACFM)
INLET GAS TEMPERATURE - C	60.0	(140 F)
SO2 REMOVAL EFFICIENCY - %	87.3	
** 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	1	
FREEBOARD DISTANCE - M	2.44	(8.0 FT)
DISTANCE BETWEEN VANES - CM	5.1	(2.00 IN)
VANE ANGLES - DEGREES	45	
PRESSURE DROP - KPA	.2	(.9 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	2.7	(9.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
WASH RATE - L/S	37.8	(600 GAL/MIN)
** REHEATER		
NUMBER	3	
GENERIC TYPE	IN-LINE	
SPECIFIC TYPE	STEAM	
TRADE NAME/COMMON TYPE	NR	
INLET FLUE GAS FLOW RATE - CU. M/S	766.13	(1623500 ACFM)
INLET FLUE GAS TEMPERATURE - C	93.3	(200 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	
** FANS		
NUMBER	2	
NUMBER OF SPARES	0	

TEXAS MUNICIPAL POWER AGENCY: GIBBONS CREEK 1 (CONT.)

DESIGN	AXIAL
SUPPLIER	COMBUSTION ENGINEERING; MITSUBISHI HEAVY INDUSTR
FUNCTION	NR
APPLICATION	FORCED DRAFT
SERVICE	DRY
FLUE GAS FLOW RATE - CU.M/S	960.79 (2036000 ACFM)
FLUE GAS TEMPERATURE - C	148.3 (299 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

LOCATION	REHEATER/ESP OUTLET
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	CARBON STEEL
LINER SPECIFIC MATERIAL TYPE	AISI 1110

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR
MANUFACTURER	COMBUSTION ENGINEERING/KENNEDY VAN SAUN
NUMBER	1

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	3
NR	1
REAGENT PREP PRODUCT	1

** PUMPS

SERVICE	NUMBER
ABSORBER SPRAY	15
ABSORBER BLEED	3
THICKENER UNDERFLOW	2
WASH	2
MILL CIRCUIT	2
RECIRCULATION	2
ADDITIVE FEED	3

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	2
NUMBER OF SPARES	0
CONFIGURATION	CYLINDRICAL
DIMENSIONS FT	190.0 DIA X 90.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
FEED STREAM CHARACTERISTICS	10% SOLIDS
OUTLET STREAM CHARACTERISTICS	25% SOLIDS

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	3
NUMBER OF SPARES	0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
FEED STREAM CHARACTERISTICS	10% SOLIDS
OUTLET STREAM CHARACTERISTICS	25% SOLIDS

*** SLUDGE

TEXAS MUNICIPAL POWER AGENCY: GIBBONS CREEK 1 (CONT.)

** TREATMENT	
METHOD	FIXATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	CONVERSION SYSTEMS [POZ-O-TEC]
INLET FLOW RATE - LITER/S	16.4 (260 GPM)
INLET QUALITY - %	25.0
** DISPOSAL	
NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	NONE
** PROCESS CONTROL AND INSTRUMENTATION	
CHEMICAL PARAMETERS	SO2 INLET GAS, STACK SO2
MONITOR LOCATION	INLET TO ABSORBER STACK
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK
** WATER BALANCE	
WATER LOOP TYPE	CLOSED
MAKEUP WATER ADDITION - LITERS/S	36.5 (580 GPM)
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	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
11/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

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

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF NOVEMBER, 1982 THROUGH MARCH, 1983.

4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THE FGD SYSTEM SUCCESSFULLY PASSED COMPLIANCE TESTING IN APRIL. NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED THROUGHOUT THE PERIOD.

7/83	SYSTEM							744			

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/83	SYSTEM							744			
9/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT AND FGD SYSTEM ARE STILL OPERATING IN A SHAKEDOWN PHASE. PROBLEMS REPORTED INCLUDE REHEATER CORROSION AND MIST ELIMINATOR PLUGGING.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE ONLY MAJOR OUTAGE DURING THE FOURTH QUARTER WAS FOR A 10 DAY PRE-INSPECTION OF THE UNIT AND FGD SYSTEM DURING NOVEMBER. THE BOILER BOTTOM ASH SYSTEM AND ABSORBER REHEATERS WERE INSPECTED. THE MAIN UNIT OUTAGE IS SCHEDULED TO TAKE PLACE NEXT YEAR FROM FEBRUARY 17 THROUGH MARCH 17.

THE UTILITY REPORTED REHEATER TUBE CORROSION DURING THE FOURTH QUARTER. TWO REHEATERS HAVE FAILED SINCE THE START UP OF THE FGD SYSTEM. THE CARBON STEEL REHEATER TUBES CORRODE ONLY AT THE ELBOWS. THE UTILITY IS PRESENTLY CONSIDERING REMOVING THE DISTRIBUTION VANES WHICH DEFLECT FLUE GAS AWAY FROM THE ELBOWS. BECAUSE OF THE DISTRIBUTION VANES, THE ELBOWS TEND TO HAVE HIGHER AMOUNTS OF CONDENSATION AND SOLIDS BUILD UP WHICH HELP AID CORROSION.

OTHER PROBLEMS REPORTED INCLUDE HARD AND SOFT SCALE FORMATION ON THE MIST ELIMINATORS AND GREATER THAN DESIGN PRESSURE DIFFERENTIALS ACROSS THE ABSORBER MODULES. THE UTILITY REPORTS HAVING TO CLEAN SCALE FROM MIST ELIMINATORS APPROXIMATELY ONCE EVERY TWO WEEKS PER MODULE.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

A SIX WEEK UNIT OUTAGE WAS REPORTED FOR THE PERIOD OF FEBRUARY 18 TO MARCH 27, 1984. DURING THIS TIME, NEW VENT PIPES WERE REPLACED IN THE DUCT WORK. THE VENT PIPES HAD CORRODED DUE TO CONDENSATION AND ACIDIC CONDITIONS.

THE UTILITY REPORTED THAT MIST ELIMINATOR BULK ENTRAINMENT CLEANING WAS PERFORMED DURING THE FEBRUARY-MARCH OUTAGE. IT WAS ALSO REPORTED THAT THIS TYPE OF CLEANING IS NECESSARY ON A MONTHLY BASIS.

THE THICKENER TANK LINER AND RAKE WERE REPLACED DURING THE FEBRUARY-MARCH OUTAGE. THE FIBERGLASS LINER HAD DEVELOPED LEAKS AND THE RAKE BROKE DUE TO HIGH SOLIDS BUILD UP.

WARRANTY WORK WAS PERFORMED ON SLURRY SPRAY PUMP REDUCTION GEARS DURING THE FEBRUARY-MARCH OUTAGE. AN OVERHEATING OF THE REDUCTION GEAR OIL WOULD NOT ALLOW PROPER LUBRICATION.

4/84	SYSTEM							720			
5/84	SYSTEM							744			

TEXAS MUNICIPAL POWER AGENCY: GIBBONS CREEK 1 (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			

** PROBLEMS/SOLUTIONS/COMMENTS

THE 'MODULE A' REHEATER WAS REPLACED DURING AUGUST DUE TO CORROSION.

9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM WAS DOWN APPROXIMATELY 50% OF THE TIME DURING THE THIRD QUARTER OF 1984 DUE TO SLURRY SPRAY PUMP PROBLEMS. REPLACEMENT HUBS WERE INSTALLED TO CORRECT AN IMPELLER PROBLEM AND THEY EVENTUALLY CAME LOOSE AT THE ATTACHMENT TO THE IMPELLER SHAFT. THE HUBS WERE SENT BACK TO THE MANUFACTURER. LOOSENING OF THE SHAFT'S RUBBER LINER IS ALSO REPORTED AS A COMMONLY OCCURRING PROBLEM.

THE UTILITY IS PRESENTLY TESTING A SCALE INHIBITOR IN HOPES OF REDUCING THE FREQUENCY OF SCALE CLEANING AND THUS INCREASE AVAILABILITY. THE ANTI-SCALANT, REFERRED TO AS P-70 IS A POLYACRYLATE POLYMER WHICH INTERFERES WITH THE GROWTH PATTERN OF CALCIUM SULFATE CRYSTALS IN A SUPER SATURATED SOLUTION. THE CRYSTALS ARE THEORETICALLY DEFORMED AND SOFTENED. TESTING WILL BEGIN ON A CLEAN MODULE, AND THUS CONCLUSIVE RESULTS HAVE NOT BEEN REPORTED.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TEXAS POWER & LIGHT	
PLANT NAME	SANDOW	
UNIT NUMBER	4	
CITY	ROCKDALE	
STATE	TEXAS	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.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	545	
NET UNIT GENERATING CAPACITY W/FGD - MW	545	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	382	

** 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	168.3	(335 F)
STACK HEIGHT - M	******	(**** FT)
STACK SHELL	NR	
STACK TOP DIAMETER - M	*******	(***** FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	******	(****** BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	13.00	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	35.00	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	1.60	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	

*** PARTICLE CONTROL

** ESP

NUMBER	1
TYPE	COLD SIDE
SUPPLIER	C.E. WALTHER

** 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	BROWN & ROOT
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.70
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	75.00

TEXAS POWER & LIGHT: SANDOW 4 (CONT.)

CURRENT STATUS	1
COMMERCIAL START-UP	1/81
INITIAL START-UP	12/80
CONTRACT AWARDED	0/78

** DESIGN AND OPERATING PARAMETERS

SPACE REQUIREMENTS - SQ M	4046.7	(43560 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 COUNTERCURRENT SPRAY
TRADE NAME/COMMON TYPE	N/A
SUPPLIER	COMBUSTION ENGINEERING
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
INLET GAS TEMPERATURE - C	160.0 (320 F)

** 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	COLD SIDE
TRADE NAME/COMMON TYPE	N/A
PERCENT GAS BYPASSED - AVG	30.0
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	WET BALL MILL
DEVICE	NR
DEVICE TYPE	NR

** PUMPS

SERVICE	NUMBER
NR	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NR

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION
DEVICE	NR
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
SITE TREATMENT	NONE

** WATER BALANCE

WATER LOOP TYPE	CLOSED

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/80	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

OPERATIONS AT SANDOW 4 COMMENCED IN DECEMBER 1980. THE SYSTEM IS PRESENTLY IN THE SHAKEDOWN/DEBUGGING PHASE OF OPERATION.

1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD PROBLEMS HAVE BEEN EXPERIENCED SINCE STARTUP. HOWEVER, APPRECIABLE AMOUNTS OF COAL WERE NOT FIRED UNTIL MARCH.

4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

7/81	SYSTEM							744			
8/81	SYSTEM							744			

TEXAS POWER & LIGHT: SANDOW 4 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

AS OF THE END OF SEPTEMBER, THE ONLY MAJOR OPERATIONAL PROBLEM REPORTED FOR THE SANDOW 4 FGD SYSTEM HAS BEEN EXCESSIVE MIST ELIMINATOR PLUGGING.

SANDOW 4 IS EXPECTED TO GO OFF-LINE IN MID-OCTOBER FOR AN OVERHAUL.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER OF 1981.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT ONLY GENERAL CLEANING WAS REQUIRED DURING THE FIRST QUARTER OF 1982. NO FORCED OUTAGES WERE ENCOUNTERED DURING THIS PERIOD.

THE UTILITY STILL REPORTS ENCOUNTERING PROBLEMS WITH MIST ELIMINATOR PLUGGING.

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			

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 APRIL 1982 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 1982 TO JUNE 1983.

7/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS IN A SCHEDULED OVERHAUL DURING JULY, HOWEVER, THE FGD SYSTEM WAS 100 PERCENT AVAILABLE.

8/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

TWO SHORT FORCED OUTAGES WERE REPORTED DURING AUGUST DUE TO THE FAILURE OF SPRAY HEADERS.

9/83	SYSTEM							720			
10/83	SYSTEM							744			
11/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF SEPTEMBER THROUGH NOVEMBER 1983.

12/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

A SCHEDULED 2-WEEK BOILER OVERHAUL TOOK PLACE IN DECEMBER. DURING THIS TIME, MIST ELIMINATOR PLUGGING REPAIRS WERE MADE AND PLUGGED SPRAY NOZZLES WERE CLEANED.

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			

TEXAS POWER & LIGHT: SANDOW 4 (CONT.)

PERFORMANCE DATA											
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 FIRST THREE QUARTERS OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TEXAS UTILITIES	
PLANT NAME	MARTIN LAKE	
UNIT NUMBER	1	
CITY	TATUM	
STATE	TEXAS	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.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	3000	
GROSS UNIT GENERATING CAPACITY - MW	793	
NET UNIT GENERATING CAPACITY W/FGD - MW	750	
NET UNIT GENERATING CAPACITY WO/FGD - MW	760	
EQUIVALENT SCRUBBED CAPACITY - MW	595	
** 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	1494.51	(3167000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	168.3	(335 F)
STACK HEIGHT - M	137.	(450 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	17166.	(7380 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		6972-7894
AVERAGE ASH CONTENT - %	********	
RANGE ASH CONTENT - %	8.0-12.0	
AVERAGE MOISTURE CONTENT - %	33.00	
RANGE MOISTURE CONTENT - %	29.0-37.9	
AVERAGE SULFUR CONTENT - %	.90	
RANGE SULFUR CONTENT - %	0.7-1.5	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** 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	1494.5	(3167000 ACFM)
INLET FLUE GAS TEMPERATURE - C	168.3	(335 F)
PRESSURE DROP - KPA	.5	(2. IN-H2O)
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	
*** FGD SYSTEM		

TEXAS UTILITIES: MARTIN LAKE 1 (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	C.T. MAIN
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.40
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	71.00
ENERGY CONSUMPTION - %	1.3
CURRENT STATUS	1
COMMERCIAL START-UP	10/77
INITIAL START-UP	4/77
CONTRACT AWARDED	5/76

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	1.50

** QUENCHER/PRESATURATOR

NUMBER	6	
TYPE	CYCLONIC SPRAY CHAMBER	
SUPPLIER	RESEARCH-COTTRELL	
INLET GAS TEMPERATURE - C	168.3	(335 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** ABSORBER

NUMBER	6	
NUMBER OF SPARES	0	
GENERIC TYPE	COMBINATION TOWER	
SPECIFIC TYPE	SPRAY/PACKED	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	RESEARCH-COTTRELL	
DIMENSIONS - FT	28 DIA X 100 HIGH	
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	VERTICAL CROSS CHANNEL FIXED GRID PACKING	
NUMBER OF CONTACTING ZONES	4	
DISTANCE BETWEEN GAS CONTACTING ZONES - CM	91.4	(36.0IN)
L/G RATIO - L/CU.M	13.4	(99.9 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.1	(4.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	2.7	(9.0 FT/S)
SO2 REMOVAL EFFICIENCY - %	95.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	6	
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	3	
PRESSURE DROP - KPA	.2	(1.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	2.4	(8.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPROPYLENE	
WASH WATER SOURCE	FRESH	
WASH RATE - L/S	7.9	(126 GAL/MIN)

** REHEATER

GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	25.0	
TEMPERATURE INCREASE - C	22.2	(40 F)
INLET FLUE GAS TEMPERATURE - C	60.0	(140 F)
OUTLET FLUE GAS TEMPERATURE - C	82.2	(180 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	4	
DESIGN	CENTRIFUGAL	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	375.48	(795680 ACFM)
FLUE GAS TEMPERATURE - C	168.3	(335 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	6
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER; FORNEY ENGINEERING
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	6
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	STAINLESS STEEL
LINER SPECIFIC MATERIAL TYPE	AUSTENITIC

** DAMPERS

NUMBER	1
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	STAINLESS STEEL
LINER SPECIFIC MATERIAL TYPE	AUSTENITIC

** DAMPERS

NUMBER	4
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	NR
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	4
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

TEXAS UTILITIES: MARTIN LAKE 1 (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	OUTLET
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	BYPASS
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	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	TUBE MILL
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	4

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	3
PRESATURATOR/QUENCHER	6
LIMESTONE SLURRY	1
WET WELL	4
MILL SLURRY SUMP	****

** PUMPS

SERVICE	NUMBER
QUENCHER FEED	12
SLURRY FEED	2
ABSORBER RECIRCULATION	9
ABSORBER PACKING	9
MILL SLURRY	8
THICKENER UNDERFLOW	3
MAIN WATER RECYCLE [THICKENER OVERFL	3
AREA SUMP PUMPS	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	CENTRIFUGE
NUMBER	3
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	35% SOLIDS
OUTLET STREAM CHARACTERISTICS	65% SOLIDS
OUTLET STREAM DISPOSITION	TO FLY ASH MIXING
OVERFLOW STREAM DISPOSITION	TO LIMESTONE SLURRY PREPARATION

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
DIMENSIONS - FT	140.0 DIA X 12.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL [WALLS]; INORGANIC [BOTTOM]
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	10-12% SOLIDS
OUTLET STREAM CHARACTERISTICS	35% SOLIDS

TEXAS UTILITIES: MARTIN LAKE 1 (CONT.)

OUTLET STREAM DISPOSITION	TO CENTRIFUGE
OVERFLOW STREAM DISPOSITION	TO LIMESTONE SLURRY PREPARATION

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION
DEVICE	MULLER-TYPE BLENDER
PROPRIETARY PROCESS	NONE
INLET QUALITY - %	65.0

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	RAIL
SITE TREATMENT	NONE

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	LIQUID LEVEL, LIQUID & GAS FLOW

** WATER BALANCE

WATER LOOP TYPE	CLOSED	
MAKEUP WATER ADDITION - LITERS/S	34.6	(550 GPM)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	95% CACO3
UTILIZATION - %	95.0
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/77	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INSTALLATION OF THE LIMESTONE SCRUBBING SYSTEM AND THE ESP WAS COMPLETED BY OCTOBER 1977. THE INITIAL OPERATING PHASE IS EXPECTED TO CONTINUE THROUGH THE FIRST QUARTER OF 1978. COMPLIANCE TESTING WAS CONDUCTED IN AUGUST 1977 AND CERTIFICATION OF COMMERCIAL AVAILABILITY IS AWAITED.

THE FGD SYSTEM IS CURRENTLY EXPERIENCING GENERAL MECHANICAL PROBLEMS AND INSTRUMENTATION PROBLEMS.

THE UTILITY EXPERIENCED SOME DIFFICULTIES IN THE SLUDGE HANDLING SYSTEM. AS A RESULT OF EQUIPMENT UNAVAILABILITY THE WASTE SLURRY IS CURRENTLY BEING DIRECTED TO THE ASH DISPOSAL AREA.

11/77	SYSTEM							720			
12/77	SYSTEM							744			
1/78	SYSTEM							744			

TEXAS UTILITIES: MARTIN LAKE 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 SLUDGE HANDLING SYSTEM DOES NOT OPERATE UNIFORMLY OVER EXTENDED PERIODS.

2/78	SYSTEM							672			
3/78	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

CERTIFICATION WAS RECEIVED FROM THE EPA DURING THE PERIOD. THE BOILER AND FGD SYSTEM OPERATED THROUGHOUT THE PERIOD.

THE UTILITY IS STILL HAVING SOME PROBLEMS WITH THE SLUDGE HANDLING SYSTEM. SOME FORCED OUTAGE TIME OCCURRED.

4/78	SYSTEM							720			
5/78	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS TAKEN OFF LINE IN APRIL FOR AN ANNUAL TWO WEEK OUTAGE.

GENERATOR PROBLEMS WERE ENCOUNTERED IN MAY CAUSING THE UNIT TO BE TAKEN OFF LINE THROUGH THE END OF THE MONTH.

6/78	SYSTEM							720			
7/78	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE DAMPERS FOR EACH ABSORBER MODULE WERE NOT FUNCTIONING PROPERLY. IT HAS BEEN IMPOSSIBLE TO ISOLATE INDIVIDUAL MODULES FOR REPAIRS (THE ENTIRE SYSTEM WOULD HAVE TO BE SHUT DOWN IF REPAIRS WERE REQUIRED ON ONLY ONE MODULE).

THE UNIT IS NOW CONSIDERED TO BE OPERATING COMMERCIALLY. OPERATIONS HAVE BEEN SATISFACTORY. DEPENDING ON THE LIGNITE BURNED THE SCRUBBER CAN BE OPERATED WITH ONLY FOUR OR SIX TOWERS ON LINE AND STILL BE IN COMPLIANCE.

THERE HAVE BEEN PROBLEMS WITH THE PH METERS. THE METERS HAVE NOT OPERATED PROPERLY FOR SOME TIME NOW.

THE UTILITY HAS GENERALLY ONLY HAD TO PERFORM GENERAL MAINTENANCE ON THE SCRUBBER TOWERS.

8/78	SYSTEM							744			
9/78	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

ISOLATION DAMPER PROBLEMS CONTINUED.

THE UNIT CONTINUES TO REQUIRE EXCESSIVE MAINTENANCE. FGD SYSTEM ACCEPTANCE TEST WERE PERFORMED BY THE UTILITY DURING AUGUST. RESULTS ARE NOT YET AVAILABLE.

FLOW MEASUREMENT INSTRUMENTATION HAS BEEN FAILING.

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

PERFORMANCE DATA

OPACITY HAS OCCASIONALLY BEEN HIGHER THAN EXPECTED (20-25%) RESULTING FROM ESP PROBLEMS.

10/78	SYSTEM							744			
11/78	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD SYSTEM PROBLEMS WERE REPORTED FOR THE OCTOBER-NOVEMBER PERIOD.

OUTAGES ARE PRIMARILY A RESULT OF ESP PROBLEMS. THE UTILITY IS RELUCTANT TO OPERATE SCRUBBERS WHEN THE ESP SHOWS HIGH OPACTIY FOR FEAR OF PLUGGING PROBLEMS.

12/78	SYSTEM							744			
1/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS SHUT DOWN WHILE THE BOTTOM ASH POND WAS CLEANED OUT. THE UTILITY HAS BEEN DUMPING SLUDGE INTO THE BOTTOM ASH POND WHICH WAS DESIGNED FOR BOTTOM ASH ONLY. ALSO SLUDGE IS PRODUCED FASTER THAN IT CAN BE REMOVED BY RAIL CAR. THE ACTUAL PROBLEM IS REPORTEDLY IN THE DEWATERING SYSTEM. HEAVY RAIN FALL HAS AGGREVATED THE SLUDGE DISPOSAL PROBLEM BY FOULING THE THICKENER OPERATIONS AND BY THREATENING POND OVERFLOW.

SOME MIST ELIMINATOR WASH PROBLEMS WERE ENCOUNTERED.

THE FGD SYSTEM REPORTEDLY FUNCTIONED ACCEPTABLY WHEN OPERATED DURING DECEMBER AND JANUARY.

COAL HANDLING WAS A SERIOUS PROBLEM DUE TO FREEZING OF THE COAL IN THE HOPPERS. THIS PROBLEM EFFECTED ALL UNITS AT MARTIN LAKE FORCING THE UTILITY'S GAS AND OIL UNITS TO CARRY THE POWER LOAD. ALL OF THE MARTIN LAKE UNITS WERE DOWN FOR AN EXTENDED PERIOD IN LATE JANUARY.

THERE IS EVIDENCE THAT THE SULFUR CONTENT IN THE COAL IS INCREASING AS THE MATERIAL IS MINED DEEPER. IF THE SULFUR CONTENT CONTINUES TO INCREASE ADDITIONAL SCRUBBER TOWERS MAY HAVE TO BE INSTALLED.

2/79	SYSTEM							672			
3/79	SYSTEM							744			
4/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 1 IS NOW IN FULL OPERATION ALTHOUGH A SLUDGE DISPOSAL PROBLEM STILL EXISTS.

THE UTILITY HAS REPLACED THE LOUVER DAMPERS WITH GUILLOTINE DAMPERS WHICH SEEM TO WORK BETTER. HOWEVER, THEY STILL HAVE PROBLEMS WITH THE GUILLOTINE DAMPERS FAILING TO SEAL WHEN THEY BECOME SCALED.

THERE HAVE BEEN REPORTS OF TOWER LEAKS RESULTING FROM LINER FAILURE BUT THE PROBLEM IS NOT SERIOUS.

5/79	SYSTEM							744			
6/79	SYSTEM							720			

TEXAS UTILITIES: MARTIN LAKE 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 SLUDGE DISPOSAL SYSTEM IS STILL CAUSING SOME OPERATING PROBLEMS. THE PROBLEMS REPORTED LAST QUARTER WERE CAUSED BY HEAVY RAINS WHICH FORCED THE THICKENERS OUT OF SERVICE.

THE FGD SYSTEM OPERATED THROUGHOUT MOST OF THE REPORT PERIOD.

7/79	SYSTEM							744			
8/79	SYSTEM							744			
9/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

ENGINEERING WORK IS IN PROGRESS TO ADD TWO NEW SCRUBBING TOWERS TO EACH MARTIN LAKE UNIT. THIS IS BEING DONE FOR THREE REASONS:

1) THE LIGNITE CURRENTLY DELIVERED HAS A GREATER SULFUR CONTENT THAN THAT FOR WHICH THE FGD SYSTEM WAS ORIGINALLY DESIGNED.
2) THE BOILER FLUE GAS FLOW IS GREATER THAN THAT FOR WHICH THE FGD SYSTEM WAS ORIGINALLY DESIGNED.
3) AS A RESULT OF CURRENT FGD SYSTEM MAINTENANCE REQUIREMENTS THE UTILITY FEELS IT IS BEST THAT ONE SPARE MODULE BE AVAILABLE SO THAT AT LEAST ONE CAN BE DOWN FOR CLEANING AT ALL TIMES.

THE TWO NEW TOWERS FOR EACH UNIT WILL BE DESIGNED FOR A LARGER CAPACITY THAN THE ORIGINAL TOWERS.

DURING THE THIRD QUARTER THE UTILITY REPORTED THE SYSTEM OPERATED WELL. HOWEVER EXCESSIVE MAINTENANCE WAS REQUIRED. THE SLUDGE DISPOSAL SYSTEM PROBLEMS PLAGUING THE UNIT HAVE BEEN SOLVED.

10/79	SYSTEM							744			
11/79	SYSTEM							720			
12/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

PLUGGING PROBLEMS HAVE BEEN ENCOUNTERED DURING THE FOURTH QUARTER REQUIRING HEAVY MAINTENANCE.

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

** PROBLEMS/SOLUTIONS/COMMENTS

PLUGGING PROBLEMS CONTINUED IN THE FIRST QUARTER OF 1980, PARTICULARLY IN THE WETTED FILM CONTACT AREA AND THE MIST ELIMINATOR SECTION. THE MIST ELIMINATOR PLUGGING WAS RECENTLY SOLVED BY SWITCHING BACK TO LAKE WATER FOR MIST ELIMINATOR WASH FROM AN ASH POND WATER WASH THE UTILITY HAD BEEN TESTING.

THE FRP STRUCTURAL WORK IS BECOMING A PROBLEM. MUCH OF THE FRP SUPPORT WORK HAS HAD TO BE REPLACED WITH STAINLESS STEEL.

THE UTILITY HAS PLANS TO INSTALL TWO NEW SCRUBBING TOWERS IN EARLY 1982. THE NEW TOWERS HAVE BECOME NECESSARY DUE TO THE INCREASING LIGNITE SULFUR CONTENT AND THE NEED FOR SPARE SCRUBBER CAPACITY.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
4/80	SYSTEM							720			
5/80	SYSTEM							744			
6/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

HIGH MAINTENANCE PROBLEMS REPORTED IN PREVIOUS MONTHS CONTINUED THROUGHOUT THE SECOND QUARTER OF 1980. THE ABSORBERS ARE STILL EXPERIENCING PLUGGING PROBLEMS.

7/80	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

CORROSION IN THE SCRUBBER MODULES WAS A PROBLEM DURING JULY.

THE FOUNDATION FOR THE TWO NEW SCRUBBING TOWERS WAS COMPLETED DURING THE MONTH.

8/80	SYSTEM							744			
9/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM OPERATED WITHOUT ANY MAJOR PROBLEMS DURING AUGUST AND SEPTEMBER.

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

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 1 FGD SYSTEM DURING THE FOURTH QUARTER 1980.

1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 1 FGD SYSTEM DURING THE FIRST QUARTER OF 1981. MAINTENANCE WORK IS CONTINUING ON THE NEW ABSORBER MODULES.

4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

TEXAS UTILITIES: MARTIN LAKE 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

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 1 FGD SYSTEM DURING THE SECOND QUARTER 1981. UTILITY IS STILL IN PROCESS OF ADDING TWO ADDITIONAL ABSORBER MODULES (1 ADDITIONAL TRAIN) TO PRESENT FGD SYSTEM DUE TO EXCESSIVE SULFUR CONTENT OF PRESENT LIGNITE COAL SOURCE.

7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED DURING THE THIRD QUARTER 1981 ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN. THE INSTALLATION IS EXPECTED TO BE COMPLETED BY THE SPRING OF 1982.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED DURING THE FOURTH QUARTER 1981 ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN. UNTIL THE ADDITIONAL MODULE IS ADDED, THE UNIT WILL BE OPERATED AT REDUCED LOAD.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED DURING THE FIRST QUARTER 1982 ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN. THE ADDITIONAL TRAIN IS NOW SCHEDULED TO START-UP IN JUNE.

4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER THE UNIT WAS TAKEN OFF-LINE FOR THE ANNUAL SPRING OUTAGE. DURING THIS TIME THE ADDITIONAL ABSORBER TRAIN WAS TIED INTO THE SYSTEM.

7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
12/82	SYSTEM							744			
1/83	SYSTEM							744			
2/83	SYSTEM							672			
3/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE PAST NINE MONTHS THE MARTIN LAKE SYSTEMS EXPERIENCED SCALING AND PLUGGING PROBLEMS WITH MIST ELIMINATORS AND SPRAY PACKED TOWERS. THE UTILITY IS PRESENTLY TESTING FORCED OXIDATION AS A POSSIBLE SOLUTION.

THE MARTIN LAKE SYSTEMS ARE ALSO HAVING LINER FAILURES IN THEIR SPRAY PACKED TOWERS.

4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

A TOTAL OF 34,600 MAN-HOURS WERE SPENT ON THE MARTIN LAKE FGD SYSTEMS DURING THE MONTHS OF MAY AND JUNE ALONE FOR SERVICING AND THE IMPLEMENTATION OF VARIOUS TEST PROGRAMS.

ABSORBER TOWERS WERE UPGRADED BY THE ADDITION OF FLOWRATE INSTRUMENTATION.

FLOW VANES WERE INSTALLED AT THE INLET OF THE ABSORBERS TO BETTER GAS DISTRIBUTION.

UTILITY IS CONDUCTING WET/DRY INTERFACE CORROSION TESTS IN THEIR BYPASS DUCTING FOR RESEARCH-COTTRELL.

THE UTILITY CONTINUED TO REPORT PROBLEMS WITH ABSORBER LINING FAILURES AND MIST ELIMINATOR PLUGGING. THE UTILITY IS PRESENTLY CONDUCTING MIST ELIMINATOR WASH, FORCED OXIDATION, AND LINER TEST PROGRAMS TO HELP SOLVE THESE TWO MAJOR PROBLEMS AREAS.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE MARTIN LAKE FGD SYSTEMS STILL CONTINUE TO HAVE MATERIALS OF CONSTRUCTION AND SYSTEM CHEMISTRY PROBLEMS. EPRI AND RADIAN ARE CURRENTLY DOING A JOINT STUDY ON THE MARTIN LAKE SYSTEMS TO DETERMINE POSSIBLE SOLUTIONS TO THESE PROBLEM AREAS.

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

TEXAS UTILITIES: MARTIN LAKE 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 UNIT 1 FGD SYSTEM WAS FORCED OFF-LINE DURING THE END OF DECEMBER DUE TO FREEZING PROBLEMS. ALTHOUGH THE FGD SYSTEM WAS DOWN FOR APPROXIMATELY 2 DAYS, THE UNIT OPERATED DUE TO POWER SHORTAGES IN THE GRID.

EPRI AND RADIAN TESTING WAS CONCLUDED DURING THE PERIOD. THE TEST RESULTS FROM THIS STUDY ARE PENDING.

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			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM PASSED PERFORMANCE TESTING CONDUCTED DURING THE PERIOD OF MAY THROUGH AUGUST 1984.

9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED OUTAGES WERE REPORTED AT MARTIN LAKE 1 DURING THE FIRST THREE QUARTERS OF 1984.

THE UTILITY CONTINUES TO EXPERIENCE MAINTENANCE PROBLEMS. TWO MODULES ARE OUT OF SERVICE AT ALL TIMES FOR MAINTENANCE, HOWEVER, OVERALL FGD SYSTEM PERFORMANCE IS NOT GREATLY EFFECTED.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TEXAS UTILITIES	
PLANT NAME	MARTIN LAKE	
UNIT NUMBER	2	
CITY	TATUM	
STATE	TEXAS	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.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	3000	
GROSS UNIT GENERATING CAPACITY - MW	793	
NET UNIT GENERATING CAPACITY W/FGD - MW	750	
NET UNIT GENERATING CAPACITY WO/FGD - MW	760	
EQUIVALENT SCRUBBED CAPACITY - MW	595	
** 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	1494.51	(3167000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	168.3	(335 F)
STACK HEIGHT - M	137.	(450 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	17166.	(7380 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		6972-7894
AVERAGE ASH CONTENT - %	********	
RANGE ASH CONTENT - %	8.0-12.0	
AVERAGE MOISTURE CONTENT - %	33.00	
RANGE MOISTURE CONTENT - %	29.0-37.9	
AVERAGE SULFUR CONTENT - %	.90	
RANGE SULFUR CONTENT - %	0.7-1.5	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** 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	1494.5	(3167000 ACFM)
INLET FLUE GAS TEMPERATURE - C	168.3	(335 F)
PRESSURE DROP - KPA	.5	(2. IN-H2O)
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	
*** FGD SYSTEM		

TEXAS UTILITIES: MARTIN LAKE 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	C.T. MAIN
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.40
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	71.00
ENERGY CONSUMPTION - %	1.3
CURRENT STATUS	1
COMMERCIAL START-UP	5/78
INITIAL START-UP	5/78
CONTRACT AWARDED	5/76

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	1.50

** QUENCHER/PRESATURATOR

NUMBER	6	
TYPE	CYCLONIC SPRAY CHAMBER	
SUPPLIER	RESEARCH-COTTRELL	
INLET GAS TEMPERATURE - C	168.3	(335 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** ABSORBER

NUMBER	6	
NUMBER OF SPARES	0	
GENERIC TYPE	COMBINATION TOWER	
SPECIFIC TYPE	SPRAY/PACKED	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	RESEARCH-COTTRELL	
DIMENSIONS - FT	28 DIA X 100 HIGH	
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	VERTICAL CROSS CHANNEL FIXED GRID PACKING	
NUMBER OF CONTACTING ZONES	4	
DISTANCE BETWEEN GAS CONTACTING ZONES - CM	91.4	(36.0IN)
L/G RATIO - L/CU.M	13.4	(99.9 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.1	(4.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	2.7	(9.0 FT/S)
SO2 REMOVAL EFFICIENCY - %	95.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	6	
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	3	
PRESSURE DROP - KPA	.2	(1.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	2.4	(8.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPROPYLENE	
WASH WATER SOURCE	FRESH	
WASH RATE - L/S	7.9	(126 GAL/MIN)

TEXAS UTILITIES: MARTIN LAKE 2 (CONT.)

** REHEATER

GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	25.0	
TEMPERATURE INCREASE - C	22.2	(40 F)
INLET FLUE GAS TEMPERATURE - C	60.0	(140 F)
OUTLET FLUE GAS TEMPERATURE - C	82.2	(180 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	4	
DESIGN	CENTRIFUGAL	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	375.48	(795680 ACFM)
FLUE GAS TEMPERATURE - C	168.3	(335 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	6
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER; FORNEY ENGINEERING
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	6
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	STAINLESS STEEL
LINER SPECIFIC MATERIAL TYPE	AUSTENITIC

** DAMPERS

NUMBER	1
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	STAINLESS STEEL
LINER SPECIFIC MATERIAL TYPE	AUSTENITIC

** DAMPERS

NUMBER	4
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	NR
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	4
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

TEXAS UTILITIES: MARTIN LAKE 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	OUTLET
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	BYPASS
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	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	TUBE MILL
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	4

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	3
PRESATURATOR/QUENCHER	6
LIMESTONE SLURRY	1
WET WELL	4
MILL SLURRY SUMP	****

** PUMPS

SERVICE	NUMBER
QUENCHER FEED	12
SLURRY FEED	2
ABSORBER RECIRCULATION	9
ABSORBER PACKING	9
MILL SLURRY	8
THICKENER UNDERFLOW	3
MAIN WATER RECYCLE (THICKENER OVERFL	3
AREA SUMP PUMPS	****

** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	CENTRIFUGE
NUMBER	3
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	35% SOLIDS
OUTLET STREAM CHARACTERISTICS	65% SOLIDS
OUTLET STREAM DISPOSITION	TO FLY ASH MIXING
OVERFLOW STREAM DISPOSITION	TO LIMESTONE SLURRY PREPARATION
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
DIMENSIONS - FT	140.0 DIA X 12.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL (WALLS); INORGANIC (BOTTOM)
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	10-12% SOLIDS
OUTLET STREAM CHARACTERISTICS	35% SOLIDS

TEXAS UTILITIES: MARTIN LAKE 2 (CONT.)

OUTLET STREAM DISPOSITION	TO CENTRIFUGE
OVERFLOW STREAM DISPOSITION	TO LIMESTONE SLURRY PREPARATION

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION
DEVICE	MULLER-TYPE BLENDER
PROPRIETARY PROCESS	NONE
INLET QUALITY - %	65.0

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	RAIL
SITE TREATMENT	NONE

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	LIQUID LEVEL, LIQUID & GAS FLOW

** WATER BALANCE

WATER LOOP TYPE	CLOSED
MAKEUP WATER ADDITION - LITERS/S	34.6 (550 GPM)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	95% CACO3
UTILIZATION - %	95.0
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT BEGAN OPERATIONS IN MAY 1978. THE COMPLIANCE TESTING IS SCHEDULED FOR AUGUST.

6/78	SYSTEM							720			
7/78	SYSTEM							744			
8/78	SYSTEM							744			
9/78	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS TESTED FOR COMPLIANCE WITH ALL SIX MODULES IN THE GAS STREAM DURING THE FIRST PART OF AUGUST. TEST RESULTS HAVE NOT YET BEEN PUBLISHED. NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED.

THE ESP PROBLEMS AT UNIT 1 HAVE NOT BEEN EXPERIENCED AT THIS UNIT.

10/78	SYSTEM							744			

TEXAS UTILITIES: MARTIN LAKE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/78	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

COMPLIANCE TEST RESULTS ARE STILL BEING REVIEWED AND RESULTS ARE NOT YET AVAILABLE.

12/78	SYSTEM							744			
1/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

COAL HANDLING WAS A SERIOUS PROBLEM DUE TO FREEZING OF THE COAL IN THE HOPPERS. THIS PROBLEM EFFECTED ALL UNITS AT MARTIN LAKE FORCING THE UTILITY'S GAS AND OIL UNITS TO CARRY THE LOAD. ALL OF THE MARTIN LAKE UNITS WERE DOWN FOR AN EXTENDED PERIOD IN LATE JANUARY.

THE FGD UNIT REPORTEDLY FUNCTIONED ACCEPTABLY WHEN OPERATED DURING DECEMBER AND JANUARY.

THE FGD SYSTEM WAS SHUT DOWN WHILE THE BOTTOM ASH POND WAS CLEANED OUT. THE UTILITY HAS BEEN DUMPING SLUDGE INTO THE BOTTOM ASH POND WHICH WAS DESIGNED FOR BOTTOM ASH ONLY. ALSO SLUDGE IS PRODUCED FASTER THAN IT CAN BE REMOVED BY RAIL CAR. THE ACTUAL PROBLEM IS REPORTEDLY IN THE DEWATERING SYSTEM. HEAVY RAIN FALL HAS AGGREVATED THE SLUDGE DISPOSAL PROBLEM BY FOULING THE THICKENER OPERATIONS AND BY THREATENING POND OVERFLOW.

SOME MIST ELIMINATOR PROBLEMS WERE ENCOUNTERED DURING DECEMBER AND JANUARY.

THERE IS EVIDENCE THAT THE SULFUR CONTENT IN THE COAL IS INCREASING AS THE MATERIAL IS MINED DEEPER. IF THE SULFUR CONTENT CONTINUES TO INCREASE ADDITIONAL SCRUBBER TOWERS MAY HAVE TO BE INSTALLED.

2/79	SYSTEM							672			
3/79	SYSTEM							744			
4/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTS THAT OPERATIONAL PROBLEMS HAVE INCLUDED ABSORBER LINER FAILURES AND TOWER LEAKS.

UNIT 2 IS NOW IN FULL OPERATION ALTHOUGH A SLUDGE DISPOSAL PROBLEM STILL EXISTS.

THE UTILITY HAS REPLACED THE LOUVER DAMPERS WITH GUILLOTINE DAMPERS WHICH SEEM TO WORK BETTER. HOWEVER, THEY STILL HAVE PROBLEMS WITH THE GUILLOTINE DAMPERS FAILING TO SEAL WHEN THEY BECOME SCALED.

5/79	SYSTEM							744			
6/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE SLUDGE DISPOSAL SYSTEM IS STILL CAUSING SOME OPERATING PROBLEMS. THE PROBLEMS REPORTED LAST QUARTER WERE CAUSED BY HEAVY RAINS WHICH FORCED THE THICKENERS OUT OF SERVICE.

PERFORMANCE DATA

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

THE FGD SYSTEM OPERATED THROUGHOUT MOST OF THE PERIOD.

7/79	SYSTEM		744
8/79	SYSTEM		744
9/79	SYSTEM		720

** PROBLEMS/SOLUTIONS/COMMENTS

ENGINEERING WORK IS IN PROGRESS TO ADD TWO NEW SCRUBBING TOWERS TO EACH MARTIN LAKE UNIT. THIS IS BEING DONE FOR THREE REASONS:

1) THE LIGNITE CURRENTLY DELIVERED HAS A GREATER SULFUR CONTENT THAN THAT FOR WHICH THE FGD SYSTEM WAS ORIGINALLY DESIGNED.
2) THE BOILER FLUE GAS FLOW IS GREATER THAN THAT FOR WHICH THE FGD SYSTEM WAS ORIGINALLY DESIGNED.
3) AS A RESULT OF CURRENT FGD SYSTEM MAINTENANCE REQUIREMENTS THE UTILITY FEELS IT IS BEST THAT ONE SPARE MODULE BE AVAILABLE SO THAT AT LEAST ONE CAN BE DOWN FOR CLEANING AT ALL TIMES.

THE TWO NEW TOWERS FOR EACH UNIT WILL BE DESIGNED FOR A LARGER CAPACITY THAN THE ORIGINAL TOWERS.

DURING THE THIRD QUARTER THE UTILITY REPORTED THE SYSTEM OPERATED WELL. HOWEVER EXCESSIVE MAINTENANCE WAS REPORTED. THE SLUDGE DISPOSAL SYSTEM PROBLEMS PLAGUING THE UNIT WERE SOLVED.

10/79	SYSTEM		744
11/79	SYSTEM		720
12/79	SYSTEM		744

** PROBLEMS/SOLUTIONS/COMMENTS

PLUGGING PROBLEMS HAVE BEEN ENCOUNTERED DURING THE FOURTH QUARTER REQUIRING HEAVY MAINTENANCE.

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

** PROBLEMS/SOLUTIONS/COMMENTS

PLUGGING PROBLEMS CONTINUED IN THE FIRST QUARTER OF 1980, PARTICULARLY IN THE WETTED FILM CONTACT AREA AND THE MIST ELIMINATOR SECTION. THE MIST ELIMINATOR PLUGGING WAS RECENTLY SOLVED BY SWITCHING BACK TO LAKE WATER FOR MIST ELIMINATOR WASH FROM AN ASH POND WATER WASH THE UTILITY HAD BEEN TESTING.

THE FRP STRUCTURAL WORK IS BECOMING A PROBLEM. MUCH OF THE FRP SUPPORT WORK HAS HAD TO BE REPLACED WITH STAINLESS STEEL.

THE UTILITY HAS PLANS TO INSTALL TWO NEW SCRUBBING TOWERS IN EARLY 1983. THE NEW TOWERS HAVE BECOME NECESSARY DUE TO THE INCREASING LIGNITE SULFUR CONTENT AND THE NEED FOR SPARE SCRUBBER CAPACITY.

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

TEXAS UTILITIES: MARTIN LAKE 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

HIGH MAINTENANCE PROBLEMS REPORTED IN PREVIOUS MONTHS CONTINUED THROUGHOUT THE SECOND QUARTER OF 1980. THE ABSORBERS ARE STILL EXPERIENCING PLUGGING PROBLEMS.

7/80	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

CORROSION IN THE SCRUBBER MODULES WAS A PROBLEM DURING JULY.

THE FOUNDATION FOR THE TWO NEW SCRUBBING TOWERS WAS COMPLETED DURING THE MONTH.

8/80	SYSTEM							744			
9/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM OPERATED WITHOUT ANY MAJOR PROBLEMS DURING AUGUST AND SEPTEMBER.

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

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 2 FGD SYSTEM DURING THE FOURTH QUARTER 1980.

1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 2 FGD SYSTEM DURING THE FIRST QUARTER OF 1981. MAINTENANCE WORK IS CONTINUING ON THE NEW ABSORBER MODULES.

4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 2 FGD SYSTEM DURING THE SECOND QUARTER 1981. UTILITY IS STILL IN PROCESS OF ADDING TWO ADDITIONAL ABSORBER MODULES (1 ADDITIONAL TRAIN) TO PRESENT FGD SYSTEM DUE TO EXCESSIVE SULFUR CONTENT OF PRESENT LIGNITE COAL SOURCE.

7/81	SYSTEM							744			
8/81	SYSTEM							744			

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED DURING THE THIRD QUARTER 1981 ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN. THE INSTALLATION IS EXPECTED TO BE COMPLETED BY THE SPRING OF 1983.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED DURING THE FOURTH QUARTER 1981 ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN. UNTIL THE ADDITIONAL MODULE IS ADDED, THE UNIT WILL BE OPERATED AT REDUCED LOAD.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED DURING THE FIRST QUARTER 1982 ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN.

4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER. WORK CONTINUED ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN WHICH IS EXPECTED TO BE ON-LINE IN MARCH 1983.

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			

TEXAS UTILITIES: MARTIN LAKE 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

DURING THE PAST NINE MONTHS THE MARTIN LAKE SYSTEMS EXPERIENCED SCALING AND PLUGGING PROBLEMS WITH MIST ELIMINATORS AND SPRAY PACKED TOWERS. THE UTILITY IS PRESENTLY TESTING FORCED OXIDATION AS A POSSIBLE SOLUTION.

THE MARTIN LAKE SYSTEMS ARE ALSO HAVING LINER FAILURES IN THEIR SPRAY PACKED TOWERS.

4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

A TOTAL OF 34,600 MAN-HOURS WERE SPENT ON THE MARTIN LAKE FGD SYSTEMS DURING THE MONTHS OF MAY AND JUNE ALONE FOR SERVICING AND THE IMPLEMENTATION OF VAROUS TEST PROGRAMS.

ABSORBER TOWERS WERE UPGRADED BY THE ADDITION OF FLOWRATE INSTRUMENTATION.

FLOW VANES WERE INSTALLED AT THE INLET OF THE ABSORBERS TO BETTER GAS DISTRIBUTION.

UTILITY IS CONDUCTING WET/DRY INTERFACE CORROSION TEST IN THEIR BYPASS DUCTING FOR RESEARCH-COTTRELL.

THE UTILITY CONTINUED TO REPORT PROBLEMS WITH ABSORBER LINING FAILURES AND MIST ELIMINATOR PLUGGING. THE UTILITY IS PRESENTLY CONDUCTING MIST ELIMINATOR WASH, FORCED OXIDATION, AND LINER TEST PROGRAMS TO HELP SOLVE THESE TWO MAJOR PROBLEMS AREAS.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE MARTIN LAKE FGD SYSTEMS STILL CONTINUE TO HAVE MATERIALS OF CONSTRUCTION AND SYSTEM CHEMISTRY PROBLEMS. EPRI AND RADIAN ARE CURRENTLY DOING A JOINT STUDY ON THE MARTIN LAKE SYSTEMS TO DETERMINE POSSIBLE SOLUTIONS TO THESE PROBLEM AREAS.

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.

EPRI AND RADIAN TESTING WAS CONCLUDED DURING THE PERIOD. THE TEST RESULTS FROM THIS STUDY ARE PENDING.

1/84	SYSTEM							744			
2/84	SYSTEM							696			

TEXAS UTILITIES: MARTIN LAKE 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
3/84	SYSTEM							744			
4/84	SYSTEM							720			
5/84	SYSTEM							740			
6/84	SYSTEM							720			
7/84	SYSTEM							744			
8/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM PASSED PERFORMANCE TESTING CONDUCTED DURING THE PERIOD OF MAY THROUGH AUGUST 1984.

9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY CONTINUED TO EXPERIENCE MAINTENANCE PROBLEMS. TWO MODULES ARE OUT OF SERVICE AT ALL TIMES FOR MAINTENANCE, HOWEVER, OVERALL FGD SYSTEM PERFORMANCE IS NOT GREATLY EFFECTED.

NO MAJOR FGD-RELATED OUTAGES WERE REPORTED AT MARTIN LAKE 2 DURING THE FIRST THREE QUARTERS OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TEXAS UTILITIES	
PLANT NAME	MARTIN LAKE	
UNIT NUMBER	3	
CITY	TATUM	
STATE	TEXAS	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.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	3000	
GROSS UNIT GENERATING CAPACITY - MW	793	
NET UNIT GENERATING CAPACITY W/FGD - MW	750	
NET UNIT GENERATING CAPACITY WO/FGD - MW	760	
EQUIVALENT SCRUBBED CAPACITY - MW	595	
** 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	1494.51	(3167000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	168.3	(335 F)
STACK HEIGHT - M	137.	(450 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	17166.	(7380 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		6972-7894
AVERAGE ASH CONTENT - %	********	
RANGE ASH CONTENT - %	8.0-12.0	
AVERAGE MOISTURE CONTENT - %	33.00	
RANGE MOISTURE CONTENT - %	29.0-37.9	
AVERAGE SULFUR CONTENT - %	.90	
RANGE SULFUR CONTENT - %	0.7-1.5	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** 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	1494.5	(3167000 ACFM)
INLET FLUE GAS TEMPERATURE - C	168.3	(335 F)
PRESSURE DROP - KPA	.5	(2. IN-H2O)
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	
*** FGD SYSTEM		

TEXAS UTILITIES: MARTIN LAKE 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	C.T. MAIN
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.40
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	71.00
ENERGY CONSUMPTION - %	1.3
CURRENT STATUS	1
COMMERCIAL START-UP	2/79
INITIAL START-UP	2/79
CONTRACT AWARDED	5/76

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	1.50

** QUENCHER/PRESATURATOR

NUMBER	6	
TYPE	CYCLONIC SPRAY CHAMBER	
SUPPLIER	RESEARCH-COTTRELL	
INLET GAS TEMPERATURE - C	168.3	(335 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** ABSORBER

NUMBER	6	
NUMBER OF SPARES	0	
GENERIC TYPE	COMBINATION TOWER	
SPECIFIC TYPE	SPRAY/PACKED	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	RESEARCH-COTTRELL	
DIMENSIONS - FT	28 DIA X 100 HIGH	
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	VERTICAL CROSS CHANNEL FIXED GRID PACKING	
NUMBER OF CONTACTING ZONES	4	
DISTANCE BETWEEN GAS CONTACTING ZONES - CM	91.4	(36.0IN)
L/G RATIO - L/CU.M	13.4	(99.9 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.1	(4.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	2.7	(9.0 FT/S)
SO2 REMOVAL EFFICIENCY - %	95.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
NUMBER PER SYSTEM	6	
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	3	
PRESSURE DROP - KPA	.2	(1.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	2.4	(8.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPROPYLENE	
WASH WATER SOURCE	FRESH	
WASH RATE - L/S	7.9	(126 GAL/MIN)

TEXAS UTILITIES: MARTIN LAKE 3 (CONT.)

** REHEATER

GENERIC TYPE	BYPASS	
SPECIFIC TYPE	COLD SIDE	
TRADE NAME/COMMON TYPE	N/A	
PERCENT GAS BYPASSED - AVG	25.0	
TEMPERATURE INCREASE - C	77.8	(140 F)
INLET FLUE GAS TEMPERATURE - C	60.0	(140 F)
OUTLET FLUE GAS TEMPERATURE - C	82.2	(180 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	4	
DESIGN	CENTRIFUGAL	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	375.48	(795680 ACFM)
FLUE GAS TEMPERATURE - C	168.3	(335 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	6
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER; FORNEY ENGINEERING
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	6
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	MOSSER
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	STAINLESS STEEL
LINER SPECIFIC MATERIAL TYPE	AUSTENITIC

** DAMPERS

NUMBER	1
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	STAINLESS STEEL
LINER SPECIFIC MATERIAL TYPE	AUSTENITIC

** DAMPERS

NUMBER	4
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	NR
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	4
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

TEXAS UTILITIES: MARTIN LAKE 3 (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	OUTLET
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	BYPASS
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	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	TUBE MILL
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	4

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	3
PRESATURATOR/QUENCHER	6
LIMESTONE SLURRY	1
WET WELL	4
MILL SLURRY SUMP	****

** PUMPS

SERVICE	NUMBER
QUENCHER FEED	12
SLURRY FEED	2
ABSORBER RECIRCULATION	9
ABSORBER PACKING	9
MILL SLURRY	8
THICKENER UNDERFLOW	3
MAIN WATER RECYCLE (THICKENER OVERFL	3
AREA SUMP PUMPS	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	CENTRIFUGE
NUMBER	3
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	35% SOLIDS
OUTLET STREAM CHARACTERISTICS	65% SOLIDS
OUTLET STREAM DISPOSITION	TO FLY ASH MIXING
OVERFLOW STREAM DISPOSITION	TO LIMESTONE SLURRY PREPARATION

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
DIMENSIONS - FT	140.0 DIA X 12.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL (WALLS); INORGANIC (BOTTOM)
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	10-12% SOLIDS
OUTLET STREAM CHARACTERISTICS	35% SOLIDS

TEXAS UTILITIES: MARTIN LAKE 3 (CONT.)

OUTLET STREAM DISPOSITION	TO CENTRIFUGE
OVERFLOW STREAM DISPOSITION	TO LIMESTONE SLURRY PREPARATION

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION
DEVICE	MULLER-TYPE BLENDER
PROPRIETARY PROCESS	NONE
INLET QUALITY - %	65.0

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	RAIL
SITE TREATMENT	NONE

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH
PHYSICAL VARIABLES	LIQUID LEVEL, LIQUID & GAS FLOW

** WATER BALANCE

WATER LOOP TYPE	CLOSED
MAKEUP WATER ADDITION - LITERS/S	34.6 (550 GPM)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE
PRINCIPAL CONSTITUENT	95% CACO3
UTILIZATION - %	95.0
POINT OF ADDITION	BALL MILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/79	SYSTEM							744			
4/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

MARTIN LAKE UNIT 3 BECAME OPERATIONAL DURING MARCH. NO OPERATIONAL DETAILS WERE AVAILABLE.

5/79	SYSTEM							744			
6/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS IN OPERATION DURING THIS PERIOD ALTHOUGH OPERATIONAL DATA WERE NOT AVAILABLE.

THE SLUDGE DISPOSAL SYSTEM IS EXPERIENCING SOME OPERATIONAL PROBLEMS.

7/79	SYSTEM							744			
8/79	SYSTEM							744			

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
9/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

ENGINEERING WORK IS IN PROGRESS TO ADD TWO NEW SCRUBBING TOWERS TO EACH MARTIN LAKE UNIT. THIS IS BEING DONE FOR THREE REASONS:

1) THE LIGNITE CURRENTLY DELIVERED HAS A GREATER SULFUR CONTENT THAN THAT FOR WHICH THE FGD SYSTEM WAS ORIGINALLY DESIGNED.
2) THE BOILER FLUE GAS FLOW IS GREATER THAN THAT FOR WHICH THE FGD SYSTEM WAS ORIGINALLY DESIGNED.
3) AS A RESULT OF CURRENT FGD SYSTEM MAINTENANCE REQUIREMENTS THE UTILITY FEELS IT IS BEST THAT ONE SPARE MODULE BE AVAILABLE SO THAT AT LEAST ONE CAN BE DOWN FOR CLEANING AT ALL TIMES.

THE TWO NEW TOWERS FOR EACH UNIT WILL BE DESIGNED FOR A LARGER CAPACITY THAN THE ORIGINAL TOWERS.

DURING THE THIRD QUARTER THE UTILITY REPORTED THAT THE FGD SYSTEM OPERATED WITHOUT ANY MAJOR OPERATIONAL PROBLEMS, HOWEVER, EXCESSIVE MAINTENANCE WAS REQUIRED. THE SLUDGE DISPOSAL PROBLEMS PLAGUING THE UNIT HAVE BEEN SOLVED.

10/79	SYSTEM							744			
11/79	SYSTEM							720			
12/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

PLUGGING PROBLEMS HAVE BEEN ENCOUNTERED DURING THE FOURTH QUARTER REQUIRING HEAVY MAINTENANCE.

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

** PROBLEMS/SOLUTIONS/COMMENTS

PLUGGING PROBLEMS CONTINUED IN THE FIRST QUARTER OF 1980, PARTICULARLY IN THE WETTED FILM CONTACT AREA AND THE MIST ELIMINATOR SECTION. THE MIST ELIMINATOR PLUGGING WAS RECENTLY SOLVED BY SWITCHING BACK TO LAKE WATER FOR MIST ELIMINATOR WASH FROM AN ASH POND WATER WASH THE UTILITY HAD BEEN TESTING.

THE FRP STRUCTURAL WORK IS BECOMING A PROBLEM. MUCH OF THE FRP SUPPORT WORK HAS HAD TO BE REPLACED WITH STAINLESS STEEL.

THE UTILITY HAS PLANS TO INSTALL TWO NEW SCRUBBING TOWERS IN EARLY 1983. THE NEW TOWERS HAVE BECOME NECESSARY DUE TO THE INCREASING LIGNITE SULFUR CONTENT AND THE NEED FOR SPARE SCRUBBER CAPACITY.

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

** PROBLEMS/SOLUTIONS/COMMENTS

HIGH MAINTENANCE PROBLEMS REPORTED IN PREVIOUS MONTHS CONTINUED THROUGHOUT THE SECOND QUARTER OF 1980. THE ABSORBERS ARE STILL EXPERIENCING PLUGGING PROBLEMS.

TEXAS UTILITIES: MARTIN LAKE 3 (CONT.)

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

** PROBLEMS/SOLUTIONS/COMMENTS

CORROSION IN THE SCRUBBER MODULES WAS A PROBLEM DURING JULY.

THE FOUNDATION FOR THE TWO NEW SCRUBBING TOWERS WAS COMPLETED DURING THE MONTH.

8/80	SYSTEM							744			
9/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM OPERATED WITHOUT ANY MAJOR PROBLEMS DURING AUGUST AND SEPTEMBER.

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

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 3 FGD SYSTEM DURING THE FOURTH QUARTER 1980.

1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 3 FGD SYSTEM DURING THE FIRST QUARTER OF 1981. MAINTENANCE WORK IS CONTINUING ON THE NEW ABSORBER MODULES.

4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 3 FGD SYSTEM DURING THE SECOND QUARTER 1981. UTILITY IS STILL IN PROCESS OF ADDING TWO ADDITIONAL ABSORBER MODULES (1 ADDITIONAL TRAIN) TO PRESENT FGD SYSTEM DUE TO EXCESSIVE SULFUR CONTENT OF PRESENT LIGNITE COAL SOURCE.

7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

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

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED DURING THE THIRD QUARTER 1981 ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN. THE INSTALLATION IS EXPECTED TO BE COMPLETED BY THE FALL OF 1982.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED DURING THE FOURTH QUARTER 1981 ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN. UNTIL THE ADDITIONAL MODULE IS ADDED, THE UNIT WILL BE OPERATED AT REDUCED LOAD.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED DURING THE FIRST QUARTER 1982 ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN.

4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER THE UNIT WAS TAKEN OFF-LINE FOR THE ANNUAL SPRING OUTAGE. DURING THIS TIME THE ADDITIONAL ABSORBER TRAIN WAS TIED INTO THE SYSTEM.

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			

TEXAS UTILITIES: MARTIN LAKE 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

DURING THE PAST NINE MONTHS THE MARTIN LAKE SYSTEMS EXPERIENCED SCALING AND PLUGGING PROBLEMS WITH THEIR MIST ELIMINATORS AND SPRAY PACKED TOWERS. THE UTILITY IS PRESENTLY TESTING FORCED OXIDATION AS A POSSIBLE SOLUTION.

THE MARTIN LAKE SYSTEMS ARE ALSO HAVING LINER FAILURES IN THEIR SPRAY PACKED TOWERS.

4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

A TOTAL OF 34,600 MAN-HOURS WERE SPENT ON THE MARTIN LAKE FGD SYSTEMS DURING THE MONTHS OF MAY AND JUNE ALONE FOR SERVICING AND THE IMPLEMENTATION OF VARIOUS TEST PROGRAMS.

ABSORBER TOWERS WERE UPGRADED BY THE ADDITION OF FLOWRATE INSTRUMENTATION.

FLOW VANES WERE INSTALLED AT THE INLET OF THE ABSORBERS TO BETTER GAS DISTRIBUTION.

UTILITY IS CONDUCTING WET/DRY INTERFACE CORROSION TESTS IN THEIR BYPASS DUCTING FOR RESEARCH-COTTRELL.

THE UTILITY CONTINUED TO REPORT PROBLEMS WITH ABSORBER LINING FAILURES AND MIST ELIMINATOR PLUGGING. THE UTILITY IS PRESENTLY CONDUCTING MIST ELIMINATOR WASH, FORCED OXIDATION, AND LINER TEST PROGRAMS TO HELP SOLVE THESE TWO MAJOR PROBLEMS AREAS.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE MARTIN LAKE FGD SYSTEMS STILL CONTINUE TO HAVE MATERIALS OF CONSTUCTION AND SYSTEM CHEMISTRY PROBLEMS. EPRI AND RADIAN ARE CURRENTLY DOING A JOINT STUDY ON THE MARTIN LAKE SYSTEMS TO DETERMINE POSSIBLE SOLUTIONS TO THESE PROBLEM AREAS.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT 3 FGD SYSTEM WAS FORCED OFF-LINE DURING THE END OF NOVEMBER DUE TO FREEZING PROBLEMS. ALTHOUGH THE FGD SYSTEM WAS DOWN FOR APPROXIMATELY 2 DAYS, THE UNIT OPERATED DUE TO POWER SHORTAGES IN THE GRID.

EPRI AND RADIAN TESTING WAS CONCLUDED DURING THE PERIOD. THE TEST RESULTS FROM THIS STUDY ARE PENDING.

1/84	SYSTEM							744			

UTILITY FGD SURVEY: OCTOBER 1983 - SEPTEMBER 1984

TEXAS UTILITIES: MARTIN LAKE 3 (CONT.)

PERFORMANCE DATA

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM PASSED PERFORMANCE TESTING CONDUCTED DURING THE PERIOD OF MAY THROUGH AUGUST 1984.

9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY CONTINUED TO EXPERIENCE MAINTENANCE PROBLEMS. TWO MODULES ARE OUT OF SERVICE AT ALL TIMES FOR MAINTENANCE, HOWEVER, OVERALL FGD SYSTEM PERFORMANCE IS NOT GREATLY EFFECTED.

NO MAJOR FGD-RELATED OUTAGES WERE REPORTED AT MARTIN LAKE 3 DURING THE FIRST THREE QUARTERS OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TEXAS UTILITIES	
PLANT NAME	MONTICELLO	
UNIT NUMBER	3	
CITY	MT. PLEASANT	
STATE	TEXAS	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1900	
GROSS UNIT GENERATING CAPACITY - MW	800	
NET UNIT GENERATING CAPACITY W/FGD - MW	750	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	800	
** 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	1650.71	(3498000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	168.3	(335 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	******	(****** BTU/LB)
RANGE HEAT CONTENT - BTU/LB		6500-7500
AVERAGE ASH CONTENT - %	18.90	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	31.90	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	.50	
RANGE SULFUR CONTENT - %	0.5-1.5	
AVERAGE CHLORIDE CONTENT - %	.04	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	2	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	C.E. WALTHER	
INLET FLUE GAS CAPACITY - CU.M/S	825.4	(1749000 ACFM)
INLET FLUE GAS TEMPERATURE - C	168.3	(335 F)
PRESSURE DROP - KPA	.4	(2. 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		

TEXAS UTILITIES: MONTICELLO 3 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
A-E FIRM	C.T. MAIN
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	74.00
CURRENT STATUS	1
COMMERCIAL START-UP	10/78
INITIAL START-UP	5/78
CONTRACT AWARDED	0/76

** DESIGN AND OPERATING PARAMETERS

OPER. & MAINT. REQUIREMENT - MANHR/DAY	92.0

** QUENCHER/PRESATURATOR

NUMBER	0

** ABSORBER

NUMBER	3	
NUMBER OF SPARES	0	
GENERIC TYPE	SPRAY TOWER	
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	GE ENVIRONMENTAL SERVICES	
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; MAT-REINFORCED POL	
LINER MATERIAL TRADE NAME/COMMON TYPE	FLAKELINE 103; CEILCRETE 2500AR	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	4000.	(63490 GPM)
L/G RATIO - L/CU.M	7.3	(54.5 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.5	(2.0 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	550.24	(1166000 ACFM)
INLET GAS TEMPERATURE - C	168.3	(335 F)
SO2 REMOVAL EFFICIENCY - %	74.0	
PARTICLE REMOVAL EFFICENCY - %	.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	OPEN VANE [SLAT]	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	1	
NUMBER OF PASSES PER STAGE	4	
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPROPYLENE	
WASH WATER SOURCE	FRESH	
WASH FREQUENCY	CONTINUOUS/INTERMITTENT	
WASH RATE - L/S	15.9	(252 GAL/MIN)

** REHEATER

NUMBER	2
NUMBER OF SPARES	0
GENERIC TYPE	INDIRECT HOT AIR
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE

TEXAS UTILITIES: MONTICELLO 3 (CONT.)

PERCENT GAS BYPASSED - AVG	50.0	
TEMPERATURE INCREASE - C	10.0	(18 F)
INLET FLUE GAS FLOW RATE - CU. M/S	1284.04	(2721000 ACFM)
INLET FLUE GAS TEMPERATURE - C	60.6	(141 F)
OUTLET FLUE GAS FLOW RATE - CU. M/S	1588.46	(3366100 ACFM)
OUTLET FLUE GAS TEMPERATURE - C	70.6	(159 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110	

** FANS

NUMBER	3	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	BUFFALO FORGE	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	550.24	(1166000 ACFM)
FLUE GAS TEMPERATURE - C	168.3	(335 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
MANUFACTURER	ANDCO
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	NR
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

** DAMPERS

GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
MANUFACTURER	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	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	INORGANIC
LINER SPECIFIC MATERIAL TYPE	HYDRAULICALLY-BONDED MORTAR

** 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

TEXAS UTILITIES: MONTICELLO 3 (CONT.)

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
MANUFACTURER	KENNEDY VAN SAUN
NUMBER	2
NUMBER OF SPARES	1

** TANKS

SERVICE	NUMBER
REAGENT PREP PRODUCT	1
ABSORBER RECYCLE	3
SO2 REMOVAL AREA SUMP	****

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	12
SLURRY FEED	****
CLEAR WATER PUMPS	****
SUMP PUMP	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NONE

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION
DEVICE	POND
PROPRIETARY PROCESS	NONE

** DISPOSAL

NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	CLAY LINING

** PROCESS CONTROL AND INSTRUMENTATION

CHEMICAL PARAMETERS	PH, SO2 CONCENTRATION
PHYSICAL VARIABLES	DENSITY
MONITOR TYPE	UNILOC, DUPONT, K-RAY

** WATER BALANCE

WATER LOOP TYPE	CLOSED	
MAKEUP WATER ADDITION - LITERS/S	34.4	(546 GPM)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIMESTONE

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

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

TEXAS UTILITIES: MONTICELLO 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 TEXAS AIR CONTROL BOARD REPORTED THAT THE TEXAS UTILITIES 750 MW MONTICELLO UNIT 3 BEGAN FGD OPERATIONS DURING EARLY MAY. AS OF YET THE UNIT HAS NOT RUN AT FULL LOAD BUT IS EXPECTED TO DO SO BY THE END OF AUGUST.

6/78	SYSTEM							720			
7/78	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT IS NOT AT FULL LOAD YET. THE UNIT IS OPERATING AT NO MORE THAN A 300 MW LOAD (OF THE 750 MW TOTAL). ONE OF THE THREE FGD MODULES IS FULLY OPERATIONAL. ANOTHER ONE IS PARTIALLY OPERATIONAL, WHILE THE THIRD IS NOT OPERATING AT ALL.

8/78	SYSTEM							744			
9/78	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE COMPLIANCE TEST HAS NOT YET TAKEN PLACE. THE FGD SYSTEM IS OPERATIONAL. INSTRUMENTATION INDICATES THAT THE UNIT IS IN COMPLIANCE.

10/78	SYSTEM							744			
11/78	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

CONTINUOUS NOX, O2, AND SO2 MONITORS ARE A PROBLEM AREA.

THE SLUDGE IS CURRENTLY NOT FIXATED. IT IS BEING PUMPED DIRECTLY TO THE POND.

THE FGD SYSTEM IS FULLY OPERATIONAL. A PRELIMINARY TEST WAS PERFORMED ON DECEMBER 14. RESULTS OF THE TEST ARE NOT YET AVAILABLE.

12/78	SYSTEM							744			
1/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM REPORTEDLY HAS BEEN PERFORMING WELL.

THE ESP IS NOT OPERATING WELL. COLLECTION EFFICIENCY IS UNEXPECTEDLY LOW. AMMONIA INJECTION HAS BEEN TRIED TO IMPROVE REMOVAL EFFICIENCY. THE PROBLEM REPORTEDLY IS THE RESULT OF STRUCTURAL DAMAGE. THE UNIT DID NOT PASS THE EPA OPACITY TEST.

2/79	SYSTEM							672			
3/79	SYSTEM							744			
4/79	SYSTEM							720			

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT IS CURRENTLY DOWN FOR A SCHEDULED OVERHAUL. THE TOWERS HAVE BEEN INSPECTED AND NO SCALING WAS FOUND.

SOME MINOR RECYCLE PUMP LINER PROBLEMS HAVE BEEN REPORTED.

DUE TO HIGH ASH LEVELS SOME PLATES IN THE ESP WERE FORCED OUT OF ALIGNMENT CAUSING AN OPACITY PROBLEM.

THE NEXT COMPLIANCE TEST IS SCHEDULED FOR THE WEEK OF JUNE 18.

5/79	SYSTEM							744			
6/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS IN OPERATION DURING THIS PERIOD ALTHOUGH OPERATIONAL DATA WERE NOT AVAILABLE.

7/79	SYSTEM							744			
8/79	SYSTEM							744			
9/79	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE ESP WAS REBUILT AND SINCE THE INITIATION OF GAS CONDITIONING WITH AMMONIA THE OPACITY PROBLEM HAS BEEN MINIMIZED.

DURING THE THIRD QUARTER THE UNIT OPERATED WITHOUT ANY MAJOR PROBLEMS. SOME MINOR ABSORBER RECYCLE PUMP LINER FAILURES HAVE BEEN ENCOUNTERED.

10/79	SYSTEM							744			
11/79	SYSTEM							720			
12/79	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO PROBLEMS HAVE BEEN ENCOUNTERED DURING THE FOURTH QUARTER. SINCE GAS CONDITIONING WITH AMMONIA BEGAN, THE OPACITY HAS BEEN ACCEPTABLE.

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

** PROBLEMS/SOLUTIONS/COMMENTS

NO PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1980.

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

TEXAS UTILITIES: MONTICELLO 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 MONTICELLO 3 SCRUBBING SYSTEM PERFORMED WELL THROUGHOUT THE SECOND QUARTER OF 1980. THE TEXAS AIR CONTROL BOARD REPORTED THAT IT HAD RECEIVED VERY FEW EXCESS EMISSIONS REPORTS FROM THE STATION DURING THE APRIL-JUNE PERIOD.

7/80 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING JULY.

8/80 SYSTEM 744

9/80 SYSTEM 720

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE RECYCLE PUMP LININGS HAVE BEEN A CONTINUAL PROBLEM DURING AUGUST AND SEPTEMBER. AT ONE TIME DURING THE TWO MONTH PERIOD THREE RECYCLE PUMP LINERS FAILED.

THE FGD SYSTEM HAS REPORTEDLY PERFORMED WELL AND IS IN COMPLIANCE MORE THAN 95% OF THE TIME.

10/80 SYSTEM 744

11/80 SYSTEM 720

12/80 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

THE MONTICELLO 3 FGD SYSTEM CONTINUED TO OPERATE DURING THE FOURTH QUARTER 1980 WITH NO MAJOR OPERATIONAL PROBLEMS REPORTED FOR THE THREE MONTH PERIOD.

1/81 SYSTEM 744

2/81 SYSTEM 672

3/81 SYSTEM 744

** PROBLEMS/SOLUTIONS/COMMENTS

MINOR PROBLEMS WITH THE RECYCLE PUMP WERE ENCOUNTERED THROUGHOUT THE FIRST QUARTER 1981.

4/81 SYSTEM 720

5/81 SYSTEM 744

6/81 SYSTEM 720

** PROBLEMS/SOLUTIONS/COMMENTS

NO PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1981. FGD SYSTEM PERFORMANCE WAS REPORTED AS BEING VERY GOOD.

7/81 SYSTEM 744

8/81 SYSTEM 744

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

IT WAS REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED AT MONTICELLO 3 DURING THE THIRD QUARTER 1981.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER 1981.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER 1982. FGD PERFORMANCE WAS REPORTED AS BEING UNUSUALLY VERY GOOD.

4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER.

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

EXCEPT FOR RECYCLE PUMP FAILURES AND PROBLEMS WITH WATER CARRY-OVER FROM MIST ELIMINATORS, THE FGD SYSTEM OPERATED FLAWLESSLY THROUGHOUT THE NINE MONTH PERIOD. THE APPROXIMATE FGD SYSTEM AVAILABILITY FOR THIS PERIOD AS REPORTED BY THE TEXAS AIR CONTROL BOARD WAS NEARLY 100%.

4/83	SYSTEM							720			

TEXAS UTILITIES: MONTICELLO 3 (CONT.)

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

EXCEPT FOR THE CONTINUED PROBLEMS WITH RECYCLE PUMP LINER FAILURES, NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED THROUGHOUT THE PERIOD.

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

** PROBLEMS/SOLUTIONS/COMMENTS

EXCEPT FOR MIST ELIMINATOR CARRYOVER PROBLEMS, NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD PERIOD.

DUE TO EXCESSIVE CARRYOVER FROM THE MIST ELIMINATORS, STACK CONDENSATE COLLECTED TO THE EXTENT THAT THE WEIGHT OF THE WATER BLEW OPEN THE STACK FLUE ACCESS DOOR. ONLY MINOR DAMAGE WAS REPORTED TO THE STACK AND REPAIRS WERE COMPLETED WITHIN A SINGLE DAY. IT WAS REPORTED THAT THE CARRYOVER CONTAINED SLURRY WHICH PLUGGED THE DRAINS LOCATED AT THE BASE OF THE STACK.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE MONTICELLO 3 FGD SYSTEM WAS OFF-LINE 5 DAYS IN DECEMBER FOR MIST ELIMINATOR REPLACEMENT. THE REPLACEMENT OF MIST ELIMINATORS IN ALL THREE SPRAY TOWERS WAS NECESSITATED DUE TO HARD SCALE BUILD UP. THE COST TO REPLACE THE MIST ELIMINATORS IN ALL THREE TOWERS WAS APPROXIMATELY $300,000. THE UTILITY BELIEVES THIS WAS A ONE-TIME OCCURRENCE CAUSED BY AN UNMONITORED PEAK IN THE SYSTEM CHEMISTRY.

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			

TEXAS UTILITIES: MONTICELLO 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

MINOR PUMP LINING PROBLEMS WERE EXPERIENCED DURING THE FIRST THREE QUARTERS OF 1984.

MIST ELIMINATOR PACKING REPAIRS WERE MADE DURING THE FIRST THREE QUARTERS OF 1984.

NO MAJOR FGD-RELATED OUTAGES WERE REPORTED AT MONTICELLO 3 DURING THE FIRST THREE QUARTERS OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	UNITED POWER ASSOCIATION	
PLANT NAME	STANTON	
UNIT NUMBER	1A	
CITY	STANTON	
STATE	NORTH DAKOTA	
REGULATORY CLASSIFICATION	D	
PARTICULATE EMISSION LIMITATION - NG/J	4.	(.010 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	187	
GROSS UNIT GENERATING CAPACITY - MW	60	
NET UNIT GENERATING CAPACITY W/FGD - MW	495	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	50	
** 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	98.19	(208074 ACFM)
BOILER FLUE GAS TEMPERATURE - C	132.2	(270 F)
STACK HEIGHT - M	77.	(254 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	4.6	(15.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	16282.	(7000 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		5976-7367
AVERAGE ASH CONTENT - %	6.90	
RANGE ASH CONTENT - %	4.9-11.8	
AVERAGE MOISTURE CONTENT - %	35.00	
RANGE MOISTURE CONTENT - %	28.0-37.9	
AVERAGE SULFUR CONTENT - %	.77	
RANGE SULFUR CONTENT - %	0.3-1.9	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** FABRIC FILTER		
NUMBER	1	
SUPPLIER	RESEARCH-COTTRELL	
INLET FLUE GAS TEMPERATURE - C	76.7	(170 F)
PRESSURE DROP - KPA	1.0	(4.0 IN-H2O)
PARTICLE REMOVAL EFFICENCY - %	99.0	
TYPICAL GAS/CLOTH RATIO - M/MIN	.5	(1.6 FT/MIN)
** ESP		
NUMBER	0	
TYPE	NONE	
** 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	

UNITED POWER ASSOCIATION: STANTON 1A (CONT.)

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	SPRAY DRYING
PROCESS TYPE	LIME/SPRAY DRYING
SYSTEM SUPPLIER	RESEARCH-COTTRELL
A-E FIRM	BLACK & VEATCH
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.80
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	72.70
CURRENT STATUS	1
COMMERCIAL START-UP	11/82
INITIAL START-UP	7/82
CONTRACT AWARDED	1/80

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	1	
NUMBER OF SPARES	0	
GENERIC TYPE	SPRAY DRYER	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	ROTARY ATOMIZER	
SUPPLIER	KOMLINE & SANDERSON	
DIMENSIONS - FT	63.0 X 38.0 72.0	
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	1	
INLET GAS FLOW - CU. M/S	134.96	(286000 ACFM)
INLET GAS TEMPERATURE - C	161.7	(323 F)
SO2 REMOVAL EFFICIENCY - %	91.0	
PARTICLE REMOVAL EFFICENCY - %	99.8	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	NONE
NUMBER PER SYSTEM	0
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	NONE
SPECIFIC TYPE	N/A
TRADE NAME/COMMON TYPE	N/A
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

UNITED POWER ASSOCIATION: STANTON 1A (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
** PUMPS	
SERVICE	NUMBER
---	---
NR	****
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	THICKENER
NUMBER	0
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	VACUUM FILTER
NUMBER	0
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	CENTRIFUGE
NUMBER	0
*** SLUDGE	
** TREATMENT	
METHOD	N/A
DEVICE	N/A
PROPRIETARY PROCESS	N/A
** DISPOSAL	
NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	PIPELINE
SITE TREATMENT	CLAY LINING
** PROCESS CONTROL AND INSTRUMENTATION	
PHYSICAL VARIABLES	TEMPERATURE,SO2
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEED FORWARD
** WATER BALANCE	
WATER LOOP TYPE	OPEN

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
7/82	SYSTEM							744			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE FGD SYSTEM INITIAL STARTUP WAS IN JULY 1982 AND IS CURRENTLY STILL IN THE SHAKEDOWN AND DEBUGGING PHASE OF OPERATION.										
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										
	THE UTILITY REPORTED EXPERIENCING A NUMBER OF PROBLEMS WITH ROTARY ATOMIZERS. GEAR BOXES HAVE BURNED OUT DUE TO BALANCING PROBLEMS AND MOTORS HAVE NOT PROVIDED ADEQUATE ATOMIZATION. THE FGD SYSTEM HAS YET TO COMPLETE EITHER PERFORMANCE OR COMPLIANCE TESTING.										
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THE CANCELLATION OF ITS SCHEDULED JULY 11 PERFORMANCE TEST BECAUSE OF ATOMIZER PROBLEMS. THE NEW TENTATIVE DATE IS SCHEDULED FOR SOMETIME IN OCTOBER. COMMERCIAL OPERATIONS ARE PLANNED TO TAKE PLACE IN DECEMBER.										
7/83	SYSTEM	99.9	100.0	100.0	99.0			744	737	737	
8/83	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	
	** PROBLEMS/SOLUTIONS/COMMENTS										
	NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JULY AND AUGUST 1983.										
9/83	SYSTEM	2.9	100.0	100.0	2.8			720	20	20	
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT FREQUENT PLUGGING AT THE TOP OF THE ATOMIZERS OCCURRED DURING THE THIRD QUARTER.										
	THE UTILITY REPORTED A UNIT OUTAGE BEGINNING SEPTEMBER 1 AND CONTINUING INTO OCTOBER.										
10/83	SYSTEM	88.3	100.0	100.0	86.5			744	643	744	
11/83	SYSTEM	88.3	100.0	100.0	86.5			720	622	720	

UNITED POWER ASSOCIATION: STANTON 1A (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
12/83	SYSTEM	88.3	100.0	100.0	86.5			744	643	744	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS OUT OF SERVICE 258.5 HRS DURING THE FOURTH QUARTER OF 1983 DUE TO AN ANNUAL OUTAGE.

1/84	SYSTEM	93.9	100.0	100.0	92.5			744	689	689	
2/84	SYSTEM	94.5	100.0	100.0	93.1			696	648	648	
3/84	SYSTEM	93.9	100.0	100.0	92.5			744	689	689	
4/84	SYSTEM	99.9	100.0	100.0	93.8			720	675	675	
5/84	SYSTEM	99.6	100.0	100.0	93.5			744	696	696	
6/84	SYSTEM	99.9	100.0	100.0	93.8			720	675	675	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING THE FIRST TWO QUARTERS OF 1984.

7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION WAS UNAVAILABLE FOR THE THIRD QUARTER OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	UTAH POWER & LIGHT	
PLANT NAME	HUNTER	
UNIT NUMBER	1	
CITY	CASTLE DALE	
STATE	UTAH	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	393	
GROSS UNIT GENERATING CAPACITY - MW	420	
NET UNIT GENERATING CAPACITY W/FGD - MW	393	
NET UNIT GENERATING CAPACITY WO/FGD - MW	400	
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	822.05	(1742000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	130.0	(266 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	7.3	(24.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26749.	(11500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10000-12600
AVERAGE ASH CONTENT - %	12.90	
RANGE ASH CONTENT - %	6.8-20.1	
AVERAGE MOISTURE CONTENT - %	7.60	
RANGE MOISTURE CONTENT - %	3.6-16.9	
AVERAGE SULFUR CONTENT - %	.52	
RANGE SULFUR CONTENT - %	0.41-0.90	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	

*** PARTICLE CONTROL

** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	2	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	BUELL DIVISION, ENVIROTECH	
INLET FLUE GAS CAPACITY - CU.M/S	443.1	(939000 ACFM)
INLET FLUE GAS TEMPERATURE - C	127.8	(262 F)
PRESSURE DROP - KPA	.1	(0. 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

UTAH POWER & LIGHT: HUNTER 1 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIME
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
A-E FIRM	STEARNS-ROGER
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	80.00
ENERGY CONSUMPTION - %	1.7
CURRENT STATUS	1
COMMERCIAL START-UP	5/79
INITIAL START-UP	3/79
CONTRACT AWARDED	12/76

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	.55	
DESIGN COAL HEAT CONTENT - J/G	29075.0	(12500 BTU/LB)
DESIGN COAL ASH CONTENT - %	9.00	
DESIGN MOISTURE CONTENT - %	6.00	
OPER. & MAINT. REQUIREMENT - MANHR/DAY	160.0	

** 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	GE ENVIRONMENTAL SERVICES	
DIMENSIONS - FT	27.5 DIAMETER X 35.5 HIGH	
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	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1178.	(18700 GPM)
L/G RATIO - L/CU.M	5.7	(42.9 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.6	(2.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.7	(12.0 FT/S)
INLET GAS FLOW - CU. M/S	205.51	(435500 ACFM)
INLET GAS TEMPERATURE - C	130.0	(266 F)
SO2 REMOVAL EFFICIENCY - %	80.0	

** 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	1	
NUMBER OF PASSES PER STAGE	4	
FREEBOARD DISTANCE - M	3.66	(12.0 FT)
DISTANCE BETWEEN VANES - CM	7.6	(3.00 IN)
PRESSURE DROP - KPA	.2	(1.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPROPYLENE	
WASH WATER SOURCE	FRESH & SUPERNATANT	
WASH FREQUENCY	CONTINUOUS	
WASH RATE - L/S	9.5	(150 GAL/MIN)

** REHEATER

NUMBER	1	
NUMBER OF SPARES	0	
NUMBER PER MODULE	1	
GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER	
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE	
PERCENT GAS BYPASSED - AVG	15.0	
TEMPERATURE INCREASE - C	26.7	(48 F)
INLET FLUE GAS TEMPERATURE - C	43.3	(110 F)
OUTLET FLUE GAS TEMPERATURE - C	70.0	(158 F)
NUMBER OF HEAT EXCHANGER BANKS	1	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL [HEADER]; STAINLESS STEEL [TUBES];	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; NR; NR	

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
SUPPLIER	WESTINGHOUSE	
FUNCTION	UNIT	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
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	411.02	(871000 ACFM)
FLUE GAS TEMPERATURE - C	130.0	(266 F)
PRESSURE DROP - KPA	2.8	(9.1 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** FANS

NUMBER	1	
NUMBER OF SPARES	0	
SUPPLIER	WESTINGHOUSE	
FUNCTION	REHEATER	
APPLICATION	INDUCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	135.91	(288000 ACFM)
PRESSURE DROP - KPA	2.7	(9.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** FANS

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

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF

UTAH POWER & LIGHT: HUNTER 1 (CONT.)

GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DAMPERS

NUMBER	4
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DAMPERS

NUMBER	8
FUNCTION	SHUT-OFF/CONTROL
GENERIC TYPE	GUILLOTINE/LOUVER
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY (HSLA); AUSTENITIC
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DAMPERS

NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	BUTTERFLY
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DAMPERS

NUMBER	5
FUNCTION	CONTROL
GENERIC TYPE	LOUVER/BUTTERFLY
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

LOCATION	FAN DISCHARGE
CONFIGURATION	RECTANGLE
DIMENSIONS	15 X 18 X 13
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	INLET MANIFOLD
CONFIGURATION	CIRCLE
DIMENSIONS	18 D X 172.5 L
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	INLET
CONFIGURATION	RECTANGLE
DIMENSIONS	8 X 16 X 7
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR

UTAH POWER & LIGHT: HUNTER 1 (CONT.)

LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

LOCATION	OUTLET
CONFIGURATION	RECTANGLE
DIMENSIONS	8.5 X 13 X 2
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

LOCATION	OUTLET MANIFOLD
CONFIGURATION	CIRCLE
DIMENSIONS	16.75 D X 165 L
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC; INORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER; HYDRAULICALLY-BOND

** DUCTWORK

LOCATION	BYPASS REHEAT
CONFIGURATION	CIRCLE
DIMENSIONS	6 D X 60 L
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	REHEAT
CONFIGURATION	RECTANGLE TO CIRCLE
DIMENSIONS	9 X 7.5 TO 11.5 D X 83 L
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	SLAKER
DEVICE	NR
DEVICE TYPE	NR
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	2.7 (3 TPH)

** TANKS

SERVICE	NUMBER
THICKENER TRANSFER	1
SLAKER TRANSFER	1
ABSORBER RECYCLE	4
PROCESS SUMP	****
THICKENER SUMP	****
FLOCCULATION SYSTEM	****

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	16
THICKENER UNDERFLOW	2
THICKENER OVERFLOW	2
LIME SLURRY	2
THICKENER SUMP	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
CONFIGURATION	CYLINDER

UTAH POWER & LIGHT: HUNTER 1 (CONT.)

DIMENSIONS - FT	60 DIA X 12 HIGH
CAPACITY	250000
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 BLEED, FILTER RECYCLE
FEED STREAM CHARACTERISTICS	543 GPM, 7% SOLIDS
OUTLET STREAM CHARACTERISTICS	100 GPM, 30% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	400 GPM, 150 PPM SOLIDS
OUTLET STREAM DISPOSITION	FILTER
OVERFLOW STREAM DISPOSITION	ABSORBER

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	2
NUMBER OF SPARES	0
CONFIGURATION	CYLINDER
DIMENSIONS - FT	6 DIA X 10 LONG
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	NYLON
BELT GENERIC MATERIAL TYPE	ORGANIC
BELT SPECIFIC MATERIAL TYPE	NYLON
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	100 GPM, 30% SOLIDS
OUTLET STREAM CHARACTERISTICS	50% SOLIDS
OUTLET STREAM DISPOSITION	TRUCK TO LANDFILL
OVERFLOW STREAM DISPOSITION	THICKENER

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	OFF-SITE
SITE TRANSPORTATION METHOD	TRUCK

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	ABSORBER RECYCLE TO SPRAYS
CHEMICAL PARAMETERS	PH
CONTROL LEVELS	5.8-6.2
MONITOR TYPE	UNILOC FLOW-THROUGH
PROCESS CONTROL MANNER	AUTOMATIC

** WATER BALANCE

WATER LOOP TYPE	OPEN

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIME
UTILIZATION - %	90.0
POINT OF ADDITION	SLAKER

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
5/79	SYSTEM		78.6		32.8			744	311	244	

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL FGD OPERATIONS BEGAN IN MAY 1979.

THE FIGURES REPORTED BY UTAH POWER AND LIGHT ARE NOT CONSISTENT WITH THE FIGURES AS DEFINED BY PEDCO FOR THIS REPORT. IN THIS SURVEY "FGD SYSTEM HOURS" IS THE AVERAGE OF THE MODULAR HOURS ACCUMULATED BY EACH ABSORBER DURING A GIVEN MONTH. UP&L DEFINES "FGD SYSTEM HOURS" AS ACCUMULATED HOURS WHEN ANY OR ALL OF THE ABSORBERS IS IN OPERATION DURING A GIVEN MONTH. THE OPERABILITY AND UTILIZATION FIGURES REPORTED ARE BASED UPON "FGD SYSTEM HOURS" AS DEFINED BY UP&L AND THEREFORE MAY YIELD DEPENDABILITY FACTORS THAT ARE NOT COMPARABLE WITH OTHER DEPENABILITY FACTORS INCLUDED IN THIS SURVEY.

6/79	SYSTEM		98.0		96.9			720	713	698	
7/79	SYSTEM		100.0		99.1			744	738	738	
8/79	SYSTEM		100.0		100.0			744	744	744	
9/79	SYSTEM		100.0		100.0			720	720	720	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR OPERATIONAL PROBLEMS WERE REPORTED BY THE UTILITY FOR THIS UNIT DURING THE THIRD QUARTER OF 1979.

10/79	SYSTEM		100.0		95.6			744	711	711	
11/79	SYSTEM		100.0		91.1			720	656	656	
12/79	SYSTEM		100.0		98.2			744	731	731	
1/80	SYSTEM		100.0		95.9			744	713	713	
2/80	SYSTEM		100.0		86.8			696	604	604	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THERE WERE NO MAJOR FGD PROBLEMS ENCOUNTERED FROM OCTOBER 1979 THROUGH FEBRUARY 1980.

3/80	SYSTEM		57.8		56.9			744	732	423	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS FORCED OUT OF SERVICE IN MARCH BECAUSE THE THICKENER RAKE SHAFT FAILED AND THE TANK HAD TO BE DRAINED. THIS OUTAGE KEPT THE SYSTEM DOWN FOR APPROXIMATELY 309 HOURS.

4/80	SYSTEM		100.0		60.1			720	433	433	
5/80	SYSTEM		100.0		64.0			744	476	476	

** PROBLEMS/SOLUTIONS/COMMENTS

THE LOW FGD HOURS DURING APRIL AND MAY RESULTED FROM THE ANNUAL OUTAGE FOR GENERAL FGD SYSTEM MAINTENANCE.

6/80	SYSTEM		100.0		97.9			720	705	705	

UTAH POWER & LIGHT: HUNTER 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										
		NO FGD SYSTEM PROBLEMS WERE REPORTED FOR JUNE.									
7/80	SYSTEM		100.0		100.0			744	744	744	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JULY.									
8/80	SYSTEM	100.0						744	744		
9/80	SYSTEM	100.0						720	713		
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF AUGUST AND SEPTEMBER.									
10/80	SYSTEM		100.0		96.5			744	718	718	
11/80	SYSTEM		80.0		76.4			720	687	550	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		OUTAGE TIME DURING NOVEMBER WAS THE RESULT OF A THICKENER RAKE FAILURE. THE SYSTEM WAS OFF LINE APPROXIMATELY SIX DAYS.									
12/80	SYSTEM		96.6		96.2			744	741	715	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING DECEMBER 25 HOURS OF OUTAGE TIME WAS CAUSED BY A LIME SLAKER PROBLEM.									
1/81	SYSTEM		100.0		92.7			744	690	690	
2/81	SYSTEM		100.0		94.6			672	636	636	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING JANUARY AND FEBRUARY NO MAJOR PROBLEMS WERE ENCOUNTERED WITH THE FGD SYSTEM.									
3/81	SYSTEM		100.0		30.5			744	227	227	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		DURING MARCH THE BOILER AND THE SYSTEM WERE OUT OF SERVICE FOR APPROXIMATELY 517 HOURS DUE TO A SCHEDULED OVERHAUL.									
4/81	SYSTEM		100.0		65.7			720	473	473	
5/81	SYSTEM		100.0		90.4			744	673	673	
6/81	SYSTEM		100.0		89.1			720	642	642	
	** PROBLEMS/SOLUTIONS/COMMENTS										
		THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1981.									
7/81	SYSTEM							744			

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
					PERFORMANCE DATA						
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER 1981.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER 1981.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER 1982. THE UTILITY PLANS TO SHUTDOWN IN APRIL FOR SCHEDULED OVERHAUL.

4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF-LINE FOR 4 WEEKS IN APRIL FOR A SCHEDULED BOILER/FGD OVERHAUL. THE UTILITY REPORTED NO OTHER MAJOR BOILER/FGD RELATED OUTAGES FOR THE SECOND QUARTER 1982.

THE UTILITY REPORTED THAT THE UNIT IS EXPERIENCING REHEAT PROBLEMS. THE INDIRECT HOT AIR STEAM REHEAT SYSTEM IS NOT PRODUCING ADEQUATE REHEAT. THE UTILITY IS PRESENTLY BAFFLED AS TO THE REASON FOR ITS INADEQUACY.

THE UTILITY ALSO REPORTED THAT THE UNIT IS EXPERIENCING FLYASH BUILDUP AND SCALING IN THE OUTLET DUCTWORK TO THE STACK.

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			

UTAH POWER & LIGHT: HUNTER 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
2/83	SYSTEM							672			
3/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT IT NOW BELIEVES ITS REHEAT PROBLEM IS DUE TO PLUGGED MIST ELIMINATORS AND NOT THE REHEATERS THEMSELVES. THE MIST ELIMINATORS BECOME PLUGGED AND SUBSEQUENTLY ALLOW INCREASED AMOUNTS OF MOISTURE TO BE CARRIED-OVER FOR WHICH THE REHEAT SYSTEM WAS NOT ORIGINALLY DESIGNED TO ACCOMMODATE. THE UTILITY NOW MONITORS THE MIST ELIMINATORS CLOSELY FOR PLUGGING AND CLEANS THEM WHENEVER IT HAS EXTENDED OUTAGE PERIODS.

THE UNIT IS SCHEDULED FOR A MAJOR OUTAGE TO BEGIN SOMETIME IN APRIL FOR TURBINE OVERHAUL. DURING THIS PERIOD, THE MIST ELIMINATORS WILL BE WASHED AND CLEANED.

4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE UNIT WAS DOWN FOR A PERIOD OF 7 WEEKS FOR A SCHEDULED TURBINE OVERHAUL. THE OUTAGE PERIOD STARTED AT THE END OF APRIL. DURING THE OUTAGE THE MIST ELIMINATORS WERE CLEANED WITH FIRE HOSES.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1983. TOTAL UNIT OUTAGE TIME WAS APPROXIMATELY 64 HOURS AND TOOK PLACE ALL IN THE MONTH OF JULY.

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			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED A SIX WEEK SCHEDULED OUTAGE DURING THE FIRST QUARTER OF 1984. NO FORCED OUTAGES WERE REPORTED.

4/84	SYSTEM							720			

UTAH POWER & LIGHT: HUNTER 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/84	SYSTEM							744			
6/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

A THICKENER RAKE FAILURE WAS REPORTED DURING THE SECOND QUARTER OF 1984. HOWEVER NO FGD SYSTEM OPERATING TIME WAS LOST. SLUDGE WAS TRUCKED TO A WASTE PILE DURING THIS TIME.

7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

TWO INCIDENCES OF LIMESTONE SLAKER FAILURE WERE REPORTED DURING THE THIRD QUARTER OF 1984. TOTAL OUTAGE TIME WAS 29 HOURS AND OVERALL FGD SYSTEM AVAILABILITY WAS 80%.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	UTAH POWER & LIGHT	
PLANT NAME	HUNTER	
UNIT NUMBER	2	
CITY	CASTLE DALE	
STATE	UTAH	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	393	
GROSS UNIT GENERATING CAPACITY - MW	420	
NET UNIT GENERATING CAPACITY W/FGD - MW	393	
NET UNIT GENERATING CAPACITY WO/FGD - MW	400	
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	822.05	(1742000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	130.0	(266 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	7.3	(24.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26749.	(11500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10000-12600
AVERAGE ASH CONTENT - %	12.90	
RANGE ASH CONTENT - %	6.8-20.1	
AVERAGE MOISTURE CONTENT - %	7.60	
RANGE MOISTURE CONTENT - %	3.6-16.9	
AVERAGE SULFUR CONTENT - %	.52	
RANGE SULFUR CONTENT - %	0.41-0.90	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
NUMBER	0	
TYPE	NONE	
** ESP		
NUMBER	2	
NUMBER OF SPARES	0	
TYPE	COLD SIDE	
SUPPLIER	BUELL DIVISION, ENVIROTECH	
INLET FLUE GAS CAPACITY - CU.M/S	443.1	(939000 ACFM)
INLET FLUE GAS TEMPERATURE - C	127.8	(262 F)
PRESSURE DROP - KPA	.1	(0. 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		

UTAH POWER & LIGHT: HUNTER 2 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIME
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
A-E FIRM	STEARNS-ROGER
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	80.00
ENERGY CONSUMPTION - %	1.7
CURRENT STATUS	1
COMMERCIAL START-UP	6/80
INITIAL START-UP	6/80
CONTRACT AWARDED	4/76

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	.55	
DESIGN COAL HEAT CONTENT - J/G	29075.0	(12500 BTU/LB)
DESIGN COAL ASH CONTENT - %	9.00	
DESIGN MOISTURE CONTENT - %	6.00	
OPER. & MAINT. REQUIREMENT - MANHR/DAY	160.0	

** 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	GE ENVIRONMENTAL SERVICES	
DIMENSIONS - FT	27.5 DIAMETER X 35.5 HIGH	
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	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1178.	(18700 GPM)
L/G RATIO - L/CU.M	5.7	(42.9 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.6	(2.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.7	(12.0 FT/S)
INLET GAS FLOW - CU. M/S	205.51	(435500 ACFM)
INLET GAS TEMPERATURE - C	130.0	(266 F)
SO2 REMOVAL EFFICIENCY - %	80.0	

** 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	1	
NUMBER OF PASSES PER STAGE	4	
FREEBOARD DISTANCE - M	3.66	(12.0 FT)
DISTANCE BETWEEN VANES - CM	7.6	(3.00 IN)
PRESSURE DROP - KPA	.2	(1.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPROPYLENE	
WASH WATER SOURCE	FRESH & SUPERNATANT	
WASH FREQUENCY	CONTINUOUS	
WASH RATE - L/S	9.5	(150 GAL/MIN)

UTAH POWER & LIGHT: HUNTER 2 (CONT.)

** REHEATER

NUMBER	1
NUMBER OF SPARES	0
NUMBER PER MODULE	1
GENERIC TYPE	INDIRECT HOT AIR
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE
PERCENT GAS BYPASSED - AVG	15.0
TEMPERATURE INCREASE - C	26.7 (48 F)
INLET FLUE GAS TEMPERATURE - C	43.3 (110 F)
OUTLET FLUE GAS TEMPERATURE - C	70.0 (158 F)
NUMBER OF HEAT EXCHANGER BANKS	1
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL [HEADER]; STAINLESS STEEL [TUBES];
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; NR; NR

** FANS

NUMBER	2
NUMBER OF SPARES	0
SUPPLIER	WESTINGHOUSE
FUNCTION	UNIT
APPLICATION	FORCED DRAFT
SERVICE	DRY
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	411.02 (871000 ACFM)
FLUE GAS TEMPERATURE - C	130.0 (266 F)
PRESSURE DROP - KPA	2.8 (9.1 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** FANS

NUMBER	1
NUMBER OF SPARES	0
SUPPLIER	WESTINGHOUSE
FUNCTION	REHEATER
APPLICATION	INDUCED DRAFT
SERVICE	DRY
FLUE GAS FLOW RATE - CU.M/S	135.91 (288000 ACFM)
PRESSURE DROP - KPA	2.7 (9.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** FANS

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

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DAMPERS

NUMBER	2
FUNCTION	SHUT-OFF

UTAH POWER & LIGHT: HUNTER 2 (CONT.)

GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DAMPERS

NUMBER	4
FUNCTION	CONTROL
GENERIC TYPE	LOUVER
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DAMPERS

NUMBER	8
FUNCTION	SHUT-OFF/CONTROL
GENERIC TYPE	GUILLOTINE/LOUVER
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY (HSLA); AUSTENITIC
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DAMPERS

NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	BUTTERFLY
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DAMPERS

NUMBER	5
FUNCTION	CONTROL
GENERIC TYPE	LOUVER/BUTTERFLY
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

LOCATION	FAN DISCHARGE
CONFIGURATION	RECTANGLE
DIMENSIONS	15 X 18 X 13
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	INLET MANIFOLD
CONFIGURATION	CIRCLE
DIMENSIONS	18 D X 172.5 L
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	INLET
CONFIGURATION	RECTANGLE
DIMENSIONS	8 X 16 X 7
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR

UTAH POWER & LIGHT: HUNTER 2 (CONT.)

LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

LOCATION	OUTLET
CONFIGURATION	RECTANGLE
DIMENSIONS	8.5 X 13 X 2
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

LOCATION	OUTLET MANIFOLD
CONFIGURATION	CIRCLE
DIMENSIONS	16.75 D X 165 L
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC; INORGANIC
LINER SPECIFIC MATERIAL TYPE	GLASS FLAKE-FILLED POLYESTER; HYDRAULICALLY-BOND

** DUCTWORK

LOCATION	BYPASS REHEAT
CONFIGURATION	CIRCLE
DIMENSIONS	6 D X 60 L
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	REHEAT
CONFIGURATION	RECTANGLE TO CIRCLE
DIMENSIONS	9 X 7.5 TO 11.5 D X 83 L
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	SLAKER
DEVICE	NR
DEVICE TYPE	NR
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	2.7 (3 TPH)

** TANKS

SERVICE	NUMBER
THICKENER TRANSFER	1
SLAKER TRANSFER	1
ABSORBER RECYCLE	4
PROCESS SUMP	****
THICKENER SUMP	****
FLOCCULATION SYSTEM	****

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	16
THICKENER UNDERFLOW	2
THICKENER OVERFLOW	2
LIME SLURRY	2
THICKENER SUMP	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
CONFIGURATION	CYLINDER

UTAH POWER & LIGHT: HUNTER 2 (CONT.)

DIMENSIONS - FT	60 DIA X 12 HIGH
CAPACITY	250000
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 BLEED, FILTER RECYCLE
FEED STREAM CHARACTERISTICS	543 GPM, 7% SOLIDS
OUTLET STREAM CHARACTERISTICS	100 GPM, 30% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	400 GPM, 150 PPM SOLIDS
OUTLET STREAM DISPOSITION	FILTER
OVERFLOW STREAM DISPOSITION	ABSORBER

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	2
NUMBER OF SPARES	0
CONFIGURATION	CYLINDER
DIMENSIONS - FT	6 DIA X 10 LONG
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	ORGANIC
LINER SPECIFIC MATERIAL TYPE	NYLON
BELT GENERIC MATERIAL TYPE	ORGANIC
BELT SPECIFIC MATERIAL TYPE	NYLON
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	100 GPM, 30% SOLIDS
OUTLET STREAM CHARACTERISTICS	50% SOLIDS
OUTLET STREAM DISPOSITION	TRUCK TO LANDFILL
OVERFLOW STREAM DISPOSITION	THICKENER

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	OFF-SITE
SITE TRANSPORTATION METHOD	TRUCK

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	ABSORBER RECYCLE TO SPRAYS
CHEMICAL PARAMETERS	PH
CONTROL LEVELS	5.8-6.2
MONITOR TYPE	UNILOC FLOW-THROUGH
PROCESS CONTROL MANNER	AUTOMATIC

** WATER BALANCE

WATER LOOP TYPE	OPEN

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIME
UTILIZATION - %	90.0
POINT OF ADDITION	SLAKER

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

UTAH POWER & LIGHT: HUNTER 2 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
0/80	SYSTEM										

** PROBLEMS/SOLUTIONS/COMMENTS

THE FIGURES REPORTED BY UTAH POWER AND LIGHT ARE NOT CONSISTENT WITH THE FIGURES AS DEFINED BY PEDCO FOR THIS REPORT. IN THIS SURVEY "FGD SYSTEM HOURS" IS THE AVERAGE OF THE MODULAR HOURS ACCUMULATED BY EACH ABSORBER DURING A GIVEN MONTH. UP&L DEFINES "FGD SYSTEM HOURS" AS ACCUMULATED HOURS WHEN ANY OR ALL OF THE ABSORBERS IS IN OPERATION DURING A GIVEN MONTH. THE OPERABILITY AND UTILIZATION FIGURES REPORTED ARE BASED UPON "FGD SYSTEM HOURS" AS DEFINED BY UP&L AND THEREFORE MAY YIELD DEPENDABILITY FACTORS THAT ARE NOT COMPARABLE WITH OTHER DEPENDABILITY FACTORS INCLUDED IN THIS SURVEY.

6/80	SYSTEM		100.0		99.5			720	717	717	

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATIONS AT HUNTER 2 BEGAN IN JUNE AND THE FGD SYSTEM WAS DECLARED COMMERICAL. NO MAJOR STARTUP PROBLEMS WITH THE FGD SYSTEM WERE ENCOUNTERED.

7/80	SYSTEM		100.0		98.9			744	736	736	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JULY.

8/80	SYSTEM					99.7		744	743		
9/80	SYSTEM					100.0		720	720		

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD PROBLEMS WERE ENCOUNTERED DURING AUGUST AND SEPTEMBER.

10/80	SYSTEM		100.0		70.1			744	521	521	
11/80	SYSTEM		100.0		98.3			720	708	708	
12/80	SYSTEM		100.0		99.8			744	742	742	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER 1980.

1/81	SYSTEM		100.0		88.8			744	661	661	
2/81	SYSTEM		100.0		96.3			672	647	647	
3/81	SYSTEM		100.0		99.4			744	740	740	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER 1981.

4/81	SYSTEM		100.0		99.6			720	717	717	
5/81	SYSTEM		100.0		62.9			744	468	468	
6/81	SYSTEM		100.0		90.8			720	653	653	

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 FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1981.

7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER 1981.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER 1982.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER 1982. THE NEXT SCHEDULED OUTAGE FOR OVERHAUL WILL BE SOMETIME IN MAY OR JUNE.

4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS OFF-LINE FROM MAY 27 TO JUNE 10 FOR A SCHEDULED BOILER/FGD OVERHAUL. THE UTILITY REPORTED NO OTHER MAJOR BOILER/FGD RELATED OUTAGES FOR THE SECOND QUARTER 1982.

THE UTILITY REPORTED THAT THE UNIT IS EXPERIENCING REHEAT PROBLEMS. THE INDIRECT HOT AIR STEAM REHEAT SYSTEM IS NOT PRODUCING ADEQUATE REHEAT. THE UTILITY IS PRESENTLY BAFFLED AS TO THE REASON FOR ITS INADEQUACY.

THE UTILITY ALSO REPORTED THAT THE UNIT IS EXPERIENCING FLYASH BUILDUP AND SCALING IN THE OUTLET DUCTWORK TO THE STACK.

7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			

UTAH POWER & LIGHT: HUNTER 2 (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			
11/82	SYSTEM							720			
12/82	SYSTEM							744			
1/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT IT NOW BELIEVES ITS REHEAT PROBLEM IS DUE TO PLUGGED MIST ELIMINATORS AND NOT THE REHEATERS THEMSELVES. THE MIST ELIMINATORS BECOME PLUGGED AND SUBSEQUENTLY ALLOW INCREASED AMOUNTS OF MOISTURE TO BE CARRIED-OVER FOR WHICH THE REHEAT SYSTEM WAS NOT ORIGINALLY DESIGNED TO ACCOMMODATE. THE UTILITY NOW MONITORS THE MIST ELIMINATORS CLOSELY FOR PLUGGING AND CLEANS THEM WHENEVER IT HAS EXTENDED OUTAGE PERIODS.

THE UTILITY REPORTED THAT THE UNIT WAS SHUTDOWN DURING THE ENTIRE MONTH OF JANUARY FOR SCHEDULED TURBINE OVERHAUL. DURING THIS OUTAGE, THE UTILITY WASHED AND CLEANED THE MIST ELIMINATORS.

2/83	SYSTEM							672			
3/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF FEBRUARY AND MARCH.

4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE MIST ELIMINATOR SCALE BUILDUP PROBLEM ON THE HUNTER 1 AND 2 FGD SYSTEMS HAS ALSO BEEN COMPOUNDED BY THE USE OF SATURATED WASH WATER. THE WASH WATER WAS FOUND TO HAVE HIGH CONCENTRATIONS OF CALCIUM SULFITE. THE UTILITY NOW MONITORS CLOSELY THE SULFITE CONCENTRATION IN THE WASH WATER.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1983. FORCED UNIT OUTAGES ALL TOOK PLACE DURING THE MONTHS OF AUGUST AND SEPTEMBER. THE TOTAL HOURS OF OUTAGE TIME FOR THESE MONTHS WAS APPROXIMATELY 47 AND 32, RESPECTIVELY.

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

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 FOURTH QUARTER OF 1983.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED A SIX WEEK SCHEDULED OUTAGE DURING THE FIRST QUARTER OF 1984. NO FORCED OUTAGES WERE REPORTED.

4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD RELATED OUTAGES WERE REPORTED DURING THE SECOND QUARTER OF 1984.

7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD RELATED OUTAGES WERE REPORTED DURING THE THIRD QUARTER OF 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	UTAH POWER & LIGHT	
PLANT NAME	HUNTER	
UNIT NUMBER	3	
CITY	CASTLE DALE	
STATE	UTAH	
REGULATORY CLASSIFICATION	B	
PARTICULATE EMISSION LIMITATION - NG/J	13.	(.030 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	1600	
GROSS UNIT GENERATING CAPACITY - MW	400	
NET UNIT GENERATING CAPACITY W/FGD - MW	495	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	400	

** 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	701.72	(1487000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	NR	
STACK TOP DIAMETER - M	7.3	(24.0 FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	29075.	(12500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		12200-12700
AVERAGE ASH CONTENT - %	10.00	
RANGE ASH CONTENT - %	9.0-12.0	
AVERAGE MOISTURE CONTENT - %	6.50	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	.55	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	

*** PARTICLE CONTROL

** ESP

NUMBER	1
TYPE	COLD SIDE
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	LIMESTONE
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
A-E FIRM	STEARNS-ROGER
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	90.00

UTAH POWER & LIGHT: HUNTER 3 (CONT.)

CURRENT STATUS	1
COMMERCIAL START-UP	6/83
INITIAL START-UP	4/83
CONTRACT AWARDED	10/79

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

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

** 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	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

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
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	NR
DEVICE TYPE	NR

** PUMPS

SERVICE	NUMBER
---	---
NA	****

UTAH POWER & LIGHT: HUNTER 3 (CONT.)

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	1

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
SITE TRANSPORTATION METHOD	TRUCK
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
4/83	SYSTEM							720			
5/83	SYSTEM							744			
6/83	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM COMMENCED OPERATION IN APRIL AND WAS REPORTED COMMERICAL IN JUNE.

DUE TO IMPROPER DESIGN OF THE BYPASS DAMPERS AND THE MIST ELIMINATOR MATERIALS OF CONSTRUCTION, THE MIST ELIMINATORS WERE MELTED IN MAY. THE BYPASS DAMPERS OPENED TOO SLOWLY AND THE MIST ELIMINATORS, CONSTRUCTED OF NORYL GRADE EN-180, WERE DESIGNED FOR TEMPERATURES NOT TO EXCEED 180 DEGREES F.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1983. HOWEVER, FORCED UNIT OUTAGES OCCURRED DURING EACH MONTH. THE TOTAL HOURS OF OUTAGE TIME FOR THE MONTHS OF JULY, AUGUST, AND SEPTEMBER WERE 179, 154, AND 160 RESPECTIVELY.

SCALE BUILDUP IN THE MIST ELIMINATORS AND ASSOCIATED DUCTWORK WAS REPORTED BY THE UTILITY. FIRST INSPECTIONS INDICATE THAT THE BUILDUP OF SCALE IS DUE TO AN INADEQUATE SPRAY WASH SYSTEM. THOSE SECTIONS CLOSE TO SPRAY NOZZLES ARE CLEAN. HOWEVER, SOME PORTIONS ARE SEEING NO WASH WATER AND SUBSEQUENTLY ARE ACCUMULATING SCALE BUILDUP.

10/83	SYSTEM							744			

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED A 30.5 HOUR OUTAGE DURING THE FIRST QUARTER OF 1984 DUE TO THE REPLACEMENT OF 1300 FEET OF CORRODING SLURRY TRANSFER LINE.

4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

TWO 4.5 HOUR OUTAGES OCCURRED DURING THE SECOND QUARTER OF 1984 DUE TO THE REPLACEMENT OF 1300 FEET OF CORRODING SLURRY TRANSFER LINE.

7/84	SYSTEM							744			
8/84	SYSTEM							744			
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD RELATED OUTAGES WERE REPORTED DURING THE THIRD QUARTER OF 1984

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	UTAH POWER & LIGHT	
PLANT NAME	HUNTINGTON	
UNIT NUMBER	1	
CITY	HUNTINGTON	
STATE	UTAH	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	516.	(1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	301.	(.700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	810	
GROSS UNIT GENERATING CAPACITY - MW	432	
NET UNIT GENERATING CAPACITY W/FGD - MW	400	
NET UNIT GENERATING CAPACITY WO/FGD - MW	407	
EQUIVALENT SCRUBBED CAPACITY - MW	366	
** 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	822.05	(1742000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	130.0	(266 F)
STACK HEIGHT - M	183.	(600 FT)
STACK SHELL	CONCRETE	
STACK TOP DIAMETER - M	7.3	(24.0 FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	27098.	(11650 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		11100-12100
AVERAGE ASH CONTENT - %	12.02	
RANGE ASH CONTENT - %	7.27-28.15	
AVERAGE MOISTURE CONTENT - %	7.73	
RANGE MOISTURE CONTENT - %	2.13-14.99	
AVERAGE SULFUR CONTENT - %	.43	
RANGE SULFUR CONTENT - %	0.29-0.83	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** MECHANICAL COLLECTOR		
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	822.0	(1742000 ACFM)
INLET FLUE GAS TEMPERATURE - C	127.8	(262 F)
PRESSURE DROP - KPA	.4	(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		

UTAH POWER & LIGHT: HUNTINGTON 1 (CONT.)

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIME
PROCESS ADDITIVES	NONE
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
A-E FIRM	STEARNS-ROGER
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	99.50
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	80.00
ENERGY CONSUMPTION - %	1.6
CURRENT STATUS	1
COMMERCIAL START-UP	5/78
INITIAL START-UP	5/78
CONTRACT AWARDED	1/75

** DESIGN AND OPERATING PARAMETERS

DESIGN COAL SULFER CONTENT - %	.55	
DESIGN COAL HEAT CONTENT - J/G	29075.0	(12500 BTU/LB)
DESIGN COAL ASH CONTENT - %	9.00	
DESIGN MOISTURE CONTENT - %	6.00	
OPER. & MAINT. REQUIREMENT - MANHR/DAY	136.0	

** QUENCHER/PRESATURATOR

NUMBER	0

** ABSORBER

NUMBER	4	
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	27.5 DIAMETER X 96 HIGH	
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	NONE	
NUMBER OF CONTACTING ZONES	1	
LIQUID RECIRCULATION RATE - LITER/S	1178.	(18700 GPM)
L/G RATIO - L/CU.M	5.7	(42.9 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.6	(2.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)
INLET GAS FLOW - CU. M/S	205.51	(435500 ACFM)
INLET GAS TEMPERATURE - C	130.0	(266 F)
SO2 REMOVAL EFFICIENCY - %	80.0	

** 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	1	
NUMBER OF PASSES PER STAGE	4	
FREEBOARD DISTANCE - M	3.66	(12.0 FT)
DISTANCE BETWEEN VANES - CM	7.6	(3.00 IN)
PRESSURE DROP - KPA	.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	POLYPROPYLENE	
WASH WATER SOURCE	FRESH & SUPERNATANT	
WASH FREQUENCY	CONTINUOUS/INTERMITTENT	

UTAH POWER & LIGHT: HUNTINGTON 1 (CONT.)

WASH RATE - L/S	15.1	(240 GAL/MIN)

** REHEATER

NUMBER	1	
NUMBER OF SPARES	0	
NUMBER PER MODULE	1	
GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER	
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE	
TEMPERATURE INCREASE - C	11.1	(20 F)
INLET FLUE GAS TEMPERATURE - C	46.1	(115 F)
OUTLET FLUE GAS TEMPERATURE - C	57.2	(135 F)
NUMBER OF HEAT EXCHANGER BANKS	1	
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL [HEADER]; STAINLESS STEEL [TUBES];	
CONSTRUCTION MATERIAL SPECIFIC TYPE	AISI 1110; AUSTENITIC; N/A	

** 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	519.09	(1100000 ACFM)
FLUE GAS TEMPERATURE - C	144.4	(292 F)
PRESSURE DROP - KPA	2.8	(9.1 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** FANS

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

** FANS

NUMBER	1	
NUMBER OF SPARES	0	
DESIGN	CENTRIFUGAL	
SUPPLIER	WESTINGHOUSE	
FUNCTION	REHEATER	
APPLICATION	N/A	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	135.91	(288000 ACFM)
PRESSURE DROP - KPA	2.7	(9.0 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

NUMBER	4	
FUNCTION	ISOLATION	
GENERIC TYPE	GUILLOTINE	
SPECIFIC TYPE	NR	
SEAL AIR FLOW - CU. M/S	1.27	(2700 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY [HSLA]; AISI 1110	
LINER GENERIC MATERIAL TYPE	NONE	
LINER SPECIFIC MATERIAL TYPE	N/A	

** DAMPERS

NUMBER	4	
FUNCTION	ISOLATION & CONTROL	
GENERIC TYPE	GUILLOTINE & LOUVER	
SPECIFIC TYPE	NR; NR	
SEAL AIR FLOW - CU. M/S	1.70	(3600 ACFM)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL/STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	HIGH STRENGTH LOW ALLOY [HSLA]; AUSTENITIC	
LINER GENERIC MATERIAL TYPE	NONE	

LINER SPECIFIC MATERIAL TYPE	N/A
** DAMPERS	
NUMBER	2
FUNCTION	CONTROL
GENERIC TYPE	BUTTERFLY
SPECIFIC TYPE	N/A
CONSTRUCTION MATERIAL GENERIC TYPE	STAINLESS STEEL
CONSTRUCTION MATERIAL SPECIFIC TYPE	AUSTENITIC
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DAMPERS	
NUMBER	5
FUNCTION	CONTROL
GENERIC TYPE	BUTTERFLY
SPECIFIC TYPE	N/A
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	BUTTERFLY
SPECIFIC TYPE	N/A
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	ISOLATION
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DAMPERS	
NUMBER	2
FUNCTION	ISOLATION
GENERIC TYPE	GUILLOTINE
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A
** DUCTWORK	
LOCATION	FAN DISCHARGE
CONFIGURATION	RECTANGLE
DIMENSIONS	15 X 18 X 13
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	INLET MANIFOLD
CONFIGURATION	CIRCULAR
DIMENSIONS	18 D X 172.5
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
SHELL SPECIFIC MATERIAL TYPE	AISI 1110
LINER GENERIC MATERIAL TYPE	NONE
LINER SPECIFIC MATERIAL TYPE	N/A

UTAH POWER & LIGHT: HUNTINGTON 1 (CONT.)

** DUCTWORK

LOCATION	ABSORBER INLET
CONFIGURATION	RECTANGLE
DIMENSIONS	8 X 16 X 7
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	ABSORBER OUTLET
CONFIGURATION	RECTANGLE
DIMENSIONS	8.5 X 13 X 12
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	OUTLET MANIFOLD
CONFIGURATION	CIRCULAR
DIMENSIONS	16.75 D X 165
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 REHEAT
CONFIGURATION	CIRCULAR
DIMENSIONS	6 D X 60
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	REHEAT
CONFIGURATION	RECTANGLE TO CIRCULAR
DIMENSIONS	9 X 7.5 TO 11.5 D X 83
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	SLAKER
DEVICE	SLAKER
MANUFACTURER	BIF
NUMBER	1
NUMBER OF SPARES	0
FULL LOAD DRY FEED CAPACITY - M.TONS/HR	2.7 (3 TPH)

** TANKS

SERVICE	NUMBER
ABSORBER RECYCLE	4
LIME SLURRY	1
TRANSFER WATER	1
FLOCCULATION SYSTEM	****
THICKENER SUMP	****
PROCESS SUMP	****

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	16
THICKENER UNDERFLOW	2
SLURRY TRANSFER	2
THICKENER OVERFLOW	2

UTAH POWER & LIGHT: HUNTINGTON 1 (CONT.)

FILTRATE	****
ME WASH	****
THICKENER SUMP	2
PROCESS SUMP	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	2
NUMBER OF SPARES	0
CONFIGURATION	CYLINDER
DIMENSIONS - FT	6 DIA X 10 LONG
CAPACITY	19000 LB/HR
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	ORGANIC
BELT SPECIFIC MATERIAL TYPE	POLYPROPYLENE
FEED STREAM SOURCE	THICKENER UNDERFLOW
FEED STREAM CHARACTERISTICS	100 GPM, 30% SOLIDS
OUTLET STREAM CHARACTERISTICS	50% SOLIDS
OUTLET STREAM DISPOSITION	LANDFILL
OVERFLOW STREAM DISPOSITION	TO THICKENER

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
NUMBER OF SPARES	0
CONFIGURATION	CYLINDRICAL
DIMENSIONS - FT	60 DIA X 12 HIGH
CAPACITY	250000
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
FEED STREAM SOURCE	ABSORBER BLEED
FEED STREAM CHARACTERISTICS	543 GPM, 5% SOLIDS
OUTLET STREAM CHARACTERISTICS	100 GPM, 30% SOLIDS
OVERFLOW STREAM CHARACTERISTICS	400 GPM, 150 PPM
OUTLET STREAM DISPOSITION	TO VACUUM FILTER
OVERFLOW STREAM DISPOSITION	RETURNED TO FGD SYSTEM

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION
DEVICE	PUG MILL
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
LOCATION	ON-SITE
SITE TRANSPORTATION METHOD	TRUCK
SITE TREATMENT	NONE

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS STREAM	ABSORBER RECYCLE TO SPRAYS
CHEMICAL PARAMETERS	PH, CONTINUOUS
CONTROL LEVELS	5.8-6.2
MONITOR TYPE	UNILOC FLOW-THROUGH
PROCESS CONTROL MANNER	AUTOMATIC

** WATER BALANCE

WATER LOOP TYPE	CLOSED	
MAKEUP WATER ADDITION - LITERS/S	18.9	(300 GPM)

UTAH POWER & LIGHT: HUNTINGTON 1 (CONT.)

** CHEMICALS AND CONSUMPTION

FUNCTION	ABSORBENT
NAME	LIME
PRINCIPAL CONSTITUENT	92% CAO, 6% MGO
UTILIZATION - %	90.0
POINT OF ADDITION	SLAKER

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
0/78	SYSTEM										

** PROBLEMS/SOLUTIONS/COMMENTS

THE FIGURES REPORTED BY UTAH POWER AND LIGHT ARE NOT CONSISTENT WITH THE FIGURES AS DEFINED BY PEDCO FOR THIS REPORT. IN THIS SURVEY "FGD SYSTEM HOURS" IS THE AVERAGE OF THE MODULAR HOURS ACCUMULATED BY EACH ABSORBER DURING A GIVEN MONTH. UP&L DEFINES "FGD SYSTEM HOURS" AS ACCUMULATED HOURS WHEN ANY OR ALL OF THE ABSORBERS IS IN OPERATION DURING A GIVEN MONTH. THE OPERABILITY AND UTILIZATION FIGURES REPORTED ARE BASED UPON "FGD SYSTEM HOURS" AS DEFINED BY UP&L AND THEREFORE MAY YIELD DEPENDABILITY FACTORS THAT ARE NOT COMPARABLE WITH OTHER DEPENABILITY FACTORS INCLUDED IN THIS SURVEY.

5/78	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATIONS BEGAN ON MAY 10, 1978. COMMERCIAL FGD SYSTEM OPERATIONS ARE EXPECTED TO BEGIN IN JUNE.

6/78	SYSTEM			65.3		65.3		720	720	470	
7/78	SYSTEM			97.7		95.9		744	731	714	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT BECAUSE 10-20% OF THE FLUE GAS BYPASSED THE FGD SYSTEM AS DAMPERS ARE VARRIED BY THE OPERATOR, IT IS DIFFICULT TO DETERMINE OVERALL SO2 REMOVAL EFFICIENCY.

8/78	SYSTEM			100.0		73.1		744	544	544	
9/78	SYSTEM			100.0		68.9		720	496	496	

** PROBLEMS/SOLUTIONS/COMMENTS

AN EXPLOSION CAUSED A THREE WEEK BOILER OUTAGE DURING THE AUGUST-SEPTEMBER PERIOD.

THE UTILITY REPORTED THAT THERE WERE NO FORCED FGD OUTAGES DURING AUGUST AND SEPTEMBER.

10/78	SYSTEM			100.0		100.0		744	744	744	
11/78	SYSTEM			62.4		62.4		720	720	449	

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE THICKENER HAD SOLIDS BUILDUP THE LAST OF NOVEMBER AND THE FIRST PART OF DECEMBER RENDERING THE RAKE INOPERATIVE. THE FGD SYSTEM WAS TAKEN OUT OF SERVICE TO ALLOW MANUAL REMOVAL OF THE SOLIDS.

TO PREVENT FUTURE SOLIDS BUILDUP IN THE THICKENER THE UTILITY IS CONSIDERING LOWERING THE PH AND POSSIBLY ADDING A FORCED OXIDATION SYSTEM. FOR NOW THE UTILITY IS ATTEMPTING TO BE MORE CONSCIENTIOUS IN MAINTAINING PROPER SOLIDS CONTENT IN THE THICKENERS.

12/78	SYSTEM		34.0		32.7			744	715	243	
1/79	SYSTEM		76.2		65.7			744	642	489	

** PROBLEMS/SOLUTIONS/COMMENTS

FREEZE-UP PROBLEMS CAUSED OUTAGES TOTALLING A FEW WEEKS DURATION DURING DECEMBER AND JANUARY.

2/79	SYSTEM		90.1		58.2			672	434	391	
3/79	SYSTEM		100.0		86.6			744	644	644	
4/79	SYSTEM		100.0		76.8			720	553	553	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE PROBLEMS ENCOUNTERED DURING FEBRUARY-APRIL INCLUDED LINING FAILURES (BOTH DESIGN-RELATED AND APPLICATION-RELATED), PUMP PROBLEMS AND DAMPER PROBLEMS.

PROBLEMS HAVE BEEN EXPERIENCED WITH DAMPER MECHANISMS CLOGGING. THE CLOGGING CAN RESULT IN DAMPER LEAKING AS MUCH AS 50%.

THE UTILITY HAS BEEN OPERATING THE FGD SYSTEM AT A PH OF 5 RATHER THAN THE DESIGN 6.5 TO YIELD A BETTER QUALITY SLUDGE PRODUCT.

5/79	SYSTEM		100.0		92.6			744	689	689	
6/79	SYSTEM		62.5		54.9			720	632	395	
7/79	SYSTEM		79.7		79.5			744	742	591	
8/79	SYSTEM		30.1		27.0			744	669	201	
9/79	SYSTEM		54.9		54.2			720	712	391	

** PROBLEMS/SOLUTIONS/COMMENTS

THE PROBLEMS ENCOUNTERED DURING THE THIRD QUARTER 1979 INCLUDED FAILURE OF CONTROL VALVES AND SOME AGITATOR PROBLEMS.

10/79	SYSTEM							744	497		

** PROBLEMS/SOLUTIONS/COMMENTS

ON OCTOBER 15 FGD OPERATIONS WITH LIMESTONE WERE INITIATED FOR TESTING PURPOSES. IF THE FGD SYSTEM OPERATIONS ARE ADEQUATE WITH LIMESTONE THE UTILITY WILL STUDY THE ECONOMIC TRADEOFFS OF LIME VS LIMESTONE SUCH AS PUMP WEAR ETC. IF THE RESULTS FAVOR LIMESTONE THE HUNTINGTON 1 FGD SYSTEM PROCESS MAY BE SHIFTED FROM LIME TO LIMESTONE.

11/79	SYSTEM							720	28		

UTAH POWER & LIGHT: HUNTINGTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
12/79	SYSTEM							744	642		
1/80	SYSTEM							744	668		

** PROBLEMS/SOLUTIONS/COMMENTS

DUE TO A LACK OF RECORDS, DATA CONCERNING THE FGD SYSTEM OPERATIONS WAS UNAVAILABLE FOR THE MONTHS OF OCTOBER 1979 THROUGH JANUARY 1980. IN NOVEMBER THE BOILER WAS DOWN MOST OF THE MONTH FOR A SCHEDULED UNIT OVERHAUL.

2/80	SYSTEM		100.0		86.9			696	605	605	
3/80	SYSTEM		100.0		89.2			744	664	664	
4/80	SYSTEM		98.1		92.1			720	676	663	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM OPERATED ALONG WITH THE BOILER DURING FEBRUARY AND MARCH WITH NO MAJOR PROBLEMS.

5/80	SYSTEM		100.0		99.7			744	742	742	
6/80	SYSTEM		100.0		99.2			720	714	714	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM OPERATED ALONG WITH THE BOILER DURING THE APRIL THROUGH JUNE PERIOD EXCEPT FOR A FEW HOURS IN APRIL. THE UTILITY REPORTED THAT NO MAJOR PROBLEMS OCCURRED DURING THIS TIME.

7/80	SYSTEM		100.0		87.2			744	649	649	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE REPORTED DURING JULY.

8/80	SYSTEM	100.0						744	695		

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR OPERATIONAL PROBLEMS WERE REPORTED IN AUGUST.

9/80	SYSTEM	.0			.0			720	0	0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM AND BOILER WERE DOWN THROUGHOUT SEPTEMBER FOR A SCHEDULED MAINTENANCE OVERHAUL.

10/80	SYSTEM		100.0		97.5			744	726	726	
11/80	SYSTEM		100.0		100.0			720	720	720	
12/80	SYSTEM		100.0		99.5			744	741	741	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER 1980.

1/81	SYSTEM		100.0		96.4			744	717	717	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM		100.0		100.0			672	672	672	
3/81	SYSTEM		100.0		93.5			744	696	696	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981, THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE EXPERIENCED.

4/81	SYSTEM		100.0		34.8			720	251	251	
5/81	SYSTEM		100.0		4.2			744	31	31	
6/81	SYSTEM		100.0		77.5			720	558	558	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1981. LOW BOILERS HOURS DURING THE MONTH OF MAY WERE DUE TO COAL STRIKE AND SCHEDULED UNIT OUTAGE.

7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER 1981.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE FNCOUNTERED DURING THE FOURTH QUARTER 1981.

1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO-FGD RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER OF 1982. THE UNIT WENT OFF-LINE ON APRIL 26 FOR A SCHEDULED OVERHAUL.

4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			

UTAH POWER & LIGHT: HUNTINGTON 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 THE UNIT WAS OFF-LINE FOR A SCHEDULED BOILER/FGD OUTAGE PERIOD FROM APRIL 26 TO MAY 14. THE UNIT WAS ALSO TRIPPED VOLUNTARILY FOR ONE DAY IN JUNE TO REPLACE A BOILER VALVE. NO OTHER BOILER/FGD RELATED PROBLEMS WERE REPORTED FOR THE SECOND QUARTER 1982.

7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							720			
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 UNIT WAS OFF-LINE FOR 5 WEEKS IN MAY FOR A SCHEDULED SPRING OUTAGE. DURING THIS PERIOD, THE ABSORBER OUTLET GUILLOTINE DAMPERS WERE CONVERTED FROM BOTTOM-ENTRY TO TOP-ENTRY. THE UTILITY REPORTED THAT WATER CARRYOVER FROM THE MIST ELIMINATORS WAS DRAINING INTO THE BOTTOM-ENTRY DAMPERS. IN WINTER MONTHS, THE WATER WOULD FREEZE AND THE UTILITY WAS OFTEN UNABLE TO CLOSE THE DAMPERS TO ISOLATE THE ABSORBER TOWERS FOR REPAIRS.

STARTING IN OCTOBER OF LAST YEAR AND ENDING IN MAY, THE UTILITY INSTALLED NEW AGITATORS IN THE BOTTOM OF THE ABSORBER TOWERS TO IMPROVE SLURRY MIXING. THE INSTALLATION WAS COMPLETED DURING OUTAGE PERIODS ON A MODULE-BY-MODULE BASIS.

THE UTILITY REPORTED THAT ONCE OR TWICE A YEAR THE MIST ELIMINATORS ARE REMOVED FOR MANUAL CLEANING DUE TO SCALE BUILDUP. THE CLEANING IS NORMALLY DONE EACH YEAR DURING THE SCHEDULED SPRING OUTAGE. THE PROCESS IS VERY COSTLY AND IS NECESSARY NOT ONLY AT THE HUNTINGTON STATION BUT ALSO AT THE HUNTER UNITS. THE UTILITY IS PRESENTLY INSTALLING AT HUNTINGTON A MIST ELIMINATOR WASH ADDITIVE FEED SYSTEM TO SOLVE THE SCALING PROBLEM. IT IS HOPED THAT THE ADDITIVE WILL BOTH INHIBIT AND DISSOLVE SCALE BUILDUP ON THE MIST ELIMINATORS.

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

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 OUTAGES OCCURRED DURING THE THIRD QUARTER 1983.

THE UTILITY IS PRESENTLY INSTALLING A NEW PH MONITORING SYSTEM. THE PH PROBES WILL BE POSITIONED IN THE RECYCLE PUMP LINES LOCATED IN-HOUSE OUT OF THE WEATHER. THE UTILITY BELIEVES THIS WILL ENCOURAGE MAINTENANCE WORKERS TO CLEAN THEM VERSUS THE PRESENT PROBES WHICH ARE POSITIONED AT THE BOTTOM OF THE ABSORBER VESSELS LOCATED OUTSIDE IN THE WEATHER.

THE UTILITY ALSO PLANS TO INSTALL ULTRASONIC MONITORS ON ALL FOUR ABSORBER VESSELS TO MONITOR LIQUID LEVEL. IN ADDITION TO THE PH MONITORING SYSTEM, THE UTILITY BELIEVES THIS WILL ENABLE THEM TO BETTER CONTROL SYSTEM CHEMISTRY.

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

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED OUTAGES WERE REPORTED IN THE THIRD QUARTER. THE FGD SYSTEM WAS OFF-LINE OCTOBER 31 THROUGH NOVEMBER 2 TO WASH OUT THE THICKENER. THE UTILITY BELIEVES THE THICKENER PLUGGED DUE TO EXCESSIVE ADDITION OF FLOCCULANT. THE UTILITY IS PRESENTLY TESTING A NEW POLYMER FLOCCULANT.

BEGINNING IN OCTOBER, THE UTILITY BEGAN TESTING A SCALE INHIBITOR IN MODULE 4. IN JANUARY, THE MODULE IS TO BE TAKEN OFF-LINE AND COMPARED TO OTHER MODULES WHICH ARE NOT USING THE SCALE INHIBITOR. THE CHEMICAL BEING TESTED IS AN ORGANIC PHOSPHATE.

THE UNIT WAS DOWN FOR A COUPLE OF DAYS DURING THE FOURTH QUARTER FOR CONDENSER TUBE AND BOILER RECIRCULATION PUMP REPAIRS.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

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

4/84	SYSTEM							720			
5/84	SYSTEM							744			
6/84	SYSTEM							720			
7/84	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT A SCHEDULED OVERHAUL TOOK PLACE FROM APRIL THROUGH JULY 1984.

8/84	SYSTEM							744			

UTAH POWER & LIGHT: HUNTINGTON 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
9/84	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD RELATED PROBLEMS WERE ENCOUNTERED DURING AUGUST AND SEPTEMBER 1984.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	UTAH POWER & LIGHT	
PLANT NAME	NAUGHTON	
UNIT NUMBER	3	
CITY	KEMMERER	
STATE	WYOMING	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	86.	(.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	*****	
GROSS UNIT GENERATING CAPACITY - MW	330	
NET UNIT GENERATING CAPACITY W/FGD - MW	310	
NET UNIT GENERATING CAPACITY WO/FGD - MW	315	
EQUIVALENT SCRUBBED CAPACITY - MW	330	
** 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	707.85	(1500000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	148.9	(300 F)
STACK HEIGHT - M	145.	(475 FT)
STACK SHELL	NR	
STACK TOP DIAMETER - M	*******	(***** FT)
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	22097.	(9500 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	6.00	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	********	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	.55	
RANGE SULFUR CONTENT - %	******	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	******	
*** PARTICLE CONTROL		
** ESP		
NUMBER	1	
TYPE	HOT SIDE	
** 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	SODIUM CARBONATE	
SYSTEM SUPPLIER	AIR CORRECTION DIVISION, UOP	
A-E FIRM	BECHTEL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %	98.00	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	70.00	
ENERGY CONSUMPTION - %	1.5	

UTAH POWER & LIGHT: NAUGHTON 3 (CONT.)

CURRENT STATUS	1
COMMERCIAL START-UP	12/81
INITIAL START-UP	9/81
CONTRACT AWARDED	0/77

** DESIGN AND OPERATING PARAMETERS

** 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	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

DESIGN	NR
FUNCTION	NR
APPLICATION	NR
SERVICE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR

** 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	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK

** PUMPS

SERVICE	NUMBER
---	---
NR	****

** SOLIDS CONCENTRATING/DEWATERING
DEVICE NR

*** SLUDGE

** TREATMENT
METHOD NR
DEVICE NR
PROPRIETARY PROCESS NR

** DISPOSAL
NATURE NR
TYPE NR
SITE TREATMENT NR

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

OPERATION OF THE FGD SYSTEM INSTALLED ON NAUGHTON 3 BEGAN IN SEPTEMBER 1981. THE SYSTEM IS CURRENTLY IN THE START-UP PHASE OF OPERATION AND IS NOT REQUIRED TO BE IN FULL SERVICE UNTIL THE END OF THE YEAR. SOME INITIAL DAMPER PROBLEMS WERE REPORTED.

10/81	SYSTEM							744			
11/81	SYSTEM							720			
12/81	SYSTEM							744			
1/82	SYSTEM							744			
2/82	SYSTEM							672			
3/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT FOR THE FIRST QUARTER 1982 THE FGD AVAILABILITY AVERAGED GREATER THAN 90%.

4/82	SYSTEM							720			
5/82	SYSTEM							744			
6/82	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT FOR THE SECOND QUARTER THE FGD AVAILABILITY AVERAGED GREATER THAN 90%.

7/82	SYSTEM							744			
8/82	SYSTEM							744			
9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			

UTAH POWER & LIGHT: NAUGHTON 3 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
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 TO JUNE 1983.

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

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO FGD-RELATED OUTAGES WERE ENCOUNTERED DURING THE THIRD QUARTER OF 1983.

THE UTILITY REPORTED PLUGGING PROBLEMS IN THE PRESATURATOR HEADERS AND NOZZLES. THIS IS BELIEVED TO BE DUE TO INSUFFICIENT FLOW AND PIPE CONFIGURATION (TOO MANY ELBOWS). THE UTILITY IS GOING TO EXPERIMENT BY RUNNING THE FGD SYSTEM WITHOUT THE PRESATURATOR. UNIT WAS AVAILABLE APPROXIMATELY 70% OF THE PERIOD. THE UTILITY REPORTED THAT LOW UNIT AVAILABILITY ACCOUNTS FOR A MAJORITY OF FGD PROBLEMS DUE TO RESTART COMPLICATIONS.

10/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS DOWN DURING THE FIRST TWO WEEKS OF OCTOBER DUE TO A RUPTURED EFFLUENT LINE TO THE EVAPORATION POND.

11/83	SYSTEM							720			
12/83	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM HAS ONLY OPERATED APPROXIMATELY 30 DAYS DURING THE FOURTH QUARTER DUE TO TURBINE PROBLEMS ON THE UNIT.

THE UTILITY EXPERIENCED RECYCLE PUMP PROBLEMS DURING THE FOURTH QUARTER. SPECIFICALLY, WORN SLEEVES AND VIBRATION PROBLEMS.

1/84	SYSTEM							744			
2/84	SYSTEM							696			
3/84	SYSTEM							744			

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
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 RECYCLE PUMP WAS REPLACED WITH A LARGER UNIT AT NAUGHTON 3 TO REDUCE VIBRATION.

ESP CONTROLS WERE INOPERATIVE FOR APPROXIMATELY ONE WEEK DURING THE FIRST THREE QUARTERS OF 1984 FORCING THE FGD SYSTEM OUT OF SERVICE.

DAMPER PROBLEMS WERE REPORTED DURING THE FIRST THREE QUARTERS OF 1984. BENT SHAFTS AND LIMIT TORQUES WERE PREVENTING THE INLET LOUVERS FROM CLOSING PROPERLY.

OVERALL FGD SYSTEM AVAILABILITY DURING THE FIRST THREE QUARTERS OF 1984 WAS ESTIMATED AT 90 TO 95%.

SLURRY TANK HEATERS BURNING OUT CONTRIBUTED TO FGD SYSTEM OUTAGE TIME DURING THE FIRST THREE QUARTERS OF 1984. THE RESULTING LOWERED TEMPERATURE OF THE SODA LIQUOR CAUSED CRYSTALLIZATION OF THE SLURRY.

THE UTILITY REPORTED PROBLEMS WITH PLUGGED PRESATURATOR SPRAY NOZZLES DUE TO POOR CLARIFIER OPERATION.

SECTION 13
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	WEST PENN POWER	
PLANT NAME	MITCHELL	
UNIT NUMBER	33	
CITY	COURTNEY	
STATE	PENNSYLVANIA	
REGULATORY CLASSIFICATION	A	
PARTICULATE EMISSION LIMITATION - NG/J	43.	(.100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	193.	(.450 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	*****	
GROSS UNIT GENERATING CAPACITY - MW	300	
NET UNIT GENERATING CAPACITY W/FGD - MW	291	
NET UNIT GENERATING CAPACITY WO/FGD - MW	294	
EQUIVALENT SCRUBBED CAPACITY - MW	300	
** UNIT DATA - BOILER AND STACK		
BOILER SUPPLIER	******	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	613.47	(1300000 ACFM)
BOILER FLUE GAS TEMPERATURE - C	148.9	(300 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	29122.	(12520 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		10770-13310
AVERAGE ASH CONTENT - %	12.50	
RANGE ASH CONTENT - %	6.3-15.2	
AVERAGE MOISTURE CONTENT - %	5.50	
RANGE MOISTURE CONTENT - %	4.0-8.9	
AVERAGE SULFUR CONTENT - %	2.80	
RANGE SULFUR CONTENT - %	1.8-3.2	
AVERAGE CHLORIDE CONTENT - %	********	
RANGE CHLORIDE CONTENT - %	0.00-0.10	
*** PARTICLE CONTROL		
** ESP		
NUMBER	1	
INLET FLUE GAS CAPACITY - CU.M/S	613.5	(1300000 ACFM)
INLET FLUE GAS TEMPERATURE - C	153.3	(308 F)
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	GE ENVIRONMENTAL SERVICES	
A-E FIRM	GIBBS & HILL	
DEVELOPMENT LEVEL	FULL SCALE	
NEW/RETROFIT	RETROFIT	
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	95.00	

WEST PENN POWER: MITCHELL 33 (CONT.)

ENERGY CONSUMPTION - %	1.0
CURRENT STATUS	1
COMMERCIAL START-UP	9/82
INITIAL START-UP	8/82
CONTRACT AWARDED	9/79

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** 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	33.5 DIA X 97.5	
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	GLASS FLAKE-FILLED POLYESTER	
LINER MATERIAL TRADE NAME/COMMON TYPE	FLAKELINE 103	
GAS CONTACTING DEVICE TYPE	NONE	
NUMBER OF CONTACTING ZONES	6	
LIQUID RECIRCULATION RATE - LITER/S	28.	(452 GPM)
L/G RATIO - L/CU.M	12.0	(90.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	.6	(2.5 IN-H2O)
SUPERFICAL GAS VELOCITY - M/SEC	3.0	(10.0 FT/S)

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	HORIZONTAL	
NUMBER OF PASSES PER STAGE	4	
PRESSURE DROP - KPA	.1	(.4 IN-H2O)
SUPERFICAL GAS VELOCITY - M/S	3.0	(10.0 FT/S)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC; STAINLESS STEEL	
CONSTRUCTION MATERIAL SPECIFIC TYPE	POLYPROPYLENE; AUSTENITIC	
WASH WATER SOURCE	FRESH	
WASH RATE - L/S	6.1	(97 GAL/MIN)

** REHEATER

GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

DESIGN	CENTRIFUGAL
FUNCTION	BOOSTER
APPLICATION	NR
SERVICE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR

** 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

WEST PENN POWER: MITCHELL 33 (CONT.)

** DUCTWORK

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	NR
DEVICE TYPE	NR
MANUFACTURER	WALLACE & TIERNAN
NUMBER	3
PRODUCT QUALITY - % SOLIDS	15.0

** TANKS

SERVICE	NUMBER
THICKENER UNDERFLOW	1
VACUUM FILTER FILTRATE	1
FIXATION ADDITIVE	2
FLYASH	1
WASTE SLURRY BLEED	1
REAGENT PREP PRODUCT	1
ABSORBER RECYCLE	3
THICKENER OVERFLOW	1

** PUMPS

SERVICE	NUMBER
ABSORBER RECIRCULATION	18
ABSORBER BLEED	6
FIXATION ADDITIVE	2
ALKALI PREPARATION AREA SUMP	2
ABSORBER AREA SUMP	2
THICKENER AREA SUMP	2
VACUUM FILTRATE	****
VACUUM FILTER FEED	****
VACUUM	****
LIME SLURRY	2
THICKENER UNDERFLOW	2
THICKENER OVERFLOW	2

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	VACUUM FILTER
NUMBER	2
NUMBER OF SPARES	1
CAPACITY	888 TON/DAY
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
OUTLET STREAM CHARACTERISTICS	50% SOLIDS

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	THICKENER
NUMBER	1
DIMENSIONS - FT	139.0 DIA X 12.0
SHELL GENERIC MATERIAL TYPE	CARBON STEEL
FEED STREAM CHARACTERISTICS	10% SOLIDS
OUTLET STREAM CHARACTERISTICS	20% SOLIDS

*** SLUDGE

** TREATMENT

METHOD	NR
DEVICE	NR
PROPRIETARY PROCESS	NR

** DISPOSAL

NATURE	NR
TYPE	NR

WEST PENN POWER: MITCHELL 33 (CONT.)

SITE TREATMENT	NR

** PROCESS CONTROL AND INSTRUMENTATION

CONTROL LEVELS	PH, RECYCLE TANK LEVEL
PROCESS CONTROL MANNER	AUTOMATIC
PROCESS CHEMISTRY MODE	FEEDBACK

** WATER BALANCE

MAKEUP WATER ADDITION - LITERS/S	28.3	(450 GPM)

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 UTILITY REPORTED THAT INITIAL START-UP FOR THE FGD SYSTEM OCCURRED DURING AUGUST.

9/82	SYSTEM							720			
10/82	SYSTEM							744			
11/82	SYSTEM							720			
12/82	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE PERIOD OF AUGUST 1982 THROUGH DECEMBER 1982, THE PLANT WAS UNDERGOING SHAKEDOWN/DEBUGGING OPERATIONS.

1/83	F-101	.0	.0		.0						
	F-201	100.0	100.0	100.0	48.7						
	F-301	100.0	100.0	100.0	48.7						
	SYSTEM	100.0	100.0	100.0	48.7			744	361	362	35.7

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE BOILER WAS OFF FOR A PERIOD OF TIME TO INSPECT THE GENERATOR.

2/83	F-101	65.3	65.3	100.0	65.3						
	F-201	100.0	100.0	100.0	100.0						
	F-301	34.7	34.7	100.0	34.7						
	SYSTEM	100.0	100.0	100.0	100.0			672	672	672	78.6
3/83	F-101	100.0	100.0	100.0	100.0						
	F-201	100.0	100.0	100.0	100.0						
	F-301	.0	.0		.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	677	744	72.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING FEBRUARY OR MARCH.

4/83	F-101	100.0	100.0	100.0	100.0						
	F-201	75.6	100.0	100.0	75.6						
	F-301	24.4	100.0	100.0	24.4						
	SYSTEM	100.0	100.0	100.0	100.0			720	93	720	79.1
5/83	F-101	100.0	100.0	100.0	100.0						
	F-201	.0	.0		.0						
	F-301	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	617	744	62.2

WEST PENN POWER: MITCHELL 33 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
		PERFORMANCE DATA									
6/83	F-101	26.7	26.7	100.0	26.7						
	F-201	73.3	73.3	100.0	73.3						
	F-301	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

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE PERIOD OF APRIL 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 UNAVAILABLE FOR THE FIRST THREE QUARTERS OF 1984.

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

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15. SUPPLEMENTARY NOTES

Summarized in EPA 340/1-85-014 - Utility FGD Survey Summary
EPA Task Manager - Sonya Stelmack (202) 382-2851

16. ABSTRACT

This report, which is generated by a computerized data base system, represents a survey of operational and planned domestic utility flue gas desulfurization (FGD) system. The three volume set 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 124 systems in operation, 25 systems under construction, and 68 systems planned. The current FGD-controlled capacity in the United States is 47,255 MW.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group

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