Summary of Operating Experience - 1987

The following is a summary of Grand Gulf Nuclear Station (GGNS) Unit 1 operating experience for the 1987 calendar year. During 1987, the reactor was critical for 7,203.3 hours with the generator on line for 7,100.0 hours. The plant set a record for continuous operating time of a General Electric (GE) Boiling Water Reactor (BWR) in the second cycle of operation by operating for 171 consecutive days. The previous record of 157 days was held by Kuosheng 2. GGNS also achieved a generator gross output of 30,930 megawatt hours (MWH) in a 24 hour period which was also a BWR record.

The first refueling outage which began on September 5, 1986 continued into 1987 due to repairs to the turbine rotor and number 10 bearing that were damaged when a wrench socket was left in the unit during outage work. Following repairs and successful completion of the turbine overspeed trip test, GGNS recommenced commercial operation on January 9, 1987. The rate of reactor power increase was limited by thermal limits and post outage testing. The plant achieved 100 percent power operation on January 19, 1987.

GGNS continued normal plant operation, varying reactor power to support system load demands and rod pattern changes. An unplanned power decrease occurred on May 27, 1987 when both reactor recirculation pumps downshifted to slow speed apparently due to an invalid cavitation interlock trip. Operators followed the off-normal event procedures to stabilize the plant at approximately 41 percent power. GGNS returned to 100 percent power operations on May 31, 1987.

On June 29, 1987, the reactor automatically scrammed on a turbine control valve fast closure signal (LER 87-009-00). An Agastat relay failed causing the main steam inlet valve to the condenser air removal system to close. The subsequent loss of condenser vacuum caused the turbine to trip and the reactor to scram on the turbine control valve fast closure signal. The relay was replaced and reactor restart commenced on June 30, 1987. The generator was off-line for 54.2 hours.

On July 29, 1987, System Energy Resources, Incorporated (SERI) design engineers discovered a containment isolation design problem: two isolation valves in series in the Reactor Water Cleanup System (RWCU) were powered from the same electrical division (LER 87-011-00). The short-term correction to the problem was to place one of the valves in the isolation (closed) position which requires the RWCU system to be operated in the pre-pump mode of operation (reactor water drawn first to the RWCU pumps and then the heat exchangers instead of vice-versa as in the post-pump mode). During the second refueling outage, separate power supplies were provided for the two isolation valves. This modification allowed the resumption of RWCU operation in the post-pump mode.

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On August 6, 1987, the generator tripped and the reactor scrammed when the generator output breakers automatically opened (LER 87-012-00). Accumulated moisture in the switchyard control house had caused a backup scheme relay to short and activate the breaker trip circuitry. Although short-term corrective actions were taken to allow plant restart, restart was delayed when SERI engineers identified concerns over the design adequacy of certain HVAC ductwork sections (LER 87-013-01). The ductwork sections of concern included: 1) the ductwork between tornado backdraft check dampers and Control Building perimeter walls and 2) the ductwork between high energy line break check dampers and Auxiliary Building interior walls. Bechtel and SERI engineers determined that all suspect duct sections were acceptable except for 3 duct sections between tornado check dampers and the Control Building perimeter wall. Additional stiffeners were installed inside the ducts to make them acceptable. Plant restart commenced on August 9, 1987. The generator was off-line for 102.0 hours.

GGNS continued normal operation until the scheduled refueling outage which began on November 7, 1987. Plant coastdown began at approximately 0700 on October 30, 1987. At 1600 on November 5, 1987 GGNS began reducing power to 38 percent for planned pre-outage testing and inspections. The main generator was taken off-line at 0112 on November 7, 1987 and the reactor shutdown at 0222. Mode 5, Refueling, was entered on November 10, 1987 at 1622. The second refueling outage ended with the generator being synchronized to the grid at 0317 on January 6, 1988.

The cycle 3 fuel reload consisted of replacing 288 GE fuel assemblies with Advanced Nuclear Fuels assemblies. On November 19, 1987 during core alterations, a load limit trip at 1200 pounds was received for the refueling platform main hoist while attempting to remove peripheral fuel assembly LJS047. Subsequent attempts to remove the assembly were also unsuccessful. The fuel assembly was found wedged beside the support casting rather than resting in the support casting. After verbally receiving a discretionary enforcement waiver on November 24, 1987, the fuel assembly was freed at approximately 1600 pounds. A subsequent inspection by GE personnel revealed no evidence of assembly or reactor internal damage. The reload including core verification was completed on November 28, 1987.

GGNS Unit 1 Annual Report

Man-REM Exposure - 1987

This section contains a tabulation of the number of station, utility, and other personnel receiving exposures greater than 100 mrem/yr and their associated man-rem exposure according to work and job function. Also included is a tabulation of the number of personnel by exposure range.

System Energy Resources, Inc.
Grand Gulf Nuclear Station
Post Office Box 756
Port Gibson, Mississippi 39150

1:58 PM THU., 31 DEC., 1987

ANNUAL REPORT

NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

Work & Job Function	Number of Personnel ( ) 100 mrem)			Total Man-Rem		
	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractors and Others
Reactor Oper & Surveillance						
Maintenance Personnel	20	0	74	2.97	0.00	17.85
Operating Personnel	65	0	0	26.46	0.00	0.00
Health Physics Personnel	42	0	37	34.86	0.00	15.97
Supervisory Personnel	5	2	7	.83	1.06	1.10
Engineering Personnel	1	0	0	.11	0.00	0.00
Routine Maintenance						
Maintenance Personnel	99	0	260	32.92	0.00	146.00
Operating Personnel	0	0	2	0.00	0.00	.54
Health Physics Personnel	0	0	3	0.00	0.00	.55
Supervisory Personnel	0	0	4	0.00	0.00	1.24
Engineering Personnel	1	0	1	.59	0.00	.11
Inservice Inspection						
Maintenance Personnel	3	0	61	.39	0.00	33.90
Operating Personnel	0	0	0	0.00	0.00	0.00
Health Physics Personnel	0	0	0	0.00	0.00	0.00
Supervisory Personnel	1	0	17	.16	0.00	7.82
Engineering Personnel	0	0	3	0.00	0.00	2.01
Special Maintenance						
Maintenance Personnel	24	0	145	7.00	0.00	42.33
Operating Personnel	0	0	2	0.00	0.00	1.02
Health Physics Personnel	0	0	1	0.00	0.00	.44
Supervisory Personnel	0	0	7	0.00	0.00	1.87
Engineering Personnel	4	0	3	.61	0.00	1.40
Waste Processing						
Maintenance Personnel	18	0	18	3.31	0.00	5.65
Operating Personnel	1	0	2	.12	0.00	.89
Health Physics Personnel	0	0	0	0.00	0.00	0.00
Supervisory Personnel	0	0	0	0.00	0.00	0.00
Engineering Personnel	0	0	0	0.00	0.00	0.00
Refueling						
Maintenance Personnel	0	0	15	0.00	0.00	6.71
Operating Personnel	0	0	2	0.00	0.00	.39
Health Physics Personnel	0	0	0	0.00	0.00	0.00
Supervisory Personnel	0	0	2	0.00	0.00	.32
Engineering Personnel	0	0	2	0.00	0.00	.65
TOTAL						
Maintenance Personnel	164	0	573	46.60	0.00	252.44
Operating Personnel	66	0	8	26.58	0.00	2.83
Health Physics Personnel	42	0	41	34.86	0.00	16.96
Supervisory Personnel	6	2	37	.99	1.06	12.34
Engineering Personnel	6	0	9	1.31	0.00	4.16
Grand Total	284	2	668	110.34	1.06	288.73

System Energy Resources, Inc.
Grand Gulf Nuclear Station
Post Office Box 756
Port Gibson, Mississippi 39150

1:58 PM THU., 31 DEC., 1987

Number of Personnel By Exposure Range

BADGES	EXPOSURE RANGE
1677	LESS THAN .010 REM
523	.010 TO .099 REM
327	.100 TO .249 REM
242	.250 TO .499 REM
144	.500 TO .749 REM
48	.750 TO .999 REM
71	1.000 TO 1.999 REM
3	2.000 TO 2.999 REM
0	3.000 TO 3.999 REM
0	4.000 TO 4.999 REM
0	5.000 TO 5.999 REM
0	6.000 TO 6.999 REM
0	7.000 TO 7.999 REM
0	8.000 TO 8.999 REM
0	9.000 TO 9.999 REM
0	10.000 TO 10.999 REM
0	11.000 TO 11.999 REM
0	12.000 OR MORE REM
TOTAL 3035	

GGNS Unit 1 Main Steam Safety

Relief Valve Challenges - 1987

This section contains a summary of main steam line safety relief valve challenges which occurred during 1987 as reported in the GGNS Monthly Operating Reports for that period. The summaries were originally included in the following monthly reports:

January, 1987 Report -	AECM-87/0035 dated February 13, 1987
August, 1987 Report -	AECM-87/0182 dated September 15, 1987
October, 1987 Report -	AECM-87/0216 dated November 13, 1987

MAIN STEAM SAFETY RELIEF VALVE CHALLENGES

Date of Occurrence: January 23, 1987

Plant Operating Condition:

Rx Power (MWT)	3825	Rx Pressure	1013	Rx Mode	1
Rx Power (MWE)	1280	Rx Temperature	528 F		

Number of main steam SRVs: 20

Number of SRVs affected by event: 6

Narrative:

On January 23, 1987 at 0843, safety relief valves B21-F051D, B21-F051B, B21-F047D, B21-F047G, B21-F051A, and B21-F051F inadvertently lifted while the plant was operating at 99.9 percent power. Operators reclosed all of the valves within 2 minutes. Reactor water level was maintained above 20 inches (187 inches above the top of active fuel) without the use of ECCS systems.

The safety relief valve actuation was the result of a voltage spike produced by a transmation test unit which was being used to adjust current to a trip unit for performance of the SRV High Pressure Trip/Low Low Set Relief monthly functional surveillance. The "B" and "F" trip channels are powered by a common power supply in the Division 1 trip system. The "gross failure" logic was being tested only in the "B" channel. The voltage spike caused trip units in the "F" channel, which was not under test, to trip and actuate the safety relief valves.

The surveillance was changed to require the valve control switches to be placed to the "off" position to prevent inadvertent logic actuation during the surveillance.

In addition, Grand Gulf implemented a design modification during the 1987 refueling outage to reduce the probability of spurious actuations. Suppression diodes were installed across the coils of relays associated with trip logic that are normally energized but are de-energized during system calibration or circuit card removal. These diodes reduce the amount of electromagnetic interference induced into the power supply circuit during relay de-energization.

MAIN STEAM SAFETY RELIEF VALVE CHALLENGES

Date of Occurrence: August 6, 1987

Plant Operating Condition:

Rx Power (MWT) 3818 Rx Pressure 1033 psig Rx Mode 1

Rx Power (MWE) 1204 Rx Temperatures 531°F

Number of main steam SRV's: 20

Number of SRV's affected by event: 6

Narrative:

As a result of the automatic reactor scram on August 6, 1987, the safety relief valve low-low set logic actuated to control reactor pressure, lifting valves B21-F051D, F051B, F047G, F051A, F047D, and F051F. Reactor pressure reached a maximum of 1107 psig with a minimum reactor water level of 168 inches above the top of active fuel. The low-low set logic functioned properly to lift all 6 safety relief valves associated with the low-low set function.

MAIN STEAM SAFETY RELIEF VALVE CHALLENGES

Date of Occurrence: October 4, 1987

Plant Operating Condition:

Rx Power (MWT) 3029 Rx Pressure 1029 psig Rx Mode 1

Rx Power (MWE) 1233 Rx Temperatures 532°F

Number of main steam SRV's: 20

Number of SRV's affected by event: 2

Narrative:

During the performance of an unrelated surveillance procedure on the Rod Pattern Control System in panel 1H13-P629, a spurious seal-in of the safety relief valve low-low set logic occurred for channels "A" and "E". This logic actuation caused safety relief valves 1B21-F051B and 1B21-F051D to open one time each. The operator manually closed both safety relief valves by taking their respective handswitches to "OFF". There were no adverse consequences to reactor pressure or level due to the short time the valves were open. The spurious actuation was due to the common power supply for the two channels in each trip system being susceptible to disturbance. Corrective actions are discussed in the preceding January 23, 1987 occurrence of similar safety relief valve actuations.

Failed Fuel Indications/Inspections - 1987

There was one irradiated fuel assembly visual inspection performed during the 1987 reporting period. During the second refueling outage core shuffle, peripheral fuel assembly LJS047 was discovered wedged beside the support casting. Removal of the assembly required a discretionary enforcement waiver (verbally received Novembr 24, 1987) to exceed the 1200 pound load limit trip for the refueling platform main hoist. The fuel assembly was freed at approximately 1600 pounds. The subsequent inspection by General Electric revealed no indication of fuel assembly damage.

Although there were no other fuel examinations during the reporting period, plant chemists observed the presence of a small fuel failure through Offgas Pretreatment and Reactor Coolant Iodine analysis. The failure stabilized at levels well below Technical Specification limits. Plant chemists closely monitored the abnormality by increased analysis frequency. Current analysis indicates that the fuel assembly was removed during the 1987 refueling operations.

SYSTEM ENERGY RESOURCES, INC.

OLIVER D. KINGSLEY, JR.
Vice President
Nuclear Operations

February 29, 1988

U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Document Control Desk

Gentlemen:

SUBJECT: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-29
Annual Operating Report - 1987
AECM-88/0048

System Energy Resources, Incorporated (SERI) is transmitting, with this letter, the Grand Gulf Nuclear Station (GGNS) Unit 1 Annual Operating Report for 1987. This report is sent in compliance with the requirements of Grand Gulf Technical Specifications 6.9.1.4 and 6.9.1.5. This report is in accordance with the reporting program described in Regulatory Guide 1.16, Revision 4, Part C.1.b as modified by the NRC letter to SERI dated May 25, 1987 (MAEC-87/0131).

Provided as attachments are:

I. A narrative summary of operating experience during the year 1987,

II. A tabulated annual report of personnel exposure greater than 100 mrem/yr.,

III. A summary of main steam line safety relief valve challenges for the year 1987, and

IV. A summary of failed fuel indications/inspections.

Yours truly,

FOR
O.D. KINGSLEY, JR.

ODK:rg
Attachments

cc: See next page

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