

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/86

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Grand Gulf Nuclear Station - Unit 1										DOCKET NUMBER (2) 0 5 0 0 9 4 1 6				PAGE (3) 1 OF 0 3				
TITLE (4) Reactor Scram Due to Relay Failure																		
EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)								
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES NA				DOCKET NUMBER(S) 0 5 0 0 0					
0 6	2 9	8 7	8 7	0 0 9	0 0 0	7	2	9					0 5 0 0 0					
OPERATING MODE (9) 1		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 8: (Check one or more of the following) (11)																
POWER LEVEL (10) 1 0 0		20.402(b)				20.405(e)				<input checked="" type="checkbox"/> 50.73(a)(2)(iv)				73.71(b)				
		20.405(a)(1)(i)				50.36(c)(1)				<input type="checkbox"/> 50.73(a)(2)(v)				73.71(e)				
		20.405(a)(1)(ii)				50.36(c)(2)				<input type="checkbox"/> 50.73(a)(2)(vii)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)				
		20.405(a)(1)(iii)				50.73(a)(2)(i)				<input type="checkbox"/> 50.73(a)(2)(viii)(A)								
		20.405(a)(1)(iv)				50.73(a)(2)(ii)				<input type="checkbox"/> 50.73(a)(2)(viii)(B)								
		20.405(a)(1)(v)				50.73(a)(2)(iii)				<input type="checkbox"/> 50.73(a)(2)(ix)								
LICENSEE CONTACT FOR THIS LER (12)																		
NAME Jewel Summers/Compliance Coordinator										TELEPHONE NUMBER 6 0 1 4 3 7 - 2 1 4 9								
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																		
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC								
X	S H	R L Y	C 6 1 2	N														
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR		
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)												<input checked="" type="checkbox"/> NO						

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On June 29, 1987 Agastat relay N62-R33 sustained an intermittent failure which caused the main steam inlet valve (N62-F001B) to steam jet air ejector (SJAЕ) "B" to close. The closure of this valve caused a loss of condenser vacuum resulting in a main turbine trip and reactor scram.

The closure of valve N62-F001B prevented the SJAЕ from removing non-condensable gases from the main condenser. In addition, motor operated valve N62-F003B failed to close allowing reverse flow through the off-gas system back into the condenser. These two failures combined to decrease main condenser vacuum resulting in a main turbine trip and reactor scram on the turbine stop valve fast closure signal. Following the scram the SJAЕs were secured which closed the N62-F003B valve and terminated the loss of vacuum event. Vacuum stabilized at approximately 21 inches mercury.

During the scram recovery, a Division II group 8 automatic isolation occurred when operators prepared to place the Reactor Water Cleanup (RWCU) system into the blowdown mode of operation.

The relay was replaced. A Maintenance Work Order was initiated to investigate the potential problem with flow switches associated with low steam flow from the second stage air ejectors and is scheduled to be worked in an upcoming plant outage. Plant Directive 04-1-01-G33-1 will also be revised to note the possibility of a group 8 isolation during valve lineup.

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(9-83)

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Grand Gulf Nuclear Station - Unit 1	0500041687	—	09	—	00	2	03

TEXT (If more space is required, use additional NRC Form 366A's) (17)

A. REPORTABLE OCCURRENCE

On June 29, 1987 at approximately 1923, relay N62-R33 failed causing the Steam Jet Air Ejector (SJAE) main steam inlet valve (N62-F001B) to close. The subsequent loss of condenser vacuum caused a main turbine trip and reactor scram. This incident is reportable pursuant to 10CFR50.73(a)(2)(iv).

B. INITIAL CONDITION

At the time of the scram, the plant was operating at 100 percent thermal power and generator output was 1210 MWe.

C. DESCRIPTION OF OCCURRENCE

On June 29, 1987 at approximately 1923, relay N62-R33 (GG-1SH-RLY-R33) failed causing main steam inlet valve to the SJAE "B" (GC-1SH-V-F001B) to close. The closure of this valve caused a subsequent loss of condenser vacuum which resulted in a main turbine trip and reactor scram.

The relay failure closed the N62-F001B valve which prevented the steam jet air ejector from removing non-condensable gases from the main condenser. Also, motor operated valve N62-F003B failed to close possibly due to an inoperable flow switch circuit associated with low steam flow upstream of the second stage air ejector. The buildup of non-condensable gases and the reverse flow through the offgas system back into the condenser combined to decrease main condenser vacuum to less than the turbine trip set point. The loss of vacuum was properly followed by the automatic closure of the main turbine stop valves. Trip channels A, B, C, and D tripped as required. The reactor scrammed on a turbine stop valve fast closure signal. Valve N62-F003B failure did not initiate the scram; however, it did contribute to the speed at which main condenser vacuum was lost.

Following initial response to the scram event at approximately 1928, a Division II Containment/Drywell group 8 automatic isolation occurred as operators prepared to place the Reactor Water Cleanup (RWC) System into the blowdown mode to aid in controlling reactor water level, if needed. Operators opened RWC valves from the condenser up to the blowdown flow control valve in accordance with the procedure. An investigation concluded that water leaked past the closed blowdown flow control valve into the empty blowdown pipe. The 4 inch pipe did not fill sufficiently for the flow transmitter to sense the flow; thus, the leak detection system detected a differential flow and isolated the RWC system. The RWC isolated in a conservative (safe) direction on a high differential flow signal.

Plant restart commenced on June 30, 1987 at approximately 2120.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Grand Gulf Nuclear Station - Unit 1	0 5 0 0 0 4 1 6 8 7	—	0 0 9	—	0 0 0	3 OF 0 3

TEXT (If more space is required, use additional NRC Form 386A's) (17)

D. APPARENT CAUSE

Relay N62-R33, Agastat model GPD 125 VDC, failed because of a break in the manufacturer's wire crimp connection which joined the coil to the relay plate causing an intermittent connection only.

The RWCU isolation which occurred following the scram was the result of flow into the empty blowdown line which was not detected by the flow transmitter. Therefore, the leak detection system isolated the RWCU system on a differential flow signal.

The cause of the N62-F003B valve failing to close, which contributed to a more rapid condenser vacuum loss, may be associated with a malfunctioning flow switch circuit which will be investigated during an upcoming plant outage. The valve is required to be open during plant operation.

A previous reactor scram due to low condenser vacuum was reported in LER 85-021. The low vacuum was due to valve N62-F003A closing when water collected in the steam jet air ejector moisture separator causing intermittent low steam flow signals. The root causes for these two events are not related.

E. SUPPLEMENTAL CORRECTIVE ACTION

The N62-R33 Agastat relay was replaced upon discovery. Based upon past experience with Agastat relays and examination of this particular relay, it was determined that the failure is not generic to Agastat relays.

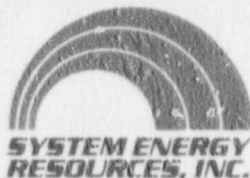
A Maintenance Work Order has been initiated to investigate the potential problem with flow switches associated with low steam flow from the second stage air ejectors. This investigation will be performed during an upcoming plant outage.

System Operating Instruction (SOI) 04-1-01-G33-1 will be revised to include information regarding the possibility of a group 8 isolation during valve lineup. As a long term measure, the possibility of "rapidly" swapping to the alternate Steam Jet Air Ejector train will be investigated. In addition, the Loss Of Condenser Vacuum Off Normal Event Procedure (ONEP) 05-1-02-V-8 will be revised to include verification that the N62-F003A and B valves close when the associated SJAE is lost.

F. SAFETY ASSESSMENT

All scram trip channels which should have tripped both before and after the scram did trip. Reactor pressure reached a maximum of 1070 psig with water levels at a minimum of 167 inches above top of active fuel. The plant did not have to rely on any of the Emergency Core Cooling Systems (ECCS) to maintain reactor water level. Conditions which required automatic actuation during the event were per design; therefore, no safety consequences existed.

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OLIVER D. KINGSLEY, JR.
Vice President
Nuclear Operations

July 29, 1987

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
Reactor Scram Due to Relay
Failure
LER 87-009-00
AECM-87/0146

Attached is Licensee Event Report (LER) 87-009-00 which is final report.

Yours truly,

ODK:bms
Attachment

cc: Mr. T. H. Cloninger (w/a)
Mr. R. B. McGehee (w/a)
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