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December 20, 1996

U.S. Nuclear Regulatory Commission
Mail Station P1-37
Washington, D.C. 20555

Attention: Document Control Desk

SUBJECT: Grand Gulf Nuclear Station
Docket No. 50-416
License No. NPF-29
Manual Reactor Scram Due to Loss of Control Rod Drive Pump
LER 96-006-00

GNRO-96/000136

Gentlemen:

In accordance with the requirements of 10 CFR 50.73, Licensee Event Report (LER) 96-006-00 for Grand Gulf Nuclear Station is attached. This report is intended as a final report, absent identification of information by Entergy Operations which requires supplementing the attached report in accordance with applicable NRC regulations.

Should you have any questions or require additional clarification of the information herein, please contact the licensee's representative listed on the LER.

Yours truly,

JJH/RR/CEB
attachment: Licensee Event Report Number 96-06-00
cc: Mr. J. E. Tedrow (w/a)
Mr. R. B. McGehee (w/a)
Mr. N. S. Reynolds (w/a)
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IE22

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260017

Attachment to
GNRO-96/00136

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)
Manual Reactor Scram Due to Loss of Control Rod Drive Pump

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 NAME	DOCKET NUMBER
									N/A	05000
11	27	96	96	006	00	12	20	96	FACILITY NAME: N/A	DOCKET NUMBER: 05000

OPERATING MODE (9)	2	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)	1		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
			20.2203(a)(2)(i)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.405(a)(1)(ii)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)	X	50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Charles E. Brooks / Licensing Specialist	601-437-6555

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
B	KA	LT	R369	N						

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

ABSTRACT (Limit to 1400 spaces, i. e., approximately 15 single-spaced typewritten lines) (16)

On November 27, 1996 plant startup was commencing from the eighth refueling outage, with vessel pressure less than 600 psig and the "B" control rod drive (CRD) pump in service. The "B" CRD pump tripped and plant operators implemented the applicable off-normal event procedure requirements. Actions were taken to restore CRD flow by swapping components. With a low CST level, CRD flow was unable to be restored.

The scram accumulator alarm for multiple control rods was received (only one alarm associated with a withdrawn control rod). When the in-service CRD pump could not maintain adequate suction pressure, the Shift Superintendent directed the Mode switch be placed to shutdown. The Operations Shift Superintendent elected to conservatively scram the reactor based upon accumulator low pressure alarms and CRD low suction pressure in lieu of verifying that the accumulator pressure had decreased below the Technical Specification minimum pressure and to prevent damage to the CRD pump. The reactor Mode switch was placed in SHUTDOWN and the plant was stabilized in accordance with applicable procedures. Technical Specification (TS) 3.1.5 requires reactor shutdown with vessel pressure below 600 psig concurrent with one or more control rod scram accumulators inoperable associated with a withdrawn control rod and charging water header pressure less than 1520 psig.

Subsequent investigation indicated that a malfunctioning CST level transmitter resulted in a erroneous CST level reading. The transmitter was replaced, satisfactorily tested and returned to service.

The ability to achieve and maintain safe shutdown was not adversely impacted, nor was public health and safety compromised by this event.

A. Reportable Occurrence

While all control rods were not fully inserted and vessel pressure was less than 600 psig, control rod drive (CRD) [AA] accumulator fault alarms were received for multiple control rods (only one of the faults received was for a withdrawn rod) with a CRD pump operating. The Reactor Mode switch was placed in the shutdown position which resulted in a manual Reactor Protection System (RPS) [JC] actuation. This event is reportable pursuant to 10 CFR 50.73(a)(2)(iv).

B. Initial Conditions

The plant was in OPERATIONAL CONDITION 2 with reactor power less than 1 percent. Reactor pressure was zero (0) psig and operators were withdrawing control rods. The reactor was critical and the core had reached the point of adding heat. Reactor coolant temperature was approximately 195 degrees F and increasing. The 'B' CRD [AA] Pump was in service.

C. Description of Occurrence

On November 27, 1996 plant personnel were commencing plant startup from the eighth refueling outage. After reaching the point of adding heat, the in-service CRD pump (the B pump) tripped. The actions associated with the applicable off-normal event procedure were taken which included starting the standby "A" CRD pump. A non-licensed operator was dispatched to the CRD pump area to assess the system conditions. Local indications at the CRD pumps revealed a low suction pressure condition for the operating "A" CRD pump. In an attempt to increase CRD pump suction pressure, CRD system flow was set lower than normal (approximately 40 gpm; then reduced to 20 gpm) and operators were directed to increase condensate system [SD] reject flow to the suction side of the CRD pump. Based on the recommendation of personnel locally at the pump, the operating pump was secured due to the onset of cavitation since no appreciable increase in suction pressure was evident.

During this evolution, blowdown flow via the Reactor Water Cleanup (RWCU) system was reduced in an attempt to control vessel level. Control room personnel observed condensate storage tank (CST) level using the associated control room indication. Level was indicated as being approximately 24 feet.

A clogged suction filter was initially suspected as being the cause of the low suction pressure. Personnel at the pump placed the standby suction filter in service. After a positive suction pressure was obtained, control room personnel restarted the "A" CRD pump. At this time, control room personnel observed control rod scram accumulator faults for multiple control rods, with one of the faults being for a withdrawn control rod.

Technical Specification (TS) 3.1.5 requires reactor shutdown with vessel pressure below 600 psig concurrent with one or more control rod scram accumulators inoperable associated with a withdrawn control rod and charging header pressure less than 1520 psig. The Operations Shift Superintendent elected to conservatively scram the reactor based upon accumulator low pressure alarms and CRD low suction pressure in lieu of verifying that the accumulator pressure had decreased below the Technical Specification minimum pressure and to prevent damage to the CRD pump.

CRD suction pressure was restored by manual reject from the condensate system.

D. Apparent Cause

Equipment Failure - Externally Damaging Conditions.

Failure determination of the malfunctioning CST level transmitter revealed that a partial short, due to moisture permeation, had occurred on the terminal strip where the signal cable is connected to the transmitter's sensing mechanism. This was determined to be the root cause of this event. The transmitter in question is a Rosemount Model 1151, installed in a low pressure application. The transmitter is located at the CST where it is exposed to the environment. A condition report has been generated to evaluate the cause of the moisture permeation into the electrical housing of the transmitter onto the terminal strip. The moisture accumulation caused the terminal strip to corrode resulting in the partial short of the transmitter. Even though the transmitter was impaired by the short, it continued to function. However, the level indicated by the transmitter was misleading in that the indicated level was higher than the actual CST level.

Additional factors identified as being contributors to this occurrence are:

Change Management - Risk/Consequences associated with change not adequately reviewed/assessed.

On November 26, 1996 during the monthly channel check, plant operating personnel identified that a mismatch of 4 feet existed between the remote shutdown panel (RSP) CST indication and the control room CST indication (with the control room instrumentation reading higher). A work order was generated to trouble shoot the cause of the mismatch, specifying that the RSP instrument was in error.

Since the RSP indicator is required by the Technical Specifications, a limiting conditions for operation (LCO) report was initiated and a high priority (Priority 2) was assigned to the work order. After performing trouble shooting activities on the RSP indicator, it was determined that the RSP indicator was correct and the control room indicator was in error. The control room CST level instrumentation is not required to be operable by the Technical Specifications. The LCO nowever, remained open to track satisfactory completion of a channel check.

Based on the above results, a second Condition Identification (CI) was initiated identifying the control room instrumentation as providing erroneous readings. In an effort to administratively control the work process, this CI was canceled and the work order was returned to maintenance planning for modification. The modification consisted of adding instructions and authorization for the work to be performed on the control room indication instrumentation under the original work order.

The CST level instrumentation is non-safety related. During the work activity planning meeting, the control room CST level indication work order was discussed and performance of trouble shooting activities on the malfunctioning control room instrumentation was maintained as a Priority 2, but lacked the attention normally afforded to TS required equipment.

Prior to implementing the corrective actions to correct the faulty CST level indication, the CRD system lost suction pressure which resulted in a trip of the operating pump. Due to accumulator fault alarms and to protect the CRD pump from damage, a manual reactor scram was conservatively inserted.

Training - Contents Did Not Adequately Address Potential Consequences of Problem.

Licensed operator lesson plans did not adequately address the consequences of low level in the CST in relationship to the CRD system. The lesson plan does encompass the low pressure trip setpoint for the CRD pumps, however there is not currently a correlation between the trip setpoint and the minimum required CST level to maintain suction pressure for the CRD pumps.

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TEXT *(If more space is required, use additional copies of NRC Form 366A) (17)*

D. Apparent Cause (cont'd)

Procedures Less Than Adequate.

Operating procedures do not reference expected CST level loss when transferring from long cycle cleanup level control valve. Additionally, procedures do not caution operators concerning the impact to the CRD pumps that results from low CST level.

E. Corrective Actions

Immediate:

Work Order 178625 was completed on 12/3/96. The faulty transmitter was replaced and a calibration performed in accordance with 07-S-53-P11-6, Condensate Storage Tank Level Calibration. Condition Report GGCR1996-0519-00 was initiated to investigate the water intrusion into the transmitter.

Long Term:

1. Engineering, with operations concurrence, will evaluate the need for addition of a redundant CST level indicator in the Control Room. Engineering Request (ER) 96/1007 has been initiated requesting the addition of a redundant CST low level annunciator.)

2. Discuss appropriate sections of this event with members of the 0700 plant status meeting.

3. Discuss this event and affects to plant systems for low and high CST levels in licensed operator requal training.

4. Change procedure 03-1-01-1 to reference expected CST level loss during transfer from long cycle cleanup to the startup level control valve. Change procedures 04-1-01-C11-1 and 04-1-01-P11-1 to caution the operator of the affects to in service CRD pumps with low CST level.

5. Operations Night Order entry discussing the effects to CRD and Condensate Transfer pumps due to low CST level. This item has been completed.

6. Present Root Cause Analysis for event to Maintenance Training Review Groups to evaluate for addition to continuing training.

7. Training will revise C11 and P11 lesson plans to include CST level at which CRD pumps lose suction.

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TEXT *(If more space is required, use additional copies of NRC Form 366A) (17)*

F. Safety Assessment

Following the shutdown, all safety systems performed as designed. Minimum vessel level experienced during this transient remained approximately 200 inches above the top of active fuel.

The CRD system is a part of the plant's reactivity control system. It consists of various of components to ensure that a single failure would not adversely impact the plant's ability to achieve and maintain a safe shutdown condition.

The CRD hydraulic system provides the motive force to position control rods during all modes of operation. Either CRD pump is capable of supplying sufficient flow and pressure to position control rods during normal and abnormal conditions. The pumps also supply high pressure water to the hydraulic control units' scram accumulators.

The system is designed such that once the accumulators are pressurized, the scram accumulators remain pressurized to provide the motive force for rapid insertion of all control rod upon RPS actuation.

Therefore, the loss of the CRD pumps during this event did not prevent the capability of the plant to shutdown and maintain a safe shutdown condition.

The health and safety of the public were not compromised as a result of this incident.

G. Additional Information

Energy Industry Identification System (EIIS) codes are identified in the text within brackets [ ].