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April 16, 2001

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

Attention: Document Control Desk

Subject: Grand Gulf Nuclear Station
Docket No. 50-416
License No. NPF-29
Tech Spec LCO Time Exceeded
Due to Two Sequential Equipment Failures
LER 2001-01

GNRO-2001/00029

Ladies & Gentlemen:

Attached is Licensee Event Report (LER) 2001-01, which is a final report.

Yours truly,

William A Eaton

WAE/CDH
attachment: 1. LER 2001-001-00

cc:

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NRC FORM 366 (1-2001) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001
Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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TITLE (4)
Tech Spec LCO Time Exceeded Due to Two Sequential Equipment Failures

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
02	21	2001	2001	-- 001 --	00	04	16	2001	FACILITY NAME N/A	DOCKET NUMBER 05000

OPERATING MODE (9)	1
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)

	20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
	20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)
	20.2203(a)(1)		50.36(c)(1)(i)(A)		50.73(a)(2)(iv)(A)		50.71(a)(4)
	20.2203(a)(2)(i)		50.36(c)(2)(ii)(A)		50.73(a)(2)(v)(A)		50.71(a)(5)
	20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)		
	20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)		
	20.2203(a)(2)(v)	X	50.73(a)(2)(i)(B)		50.73(a)(2)(vii)		
	20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)		
	20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Charles D. Holifield / Senior Licensing Engineer	601-437-6439

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
B	EK	DG	T274	Y					

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 February 19, 2001, a 24-hour load surveillance was being performed on the Division I Emergency Diesel Generator (EDG 11) when a water leak in the engine's left turbocharger return jacket water pipe was discovered. EDG 11 was declared inoperable while the leak was repaired. According to Technical Specification (TS) 3.8.1 ACTION B.4, the time allowed for continued operation would have ended on February 22 at 0100 (72 hours later). Following the pipe repair, the surveillance was recommenced. However, a fuel oil leak occurred which required another shutdown of EDG 11.

Since there was insufficient time to restore EDG 11 to operable status per the TS LCO, a Notice of Enforcement Discretion (NOED) to extend the LCO from 72 to 108 hours was requested and approved by the NRC. The 24-hour surveillance was commenced at 1542 on February 21 and EDG 11 returned to operable status at 1606 on February 22. Successful completion of the surveillance indicates EDG 11 was functional prior to entering the NOED.

The event was caused by two sequential and unrelated equipment failures: return jacket water pipe crack caused by low stress high cycle fatigue induced by misalignment during maintenance and a fuel oil leak caused by a loose air bleed screw that subsequently backed out which has been determined to be an isolated, random event on a recently installed vendor-supplied injector pump.

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

A. Reportable Occurrence

On February 21, 2001, GGNS exceeded the Allowed Outage Time (AOT) of the LCO contained in TS 3.8.1

During the performance of a 24-hour load surveillance run on the Division I Emergency Diesel Generator (EDG 11) [EK], EDG 11 was secured and declared inoperable due to a cooling water leak from the left turbocharger return jacket water pipe. The cooling water leak was repaired and the surveillance recommenced. However, during the recommenced surveillance, a fuel oil leak occurred which necessitated another shutdown of EDG 11.

Technical Specification (TS) 3.8.1, ACTION B.4 required that EDG 11 be restored to OPERABLE status within 72 hours or the unit be in at least HOT SHUTDOWN (Mode 2) within the following 12 hours and in COLD SHUTDOWN (Mode 3) within the following 36 hours. However, the time interval of the TS LCO in Mode 1 was insufficient to restore the system to operable status per TS 3.8.1 before the 24-hour load test could be completed. As a result, enforcement discretion was requested to extend the 72-hour LCO, contained in TS 3.8.1 Required Action B.4 Completion Time, to 108 hours. The Notice of Enforcement Discretion (NOED) was intended to avoid an unnecessary plant transient (shutdown). Although GGNS received a NOED from the NRC to extend the LCO time from 72 hours to 108 hours, the TS 72-hour LCO time was still exceeded which is reportable pursuant to 10CFR50.73(a)(2)(i)(B).

An assessment of the change in the GGNS core damage frequency due to allowing continued operation beyond the TS AOT (Allowed Outage Time) of 72 hours while repairing EDG 11 was performed for an additional period of 36 hours. This assessment was performed with the GGNS at-power risk monitor (EOOS) and is described in Section F of this report.

B. Initial Conditions

At the time of the event, the reactor was in OPERATIONAL CONDITION 1 with reactor power at approximately 100 percent. Reactor temperature, reactor pressure vessel (RPV) pressure and RPV water level were at approximately 540 degrees F, 1045 PSIG and 36 inches, respectively. The 24-hour load surveillance was being performed on EDG 11. There were no additional inoperable structures, systems, or components at the start of the event that contributed to the event.

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C. Description of Occurrence

On February 19, 2001 at approximately 0045, a 24-hour load surveillance was being performed on EDG 11 when a cooling water leak through a radial crack in the engine's left turbocharger return jacket water pipe was discovered. EDG 11 was secured and declared inoperable at 0100 while the cooling water leak was repaired. According to TS 3.8.1 ACTION B.4, the time allowed for continued operation would have ended on February 22nd at 0100 (72 hours later).

Following the repair to the cooling water pipe, the 18-month surveillance was recommenced. However, a fuel oil leak occurred which required another shutdown of EDG 11.

The time interval of the TS LCO in Mode 1 was insufficient to restore EDG 11 to an operable status per TS 3.8.1. Enforcement discretion to extend the 72-hour LCO to 108 hours was requested and approved during a telephone conference with the NRC at 1530 hours on February 21. The 24-hour surveillance was commenced at 1542 on February 21 and EDG 11 returned to operable at 1606 on February 22. This required using 15 hours and 6 minutes of the 36-hour NOED granted by the NRC. Additionally, the successful completion of the surveillance indicates the diesel generator was functional prior to entering the NOED.

D. Apparent Cause

The event was caused by two sequential and unrelated equipment failures requiring a 24-hour load surveillance in order to establish operability. The two failures were:

- failed return jacket water pipe
- fuel oil leak on an engine injector pump

The cause of the failed return jacket water pipe was determined to be low stress high cycle fatigue. A high mean (bending) stress induced by misalignment during post-maintenance re-assembly in 1995 along with inherent engine low amplitude high cycle vibration resulted in depletion of the material fatigue life.

The cause of the fuel oil leak on the engine injector pump was a loose air bleed screw that subsequently backed out of the pump resulting in a fuel oil leak. The loss of the air bleed screw has been determined to be an isolated, random event on a recently installed vendor-supplied injector pump.

E. Corrective Actions

Immediate Corrective Actions:

- To avoid an unnecessary plant shutdown transient, enforcement discretion was requested to extend the 72-hour LCO to 108 hours.

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E. Corrective Actions (cont'd)

Long Term Corrective Actions:

- Condition Report CR-GGN-2001-0285 was written to document the failed return jacket water pipe on EDG 11. A work package was issued and the failed jacket water piping was reworked.

- Condition Report CR-GGN-2001-0303 was written to document the engine injector pump fuel oil leak. The vent screw was replaced which repaired the fuel oil leak.

F. Safety Assessment

An assessment of the change in core damage frequency due to allowing continued operation while repairing the diesel generator beyond the TS Allowed Outage Time (AOT) of 72 hours was performed for an additional period of 36 hours. This assessment was performed with the GGNS at-power risk monitor (EOOS). The EOOS model is an at-power, internal events probabilistic risk analysis (PRA) model. This model was used to determine the core damage frequency (CDF) associated with EDG 11 out-of-service (oos). This value is then compared to the baseline risk (no equipment out of service) for the additional 36 hours granted in the NOED to determine the delta associated with the evolution. Only 15.1 hours of the 36 hours was expended. The core damage probability (CDP) for 15.1 hours is approximately one-half of the CDP for 36 hours.

	CDF (/reactor-yr)	CDP for 15.1 hours	CDP for 36 hours
Baseline	2.27E-06	3.91E-09	9.33E-09
EDG 11 oos	2.08E-05	3.59E-08	8.55E-08
Increase in CDP		3.20E-08	7.62E-08

Since the additional AOT is expected to be a one-time occurrence, the delta CDP also represents the increase in risk on a yearly basis. Therefore, the change in annual risk is in Region III (very small risk) of the NRC's CDF (core damage frequency) acceptance guidelines in Figure 3 of RG 1.174. The values obtained for the incremental risk demonstrate that the increase in AOT has only a small quantitative impact on plant risk.

Compensatory measures also served to further reduce the risk of continued power operation. The very small change in risk did not justify the alternative of shutting the plant down to effect the repairs. While not quantifiable at GGNS (GGNS does not have a quantitative transition and shutdown model), there are risks associated with manually shutting the plant down from a stable condition. They include challenging systems that are currently in standby and requiring the operation of the decay heat removal systems with one train without its full complement of support systems. Therefore, the relative safety significance of the enforcement discretion was low and the potential consequences of the granted request were preferable to the potential consequences associated with plant shutdown.

Therefore, based on this evaluation and the compensatory measures, the exceeded LCO time did not involve an increase in radiological risk and was not a potential detriment to the public health and safety.

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G. Additional Information

There is no evidence of a generic problem in the industry with this type of failure of either the jacket water piping or the injector pump air bleed screw.

Diesel Generator data:

Manufacturer: Transamerica Delaval – Engine and Compressor Division
Model Number: DSRV-16-4 Diesel Engine/Generator
Serial Number: 74033-2624
Drawing Number: 9645-M-1070C&D
Engine Characteristics: Four Stroke Recip V-block, 16 Cylinder, 450 RPM

As a result of this event, Condition Report GGCR 2001-0285-00 and GGCR 2001-0303-00 were generated. Energy Industry Identification System (EIIS) codes are identified in the text within brackets [ ].