



ENTERGY

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December 21, 1995

U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Attention: Document Control Desk

SUBJECT: Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29
Violation of Operating License Condition 2.C.(1) Maximum Power Level
LER 95-013-00

GNRO-95/00140

Gentlemen:

Attached is Licensee Event Report (LER) 95-013 which is a final report.

Yours truly,

CRH/MLJ
attachment

cc: Mr. J. E. Tedrow (w/a)
Mr. R. B. McGehee (w/a)
Mr. N. S. Reynolds (w/a)

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NRC FORM 366 (5-92)		U.S. NUCLEAR REGULATORY COMMISSION				APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95					
LICENSEE EVENT REPORT (LER)						ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 7714), 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					
FACILITY NAME (1) Grand Gulf Nuclear Station, Unit 1						DOCKET NUMBER (2) 05000-416		PAGE (3) 1 of 4			
TITLE (4) Violation of Operating License Condition 2.C.(1) Maximum Power Level											
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	
12	04	95	95	013	00	12	21	95	N/A	05000	
									FACILITY NAME	DOCKET NUMBER	
									N/A	05000	
OPERATING MODE (9)		1		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more (11))							
POWER LEVEL (10)		100		20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)	
				20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)	
				20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		<input checked="" type="checkbox"/> OTHER	
				20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		Specify in abstract below and in text, NRC Form 366A Violation of OL Condition 2.C.(1)	
				20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)			
				20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)			
LICENSEE CONTACT FOR THIS LER (12)											
NAME Milton Jones / Licensing Specialist						TELEPHONE NUMBER (include Area Code) (601)437-6198					
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	
SUPPLEMENTAL REPORT EXPECTED (14)						EXPECTED		MONTH	DAY	YEAR	
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)		<input checked="" type="checkbox"/> NO				SUBMISSION DATE (15)					
ABSTRACT (Limit to 1400 spaces, i. e., approximately 15 single-spaced typewritten lines) (16)											
<p>On December 4, 1995, GGNS confirmed a nonconservative error in the core thermal power calculation. A portion of the control rod drive (CRD) [AA] system flow is diverted to the recirculation pump seals for purge flow. Some of this flow is allowed to leak to the drywell equipment drain sump, however, most of it passes along the pump shaft into the reactor coolant and thus into the vessel. Since the CRD system flow element is located downstream of the diversion point for purge flow, this energy and flow input were not accounted for in the GGNS heat balance. Manual heat balances were performed and showed that when this additional flow is included, core thermal power is higher by approximately 0.8 MWt.</p> <p>The apparent cause of this discrepancy is failure to account for this flow path in the original vendor supplied heat balance equations. Grand Gulf has adjusted its heat balance inputs to account for this flow. Although this error is in the nonconservative direction, it is of small magnitude and does not represent a safety concern.</p> <p>Exceeding the maximum power level specified in Operating License Condition 2.C(1) is reportable pursuant to Operating License paragraph 2.F.</p>											

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

A. Reportable Occurrence

Operating License (OL) Condition 2.C.(1) authorizes the operation of the facility at reactor core thermal power (CTP) levels not in excess of 3833 megawatts thermal. As a result of not accounting for some CRD system flow diverted for seal purge but eventually entering the reactor pressure vessel, GGNS may have operated at reactor core power levels in excess of 3833 megawatts thermal over an 8 hour period. Such operation was in violation of OL Condition 2.C.(1) and is being reported pursuant to OL Condition 2.F.

B. Initial Conditions

At the time of discovery, the plant was in OPERATIONAL CONDITION 1 with reactor power at approximately 99.9 percent. Reactor coolant temperature was approximately 525 degrees F. Reactor Pressure Vessel level was 36 inches.

C. Description of Occurrence

On December 4, 1995, Grand Gulf evaluated the potential for a calculational error similar to that reported recently at another plant. Nine Mile Point Unit 2 reported the discovery of a nonconservative error in the calculation used to determine core thermal power. Investigation at Grand Gulf revealed a similar error.

At GGNS, a portion of the control rod drive (CRD) [AA] system flow is diverted to the reactor recirculation system [AD] pump seals for purge flow. Some of this flow is allowed to leak off to the drywell equipment drain sump; however, most of this seal purge flow passes along the pump shaft into the reactor coolant and thus into the vessel. Since the CRD system flow element is located downstream of the diversion point for purge flow, this energy and flow input were not accounted for in the GGNS heat balance. This flow, which is locally adjustable, is limited by operating procedures to 5.5 gpm and is currently set at a total of 5.5 gpm. Manual heat balances performed as part of this evaluation show that when this additional flow is included, core thermal power is higher by approximately 0.8 MWt. Grand Gulf does not use diverted CRD flow for reactor water cleanup system [CE] pump seal cooling, as do some other plants, which would make the magnitude of the nonconservative error greater. A very small amount of CRD flow is also diverted to the vessel

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C. Description of Occurrence (Continued)

level instrumentation reference leg keep-fill lines; however this is only about .044 gpm which is negligible for heat balance considerations.

Immediate action was taken to limit the core thermal power to 3832 MWt for the eight hour average.

Subsequently action was taken to account for the missing input to the computer heat balance program. A fixed bias was added by creating a new computer point to furnish the input to the core monitoring system heat balance calculations. The bias for the correction was based on maximal flow values of 2.0 gpm for recirculation system loop A purge flow, 3.5 gpm for recirculation system loop B purge flow, and 0.044 gpm for water level instrumentation reference leg keep-fill flow. Five (5) percent flow measurement uncertainty was assumed for rotometer measurements used, resulting in a total maximum flow of approximately 6 gpm. Seal flow allowed to leak off to radwaste, for conservatism, was ignored. A value of 8 gpm was used to conservatively account for these flows. Note that, aside from this conservative input provision, 5 gpm is considered to be the realistic magnitude of the flow error based on actual current data.

D. Apparent Cause

The apparent cause of this deficiency is that the vendor failed to properly account for this flow path in the heat balance equations originally provided as part of the process computer system. Review of the original documentation indicates that this flow was never included. Grand Gulf review of documentation for process computer accuracy confirmed that this flow path was not documented as being accounted for in some other manner such as inclusion in the overall calculational uncertainty. GGNS cannot determine if the root cause was oversight, inadequate documentation, or some combination of these and other causal factors. Consideration was given to whether Grand Gulf should have discovered this discrepancy during plant operation. In theory, Grand Gulf could have discovered this error; however, because of the nature and magnitude of the error, the opportunity and likelihood of discovery were so slight that the absence of subsequent discovery by GGNS is not considered a program weakness.

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E. Corrective Actions

As discussed above, immediate action was taken to limit CTP to 3832 MWt. The conservative fixed bias discussed above was then added to provide the input previously missing. In addition, the following actions are planned.

- 1) GGNS will review the Operations and Reactor Engineering procedures to ensure that the CRD flow used in the heat balance is documented and controlled.
- 2) GGNS will review the heat balance equations against the GGNS drawings to ensure that no other flow paths are being ignored.
- 3) GGNS will review its methods for controlling changes to heat balance inputs and revise those methods if necessary.

F. Safety Assessment

The magnitude of the nonconservative effect on reactor power level from this deficiency, at maximum allowable seal purge flow would have been 0.8 MWt or approximately 0.02% of rated CTP. The CTP is used in the calculation of the Technical Specification thermal limits for LHGR, MAPLHGR, and MCPR. An additional uncertainty of 0.02% does not impact Grand Gulf's past compliance with these limits. Grand Gulf typically operates with margins of at least 2% and usually operates with margins from 6% to 8% under the most limiting conditions. Thermal limits calculation is not performed with the degree of precision required to confirm any impact from an error of this small magnitude.

3833 MWt represents 100% CTP. Safety analysis assumes a power level of 102% for transient and accident analyses, and radiological analyses are performed assuming operation at 104.5%. Therefore, adequate margin is included to account for this discrepancy.

On the basis of this evaluation, it is concluded that this deficiency had no significant effect on safety.

G. Additional Information

No previous similar conditions have been discovered at Grand Gulf.

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