Entergy

Entergy Operations, Inc.
Waterloo Road
P.O. Box 756
Port Gibson, MS 39150
Tel 601 437 6470

Jerry C. Roberts
Director
Nuclear Safety Assurance

December 20, 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
LER 2001-004-01; Violation of Operating License
Condition 2.C (1) Maximum Power Level

GNRO-2001/00093

Ladies & Gentlemen:

Attached is Licensee Event Report (LER) 2001-004-01, which is a final report. This letter does not contain any commitments.

Yours truly,

RGJCR

JCR/cdh
attachments: 1. LICENSEE-IDENTIFIED COMMITMENTS
2. LER 2001-004-01
cc: (See Next Page)

cc:

Hoeg	T. L.	(GGNS Senior Resident)	(w/a)
Levanway	D. E.	(Wise Carter)	(w/a)
Reynolds	N. S.		(w/a)
Smith	L. J.	(Wise Carter)	(w/a)
Thomas	H. L.		(w/o)

Mr. E. W. Merschoff (w/2)
Regional Administrator
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive,
Suite 400 Arlington, TX 76011

Mr. S. P. Sekerak, NRR/DLPM/PD IV-1 (w/2)
ATTN: ADDRESSEE ONLY
U.S. Nuclear Regulatory Commission
One White Flint North, Mail Stop O7-D1
11555 Rockville Pike
Rockville, MD 20852-2378

ATTACHMENT 1 TO GNRO-2001/00093
LICENSEE-IDENTIFIED COMMITMENTS

Letter #:	GNRO-2001/00085

COMMITMENT	TYPE (Check only one type)		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
N/A			
N/A			

NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

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.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Grand Gulf Nuclear Station, Unit 1	05000 416	1 OF 4

4. TITLE

Violation of Operating License Condition 2.C (1) Maximum Power Level

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL	REV	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
12	04	2001	2001	004	01	12	20	2001	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE	1
10. POWER LEVEL	100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

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)	73.71(a)(4)
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	X OTHER
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	Violation of OL Condition 2.F
20.2203(a)(2)(v)	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)	

12. LICENSEE CONTACT FOR THIS LER

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

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

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

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

General Electric (GE) recently provided information related to methodology used to calculate core thermal power (CTP). On October 3, 2001, GGNS performed an evaluation which identified the potential for an error related to moisture carryover. GGNS had applied the generic moisture carryover assumption provided by GE and currently uses 0.1 percent for the moisture carryover fraction in the CTP. GE now recommends a value of 0.0 percent be used. Changing the fraction to 0.0 percent results in an increased calculated CTP of 0.082 percent (3.1MWt). Further evaluation by GE revealed that an older version of steam table data was used to calculate the saturated steam enthalpy. As a result, GGNS unknowingly operated at a core power level slightly in excess of the CTP limit (3833 megawatts thermal). Such operation was in violation of Operating License (OL) Condition 2.C (1) and is being reported pursuant to OL Condition 2.F.

Immediate actions were to administratively limit reactor CTP to account for the error in the calculated CTP. Programs/procedures were revised to assume a 0.0 percent moisture carryover value in the plant calorimetric heat balance.

The GE report stated the error in CTP, although non-conservative, does not represent a safety issue. Therefore, this condition was of minimal safety consequence and the health and safety of the general public were not compromised.

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

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Grand Gulf Nuclear Station, Unit 1	05000-416	2001	-- 004 --	01	2	OF	4

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

A. Reportable Occurrence

Operating License (OL) NPF-29 Condition 2.C (1) authorizes the operation of the facility at reactor core thermal power (CTP) levels not to exceed 3833 megawatts thermal (MWt). As a result of a non-conservative main steam moisture carryover fraction in the reactor CTP calculation, GGNS may have unknowingly operated at a reactor core power level slightly in excess of the licensed CTP limit. Additionally, following further review, it was found that an older version of steam table data was used to calculate the saturated steam enthalpy. This also resulted in possible operation at a reactor core power level slightly in excess of the licensed CTP limit. Such operation was in violation of OL Condition 2.C (1) and is being reported pursuant to OL Condition 2.F which requires a 24 hour NRC notification for violating the GGNS Operating License followed by a written follow-up report in accordance with the requirements described in 10CFR50.73(b), (c) and (e). Although, this event is not reportable per 10CFR50.73 criteria, it is being reported in accordance with OL Condition 2.F. This condition does not represent a safety system functional failure.

B. Initial Conditions

At the time of discovery of the condition, the plant was in OPERATIONAL CONDITION 1 with reactor water level at approximately 36 inches and reactor water temperature at approximately 532 degrees F. The plant was operating at approximately 100 percent power.

C. Description of Occurrence

On October 3, 2001, Grand Gulf evaluated the potential for a calculational error similar to that reported recently at other BWR plants. General Electric recently provided information related to the GE methodology used to calculate CTP. A review of the GE information and GGNS calorimetric calculations identified the error at Grand Gulf.

GGNS currently uses a value of 0.1 percent for the moisture carryover fraction in the CTP calculation which is performed by the process computer. BWRs with steam dryers similar to the GGNS design reported moisture carryover fractions of less than 0.003 percent. This value is consistent with the GGNS carryover fraction measured during initial startup testing at near rated power conditions. Although GE recommends a value of 0.0 percent be used, changing the carryover fraction from 0.1 to 0.0 percent results in an increase in calculated CTP of approximately 0.082 percent (3.1MWt). This indicates that, due to the non-conservative calculation, GGNS unknowingly slightly exceeded the maximum allowed value for CTP in it's past operating history.

C. Description of Occurrence (continued)

At the request of GGNS, GE reviewed the bases for the saturated steam correlation used in the GGNS plant calorimetric heat balance and concluded that the correlation was based on version 2 of the 1936 Keenan and Keyes data instead of more recent 1969 data. Consequently, the saturated steam enthalpy calculation in the GGNS process computer's calorimetric heat balance applies steam table data which is superseded with more conservative values. A further comparison between the 1969 Keenan and Keyes data and the 1967 ASME data indicated that the 1967 ASME data is even more conservative. Based on a steam flow of 16.5 Mlb/hr and a 1.1 Btu/lb difference between the enthalpy correlations at 1040 psia, the application of the more conservative 1967 ASME steam tables increases the calculated core thermal power by approximately 5.5 MW at full power conditions. This non-conservatism, discovered on December 4, 2001, combined with the moisture carryover error, produces a total Core Thermal Power increase of 8.6 MWt or 0.224 percent.

D. Apparent Cause

A moisture carryover assumption of 0.1 percent percent in addition to the older steam table data have been applied in the GGNS calorimetric heat balance since receiving a full power license. Like other BWRs, GGNS applied the generic moisture carryover assumptions provided by General Electric.

E. Corrective Actions

Corrective Actions:

1. In both cases, reactor core thermal power was administratively limited to account for the non-conservatism in the calculated CTP.
2. A preliminary review was performed of the other inputs that are not monitored and concluded that these parameters appear to be conservative for application in the heat balance calculation.
3. Applicable programs/procedures were revised to apply a 0.0 percent moisture carryover value and an updated correlation for saturated steam in the plant calorimetric heat balance.

F. Safety Assessment

The impact of steam carryover fraction on the process computer heat balance calculations was provided by GE Nuclear Energy in a report dated September 2001. The GE report stated that the error in calculated CTP is an order of magnitude less than the precision of the MCPR safety limit evaluation process. Additionally, the error in calculated CTP is significantly less than the precision of the process computer core thermal power estimate. Therefore, the use of the carryover fraction of 0.1 percent, although non-conservative, was of minimal safety consequence and the health and safety of the general public were not compromised. Use of the older steam table data was not addressed in the GE Nuclear Energy report. However, the same general conclusions can be drawn regarding the resultant minor error.

G. Additional Information

As a result of these events, CR-GGN-2001-1645 and CR-GGN-2001-1899 were issued.

A previous similar event occurred on December 4, 1995. GGNS exceeded maximum power level specified in Operating License Condition 2.C (1) due to a non-conservative error in the CTP calculation and reported the condition via LER 95-013-00.

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