



ENTERGY

Entergy Operations, Inc.  
P.O. Box 756  
Fort Green, MS 39162  
Tel 601 437-6400

W. T. Cottle  
Vice President  
Operations  
Grand Gulf Nuclear Station

February 13, 1992

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  
Voluntary Report on Re-Criticality  
LER 91-016

GNRO-92/00020

Gentlemen:

Attached is Licensee Event Report (LER) 91-016 which is a final report.

Yours truly,

*WTC*

WTC/RR/cg  
attachment

cc: Mr. D. C. Hintz (w/a)  
Mr. J. L. Mathis (w/a)  
Mr. R. B. McGehee (w/a)  
Mr. N. S. Reynolds (w/a)  
Mr. H. L. Thomas (w/o)

Mr. Stewart D. Ebnetter (w/a)  
Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region II  
101 Marietta St., N.W., Suite 2900  
Atlanta, Georgia 30323

Mr. P. W. O'Connor, Project Manager (w/a)  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Mail Stop 13H3  
Washington, D.C. 20555

*JE22*  
*[Signature]*



## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO 3150-0104  
EXPIRES 8/31/88

FACILITY NAME (1)  Grand Gulf Nuclear Station	DOCKET NUMBER (2)  0   5   0   0   0   4   1   6	LER NUMBER (6)			PAGE (8)  9   1   -   0   1   6   -   0   0   0   2   OF   0   4
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TEXT (if more space is required, use additional NRC Form 305A's) (17)

**A. Reportable Occurrence**

On December 30, 1991 during a plant shutdown for maintenance on the 'B' Reactor Recirculation Water Pump [AD], control rod insertion was suspended in order to perform a SRM [IG] functional test. Prior to the completion of the test, reactor power began to increase due to cooldown with no control rod motion. Due to industry interest, this event is being reported as a Voluntary Report.

**B. Initial Conditions**

The reactor was in Operational Condition 2 at less than 1 percent power at the time of occurrence. Reactor pressure was decreasing due to existing plant loads. Operations personnel were performing a channel functional test for the SRMs.

**C. Description of Occurrence**

On December 30, 1991, operation personnel were performing a "Soft Shutdown". Soft Shutdown refers to a controlled plant shutdown during which the rate of coolant temperature decrease is minimized. The purpose of a "Soft Shutdown" is to minimize boiling in the core, which decreases the amount of Cobalt-60 released in the reactor coolant.

With the reactor power less than 1 percent and indicating on ranges 5 and 6 of the IRMs [IG], operation personnel suspended insertion of control rods in order to perform a functional test on the SRMs. Reactor power continued to decrease as preparations were made to perform the required test. At this time, the operators were instructed to close the drain valves in order to reduce the vessel's pressure decrease.

Even though the indicated neutron population continued to decrease, the operations Shift Superintendent discussed, with the operating shift, the possibility of a power increase due to the coolant temperature decrease.

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TEXT IF A ONE SPACE IS REQUIRED, USE ADDITIONAL NRC FORM 366A-4 (1/77)

Approximately 20 minutes elapsed during the performance of the SRM testing. During this period, the power decrease continued until the IRMs were indicating on range 1. At this time, operations personnel observed an increase in reactor power, as indicated by the IRMs, and ranged the IRMs up in accordance with plant procedures. The power increase was self-limiting. The IRMs increased until they reached ranges 7 and 8; then power stabilized.

After power stabilized, the SRM functional test was completed and the shutdown was completed in accordance with plant procedures.

**D. Apparent Cause**

The cause of the increase in reactor power, following the suspension of control rod motion, is attributed to a decrease in moderator temperature which resulted in a positive reactivity addition.

**E. Corrective Actions**

Subsequent to the event, an investigation was performed to review the circumstances surrounding the incident.

Based on the review, it was determined that operator actions were satisfactory. The operators exhibited understanding, anticipation and control of the event. The actions taken by the operating crew reflected training which was consistent with plant procedures.

A weakness was identified in the integrated operating instruction (IOI), in that more guidance could have been used to minimize the potential for re-criticality.

An evaluation is in progress to assess the potential of re-criticality events during plants shutdowns. Allowing the steam drain valves to remain closed during a plant shutdown is also being evaluated in order to decrease the number of steam loads during vessel depressurization. This would reduce the cooldown rate of the moderator.

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Additionally, changes to the Technical Specifications (TS) are being evaluated that would allow performance of the SRM surveillance without adversely affecting plant operations.

#### F. Safety Assessment

Re-criticality during this shutdown process was an anticipated occurrence. While limiting this type of event is prudent, operators are adequately trained to understand, identify the potential for, recognize, and control re-criticality.

During the power increase, the shortest period was calculated to be on the order of several minutes. The power increase was estimated to be .25 percent. Therefore, the occurrence posed no adverse effects on plant safety or the ability of operable plant safety systems to perform their intended functions.

#### G. Additional Information

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

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