



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0189

Report No.: 50-416/93-09

Licensee: Entergy Operations, Inc.
Jackson, MS 39205

Docket No.: 50-416

License No.: NPF-29

Facility Name: Grand Gulf Nuclear Station

Inspection Conducted: May 16 through June 19, 1993

Inspectors:

R. H. Bernhard, Senior Resident Inspector

7/13/93
Date Signed

C. A. Hughey, Resident Inspector

7/13/93
Date Signed

Approved by:

F. S. Cantrell, Chief
Reactor Projects Section 1B
Division of Reactor Projects

7/15/93
Date Signed

SUMMARY

Scope:

The resident inspectors conducted a routine inspection in the following areas: operational safety verification; maintenance observation; surveillance observation; action on previous inspection findings; and reportable occurrences. The inspectors conducted backshift inspections on May 19, 26, and June 3, and 14, 1993.

Results:

Short term compensatory actions in response to NRC Bulletin 93-03 and related Temporary Instruction TI 2515/119 were completed and deemed satisfactory (Paragraphs 3b and 8). Operator response to a main generator cooling water (primary water) leak was good (Paragraph 3d). Inspections in the area of maintenance and surveillance activities did not identify any areas of concern (Paragraphs 4 and 5). Within the scope of the inspection, no violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *L. Daughtery, Superintendent, Plant Licensing
- *W. Deck, Security Superintendent
- M. Dietrich, Manager, Training
- J. Dimmette, Manager, Performance and System Engineering
- C. Dugger, Manager, Plant Operations
- *C. Ellsaesser, Technical Coordinator
- C. Hayes, Director, Quality Assurance
- *C. Hicks, Operations Superintendent
- *C. Hutchinson, Vice President, Nuclear Operations
- F. Mangan, Director, Plant Projects and Support
- M. Meisner, Director, Nuclear Safety and Regulatory Affairs
- D. Pace, Director, Nuclear Plant Engineering
- *J. Roberts, Manager, Plant Maintenance
- *R. Ruffin, Plant Licensing Specialist

Other licensee employees contacted included superintendents, supervisors, technicians, operators, security force members, and office personnel.

*Attended exit interview

2. Plant Status

The plant operated in Mode 1, power operations, during the entire reporting period. At the end of the reporting period, the unit had been on-line for 317 days which exceeded the previous Entergy System continuous run record of 298 days.

During the week of May 24, 1993, Region II personnel from Division of Radiation Safety and Safeguards conducted an inspection in the radiation protection area (NRC Inspection Report No. 50-416/93-08).

During the week of June 14, 1993, a regional inspector from Division Radiation Safety and Safeguards conducted an inspection in the security area (NRC Inspection Report No. 50-416/93-10).

3. Operational Safety (71707 and 93702)

- a. Daily discussions were held with plant management and various members of the plant operating staff. The inspectors made frequent visits to the control room to review the status of equipment, alarms, effective LCOs, temporary alterations, instrument readings, and staffing. Discussions were held as appropriate to understand the significance of conditions observed.

Plant tours were routinely conducted and included portions of the control building, turbine building, auxiliary building, radwaste

building and outside areas. These observations included safety related tagout verifications, shift turnovers, sampling programs, housekeeping and general plant conditions. Additionally, the inspectors observed the status of fire protection equipment, the control of activities in progress, the problem identification systems, and the readiness of the onsite emergency response facilities. No deficiencies were identified.

- b. NRC Bulletin 93-03, Resolution of issues related to reactor water level instrumentation in BWRs, requested licensees perform short term compensatory actions to include enhanced monitoring to provide early detection of anomalies, development of enhanced procedures for minimizing maintenance or operations with the potential to drain the vessel during Mode 3, and alerting operators to potential for misleading level indications in Mode 3.

Grand Gulf has implemented procedural changes to address this bulletin. SOI 04-1-01-E12-1, Residual Heat Removal System, was modified with steps and cautions to address Mode 3 concerns. IOI 03-1-01-3, Plant Shutdown, was modified to include enhanced monitoring of level and cautions to minimize maintenance or operations with the potential to drain the vessel during plant cooldown. ARI 04-1-02-1H13-P680-4A2-A2, RX WTR LVL SIG FAIL HI/LO, has been changed to include actions to be taken in case of level reference leg degassing. Operations department Standing Order 93-008, dated June 7, 1993, was issued to discuss level anomalies and action to perform if they occur. In addition, training document OP-LOR-IE-024-00, Level Instrumentation and RPV Draindown Concerns, was issued June 3, 1993. The training document is a one hour lesson given to the operations staff. Affected personnel will be trained prior to July 30, 1993, or if unavailable for training by that date, will not assume shift duties until trained.

In addition to the above documents, the inspectors reviewed the video tapes provided to the operations staff to familiarize them with the causes and symptoms of vessel level anomalies. The inspectors have attended planning meetings on the proposed hardware modifications recommended in the bulletin. The inspectors have determined the actions taken in response to the recommendations in the bulletin were adequate. The inspectors will monitor the licensee's actions in response to the hardware modification recommendations.

- c. On May 26, and 27, 1993, the inspectors accompanied an NRC contractor, and headquarters and regionally based inspectors on a system walkdown of the HPCS system. The purpose of the walkdown was to verify the system configuration assumptions for development of risk based inspection guidelines of HPCS. The walkdown included all accessible system piping, switchgear, and controls.

The inspectors verified system lineup, equipment and general area conditions, and control board lineup. Equipment deficiencies were not identified, and housekeeping in the areas examined was good.

- d. The inspectors reviewed the activities associated with the events listed below.

On May 26, 1993, the control room received indication of a main generator primary water trouble alarm and dispatched an operator to determine the cause. Primary water tank pressure was found to be much higher than normal. The high pressure caused primary water to leak from the seals of the shaft mounted primary water pump, wetting the generator auxiliary cabinet, causing electrical shorting in the alarm circuits. During the response to the event, a mispositioned valve that bypassed the system pressure regulator was closed and system pressure returned to normal. This event had the potential to trip the main generator and the plant. The inspector observed operations' response to the event for about one hour after the alarm and during the recovery. High levels of hydrogen existed in the generator exciter housing for part of the event. The housing was vented to dilute the hydrogen to a safe concentration. A power reduction had been initiated in the control room during the event prior to the primary water pressure being stabilized. The inspector observed good coordination of operations response activities by the on shift crew. Additional operations personnel were called in from off-shift duties to help with the response and recovery. The on shift RO kept an accurate record of activities as the event occurred. This record was in greater detail than most control room logs the inspector has examined at this facility and proved useful in detailing the sequence of events.

A root cause group determined two possible causes. One was a possible inlet pressure regulator failure. The second was that the bypass valve may have been inadvertently opened. The inlet pressure regulator was replaced after the event. The pressure regulator has been sent offsite for additional examination. In response to the event an MCP has been written to change the vent path of the system's back pressure regulators to prevent the pump seal leakage and subsequent hydrogen offgassing in case of a future overpressurization. Operations response to this event was good, and prevented an unnecessary plant shutdown.

No violations or deviations were identified.

4. Maintenance Observation (62703)

During the report period, the inspectors observed portions of the maintenance activities listed below. The observations included a review of the MWOs and other related documents for adequacy; adherence

to procedure, proper tagouts, technical specifications, quality controls, and radiological controls; observation of work and/or retesting; and specified retest requirements.

<u>MWO</u>	<u>DESCRIPTION</u>
89967	Clean Division II emergency diesel generator.
96608	Change oil in emergency diesel generator pedestal bearing.
96640	ECCS Division 2 trip unit inverter troubleshooting.

No violations or deviations were identified. The results of the observations in this area indicated that maintenance activities were effective.

5. Surveillance Observation (61726)

The inspectors observed the performance of portions of the surveillances listed below. The observations included a review of the procedures for technical adequacy, conformance to Technical Specifications and LCOs; verification of test instrument calibration; observation of all or part of the actual surveillance; removal and return to service of the system or component; and review of the data for acceptability based upon the acceptance criteria.

06-IC-1E51-R-0002, Rev. 23	Calibration of Channel E of CST (RCIC) Level Loop.
06-IC-SD170-1026, Rev. 26	Turbine Building Ventilation Accident Range Monitor AXM Calibration.
07-S-12-3, Rev. 5	Calibration Check of AC and DC Ammeters (Div. II EDG Phase A, B, and C ammeters).

No violations or deviations were identified. The observed surveillance tests were performed in a satisfactory manner and met the requirements of the Technical Specifications.

6. Reportable Occurrences (90712 and 92700)

The event reports listed below were reviewed to determine if the information provided met the NRC reporting requirements. The determination included adequacy of event description, the corrective action taken or planned, the existence of potential generic problems and the relative safety significance of each event. The inspectors used the NRC enforcement guidance to determine if the event met the criterion for licensee identified violations.

On May 17, 1993, at 10:00 p.m., a momentary power spike on a Division 2 ECCS trip unit inverter resulted in a RCIC initiation and immediate isolation (ESF actuation) along with numerous other "gross fail" indications on other trips units powered from the same inverter. RCIC did not inject. There were two recurrences the next day at 6:39 p.m. and 9:39 p.m. hours. The inverter was replaced on May 19, 1993. In each case, the resident inspector was notified and a four hour notification was made per 10 CFR 50.72(b) (2) (ii). The inspectors determined that long term corrective actions under consideration by the licensee included changing maintenance instructions to include testing of the inverters under loaded conditions (versus unloaded) and replacing the inverters every several years to address aging concerns. The adequacy of these corrective actions will be addressed by the resident inspectors during the closure of LER No. 93-004.

No violations or deviations were identified.

7. Action on Previous Inspection Findings (92701 and 92702)

(Closed) Inspector Followup Item 50-416/92-16-02, Followup to fuel rod growth evaluation. During RFO5 (May 1992) Siemens Power Corporation (SPC) personnel were not able to remove the upper tie plate from some 8X8 fuel assemblies because the fuel rod compression springs were fully compressed. The apparent reason for the compressed springs was that some standard fuel rods had experienced a greater growth rate than the tie rods. The licensee and SPC determined through root cause evaluation that the differential growth was caused by the time required for thermal creep of the channel to relax the contact force between the channel and lower tie plates. The channel was not free to slide over the lower tie plate as designed as the fuel assembly grows during irradiation. Since the channel is mechanically attached to the upper tie plate, the force of the fuel rod spring compression acts on the channel and not on the tie rods as intended. This resulted in some fuel rods growing faster than some of the tie rods causing the fuel rod compression springs to be nearly fully compressed. As a result, the upper tie plates could not be depressed enough to unlatch the tie rods. Tie rods normally grow faster than fuel rods because the tie rods are normally under tension while resisting the reaction of the compression springs. Additionally, it was determined that the design bases for the fuel was not being violated and fuel performance limits were not affected by this unexpected growth. The licensee indicated that SPC has changed the design of the lower tie plate to eliminate any mechanical interference at reactor operating temperatures.

8. Reactor Water Level Instrumentation Errors (TI 2515/119)

TI 2515/119, water level instrumentation errors during and after depressurization (GL 92-04), was completed. The plant's guidance to the operations staff and the operator training concerning errors in reactor level after rapid depressurization were examined. The inspector verified the guidance and lessons convey the cause and symptoms. The required survey was completed. The only limitations

found in the training resulted from hardware limitations in the simulator. Simulator modeling of instrumentation response is limited to accurate indication, fail upscale, fail downscale or fail as-is. This would not prevent adequate training on the event due to the other aids available (good lesson plans, a video tape on the subject, and the response to failed instrumentation is trained in the simulator). Operators questioned were knowledgeable of the actions required in the event of anomalous readings.

9. Exit Interview (30703)

The inspection scope and findings were summarized on June 18, 1993, with those persons indicated in paragraph 1 above. Dissenting comments were not received from the licensee. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

10. Acronyms and Initialisms

AC	-	Alternating Current
ARI	-	Annunciator Response Instruction
BWR	-	Boiling Water Reactor
CST	-	Condensate Storage Tank
DCP	-	Design Change Package
EDG	-	Emergency Diesel Generator
ECCS	-	Emergency Core Cooling System
ESF	-	Engineering Safety Feature
HPCS	-	High Pressure Core Spray
IOI	-	Integrated Operating Instruction
LCO	-	Limiting Condition for Operation
LER	-	Licensee Event Report
MCP	-	Minor Change Package
MWO	-	Maintenance Work Order
NRC	-	Nuclear Regulatory Commission
RCIC	-	Reactor Core Isolation Cooling
RFO	-	Refueling Outage
RO	-	Reactor Operator
RPV	-	Reactor Pressure Vessel
SOI	-	System Operating Instruction