



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report No.: 50-416/93-23

Licensee: Entergy Operations, Inc.
Jackson, MS 39205

Docket No.: 50-416

License No.: NPF-29

Facility Name: Grand Gulf Nuclear Station

Inspection Conducted: November 28, 1993, through December 31, 1993

Inspectors: <u>For R. H. Bernhard</u>	<u>1/20/94</u>
R. H. Bernhard, Senior Resident Inspector	Date Signed
<u>For C. A. Hughey</u>	<u>1/20/94</u>
C. A. Hughey, Resident Inspector	Date Signed
<u>For R. W. Wright</u>	<u>1/20/94</u>
R. W. Wright, Project Engineer	Date Signed

Accompanying Personnel: M.D. Sykes, Resident Inspector (Intern)

Approved by: <u>F. S. Cantrell</u>	<u>1/21/94</u>
F. S. Cantrell, Chief	Date Signed
Reactor Projects Section 1B	
Division of Reactor Projects	

SUMMARY

Scope:

The resident inspectors conducted a routine inspection in the following areas: operational safety verification; maintenance observation; surveillance observation; and reportable occurrences. The inspectors conducted backshift inspections on November 28 and December 13, 27 and 28, 1993.

Results:

Problems were experienced during the restart from the refueling outage. Water chemistry problems resulted from inadvertent injection of resin fines into the reactor vessel. Vacuum leaks resulted from improper completion of maintenance activities by the turbine generator vendor. Management acted conservatively in responding to each event. The outage ended officially on December 4, 1993.

All unnecessary activities at the plant were curtailed at the end of the outage, through the holidays, to allow personnel to take their holidays and leave prior to year end. The residents did not notice any impact on plant

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safety. In the observed maintenance activities, the inspectors noticed proper consideration given to the system's importance. Independent verification was performed by a supervisor for a trip critical system. The licensee's use of a full scale mockup in preparing for valve maintenance was a strength.

The inspectors noted that high quality procedures were used to perform the post modification tests for the Reactor Feed Pump modification, and reviewed the results from that test and for the Reactor Water Level Backfill modification. Both modifications are in service, and the plant is performing as expected.

In the areas inspected, violations or deviations were not identified. One unresolved item was identified involving methane in a waste resin shipment (paragraph 8).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *J. Czaika, Nuclear Specialist, SMEPA
- *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
- M. Meisner, Director, Nuclear Safety and Regulatory Affairs
- *D. Pace, General Manager, Plant Operations
- *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

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Plant Status

Refueling Outage 6 officially ended when the unit was synchronized to the electrical grid at 11:05 a.m. on December 4, 1993. Delays in restarting were experienced due to reactor water chemistry problems and excessive vacuum leaks in the low pressure turbine hoods. After restart the unit ran at or near rated power until the end of the inspection period.

Danny Bost was named Director, Design Engineering on December 8, 1993. He filled the position left open when Dan Pace assumed the duties of General Plant Manager. Danny Bost was previously the Manager, Mechanical Engineering and Safety Analysis in the Design Engineering organization.

There was a significant reduction in scope of work to only essential items after the outage and during the holiday period in order to accommodate vacation schedules. No significant impact on plant operations or equipment reliability was observed during this period.

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.

Although the outage had recently ended, some examples of less than adequate housekeeping and post-job cleanup, and several minor equipment deficiencies were noted in several areas of the plant, most notably around the RCIC and RHR pumps. These observations were passed on to control room personnel and plant management for resolution. In addition, excessive condensation was noted to be leaking from the RCIC room cooler. Maintenance crews investigating the inspector's observation discovered a plugged drain. An MWO was initiated and the drain was cleared.

On November 27, 1993, the last day of resident report 50-416/93-16's inspection period, the licensee shut down the reactor while critical because water chemistry exceeded EPRI procedural guidelines. The plant was restarted at 12:15 a.m. on November 28, 1993, when the chemistry was again within specifications. The initial cause was determined to be resin fines which had been injected into the vessel from the CST during a RCIC test. The fines broke down at the elevated temperatures in the vessel, causing sulfate and conductivity limits to be exceeded. During this inspection period, the licensee continued to perform corrective actions in response to the event. An optimum reactor water chemistry task force had been formed to address this and other water chemistry issues. An underwater robot is planned to perform CST cleanup about the middle of January. In addition, a one micron filter has been installed at the discharge of the radwaste equipment drain demineralizers which are used for recycling water prior to discharge into the CST. An improvement in reactor water chemistry sulfates has been noted since the installation of the filter. The resident inspectors will continue to monitor activities associated with the CST cleanup.

After the restart on November 28, 1993, high condenser inleakage forced a shutdown on December 1, 1993. The leakage was determined

to be through low pressure turbine casing number three, to which maintenance had been performed during the outage. Modifications had been performed to the casing several outages ago, which would allow decking to be installed over open areas in the turbine when the upper casing was removed. The decking supports are bolted through the inner casing by twelve bolts, and are inaccessible from the outside of the outer casing. The turbine maintenance contractor, did not replace these bolts upon removal of the decking, and the holes left unfilled by the bolts allowed air inleakage into the condenser. After reactor shutdown, and the breaking of condenser vacuum, maintenance personnel entered the inner casing through the turbine blowout panels and replaced the bolts.

The plant restarted December 2, 1993, reached Mode 1 at 8:43 p.m. on December 3, and the main generator was synchronized to the grid, officially ending RF06, at 11:05 a.m. on December 4. The inspectors followed the activities associated with the two startups, and the corrective actions performed in response to the problems encountered. Licensee management made conservative decisions in response to the startup problems identified.

The inspectors performed periodic monitoring of control room activities during the startups. Activities that could provide distraction were minimized during control rod movement. Independent verification of rod movement was performed, and personnel were rotated out to prevent fatigue. Startup testing was preplanned, and performed after pre-job briefings with the onshift crew. The inspectors are noticing an increase in the use of repeat back communication techniques in the control room.

The inspectors observed one of several one hour introductory seminars on the revised 10 CFR 20 to be implemented in 1994. The seminar was well organized and informative.

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>
113830	EPA Feeder Circuit Breaker maintenance
112234	MSR "A" inlet isolation valve steam leak

On December 27, 1993, the EPA circuit breaker for the 'B' RPS MG set tripped resulting in a Division II half scram. The system was placed on its alternate supply and MWO#113830 was initiated. The inspectors observed activities associated with the repair of this trip critical component. Maintenance was performed by an experienced two man crew with their supervisor present at all times. The Supervisor provided independent verification of activities. The breaker was found in a trip free state with no alarm lights present. The eighteen month surveillance was used to trouble shoot the control circuit board. The board was found out of tolerance and could not be adjusted enough to bring it into specifications. A replacement control board was obtained and placed into service. The crew used procedure 06-EL-1C71-R-0012, Revision 24, to calibrate the circuit board. The resistors used to adjust the board were not labeled on the circuit card, and a controlled vendor manual, GEK-83433B dated December 1988, Electrical Protection Assembly, 914E175 was used to identify the proper components for the adjustment. The work was performed in an efficient manner, and the workers and supervisor were knowledgeable of the equipment and procedures.

The inspector observed a maintenance crew with Health Physics' involvement perform a simulated mockup repair to a duplicate model (obtained from Unit 2's storage) of MSR "A" MOV 1N11F028A. Valve F028A was leaking steam around the body to the bonnet area and prior attempts to seal the leak with Furmanite were unsuccessful. MWO #00112234 required disassembly of the valve to the extent necessary to remove spacers and reinstall it correctly torquing the bonnet and yoke to 245 ft-lbs. This mockup repair proved very beneficial in that it disclosed the exact number of craft and types of tools necessary to perform the work, gave a good estimate of the time required to perform the various tasks involved, and allowed Health Physics personnel to plan for ALARA considerations to keep cumulative dose to a minimum. Review of the completed work package disclosed the repair was successful and the mockup preparations were effective in handling the repair. The licensee's continuing use of job mockups for validation of work procedures and ALARA is a strength in their maintenance and radiation safety programs.

DCP 91/088-2 modified the reactor feed pump controls and replaced the low pressure mechanical-hydraulic control system with a high pressure control system. TSTI 1N21-93-005-0-N, "RFPT A(B) Power Ascension Test", dated November 18, 1993, provided the post modification testing to re-baseline the system, and ensured the systems response was substantially the same as the system that was replaced. The inspectors observed portions of Section 7.1.2, "Initial Turbine Roll and Stability Tests", at the 400 psi testing plateau. The testing was accomplished per the procedure on critical path during the power ascension. Other activities were minimized during the testing. The feed pumps performed well, and seemed to be very stable at the test condition. The inspector reviewed the TSTI, and found it to include the activities required in the original startup test performed during initial plant startup testing a

decade ago. The test was well written, and will provide a baseline for assessing system response to various inputs and reactor water level step changes.

Inspection reports 50-416/93-14, 16, and 21 discussed installation and low power testing of the reactor water level backfill modification. During this inspection period the inspectors reviewed the results of the full power testing activities of the installed vessel level backfill system. The inspectors reviewed sections 7.1 through 7.3 of TSTI 1B21-93-012-0-S, Reference Leg Purge Preoperational Test - Modes 1 & 2. This testing included removing and installing the purge flows, and testing the systems stability during SRV testing at power. The system was shown to be stable in all tested operating conditions. All four channels of the system have been placed in operation, and have been performing as expected.

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

5. Corrective Maintenance Backlog and Deferred Modifications (62703)

The inspectors reviewed the non-outage corrective maintenance backlog status. Prior to RF06 there were approximately 350 backlog items. As of December 27, 1993, there were 546 total items (RF06 ended December 4). Approximately 90 percent were electrical, mechanical and I&C items with the remainder being engineering and plant services items. The backlog after the recent outage (RF06) was much less than the backlog at the end of RF05 (Spring 1992) which peaked at greater than 700 items. During the recent outage the additional time required to replace the jet pump beams provided the opportunity for further backlog reduction.

Outstanding backlog items/MWOs for ECCS and other selected safety related systems were reviewed and no items of immediate safety concern were noted. All items appeared to be properly prioritized.

The inspectors concluded that the current non-outage corrective maintenance backlog was well within manageable levels and was significantly less than post-RF05 levels. The maintenance manager indicated that further reductions were anticipated over the next few months after the post-outage and year end vacation schedule were over.

The inspectors reviewed the scope of modifications scheduled for RF06 but not completed during the outage. Out of 67 design changes (DCPs and MCPs) scheduled for implementation, 6 were deferred. Of these, 5 were deferred to RF07 and 1 was changed to work nonoutage. The licensee estimated a savings of 2500-3000 man-hours. There were 16 additional design changes added and completed during the outage. A review by the

inspectors concluded that sufficient justifications existed for deferral of the modifications and that the number of deferrals was relatively small.

No violations or deviations were identified.

6. 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-RE-1B33-D-0001, Rev. 35	Jetpump Functional Test.
06-RE-SC11-V-0402, Rev. 34	Control Rod Scram Testing.
06-EL-1C71-R-0012, Rev. 24	RPS Electrical Protection Assembly Calibration.

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

7. Review of Licensee Self-Assessment Capability (40500)

The inspector attended a meeting of the Plant Safety Review Committee (PSRC) on December 9, 1993. This meeting (PSRC 126/93) was conducted, attended by the required quorum, and properly documented in accordance with TS 6.5.1. The meeting was held to discuss, recommend, approve as applicable two 10 CFR 50.59 safety evaluations, two procedural changes, some nonconformance/deficiency reports, a recent incident report and the recommended revised response to be submitted for the violation identified in NRC Inspection Report No. 50-416/93-14. Members were prepared, the discussion among the PSRC members was uninhibited, and encouraged by the chairman of the committee. The licensee's self-assessment program, specifically PSRC activities, are adequate and no violations or deviations were identified.

8. Methane Gas in Offsite Shipment

The inspectors reviewed the licensee's response to information that a shipment sent to Barnwell contained methane gas. On December 9, 1993 the licensee sent radwaste shipment number 93-1207 containing dewatered resin from the RWCU "B" phase separator tank to Barnwell in a Poly High Integrity Container. On December 10, the licensee was informed that, while loosening the binders, Barnwell employees heard the container "burp". Tests with an explosive gas meter detected gas slightly below the meters explosive concentration limit. The cask was placed in a holding area. The licensee held up all offsite shipments to Barnwell until corrective actions could be taken. A requirement was placed on discharges from the RWCU "A" and "B" tanks to perform biocide

treatments. Evaluations are being performed for other potential sources of bacteria in other waste streams. The shipment at Barnwell was held for several days, sampled again, and buried when no further gas producing activity was found. The gas resulted from a waste stream previously not found to contain methane producing bacteria. The licensee's final actions on this matter are not due until March, 1994. The licensee acted in a prompt manner, taking immediate corrective actions to address this event, however, this is identified as Unresolved Item No. 50-416/93-23-01 pending additional review by region-based specialists.

9. 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 descriptions, the corrective actions 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 events met the criterion for licensee identified violations.

- a. On December 31, 1993, the control room was notified that the local civil defense sirens had actuated. A preliminary investigation by the licensee and Claiborne County officials revealed that one siren (No. 35) actuated at about 11:45 p.m. on December 30 after a transformer on the siren pole failed. Four additional sirens were inadvertently actuated at 12:36 a.m. and were shut off within a few minutes. Local radio and television stations were contacted and broadcasts to the general public were made shortly after the incident. The licensee and Claiborne County officials were still investigating the event at the end of this report period. The resident inspectors were notified and a four hour notification was made to the NRC Operations Center per 10 CFR 50.72(b)(2)(vi).
- b. On December 13, 1993, an ESF actuation occurred when the RCIC outboard steam supply valve (1E51-F064) isolated. The Riley temperature switch associated with the RHR "A" equipment area delta temperature failed causing the isolation. RCIC was declared inoperable and HPCS was verified to be operable. The trip unit was replaced and RCIC was declared operable the same day. The resident inspectors were notified and a four hour notification was made to the NRC Operations Center per 10 CFR 50.72(b)(2)(ii).

No violations or deviations were identified.

10. Exit Interview

The inspection scope and findings were summarized on January 4, 1993, with those persons indicated in paragraph 1 above. Dissenting comments were not received from the licensee. Proprietary information is not contained in this report.

<u>Item No.</u>	<u>Type</u>	<u>Description</u>
50-416/93-23-01	URI	Methane In Waste Resin Shipment (paragraph 8)

11. Acronyms and Initialisms

ALARA	-	As Low as Reasonably Achievable
CFR	-	Code of Federal Regulations
CST	-	Condensate Storage Tank
DCP	-	Design Change Package
ECCS	-	Emergency Core Cooling System
EPA	-	Electrical Protection Assembly
EPRI	-	Electrical Power Research Institute
ESF	-	Engineering Safety Feature
GGNS	-	Grand Gulf Nuclear Station
HPCS	-	High Pressure Core Spray
I&C	-	Instrumentation and Control
IR	-	Incident Report
MCP	-	Minor Change Package
MG	-	Motor Generator
MNCR	-	Material Nonconformance Report
MOV	-	Motor Operated Valve
MSR	-	Moisture Separator/Reheater
MWO	-	Maintenance Work Order
NRC	-	Nuclear Regulatory Commission
PSRC	-	Plant Safety Review Committee
QDR	-	Quality Deficiency Report
RCIC	-	Reactor Core Isolation Cooling
RFO	-	Refueling Outage
RFPT	-	Reactor Feed Pump Turbine
RHR	-	Residual Heat Removal
RPS	-	Reactor Protection System
RWCU	-	Reactor Water Cleanup
SMEPA	-	Southern Mississippi Electric Power Association
SRV	-	Safety Relief Valve
TSTI	-	Temporary Special Test Instruction