



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30333

Report No.: 50-416/91-23

Licensee: Entergy Operations, Inc.
Jackson, MS 39205

Docket No.: 50-416

License No.: NPF-29

Facility Name: Grand Gulf Nuclear Station

Inspection Conducted: November 13 through December 31, 1991.

Inspector: *J. L. Mathis* 1/17/92
J. L. Mathis, Senior Resident Inspector Date Signed

Accompanying Personnel: C.A. Hughey

Approved by: *F.S. Cantrell* 1/17/92
F.S. Cantrell Section Chief, Division of Date Signed
Reactor Projects

SUMMARY

Scope:

The resident inspectors conducted routine inspections and observations in the following areas: operational safety verification; maintenance and surveillance activities; review of nonconformance reports; and reportable occurrences. The inspectors conducted backshift inspections on November 18, December 2, 9, 22, 29, 30, and 31, 1991.

Results:

During this inspection period, one violation was identified for an inadequate procedure for testing the drywell airlock. One Inspector Followup Item was identified to track the licensee's root cause investigation of the SLCS pump B cracked expansion bellows (Paragraph 3).

The staff considered plant managements' decision to shut the plant down on December 29, 1991, prior to experiencing severe recirculation pump '3' vibration, to be prudent (Paragraph 3).

The licensee met the safety objectives in the areas of safety verification, maintenance and surveillance activities (Paragraphs 4 and 5).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *W. T. Cottle, Vice President, Nuclear Operations
- D. G. Cupstid, Manager, Plant Projects
- *L. F. Daughtery, Supervisor, Compliance
- *M. A. Dietrich, Director, Quality Programs
- *J. P. Dimmette, Manager, Performance and System Engineering
- *C. W. Ellsaesser, Superintendent, Operations
- *D. C. Hintz, Chief Operating Officer, EOI
- *C. R. Hutchinson, General Manager, GGNS
- *J. R. McGaha, Vice President, Operation Support, EOI
- *A. S. McCurdy, Assistant Manager, Operation
- F. K. Mangan, Director, Plant Projects and Support
- *M. J. Meisner, Director, Nuclear Licensing
- D. L. Pace, Director, Nuclear Plant Engineering
- J. V. Parrish, Manager, Plant Operations
- J. C. Roberts, Manager, Plant Maintenance
- J. E. Reaves, Manager, Quality Services
- *R. Ruffin, Licensing Specialist
- G. W. Vining, Manager, Plant Modification and Construction
- G. Zinke, Superintendent, Plant Licensing

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

*Attended exit interview

2. Plant Status

The plant was operating in mode one, power operations, at the beginning of the inspection period. An automatic scram occurred on November 19, 1991, due to high neutron flux on all eight channels of APRMs caused by a lightning strike during a severe thunderstorm. During the storm approximately 30,000 gallons of rain water entered the auxiliary building via conduits. Shortly after the scram the drywell airlock was found to be over pressurized. On December 29, 1991, the plant commenced to cold shutdown due to the trending up of the reactor recirculation pump B coupling vibration phase angle readings which indicated early signs of possible pump shaft cracking. By the end of the inspection period the plant was in cold shutdown preparing to replace the B pump shaft.

3. Operational Safety, (71707, and 93702)

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 LCO's, temporary alterations, instrument readings, and staffing. Discussions

were held as appropriate to understand the significance of conditions observed.

Plant tours were conducted weekly which included portions of the control building, turbine building, auxiliary 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.

The inspectors observed health physics management involvement and awareness of significant plant activities, and observed plant radiation controls. The adequacy of physical security control was verified.

Weekly selected ESF systems were confirmed operable by verifying that accessible valve flow path alignment was correct, power supply breaker and fuse status were correct and instrumentation was operational. The following systems were confirmed operable using the Probabilistic Risk Assessment Based System Inspection Plans: LPCS, RHR B and HPCS. Safety related tagouts, 911790 (hydraulic control unit 20-25), 911544 (Drywell chiller B001A PSW isolation valve), and 911956 (Reactor recirculation pump 8330001A) were reviewed to ensure that the tagouts were properly prepared and performed.

MNCRs and QDRs were reviewed to verify that TSs were met, corrective actions as identified in the reports were accomplished or being pursued for completion, and that operability was not affected. The following MNCRs were reviewed:

- MNCR-910169 - Aux. Bldg. penetrations AE-4B and AE-5B leaking water.
- MNCR-910170 - Drywell airlock pressurized to 40 PSI.
- MNCR-910174 - Expansion joint ruptured during surveillance test.
- MNCR-910175 - Room cooler transmitter setpoints do not agree with as-built documentation.

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

On November 19, 1991, at 2049 hours, the reactor scrammed from 100% power due to APRM high neutron flux. The licensee concluded that a lightning strike at or near the enclosure building (surrounding containment) caused APRM instrumentation to spike above the setpoint on all 8 channels resulting in an actuation of the reactor protection system. The plant was stabilized at 2055 hours and there were no planned or unplanned ECCS actuations associated with the scram. A lightning dissipation array had

previously been installed, at the site to protect against lightning-induced transients; however, on August 10, 1991, the unit scrambled due to a lightning strike as discussed in LER 91-010. Three previous similar events have been reported in LER 88-012, LER 89-010 and LER 89-016. As part of the corrective actions associated with LER 91-010, a vendor performed an evaluation and provided recommendations for expanding the existing lightning protection system and removing some remaining static lines. At the time of the scram on November 19, 1991, the licensee had not implemented all of the recommendations. The static lines from the 500 kv lines were, however, removed on November 21, 1991. Expansion of the site lightning protection was scheduled for completion prior to startup from Refueling Outage Five (June 1992).

Following the above discussed scram and thunderstorm, a significant amount of rain water was discovered by operations personnel entering the auxiliary building at elevation 119 (south wall) via conduits associated with penetrations AE-4B and AE-5B. The majority of the leakage occurred around a conduit cover on one of the 8 conduits in penetration AE-4B. The other 8 conduits in penetration AE-5B were dripping. MNCR 00169-91 was initiated to document the leaking conduits and to provide for a determination of cause and corrective action. An investigation by the licensee revealed that the AE-4B and AE-5B conduits originated from a large manhole in the yard on the south side of the site. The manholes served as hubs for the routing of many electrical cables via underground conduit. The heavy rainfall that occurred on the site entered the manhole from which the subject auxiliary building conduits were routed. The manholes were equipped with sump pumps to handle normal rain and ground water leakage, however, the sump pump was found off, likely due to heavy rainfall on the circuit box which in turn tripped the pump. With the sump pump out of service, water level in the manhole rose to a point at which it started flowing into the conduits leading into the auxiliary building. Further investigation by the licensee revealed that the design of the subject penetrations required closure sealant to be installed inside the ends of the 4 inch diameter conduit near the point at which the conduits penetrated the auxiliary building wall. A field inspection of the 16 conduits conducted after the leakage showed that closure sealant was missing from 8 of them. The rework of the leaking conduits was completed on November 20, 1991. Afterwards, an inspection of all conduits which penetrate the boundary of secondary containment and the control building was performed. Additional conduits were found to have nonconforming seals and were repaired.

Following the scram, on November 20, 1991, the licensee's initial attempt to enter the drywell through the drywell airlock was unsuccessful. Entry could not be made because a safety interlock actuated due a high differential pressure. The licensee noted that the internal pressure of the airlock was approximately 40 psi. The drywell airlock was originally designed for a 30 psi internal pressure. The pressure was eventually relieved through a test flange located on the containment side of the airlock. Subsequent investigation by the licensee revealed that a 3-way equalizing valve had a protective tube plug in the inlet port. This plug

did not allow the airlock pressure to relieve to the drywell during a pressurization event as designed. The airlock should have relieved back to the drywell when the internal airlock pressure reached approximately 1 psid. The licensee concluded that the plug had been in place since construction. Technical Specification 6.8.1 requires that written procedures be established, implemented and maintained for surveillance and test activities of safety related equipment. Contrary to the above, procedure 06-ME-1M61-V-0001, Local Leak Rate Test, was inadequate in that no provisions were included for installation and removal of the plug for the drywell airlock relief valve. In addition, no provisions were provided to verify that the relief valves on all airlocks would relieve internal pressure. This will be identified as violation 91-23-01. Upon investigating the over-pressurization, an instrument air leak was found and repaired at the supply tubing connection of the inner door interlock valve.

On November 22, 1991, the outboard MSIV of the "D" Main Steam Line (MSL), (F022D), failed an operability test with a valve closure time of 2.94 seconds. Technical Specifications Section 3.4.f required the closing times of the MSIVs to be greater than or equal to three (3) and less than or equal to five (5) seconds. LCO 91-1650 was entered which required the closing of the inboard MSIV of the "D" MSL, resulting in the isolation of this steam line. After a hydraulic dash pot associated with the affected MSIV was adjusted, a subsequent retest the same day showed the closure time to be within 3 to 5 seconds and the LCO was cleared.

On November 23, 1991, at 2312 hours the plant received a Division II, group eight (8) isolation on the RWCu system. Prior to the isolation the control room had received a PWCu heat exchanger high temperature alarm three times within a period of approximately 1 minute. The trip units were found reading normal and no signs of leakage in the RWCu heat exchanger room were found. The cause is still under investigation, but the problem is suspected to be associated with the Riley temperature switches. However, because of the extended service time of the switches and the RWCu isolation, two of the suspected temperature switches were replaced as a preventative measure.

On November 29, 1991, during the performance of surveillance procedure 05-OP-1C41-Q-0001, Standby Liquid Control Operability, the B pump discharge expansion joint ruptured. The licensee found a 36° degree crack in the weld connecting the flow director to the flange. MNCR 0174-91 was written to document this nonconformance and to evaluate the probable cause. A replacement bellows was installed under work order 57267 on December 5, 1991, a monthly surveillance was run for the B pump satisfactorily, and the LCO was clear. Inspector Followup Item 91-23-02 was identified to followup on the root cause of the expansion bellows cracking associated with SLCS pump B.

On December 6, 1991, at approximately 1155 hours the control room received a "Division II LSS System Fail" alarm. An operator was dispatched to the panel. The panel display indicated fault number 88 which indicated no power to the panel. The operator noted that at the time of arrival the

panel was responding erratically (i.e., the power available lights would come on and off, one or two at a time). The operator was instructed to secure the panel and at 1217 hours TS requirement 3.8.3.1 LCO was entered. A work order was written to troubleshoot the panel. The licensee changed out the 15 volts and 24 volts power supplies associated with the panel and concurrently replaced the power supplies associated with the Unit 2 Division 1 LSS panel which had been preoperationally tested and reworked as a backup to the inservice panel (refer to report number 91-16). After the power units were replaced, the operability surveillance on the panel was successfully completed.

On December 29, 1991, unit shutdown was commenced due to up trending of the reactor recirculation pump B coupling vertical and horizontal vibration phase angle readings which strongly indicated possible pump shaft cracking. Due to previous experience with recirculation pump shaft cracking and as a matter of prudence, management decided to shut down the unit to replace the B pump shaft. Vibration amplitude had not significantly increased; however, the vertical and horizontal phase angle had changed approximately 70 degrees. The plant was scheduled for a 12 day forced outage.

4. Maintenance Observation (62703)

During the report period, the inspectors observed portions of the maintenance activities listed below. These 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/MCP</u>	<u>DESCRIPTION</u>
55329	Inspect fuel oil piping on Division I emergency diesel generator.
19911086	Condensate pumps minimum flow recirculation valve rework (1N19-F504).

No violations or deviations were identified. The results of the inspection in this area indicate that the maintenance program was effective. The observed activities were conducted in a satisfactory manner and work was properly performed in accordance with the maintenance work orders.

5. Surveillance Observation (61726)

The inspectors observed the performance of portions of the surveillances listed below. These 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 surveillances; removal and return to service of the system or

component; and review of the data for acceptability based upon the acceptance criteria.

06-CH-1N62-M-0048,	Pretreatment Offgas Isotopic Analysis.
06-CH-1U41-M-0015,	Turbine Building Ventilated Exhaust Gaseous Isotopic.
06-EL-1B21-M-0001,	ADS Timer Functional and Calibration Test.
06-OP-1C41-M-0001,	Standby Liquid Control Operability.
06-OP-1E32-C-0002-01,	MSIV Leakage Control System Cold Shutdown Valve Test.
06-OP-1E52-C-0001-01,	RCIC System Cold SP Valve Operability Test.
06-OP-1E61-M-0001,	Post-LOCA Drywell Vacuum Breaker Operability.

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

6. Reportable Occurrences (90712 & 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.

(Closed) LER 90-024, Standby Fresh Air Unit actuation due to an inadequate test instruction. This incident was attributed to the performance of an inadequate test instruction. During the test, power was lost to a load distribution panel resulting in an isolation and an automatic start of the standby fresh air unit. The special test instruction was corrected prior to continuing the test. The test directors and technical reviewers were counseled on verbatim compliance.

No violations or deviations were identified.

7. Exit Interview (30703)

The inspection scope and findings were summarized on January 3, 1992, with those persons indicated in paragraph 1 above. The licensee did not identify as proprietary any of the materials provided to or reviewed by

the inspectors during this inspection. The licensee had no comment on the following inspection findings:

<u>Item Number</u>	<u>Description and Reference</u>
VIO 91-23-01	Inadequate procedure for testing of the drywell airlock
IFI 91-23-02	Root cause followup of SLCS pump B expansion bellows cracking

8. Acronyms and Initialisms

APRM -	Average Power Range Monitor
BWR -	Boiling Water Reactor
DG -	Diesel Generator
ECCS -	Emergency Core Cooling System
ESF -	Engineering Safety Feature
HPCS -	High Pressure Core Spray
IFI -	Inspector Followup Item
LCO -	Limiting Condition for Operation
LER -	Licensee Event Report
MCP -	Minor Change Package
MNCR -	Material Nonconformance Report
MSIV -	Main Steam Isolation Valve
MSL -	Main Steam Line
MWO -	Maintenance Work Order
NPE -	Nuclear Plant Engineering
NRC -	Nuclear Regulatory Commission
QDR -	Quality Deficiency Report
RCIC -	Reactor Core Isolation Cooling
RWCU -	Reactor Water Cleanup
SLCS -	Standby Liquid Control System
TCN -	Temporary Change Notice
TS -	Technical Specification
VIO -	Violation