



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

Report No.: 50-416/91-12

Licensee: Entergy Operations, Inc.
Jackson, MS 39205

Docket No.: 50-416

License No.: NPF-29

Facility Name: Grand Gulf Nuclear Station

Inspection Conducted: May 19, through June 14, 1991

[Signature]
for L. Mathis, Senior Resident Inspector

6/27/91
Date Signed

Approved by: *[Signature]*
for F. S. Cantrell, Section Chief
Reactor Projects Branch 1
Division of Reactor Projects

6/27/91
Date Signed

SUMMARY

Scope:

The resident inspector conducted a routine inspection in the following areas: operational safety verification, maintenance observation, surveillance observation, and reportable occurrences. Backshift inspections were conducted on May 27, June 4, 5, 12, 13 and 14, 1991.

Results:

During the inspection period no violations or deviations were identified. In the areas of safety verification, maintenance observation and surveillance observation, the licensee met the safety objectives of these areas.

The licensee's coordinated efforts for replacing the recirculation pumps seals were good as demonstrated by a total down time of 4-5 days in each cases.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

W. T. Cottle, Vice President, Nuclear Operations
D. G. Cupstid, Manager, Plant Projects
*L. F. Daugherty, Compliance Supervisor
*M. A. Dietrich, Director, Quality Programs
J. P. Dimmette, Manager, Plant Maintenance
C. W. Ellsaesser, Operations Superintendent
*C. R. Hutchinson, General Manager, GGNS
F. K. Mangan, Director, Plant Projects and Support
M. J. Meisner, Director, Nuclear Licensing
J. V. Parrish, Manager, Plant Operations
*J. C. Roberts, Manager, Plant & System Engineering
J. E. Reaves, Manager, Quality Services
F. W. Titus, Director, Nuclear Plant Engineering
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 started this inspection period in a scheduled maintenance outage to replace both recirculation pumps seals. The plant operated in mode 1, power operation, from May 24, 1991 to June 11, 1991. The plant ended this inspection period in another outage to replace the recirculation pumps seals.

3. Operational Safety (71707, 93702)

The inspector kept aware of the overall plant status, and of any significant safety matters related to plant operations. Daily discussions were held with plant management and various members of the plant operating staff. The inspector made frequent visits to the control room. Observations included: verification of instrument readings, setpoints and recordings; review of operating system status and the tagging of equipment; verification of annunciator alarms, limiting conditions for operation, and the temporary alterations; and review of daily journals, data sheet entries, control room manning, and access controls.

Weekly, selected engineered safety feature (ESF) systems were confirmed operable. The inspector verified that accessible valve flow path alignment was correct, power supply breaker and fuse status was correct and instrumentation was operational. The inspector verified the following systems operable: RCIC, LPCS, ADS and SSW B.

The inspector conducted plant tours weekly. Portions of the control building, turbine building, auxiliary building and outside areas were visited. The observations included safety related tagout verifications, shift turnovers, sampling programs, housekeeping and general plant condition. Additionally, the inspector 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.

The inspector observed health physics managements involvement and awareness of significant plant activities, and observed plant radiation controls. Periodically the inspector verified the adequacy of physical security control. Additionally, senior plant management was observed making routine tours of the plant.

The inspector reviewed safety related tagouts, 911045 (SGTS B), 911046 (control room /C humidifier P66F220), 911066 (reactor recirculation pump B33C001B) and 911071 (recirculation pump B cooler relief valve P42F046B) to ensure that the tagouts were properly prepared, and performed. Additionally, the inspector verified that the tagged components were in the required position.

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

Recirculation Pump (RP) Seals - Following replacement of the RP shafts due to indications of cracking (Inspection Report 50-416/90-25), the corrective action was to operate without seal flow (December 1990). A decreasing pressure was noted in the B recirculation pump outer seal on April 10, 1991. The pressure dropped from a normal of about 520 psig to approximately 210 psig over a period of a week. The outer seal pressure then stabilized around 210 psig. During the period no increase in seal leak-off flow was observed.

On May 9, 1991, "B" recirculation pump outer seal pressure began to increase along with a minor increase in floor drain leakage. Normal seal leak off is routed to the drywell equipment drains, however no noticeable increase was seen. Drywell floor drain leakage on the other hand, increased from .82 gpm to 1.2 gpm over the next several days. This leakage was within the technical specification limit of 5 gpm. Due to this increase in leakage, management decided to shut down the unit on May 18, 1991, and replace the inner and outer seals on both recirculation pumps. The seals were replaced with the unmodified type SU mechanical

seals based on recommendation from the vendor. The modified SU type seal design improved the pressure stability and the tolerance of the seal to pressure and temperature changes, however, it was more sensitive to crud burst. The unmodified SU type seal is less sensitive to crud burst during power transients; however, the SU type seal oscillates with pressure and temperature transients.

On May 24, 1991, following startup with the newly installed unmodified SU type seals, the "A" pump outer seal pressure began to oscillate, between 500-700 psig. Additionally the outer seal pressure on the "B" pump dropped from a normal of 500 psig to 400 psig and stabilized.

On June 4, 1991, the vendor along with the licensee disassemble the modified seal (from the May 1991 outage) to investigate the failure mechanism on the "B" pump outer seal. The licensee's investigation found deposits of crud throughout the seal and cartridge parts. Especially heavy accumulations were found in the second (upper) stage seal cavity. The second stage carbon stationary face had heavy circumferential grooves, and was worn on the sealing surface that interfaces with the titanium carbide rotating face ring.

Due to degrading conditions on the unmodified seals, the plant went to cold shutdown again on June 11, 1991, to replace the recirculation pumps seals. Based on the operational history of seals at GGNS and recommendations from the vendor, the decision was made to install the modified SU type seals and restore seal purge flow to the previous flow conditions (3-5 gpm).

On June 11, 1991, while shutting down to replace the "A" and "B" recirculation pumps seals, the reactor scram at approximately 1840 from 35% power on low reactor vessel water level. The condensate and condensate booster pumps tripped thereby causing a low feed water flow into the vessel. The RCIC system was initiated manually to increase level; however, attempts were unsuccessful. All safety system functioned properly and no technical specification heatup/cooldown limits were exceeded. Prior to the scram a BOP computer alarm was received on low condensate minimum flow. The licensee investigation revealed that when the recirculation pumps were downshifted, the demand for feedwater flow to decrease did not occur. A failed pneumatic relay in the positioner controller for condensate minimum flow valve, N19F504, prevented the valve from responding to the open demand. The pneumatic relay was replaced during the scheduled outage and tested prior to startup.

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>
21748	Functionally test division 1 D/G motor driven compressor lube oil level switch.
44642	Rebuild recirculation pump seal B33-C001-5.
44860	Inspect fuel oil piping for SDG 12.
44861	Lube SDG 12.

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. The observation 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-IC-1B21-M-2010	Reactor Vessel Water Level (HPCS) Functional Test.
06-IC-1C11-M-2001	CRD Scram Discharge Volume High Water Level (RPS) Functional Test.
06-EL-1E12-M-0002	Containment Spray Time Delay Relay Calibration and Functional Test.
06-EL-1E31-M-0001	RCIC Main Steam Tunnel Isolation Delay Timer Functional Test and Calibration.
06-OP-1C11-V-0012	RPC Rod Block Functional Test, Attachment 1.

06-OP-1E12-C-0012

RHR A Shutdown Cooling Mode Valve Test.

06-OP-1G33-C-0002

RWCU System Cold Shutdown Valve Test.

No violations or deviations were identified. The surveillance tests were performed in a satisfactory manner and met the requirement of TS.

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 inspector used the NRC enforcement guidance to determine if the event met the criterion for licensee identified violations.

(Closed) LER 90-03, Loss of ESF division 1 power could effect long-term post LOCA core spray. During a review of the concerns raised in the GE Topical Report about cooling, the licensee recognized that a concern about spray nozzle distribution could adversely affect HPCS long term cooling availability. As a final resolution, the licensee implemented a pattern piping and spray nozzle design change during refueling outage 4 to attain the effective spray needed for long term HPCS service water cooling. This item is closed.

(Closed) LER 90-14, Failure to retest secondary containment isolation valve following maintenance. The inspector reviewed the licensee corrective action which consisted of revising plant procedures to more clearly specify the responsibilities for specifying post-maintenance retests. Maintenance planning and operations personnel recieved additional training on procedural changes, and the licensee conducted a review of the test/retest program to identify any other potential programmatic weaknesses. This item is closed.

No violations or deviations were identified.

7. Exit Interview (30703)

The inspection scope and findings were summarized on June 14, 1991, 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 inspector during this inspection.

9. Acronyms and Initialisms

ADHRS- Alternate Decay Heat Removal System
 ADS - Automatic Depressurization System
 APRM - Average Power Range Monitor

ATWS	-	Anticipated Transient Without Scram
BJ	-	Byron Jackson
BWR	-	Boiling Water Reactor
CRD	-	Control Rod Drive
DCP	-	Design Change Package
DG	-	Diesel Generator
ECCS	-	Emergency Core Cooling System
ESF	-	Engineering Safety Feature
FCV	-	Flow Control Valve
HPCS	-	High Pressure Core Spray
HPU	-	Hydraulic Power Unit
I&C	-	Instrumentation and Control
IFI	-	Inspector Followup Item
LCO	-	Limiting Condition for Operation
LER	-	Licensee Event Report
LLRT	-	Local Leak Rate Test
LPCI	-	Low Pressure Core Injection
LPCS	-	Low Pressure Core Spray
MNCR	-	Material Nonconformance Report
MSIV	-	Main Steam Isolation Valve
MWO	-	Maintenance Work Order
NPE	-	Nuclear Plant Engineering
NRC	-	Nuclear Regulatory Commission
PDS	-	Pressure Differential Switch
P&ID	-	Piping and Instrument Diagram
PSW	-	Plant Service Water
RCIC	-	Reactor Core Isolation Cooling
RHR	-	Residual Heat Removal
RPS	-	Reactor Protection System
RWCU	-	Reactor Water Cleanup
RWP	-	Radiation Work Permit
SBLC	-	Standby Liquid Control
SDG	-	Standby Diesel Generator
SOI	-	System Operating Instruction
SSW	-	Standby Service Water
TS	-	Technical Specification