ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

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Report No.:	50-416/99-09
Licensee:	Entergy Operations, Inc.
Facility:	Grand Gulf Nuclear Station
Location:	Waterloo Road Port Gibson, Mississippi 39150
Dates:	June 13 through July 24, 1999
Inspectors:	Jennifer Dixon-Herrity, Senior Resident Inspector Peter Alter, Resident Inspector
Approved By:	Joseph Tapia, Chief, Project Branch A

ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Grand Gulf Nuclear Station
NRC Inspection Report 50-416/99-09

This inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a 6-week period of resident inspection.

Operations

- Operator recovery of a single control rod which inadvertently scrammed was well controlled (Section O1.2).

- Residual heat removal Train C was correctly aligned and maintained in good material condition (Section O2.2).

Maintenance

- Work performed during eight maintenance and surveillance activities observed was well performed and thorough. Technicians were experienced and knowledgeable of their assigned tasks and of equipment performance. (Section M1.3)

- Incomplete work instructions for the proper fill and vent of the auxiliary lube oil system for the high pressure core spray diesel generator led to a delay of approximately 20 hours in returning the diesel generator to service (Section M1.3).

Engineering

- The engineering evaluation conducted to determine the impact on operability of the Division I standby diesel generator from recurrence of epoxy encapsulant breakdown on a breaker current transformer was well performed and technically sound (Section E1.2).

Plant Support

- Although the ability of the fire protection system to perform its safety function was not affected, the overall integrity of the system and the material condition of the jockey pump were poor. The corrective actions taken in response to the deficiencies were untimely and ineffective in that system leakage was allowed to decay to the point that the jockey pump now ran continuously. This condition has existed since October 1998 and has not been repaired to date (Section F2.1).

Report Details

Summary of Plant Status

The plant operated at 100 percent power from the beginning of the inspection period until July 9, 1999, when power was reduced to approximately 60 percent because of the loss of balance-of-plant Transformer 23. The reactor was returned to 100 percent power on July 10, 1999. Operators reduced power to 77 percent on July 17, 1999, for a control rod sequence exchange and returned power to 100 percent the same day. Operators lowered power to 90 percent on July 20, 1999, to provide margin while a control rod that inadvertently scrammed was restored. Power was returned to 100 percent the same day and remained there through the remainder of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

The inspectors performed control room observations to assess operator knowledge and performance. Operations shift turnovers were thorough and well conducted. Operators were knowledgeable of the status of equipment, and applicable Technical Specification limiting conditions for operations were appropriately entered.

On July 9, 1999, balance-of-plant Transformer 23 tripped and power was lost to 4 of 7 running radial well pumps in the plant service water system. Operators entered Off-Normal Procedure 05-1-02-V-11, "Loss of Plant Service Water," Revision 21, began reducing power, and stabilized power at approximately 60 percent. After observing that the transformer tripped off-line because of a ground overcurrent, operators crosstied the bus to allow the radial well pumps to run off of balance-of-plant Transformer 13. Transformer 23 was left off-line to allow troubleshooting (discussed in Section E1.1). Operators returned the plant to 100 percent power on July 10, 1999, and Transformer 23 was brought back on-line on July 16, 1999.

On July 17, 1999, the inspectors observed operators reduce reactor power to 77 percent for a control rod sequence exchange. The plant supervisor controlled the evolution with the assistance of reactor engineering. While at the reduced power level, maintenance personnel toured the turbine building steam tunnel to find and repair steam valve packing leaks. The operators coordinated these evolutions well and proper oversight of reactivity control manipulations and of radiological controls for the maintenance personnel who entered the steam tunnel was exhibited.

O1.2 Inadvertent Scram of One Control Rod and Recovery

a. Inspection Scope (71707)

On July 20, 1999, Control Rod 52-49 inadvertently scrammed while operators were conducting Procedure 06-OP-1C71-W-0001. "Reactor Manual Scram Switch Test," Revision 101. The inspectors reviewed the operations log and Off-Normal Procedure 05-1-02-IV-1, "Control Rod/Drive Malfunctions," Revision 104 and observed the recovery of the control rod later that same day.

b. Observations and Findings

The operators' response was in accordance with the Procedure 05-1-02-IV-1, Section 3.3.1, "Single Rod Scram." The operators determined that the cause of the control rod scram was testing of the Division I reactor manual scram switch concurrent with a blown fuse in the Division II individual Rod 52-49 scram solenoid. The operators informed the reactor engineer, wrote condition report CR-GGN-1999-0735, and wrote maintenance action item (MAI) 259112 to replace the fuse.

After replacing the blown fuse, the operators reduced power to 90 percent and restored Rod 52-49 to its full-out position. The downpower and rod recovery were well controlled by the plant supervisor and monitored by a reactor engineer. The reactivity control manipulation was conducted by two reactor operator license candidates under the close supervision of licensed operators.

c. Conclusions

Operator recovery of a single control rod which inadvertently scrammed was well controlled.

O2 Operational Status of Facilities and Equipment

O2.1 Plant Tours

a. Inspection Scope (71707)

The inspectors conducted tours through safety-related portions of the plant.

b. Observations and Findings

The areas of the plant that were toured were maintained in good condition. The minor discrepancies noted had been identified by the licensee and were being tracked for repair with an MAI.

The inspector observed that information labels were permanently placed on structures, components, and control panels throughout the plant. The inspector reviewed the plant procedures and found that these information labels were not covered or controlled by any procedure. Although the inspector did not find any labels where the lack of controls affected safety, a potential existed for the introduction of errors as a result of the lack of controls. For example, a label which identified where test equipment was to be placed during the performance of a specific surveillance was incorrectly placed on a berm in the Division II emergency diesel generator room. The label had come loose and was laying on the opposite side of the berm from where it had been installed. The inspector discussed the labels with the operations superintendent and questioned how the labels were controlled to ensure that they were updated and maintained. The superintendent acknowledged the omission and planned to improve the existing tagging program so that the information labels were included and better controlled.

O2.2 Engineered Safety Feature System Walkdown

a. Inspection Scope (71707)

The inspectors conducted daily control board walkdowns to verify that engineered safety feature systems were aligned as required by Technical Specification for the existing operating mode, that instrumentation was operating correctly, and that power was available. The inspectors performed a more detailed walkdown of accessible portions of residual heat removal Train C to independently verify its operability and configuration. During this review, the inspectors reviewed Instruction 04-1-01-E12-1, "Residual Heat Removal System," Revision 111, and P&ID M-1085C, "Residual Heat Removal System," Revision 13.

b. Observations and Findings

Equipment operability, material condition, and housekeeping for residual heat removal system Train C were well maintained. The inspectors verified that the system was properly aligned for the existing mode of operation. The inspectors reviewed the maintenance records and the system engineer's quarterly status and found that there were no significant maintenance concerns open for the system.

c. Conclusions

Residual heat removal Train C was correctly aligned and maintained in good material condition.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Maintenance and Surveillance Observations

a. Inspection Scope (62707, 61726)

The inspectors observed all or portions of the maintenance and surveillance activities listed below. For surveillances, the test procedures were reviewed and compared to the Technical Specification surveillance requirements and bases to ensure that the procedures satisfied the requirements. Maintenance work was reviewed to ensure that adequate work instructions were provided, that the work performed was within the scope of the authorized work, and that the work performed was adequately documented. In all cases, the impact to equipment operability and applicability of Technical Specifications actions were independently verified.

Maintenance:

- MAI 256231 Division I standby diesel generator pedestal bearing oil change
- MAI 256395 Division I standby diesel generator crankcase trip pressure switch calibration
- MAI 258081 Current transformer inspection - Breakers 52-15501 and 503
- MAI 258082 Current transformer inspection - Breaker 152-1514
- MAI 258083 Current transformer inspection - Breaker 152-1902
- MAI 256978 Standby fresh air Unit A flow transmitter loop calibration
- MAI 258928 High pressure core spray diesel soakback pump replacement

Surveillance:

- 06-ME-1M23-R-0001 Personnel Airlock Door Seal Air System Leak Test
- 06-OP-1P75-M-0002 Standby Diesel Generator 12 Functional Test

b. Observations and Findings

Generally, the inspectors observed that the work performed during these activities was well conducted and thorough. Technicians were experienced and knowledgeable of their assigned tasks and of equipment performance. Good coordination with various control room operators and plant operators resulted in effective performance of the surveillance tests. The inspectors also noted very good use of three-way communication.

After racking out the Division I standby diesel generator output Breaker 152-1508 on June 28, 1999, operators discovered a pool of red, plastic-like material on the floor of the breaker cubicle. This indicated that the epoxy encapsulant on a current transformer in the breaker cubicle had reverted to its liquid form. Upon inspection, the licensee found that the affected current transformer was on the same phase that was found reverted in January 1999 (see NRC Inspection Reports 50-416/98-17 and 99-05). The licensee inspected two 480 V breakers and four 4.16 kV breakers and identified no other degraded current transformers. Operations personnel maintained the diesel out of service until an operability determination was made that the diesel could be returned to service. The engineering evaluation is discussed in Section E1.2.

M1.2 High Pressure Core Spray Diesel Generator Lube Oil System Maintenance

a. Inspection Scope (62707)

The inspectors observed the replacement of the high pressure core spray (HPCS) diesel generator soakback pump.

b. Observations and Findings

On July 16, 1999, maintenance technicians, working under MAI 258928, replaced the lube oil circulating "soakback" pump and system check valve in order to increase lube oil flow through the lube oil-jacket water heat exchanger. On July 17, 1999, after the auxiliary lube oil system was returned to service, an operator reported that the lube oil filter did not appear to be completely filled. The system engineer determined that there was not enough flow in the system and had the system strainer flushed and cleaned. When the auxiliary lube oil system was subsequently returned to service, the lube oil filter did not fill with the soakback pump running. The system engineer then added steps to the MAI to vent the filter by removing pressure gauges at the top of the filter housing. This was successful and the HPCS diesel generator was returned to service on July 18, 1999.

After draining the lube oil system, Procedure 04-1-01-P81-1, "High Pressure Core Spray Diesel Generator," Revision 45, Precaution 3.8 recommends running the soakback pump for 30 minutes and running the engine unloaded "to ensure complete filling of accessories [lube oil filter and heat exchanger] before any subsequent fast start is made." Vendor Manual 460000154, "Instruction Manual for [HPCS] Diesel Generator," stated that the soakback pump should be run for a "few hours to fill the filters, oil cooler and prelube turbocharger." MAI 258928 did not contain any guidance for the proper filling and venting of the lube oil filter. As a result, there was a delay of approximately 20 hours in returning the HPCS diesel generator to service.

M1.3 Conclusions to Conduct of Maintenance

Work performed during eight maintenance and surveillance activities observed was well performed and thorough. Technicians were experienced and knowledgeable of their assigned tasks and of equipment performance. Incomplete work instructions for the proper fill and vent of the auxiliary lube oil system for the HPCS diesel generator led to a delay of approximately 20 hours in returning the diesel generator to service.

III. Engineering

E1 Conduct of Engineering

E1.1 Balance of Plant Transformer 23 (37551)

Balance of plant Transformer 23 tripped on July 9, 1999. The transformer also tripped on August 4, 1997, May 22, 1997, and June 8, 1995. Each time, similar alarms came in and the ground overcurrent relay was found tripped. After the second trip in 1997, the licensee put together a Significant Event Response Team. The team conducted a detailed inspection of the equipment and the area, had equipment tested, and made a number of system improvements. With the exception of the trip in May 1997, when a tree limb was found in direct contact with one phase of the supply line, the team could not identify a root cause for the trips. The licensee had the right-of-way cleaned up and continued to maintain it. In response to the most recent trip, the licensee planned to

reinstall a digital fault recorder on the ground overcurrent relay to allow continuous monitoring of the feeder circuit. The licensee also planned to purchase faulted circuit indicators with a fast response option for installation at the transition pole and at the transformer. Lastly, the licensee planned to evaluate utilizing a fast bus transfer scheme for this application and to analyze the transformer circuitry to determine if other cables were inducing a current.

E1.2 Current Transformer Reversion

a. Inspection Scope (37551)

The inspectors reviewed the design engineering operability resolution input conducted in response to the discovery of a current transformer with degraded epoxy encapsulant in the Division I standby diesel generator breaker cubicle.

b. Observations and Findings

The operability resolution input summarized the actions, inspections, and evaluations conducted by engineering personnel in response to CR-GGN-1999-0668. This CR documented the degraded current transformer identified on June 28, 1999. The possibility of this problem was reported to industry in a 10 CFR Part 21 report in 1989. The report recommended that items encapsulated with the epoxy (in this case, current transformers) be inspected at 18-month intervals for signs of reversion from solid to liquid form. The report indicated that the material was still acceptable for use if a thumbnail could be pressed into the material leaving a small indentation. The degraded current transformer was replaced in January 1999 with a Unit 2 current transformer that passed the thumbnail test. Given this information, engineering personnel hypothesized that a localized temperature excursion or the storage history may have accelerated the reaction rate beyond that observed in the Part 21 report. None of the breaker inspections indicated an extreme temperature excursion that would adversely affect the switchgear. Temperature indicating strips were placed on the stabs of Breaker 152-1508 to determine whether a temperature difference existed between the phases. The measurement span of the strips did not allow such a low temperature to be measured (lowest temperature was 110ºF), but it verified that there was no detrimental high impedance connection on a single phase that could heat the bus.

Materials and functional testing was conducted on the most degraded current transformer removed in January 1999. The tests showed that the current transformer retained its functional capability at normal voltage conditions. The only deficiency identified was that the reverted current transformer did not pass a full impulse level rating test at 60 kV. Nevertheless, it did pass at 25 kV, indicating a margin of 5 times the normal application voltage. The incoming feeders to the bus are protected by station class lightning arresters to limit the voltage on the bus to 4.5 kV. Engineering personnel used the test results to determine that Breaker 152-1508 was acceptable for use through the end of Refueling Outage 10. The licensee planned to replace the Division I current transformers with current transformers not susceptible to reversion during Refueling Outage 10.

c. Conclusions

The engineering evaluation conducted to determine the impact on operability of the Division I standby diesel generator from recurrence of epoxy encapsulant breakdown on a breaker current transformer was well performed and technically sound.

E8 Miscellaneous Engineering Issues

E8.1 Completion of Year 2000 (Y2K) Readiness Review (2515/141)

Using Temporary Instruction 2515/141, "Review of Year 2000 Readiness of Computer Systems at Nuclear Power Plants," dated April 13, 1999, the inspectors reviewed aspects of the licensee's Y2K readiness program that were not completed by June 4, 1999. The inspectors reviewed the licensee's Y2K actions for the plant security and fire systems computer and the "Grand Gulf Y2K Integrated Contingency Plan," dated June 29, 1999. The results of this review will be included in a summary report to be issued in August 1999.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

During tours of the radiologically controlled area, the inspectors observed radiological postings and worker adherence to radiation protection procedures. Personnel followed radiation protection procedures, locked high radiation area doors were locked, and radiation and contamination areas were properly posted.

S1 Conduct of Security and Safeguards Activities

The inspectors observed security personnel practices and the condition of security equipment. Protected and vital area barriers were maintained in good condition. The isolation zones were free of obstructions, and the protected area illumination levels were good.

F2 Status of Fire Protection Facilities and Equipment

F2.1 Fire Pump Monthly Test

a. Inspection Scope (71750)

On July 13, 1999, the inspectors observed as auxiliary operators ran all three fire pumps in accordance with Procedure 06-OP-SP64-M-0001, "Fire Pump Monthly Operability Test," Revision 100.

b. Observations and Findings

The operators exhibited a good level of knowledge, followed the procedure and used good three-way communications throughout the test.

The inspectors made several observations during the pump runs. A jockey pump had a packing leak and had been flooding the floor around one pump. The rust and growth in the water indicated that the leak had existed a while. The header under the cooling water heat exchanger on the Train A diesel-driven fire pump had a build-up of corrosion on it. The drain line designed to contain the cooling water discharge from the Train B diesel engine cooler was too small to contain the large flow of water and allowed flooding of the room. Operators had to stand in a half inch pool of water to manipulate the controls in the local control panel. The operators believed that there was an open MAI on the jockey pump.

The inspectors discussed these items with the fire protection system engineer. The engineer stated that there were no open MAIs to address the items noted. He subsequently generated MAIs to address the specific concerns noted. The engineer explained that there was a problem with maintaining the system pressure because of system leaks, including a leaking discharge check Valve SP64F002A. As a result of the jockey pump cycling repeatedly to keep up with the loss of system pressure, operators had placed the jockey control pump in manual so that it ran continuously. The engineer recalled that this condition had existed since approximately October 1998 and that, although it had been worked on recently, the problem was not resolved. The engineer explained that maintenance personnel had found erosion on the valve seat, but had not repaired the problem because the valve could not be drained due to other leaks in the system. The engineer had written MAI 258539 to address the valve seat leakage after finding that the leak had not been fixed.

The inspectors reviewed open CRs and MAIs on the system. CR-GGN-1998-265 was opened in April 1998 to document that a 1996 condition identification had been closed without addressing the corrosion discussed above. The 1998 CR was closed with a note from planning and scheduling stating that there was no leak and the corrosion was never addressed. CR-GGN-1997-939 was written to address the poor drainage system for the diesels. The CR was closed January 8, 1998, when an engineering request (ER 98/0006) was generated to address the problem. No action had been taken on the ER, and the personnel safety concern of standing in water while operating equipment was never addressed. The licensee acknowledged the safety concern and discussed temporary action that could be taken until the drainage problem could be addressed.

c. Conclusions

Although the ability of the fire protection system to perform its safety function was not affected, the overall integrity of the system and the material condition of the jockey pump were poor. The corrective actions taken in response to the deficiencies were untimely and ineffective in that system leakage was allowed to decay to the point that the jockey pump now ran continuously. This condition has existed since October 1998 and has not been repaired to date.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on July 28, 1999. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Bottemiller, Superintendent, Plant Licensing
R. Carroll, Superintendent, Operations
D. Cupstid, Manager, Operations Technical Support
B. Edwards, Manager, Planning and Scheduling
C. Ellsaesser, Manager, Corrective Action and Accessmeant
C. Lambert, Director, Design Engineering
L. Moulder, , Manager, Maintenance
W. Shelly, Manager, Training and Emergency Planning
C. Stafford, Manager, Plant Operations
J. Venable, General Manager, Plant Operations

NRC

P. Sekerak, NRR Project Manager

INSPECTION PROCEDURES USED

37551	Onsite Engineering
61726	Surveillance Observations
62707	Maintenance Observation
71707	Plant Operations
71750	Plant Support Activities
TI 2515/141	Year 2000 Program Review