UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

July 28, 2003

George A. Williams, Vice President
Operations - Grand Gulf Nuclear Station
Entergy Operations, Inc.
P.O. Box 756
Port Gibson, Mississippi 39150

SUBJECT: GRAND GULF NUCLEAR STATION - NRC INSPECTION INTEGRATED REPORT 50-416/2003-02

Dear Mr. Eaton:

On June 28, 2003, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Grand Gulf Nuclear Station. The enclosed integrated inspection report documents the inspection findings, which were discussed on July 2, 2003, with you and other members of your staff.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

This report documents one finding of very low safety significance (Green), evaluated under the risk significance determination process (SDP), which was determined to involve violations of NRC requirements. However, because of the very low safety significance and because it was entered into your corrective action program, the NRC is treating this finding as a noncited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest the NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011-4005; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Grand Gulf Nuclear Station facility.

Since the terrorist attacks on September 11, 2001, NRC has issued five Orders and several threat advisories to licensees of commercial power reactors to strengthen licensee capabilities, improve security force readiness, and enhance controls over access authorization. In addition to applicable baseline inspections, the NRC issued Temporary Instruction 2515/148, "Inspection of Nuclear Reactor Safeguards Interim Compensatory Measures," and its subsequent revision, to audit and inspect licensee implementation of the interim compensatory measures required by order. Phase 1 of TI 2515/148 was completed at all commercial nuclear power plants during Calender Year 2002 and the remaining inspection activities for Grand Gulf Nuclear Station were completed December 6, 2002. The NRC will continue to monitor overall safeguards and security controls at Grand Gulf.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

/RA/

William D. Johnson, Chief
Project Branch A
Division of Reactor Projects

Docket: 50-416
License: NPF-29

Enclosure:
Inspection Report 50-416/03-02
w/Attachment: Supplemental Information

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DPC: DMB (A045)

ADAMS: √ Yes ☐ No Initials: __WDJ__
√ Publicly Available ☐ Non-Publicly Available ☐ Sensitive √ Non-Sensitive

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RIV:RI:DRP/A	SRI:DRP/A	PE:DRP/A	C:DRS/PSB	DRS/PSB
RWDeese	TLHoeg	JMKeeton	TWPruett	GAPick
E-WDJ	T-WDJ	T-WDJ	/RA/	
07/22/03	07/23/03	07/18/03	07/22/03	NA

RIV:RI:DRP/E	SPE:DRP/A			C:DRP/A
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07/28/03	07/ /03			07/23/03

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	50-416
License:	NPF-29
Report:	50-416/03-02
Licensee:	Entergy Operations, Inc.
Facility:	Grand Gulf Nuclear Station (GGNS)
Location:	Waterloo Road Port Gibson, Mississippi 39150
Dates:	March 30 through June 28, 2003
Inspectors:	T. L. Hoeg, Senior Resident Inspector R. W. Deese, Resident Inspector T. W. Jackson, Resident Inspector - Diablo Canyon J. M. Keeton, Project Engineer R. E. Lantz, Senior Emergency Preparedness Inspector G. A. Pick, Senior Physical Security Inspector
Approved By:	W. D. Johnson, Chief Reactor Projects Branch A Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000416/2003-002; 03/30/02 - 06/28/03; Grand Gulf Nuclear Station; Agastat relay special inspection unresolved item closure.

The report covered a 13-week period of inspection by resident inspectors and regional reactor safety inspectors. One Green noncited violation was identified. The significance of any findings are indicated by their color (Green, White, Yellow, or Red) using IMC 0609 "Significance Determination Process." Findings for which the Significance Determination Process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a noncited violation of Criterion III of Appendix B to 10 CFR Part 50 for failure to assure adequate design controls were in place such that Agastat® General Purpose relays would be replaced prior to exceeding their design basis life. As a result, 15 out of 17 failed relays in an 18 month period had exceeded their design basis lives; including 4 relays having one or more contacts that would not perform their safety actuation.

  This finding is greater than minor because, if the condition were left uncorrected it would become a more significant safety concern. Specifically, the affected safety-related systems would have a lower reliability and availability since the failure rate of relays used beyond their service life is significantly higher than those relays that are within their service life. A Significance Determination Process, Phase 3 analysis was performed by the Senior Reactor Analyst in Region IV. It considered the impact of the 4 relays that failed to initiate functions. The 4 relays impacted standby service water to the control room air conditioning system and five containment/drywell isolation valves. The analysis was based on a set of core damage sequences that would initiate from normal operations, but only progress given a loss-of-offsite-power or a loss-of-coolant-accident. The core damage sequence would continue only if the loss of control room air conditioning progressed to a point that control room instrumentation began to fail as a result of high temperatures and operators were required to evacuate the control room. Finally, for core damage to occur, operators would have had to fail to properly shutdown the reactor from the alternate shutdown panel. The analysis indicated that, given this core damage sequence, the estimated change in core damage probability was 7.0×10^{-8}, and the change in large early release probability was 1.4×10^{-8}. The conclusion of this analysis characterized the performance deficiency as an issue of very low safety significance. The licensee implemented an aggressive campaign to replace the affected relays. (Section 4OA5)

B. Licensee-Identified Violations

A violation of very low safety significance, which was identified by the licensee, has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and its corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

The Grand Gulf Nuclear Station (GGNS) began this inspection report period at 100 percent power and was operated at or near there until April 24, when an automatic scram occurred caused by an unplanned closure of Disconnect J5205 . The plant returned to 100 percent power on April 29, and remained there until May 22, when power was lowered to 58 percent in response to an isolation of the Division II containment and drywell penetrations. The plant was returned to full power later that day and remained there throughout the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

During the week of May 5, 2003, the inspectors reviewed off-normal event Procedure 05-1-02-VI-2, "Hurricanes, Tornados, and Severe Weather," Revision 105, to verify appropriate preparations for severe weather had been made. This review included verifications of activities prescribed by plant management to protect the electrical switchyard, emergency diesel generators, and service water systems from potential airborne debris created by equipment stored on site.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignments

a. Inspection Scope

Partial System Walkdowns. The inspectors performed three partial system walkdowns of systems important to reactor safety during this inspection period in order to verify the operability of the systems. The inspectors reviewed system operating instructions and required system valve and breaker lineups and then compared them to operator logs, system control room indications, valve positions, breaker positions, and control circuit indications to verify these components were in their required configuration for making their systems operable. The following walkdown inspections were conducted:

- On May 21, 2003, the inspectors walked down Train A of the control rod drive system while the control rod drive Pump B was out of service for maintenance.

- On June 10, 2003, the inspectors walked down the fire water system while diesel driven fire Pump A was out of service for maintenance and testing.

On June 20, 2003, the inspectors walked down the component cooling water system while Train B of the standby service water system was out of service for planned maintenance.

Complete System Walkdown. The inspectors conducted a detailed review of the alignment and condition of the high pressure core spray system including the Division III electrical power distribution system to determine if there were any discrepancies between the actual equipment alignment versus what was procedurally required. During the walkdown, System Operating Instruction 04-1-01-E22-1, "High Pressure Core Spray System," Revision 105, was used by the inspectors to verify major system components were correctly labeled and aligned. The inspectors also reviewed open condition reports on the system for any deficiencies that could affect the ability of the system to perform its design function. Documentation associated with control room deficiencies, temporary modifications, operator workarounds, and items tracked by plant engineering were also reviewed to assess their collective impact on system operation.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

Quarterly Tours. The inspectors reviewed area fire plans and performed walkdowns of six plant areas to assess the materiel condition and operational status of fire detection and suppression systems and equipment; the materiel condition of fire barriers; and the control of transient combustibles. Specific risk-significant plant areas included:

- Division II engineered safety features switchgear Room 1A308
- Division II heating, ventilating, and air conditioning Room OC303
- Division II switchgear Room 0C215
- Electrical penetration Room 1A320
- Reactor core isolation cooling Room 1A104
- Reactor plant vibration monitor Room 1A319

Annual Drill Observation. On April 16, 2003, the inspectors observed a fire brigade drill staged in Room 0C707, Reactor Protection System Motor Generator A Room, to evaluate the readiness of the fire brigade to fight fires. The inspectors reviewed the strategies and information in Fire Pre-plan C-18, "Reactor Protection System Motor Generator A Room Motor, Room 0C707, Area 25A," Revision 1, to verify if it was consistent with the fire protection design features, fire area boundaries, and combustible loading assumptions shown in the fire protection plan. The inspectors observed the fire brigade members: (1) donning protective clothing, (2) selecting turnout gear, (3) entering the fire zone, and (4) communicating with the control room staff. The inspectors observed the fire fighting equipment brought to the fire scene to evaluate

whether sufficient equipment was available for the simulated fire. The inspectors also observed fire fighting directions and radio communications between the brigade leader, brigade members, and the control room.

b. Findings

No findings of significance were identified.

1R06 Flood Protection

a. Inspection Scope

During the week of June 2, 2003, the inspectors reviewed internal flooding protection features and off-normal event Procedure 05-1-02-VI-1, “Flooding,” Revision 102, dealing with the potential flooding of the circulating water pump area and its likelihood of initiating a unplanned down-power event. The inspectors reviewed internal flooding vulnerabilities and the protective features installed to mitigate the impact of any flooding.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the documentation associated with the thermal performance testing of engineered safety features room Cooler 1T46B001B. Specifically, the inspectors reviewed Maintenance Action Item (MAI) 330187 documentation which controlled the cooler performance tests performed on April 6, 2003. In this inspection effort, the inspectors reviewed the test acceptance criteria, as well as the results of the test to determine acceptability of the cooler to perform its design function.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

On May 8, 2003, the inspectors observed one simulator scenario during licensed operator requalification training to assess the licensee's effectiveness in conducting the requalification program and to verify that licensed individuals received the appropriate level of training required to maintain their licenses. The inspectors also observed the post-training critique conducted by the training instructors and the shift manager to

verify that weak areas observed during simulator operations were appropriately identified for additional training.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors reviewed performance-based problems involving three selected in-scope structures, systems, or components (SSCs) to assess the effectiveness of the Maintenance Rule Program. Reviews focused on: (1) proper Maintenance Rule scoping in accordance with 10 CFR 50.65; (2) characterization of failed SSCs; (3) safety significance classifications; (4) 10 CFR 50.65 (a)(1) and (a)(2) classifications; and, (5) the appropriateness of performance criteria for SSCs classified as (a)(2), and goals and corrective actions for SSCs classified as (a)(1). Also, the inspectors reviewed the system functional failures for the last two years. The following systems were reviewed:

- Drywell monitoring system
- Fire protection system
- Standby gas treatment system

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

Throughout the inspection period, the inspectors reviewed weekly and daily work schedules to determine when risk-significant activities were scheduled. The inspectors discussed six selected activities with operations and work control personnel regarding risk evaluations and overall plant configuration control. The inspectors discussed emergent work issues with work control center personnel and reviewed the prioritization of scheduled activities. The inspectors verified the performance of plant risk assessments related to planned and emergent maintenance activities as required by 10 CFR 50.65(a)(4) and plant Procedure 01-S-18-6, "Risk Assessment of Maintenance Activities," Revision 1. Specific maintenance items reviewed during this period included:

- MAI 318951, Standby service water system Train A mechanical maintenance
- MAI 319366, Reactor core isolation cooling system mechanical maintenance
- MAI 328913, Control rod drive Pump B maintenance
- MAI 329272, Component cooling water Pump A mechanical maintenance
- MAI 330381, Division III emergency diesel generator mechanical maintenance

- MAI 331876, Unit 1 instrument air compressor electrical maintenance

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-Routine Evolutions and Events

a. Inspection Scope

For the three non-routine events described below, the inspectors observed operator actions during the events. The inspectors also reviewed operator logs, plant computer data, and strip charts to determine what occurred and how the operators responded, and to determine if the response was in accordance with plant procedures.

- On April 24, 2003, the inspectors observed control room personnel performance while responding to a switchyard transient which isolated loss of Service Transformer 21 and the west 500 kVolt switchyard bus resulting in a reactor scram. The licensee determined that the transient was initiated when wind blew down Disconnect J5205 which was previously opened for maintenance. The inspectors observed licensee operators attempt to restore the power conversion system, restore the instrument air system, control reactor vessel water level with the reactor core isolation cooling system, and control reactor pressure during the plant cooldown with the safety relief valves.

- From April 27-29, 2003, the inspectors observed the licensee performing a reactor startup while in Mode 2 of operation. Initially the inspectors observed operators starting up the reactor with air in the control rod drive system which was introduced during the scram on April 24. Because this air caused use of procedural steps which required significantly more time to withdraw individual control rods, the licensee inserted all control rods and thoroughly vented the control rod drive system. After this, the inspectors observed portions of reactor startup as the control room reactor operators sequentially withdrawing control rods to obtain criticality.

- On May 22, 2003, the inspectors observed operators response to a Division II isolation of the containment and drywell penetrations. Operators reduced reactor power to 58 percent in accordance to off-normal event Procedure 05-1-02-V-11, "Loss of Plant Service Water," Revision 22. The inspectors also observed operators implementing off-normal event procedure 05-1-02-III-5, "Automatic Isolations," Revision 35 and off-normal event procedure 05-1-02-III-3, "Reduction in Recirculation System Flow Rate," Revision 103. The licensee determined that the isolation occurred after a fuse for the Division II containment and drywell penetration circuit blew due to failed Agastat Relay M71-R22. The inspectors observed the actions to replace the blown fuse and return the plant to full power on May 22.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors selected four operability evaluations conducted by GGNS personnel during the report period involving risk-significant SSCs. The inspectors evaluated the technical adequacy of the operability determinations, determined whether appropriate compensatory measures were implemented, and determined whether GGNS personnel considered all other pre-existing conditions, as applicable. Additionally, the inspectors evaluated the adequacy of the GGNS's problem identification and resolution program as it applied to operability evaluations. Specific operability evaluations reviewed are listed below.

- CR-GGN-2003-0706, Main turbine electro-hydraulic control system resin intrusion
- CR-GGN-2003-1141, Engineered safety features room cooler 1T46B001B flow
- CR-GGN-2003-1351, Excessive reactor vessel heat-up and cooldown rates
- CR-GGN-2003-1684, Improper fuses for Division II containment / drywell isolation logic

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds

a. Inspection Scope

On May 28, 2003, the inspectors evaluated the cumulative effects of all the plant's significant operator workarounds for the following attributes: (1) the reliability, availability, and potential for mis-operation of safety-related systems; (2) the ability of the operators to respond in a correct and timely manner to plant transients and accidents; and (3) the potential for increasing an initiating event frequency or affecting multiple mitigating systems.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed a permanent plant modification completed on the Division III emergency diesel generator thrust bearing oil level sight glass. The modification moved the location of the sight glass to end the loss of lube oil inventory through the sight glass when foaming would occur. The inspectors reviewed design change Package ER-2003-0116 in order to verify the new sight glass location was acceptable under accident and seismic conditions. The inspectors also verified the modification did not degrade the design bases, licensing basis, or performance capability of the high pressure core spray diesel generator and its lube oil system.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing

a. Inspection Scope

The inspectors reviewed postmaintenance test procedures and associated testing activities for six selected risk-significant mitigating systems. In each case, the associated work orders and test procedures were reviewed against the attributes in Inspection Procedure 71111, Attachment 19, to determine the scope of the maintenance activity and determine if the testing was adequate to verify equipment operability. The reviewed activities were:

- MAI 329868, Component cooling water Pump C maintenance
- MAI 330271, High pressure core spray diesel generator maintenance
- MAI 332353, Standby service water Pump B discharge valve restoration
- MAI 332355, Residual heat removal heat Exchanger B outlet isolation valve restoration
- MAI 333334, Division I containment / drywell isolation logic maintenance
- MAI 333435, Motor driven fire pump electrical maintenance

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed performance of surveillance test procedures and reviewed test data of six selected risk-significant SSCs to assess whether the SSCs satisfied the Technical Specifications, the Updated Final Safety Analysis Report, the Technical Requirements Manual, and licensee procedural requirements; and, to determine if the testing appropriately demonstrated that the SSCs were operationally ready and capable of performing their intended safety functions. The following tests were inspected:

- 06-OP-1C11-W-0001, "Control Rod Operability," Revision 102
- 06-OP-1E12-Q-0025, "Residual Heat Removal Subsystem C Quarterly Functional Test," Revision 108
- 06-OP-1P41-Q-004, "Standby Service Water Loop A Valve and Pump Operability Test," Revision 112
- 06-OP-1P75-M-0002, "Standby Diesel Generator 12 Functional Test," Revision 118
- 06-OP-1R21-M-0002, "Division I Load Shedding and Sequencing Functional Test," Revision 101
- 06-RE-1B33-D-0001, "Jet Pump Functional Test," Revision 106

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the two temporary alterations listed below to assess the following attributes: (1) the adequacy of the safety evaluation; (2) the consistency of the installation with the modification documentation; (3) the updating of drawings and procedures, as applicable; and (4) the adequacy of the post-installation testing.

- No. 2003-0001, Service Transformer 11 trouble alarm modification
- No. 2003-0002, Electro-hydraulic control pall unit trip logic changes

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

The inspector performed an in-office review of the Grand Gulf Emergency Plan, Revision 49 against the previous revisions and 10 CFR 50.54(q) to determine if the revision decreased the effectiveness of the emergency plan. This change added definitions of Emergency Preparedness Owner Controlled Area and non-essential personnel, updated three letters of agreement, and made other minor administrative corrections.

b. Findings

No findings of significance were identified.

1EP6 Drill Observation

a. Inspection Scope

On June 18, 2003, the inspectors observed a planned licensee emergency preparedness quarterly drill. The inspectors reviewed the drill scenario to determine if it reflected realistic plant configurations. The inspectors observed GGNS personnel at various locations during the exercise including the Control Room Simulator, the Technical Support Center, the Emergency Operations Facility, and the Operations Support Center. The inspectors primarily focused on the ability of the emergency response organization to properly classify the simulated emergency through recognition of emergency action levels, their ability to activate the station emergency plan and procedures, and their ability to make proper and timely notifications as appropriate.

b. Findings

No findings of significance were identified.

3. SAFEGUARDS

Cornerstone: Physical Protection

3PP4 Security Plan Changes

a. Inspection Scope

The inspector reviewed the following plan changes to determine if requirements of 10 CFR 50.54 (p) were met:

- Physical Security Plan, Revision 33, dated September 27, 2002, which documented a change to shift staffing, modified the method to verify military service employment, replaced contingency weapons, and several other administrative changes

- Training and Qualification Plan, Revision 9, dated September 27, 2002, which reflected a change in the contingency weapon used by personnel

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

a. Inspection Scope

The inspectors sampled licensee submittals for the performance indicators (PIs) listed below for the period from April 2002 through March 2003. To verify the accuracy of the PI data reported during the period, PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 2, were used to verify the basis in reporting for each element.

Reactor Safety Cornerstone

The inspectors reviewed operator log entries, chemistry log entries, daily shift manager reports, plant computer data, condition reports, maintenance action item paperwork, maintenance rule data, and PIs data sheets to determine whether the licensee adequately verified the three PIs listed below during the previous four quarters. This number was compared to the number reported for the PI during the current quarter. Also, the inspectors interviewed licensee personnel responsible for compiling the information.

- Unplanned power changes per 7,000 critical hours
- Reactor coolant system specific activity
- Safety system functional failures

b. Findings

No findings of significance were identified.

4OA2 Problem Identification and Resolution

1. Annual Sample Review

a. Inspection Scope

The inspectors selected two issues for detailed reviewed. The first dealt with the failure of Agastat Relay M71-R22 on May 22, 2003, which blew a fuse that initiated Division II of the drywell and containment isolation system. The second assessed the multiple equipment problems associated with the motor driven fire pump which caused its increased unavailability between April 24-May 6, 2003. The inspectors reviewed these issues to ensure that the full extent of the issues were identified, an appropriate evaluation was performed, and appropriate corrective actions were specified and prioritized. The inspectors evaluated the condition reports against the requirements of the licensee's corrective action program as delineated in administrative procedure LI-102, “Corrective Action Process,” Revision 2 and 10 CFR 50, Appendix B.

b. Findings and Observations

No findings of significance were identified.

4OA3 Event Followup

(Closed) Licensee Event Report 50-416/03-002-00, "Reactor Scram Due to a Partial Loss of Offsite Power"

On April 24, 2003, the licensee experienced an unplanned automatic scram. Disconnect J5205, which had been opened for maintenance, was blown shut, thereby initiating a swtichyard transient which caused a load reject of the main generator. This load reject initiated a turbine control valve fast closure signal and therefore a reactor protection system scram. This LER was reviewed by the inspectors and no findings of significance were identified. A special inspection was conducted after this scram and documented in NRC Inspection Report 50-416/2003-07. The licensee documented problems associated with the scrams in Condition Reports CR-GGN-2003-1340, CR-GGN-2003-1345, CR-GGN-2003-1350, CR-GGN-2003-1351, CR-GGN-2003-1355, and CR-GGN-2003-1357.

4OA5 Other

(Closed) Unresolved Item 50-416/03-06-01: Failure to Apply Adequate Design Control Measures Lead to Increased Agastat® Relay Failure Rate.

Introduction. A Green NCV was identified by the inspectors for the failure to apply adequate design control measures as required by 10 CFR Part 50, Appendix B, Criterion III, leading to an increased number of Agastat® Relay failures in safety-related systems.

Description. During inspection 50-416/2003-06, the inspectors observed that 227 Agastat® Relays had been allowed to operate beyond their analyzed service life of 10 years. The independent failure of two normally-energized Agastat® Relays on November 17, 2002, caused operators to declare both trains of the standby service water (SSW) system inoperable. With both trains of SSW declared inoperable, Technical Specification Action Statement 3.7.1.E requires the reactor be in Mode 3 in

12 hours. As a result of the two relay failures, and 11 other Agastat® Relay failures discovered during Refueling Outage RFO12, plant personnel initiated Condition Report CR-GGN-2002-2426 to identify the cause of the relay failures. Plant personnel determined the cause of the normally-energized, Agastat® Relay failures to age-related degradation. Condition Report CR-GGN-2002-2426 noted that the service life of normally-energized, Agastat® Relays was 10 years, as analyzed in Calculation EC-Q1111-88002, “Thermal Life of Agastat Relays,” Revision 1. However, over a period of 18-months, 15 out of 17 failed Agastat® Relays had exceeded their service life.

The use of normally-energized Agastat® Relays beyond their analyzed service life was caused by several factors. First, an expectation that allowed routine maintenance tasks to be completed between the due and late dates allowed Agastat® Relays to exceed their service life. This expectation was formalized in Procedure 01-S-17-11, "Repetitive Task Program," Revision 5. With respect to normally-energized Agastat® Relays, the due date for replacement was 10 years and the late date was automatically assigned by the repetitive task program as 12.5 years.

Another contributing factor to the increased failure rate of Agastat® Relays was the exclusive use of the Agastat® Relay failure rate of 1E-6 relay failures per hour, without considering other relevant information. Since there were approximately 1700 Agastat® Relays in the plant, and using the limiting failure rate, the licensee engineers calculated that 22 relay failures per cycle was within their design basis. General Electric Purchase Part Drawing 169C9489 listed the Agastat® Relay failure rate as 1E-6 relay failures per hour. However, the inspectors noted that the same document also listed the service life as 10 years, and it did not specify whether the data applied to normally-energized or normally de-energized applications. The inspectors also discovered that engineering personnel had not documented their engineering basis for allowing Agastat® Relays to exceed 10 years of service life. Therefore inspectors determined that licensee personnel had not applied the same design control measures as applied in Calculation EC-Q1111-88002 when they allowed the relays to exceed 10 years of service life.

Analysis. The finding was determined to be more than minor since the failure to apply proper design control measures, if left uncorrected, would lead to a more significant safety concern. Specifically, the failure to apply adequate design control measures reduced the reliability and availability of mitigating systems due to an increased probability of failure from those Agastat® Relays that had exceeded their service life. The finding was assessed in accordance with NRC Inspection Manual Chapter 0609, "Significance Determination Process". In the assessment, the inspectors only considered those relays that had greater than 10 years of service life and failed to transition from the normally-energized state to the de-energized state (i.e., failure to transition to the safe state). The inspectors determined that 4 relays met this criteria, and they affected SSW to the control room air conditioning system and containment/drywell isolation. The Significance Determination Process (SDP) Phase 1 worksheet directed the inspectors to perform a SDP Phase 2 analysis since both the mitigating system and barrier integrity cornerstones were impacted by the relay failures.

A SDP Phase 2 analysis could not be performed since it did not model containment isolation valves. Therefore, a SDP Phase 3 analysis was required.

The SDP Phase 3 analysis was performed by the Senior Reactor Analyst from Region IV. The analysis was based on a set of core damage sequences that would initiate from normal operations, but only progress given a loss-of-offsite-power or a loss-of-coolant-accident. The core damage sequence would continue only if the loss of control room air conditioning progressed to a point that control room instrumentation began to fail as a result of high temperatures, and operators were required to evacuate the control room. Finally, for core damage to occur, operators would have had to fail to properly shutdown the reactor from the alternate shutdown panel. The analysis indicated that, given this core damage sequence, the estimated change in core damage probability was 7.0×10^{-8}, and the change in large early release probability was 1.4×10^{-8}. The conclusion of the analysis characterized the performance deficiency as an issue of very low safety significance (Green).

Enforcement. 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, that design changes, including field changes, shall be subject to design control measures commensurate with those applied to the original design. In this case, the licensee failed to apply design control measures commensurate with the previous Agastat® Relay service life calculations performed by the licensee and the vendors, including documentation of the licensee's basis for changing the service life. Because this failure to apply design control measures is of very low safety significance and has been entered into the corrective action program as CR-GGN-2002-2426, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000416/2003-002-01, Failure to Apply Adequate Design Control Measures Leads to Increased Agastat Relay Failure Rate.

4OA6 Meetings, including Exit

On January 3, 2002, the inspector presented the inspection results of the review of security plan changes to Mr. Steve Kinne telephonically who licensee acknowledged the information presented.

On May 14, 2003, the inspector presented the inspection results of the review of emergency plan changes to Mr. M. Guynn telephonically who acknowledged the findings.

On July 2, 2003, the resident inspectors presented the inspection results to Mr. J. Brad Edwards, General Manager of Plant Operations, and other members of the Grand Gulf Nuclear Station staff who acknowledged the findings.

The inspectors confirmed that proprietary information was not provided or examined during the inspections.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as an NCV.

10 CFR 50, Appendix B, Criterion V requires the licensee to accomplish activities affecting quality in accordance with procedures. On May 30, 2003, licensee personnel restored Train A of the standby gas treatment system after performing maintenance on the system without performing a prescribed post maintenance test procedure for the intake damper valve to verify its proper operation. This was described in the licensee's corrective action program in Condition Report CR-GGN-2003-1729. Because the finding only represented a potential degradation of the radiological barrier function of the standby gas treatment system, this violation is not of more than very low significance, and is being treated as a noncited violation.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

D. Barfield, Manager, System Engineering
C. Bottemiller, Manager, Plant Licensing
B. Bryant, Supervisor, Chemistry
J. Czaika, Nuclear Specialist, South Mississippi Electric Power Association
K. Christian, Superintendent, Mechanical Maintenance
J. Edwards, General Manager, Plant Operations
C. Ellsaesser, Manager, Planning and Scheduling
R. Green, Acting Manager, Training
M. Guynn, Manager, Emergency Preparedness
C. Holifield, Senior Licensing Engineer
R. Moomaw, Manager, Outage Planning and Scheduling
L. Patterson, Manager, Site Business Services
J. Roberts, Director, Nuclear Safety Assurance
J. Robertson, Manager, Quality Assurance
M. Rohrer, Manager, Maintenance
G. Sparks, Manager, Operations
W. White, Manager, Materials, Procurement, and Contracts
G. Williams, Vice President, Operations
D. Wiles, Director, Engineering
R. Wilson, Superintendent, Radiation Protection
H. Yeldell, Manager, Design Engineering

NRC personnel

D. Loveless, Senior Risk Analyst, Region IV

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Closed

50-416/03-06-01	URI	Failure to Apply Adequate Design Control Measures Lead to Increased Agastat Relay Failure Rate
05000416/2003-002-00	LER	Reactor Scram Due to a Partial Loss of Offsite Power

Opened and Closed

05000416/2003-002-01	NCV	Failure to Apply Adequate Design Control Measures Leads to Increased Agastat Relay Failure Rate

LIST OF DOCUMENTS REVIEWED

Procedures

Administrative Procedure 01-S-17-22, “Maintenance Rule Program,” Revision 3

Administrative Procedure LI-102, “Corrective Action Process,” Revision 2

Entergy System Policies and Procedures, "Drugs, Alcohol, Firearms, and Weapons," dated April 15, 2003

Equipment Performance Instruction 04-1-03-T46-2, "ESF Switchgear Room Coolers Flow Test," Revision 16

Off-normal Event Procedure 05-1-02-V-12, "Condensate High Conductivity," Revision 18

Maintenance Procedure, "Troubleshooting," Revision 3

Maintenance Rule Desk Top Guide, Revision 1

Special Test Instruction STI-GG-2003-007, "Manual Positioning of High Pressure Turbine Control Valve N11F026C Using the ATT Motor," Revision 0

Surveillance Test Procedure 06-OP-1T48-Q-0002, "Standby Gas Treatment Valve Test A Train," Revision 102

Condition Reports

2002-2300	2003-0500	2003-1067	2003-1462
2002-2374	2003-0553	2003-1132	2003-1480
2003-0056	2003-0592	2003-1135	2003-1676
2003-0076	2003-0598	2003-1141	2003-1682
2003-0100	2003-0603	2003-1151	2003-1684
2003-0102	2003-0750	2003-1238	2003-1722
2003-0152	2003-0853	2003-1350	2003-1729
2003-0218	2003-1056	2003-1417	2003-1745
2003-0350	2003-1058	2003-1424	

Maintenance Action Items

317051	328596	330841	332506
321274	328999	330842	333031
321317	329264	331775	333032
322526	330064	331854	333405
326070	330381	331541	333435
327225	330529	332032	333953
327431	330839	332146	334052
328276	330840		

Other Miscellaneous Documents

Engineering Request ERT-GG-2000-0859-02-03, "Leading Edge Flow Meter Check Plus Software Upgrades," Revision 0

Engineering Request ER-GG-2000-0072-001, "Auxiliary Building Roll-up Door," Revision 1

Tracking LCO Report 03-0416, "Motor Driven Fire Pump," dated April 25, 2003

Tracking LCO Report 03-0458, "Motor Driven Fire Pump," dated May 3, 2003

Standing Order 03-0009, "Instructions for Restarting Instrument Air Compressors with NO Seal or Control Air Pressure," dated May 23, 2003

Standing Order 03-0005, "Contingency Supply of Division III Diesel Generator Thrust Bearing Oil," dated March 14, 2003

Grand Gulf Fire Pre-plans, Revision 11

Calculation

MC-Q1111-90207, "Evaluate the Thermal Cycles Experienced by the Bottom Head Drain, the Recirculation Suction Lines A and B, and Vessel Head During the Scrams Recorded at GGNS," Revision 00, Supplement 6