



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

February 5, 2007

William R. Brian, Vice President
of Operations
Grand Gulf Nuclear Station
Entergy Operations, Inc.
P.O. Box 756
Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION - NRC INTEGRATED INSPECTION
REPORT 05000416/2006005

Dear Mr. Brian:

On December 31, 2006, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Grand Gulf Nuclear Station facility. The enclosed inspection report documents the inspection findings, which were discussed on January 10, 2007, with you and other members of your staff.

The 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. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents two self-revealing findings of very low safety significance (Green). One of the findings 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 the finding as a noncited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest this NCV, 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.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection

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-2-

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).

Sincerely,

/RA/

Michael C. Hay, Chief
Project Branch C
Division of Reactor Projects

Docket: 50-416
License: NPF-29

Enclosure:
Inspection Report 05000416/2006005
w/Attachment: Supplemental Information

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-3-

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-4-

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SUNSI Review Completed: _wcw_ ADAMS: Yes No Initials: _wcw_
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RIV:RI:DRP/C	SRI:DRP/C	C:DRS/OB	C:DRS/EB1
AJBarrett	GBMiller	ATGody	WBJones
<i>E - WCWalker</i>	<i>E - WCWalker</i>	<i>/RA/</i>	<i>/RA/</i>
2/5/07	1/26/07	1/26/07	1/27/07
C:DRS/EB2	C:DRP/C		
LJSmith	MCHay		
<i>/RA/</i>	<i>/RA/</i>		
1/29/07	2/5/07		

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket: 50-416

Licenses: NPF-29

Report No.: 05000416/2006005

Licensee: Entergy Operations, Inc.

Facility: Grand Gulf Nuclear Station

Location: Waterloo Road
Port Gibson, Mississippi 39150

Dates: October 1 through December 31, 2006

Inspectors: G. Miller, Senior Resident Inspector
A. Barrett, Resident Inspector
P. Elkmann, Emergency Preparedness Inspector

Approved By: Michael C. Hay, Chief
Project Branch C
Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000416/2006005; 10/1/06 - 12/31/06; Grand Gulf Nuclear Station; Postmaintenance Testing, Followup of Events and Notices of Enforcement Discretion

This report covered a 3-month period of inspection by resident inspectors and Regional office inspectors. The inspection identified two Green findings, one of which was a noncited violation. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter 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's 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: Initiating Events

- Green. The inspectors reviewed a Green, self-revealing finding for failure to implement preventive maintenance on the bus duct cooling system components prior to system failures, causing a plant transient. The licensee entered this into their corrective action program as Condition Report CR-GGN-2006-3996.

The finding is more than minor since it affects the equipment performance attribute of the initiating events cornerstone and affects the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions. Using the NRC Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding has a very low safety significance since it did not contribute to the likelihood of a loss of coolant accident, did not contribute to a loss of mitigation equipment, and did not increase the likelihood of a fire or internal/external flood (Section 4OA3).

Cornerstone: Mitigating Systems

- Green. The inspectors reviewed a Green, self-revealing, noncited violation of Technical Specification 5.4.1(a) for failure to follow station maintenance procedures while troubleshooting the control rod drive Pump A hand switch green indicating light socket. The licensee entered this into their corrective action program as Condition Report CR-GGN-2006-4474.

The finding is more than minor since it affects the human performance attribute of the mitigating systems cornerstone and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Additionally, improper maintenance practices on control room equipment could lead to a more significant safety concern. Using the NRC Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, inspectors determined that the finding has very low safety significance because it did not result in a loss of safety function. This finding has a crosscutting aspect in the area of

human performance associated with work practices in that licensee personnel proceeded to troubleshoot the bulb in the face of uncertainty surrounding the required bulb type and expected system response (Section 1R19).

B. Licensee-Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Grand Gulf Nuclear Station (GGNS) began the inspection period at 100 percent rated power. On November 8, 2006, power was reduced to approximately 75 percent due to high temperature on the generator to main transformer bus duct. Power was increased to 100 percent on November 9. On December 19 and 22, 2006, short duration power reductions to approximately 95 percent power were performed due to emergent maintenance on a condensate booster pump. On December 23, the plant reduced power to 80 percent due to a loss of feedwater heating event. The plant returned to 100 percent power on December 25. Other than the above noted events, the plant remained at or near full rated thermal power, except for planned control rod pattern adjustments and control rod drive maintenance and testing.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

Readiness For Impending Adverse Weather Conditions

a. Inspection Scope

On October 16, 2006, the inspectors completed a review of the licensee's readiness for impending adverse weather involving severe thunderstorms. The inspectors: (1) evaluated implementation of the adverse weather preparation procedures and compensatory measures for the affected conditions before the onset of adverse weather conditions; (2) reviewed plant procedures, the Updated Final Safety Analysis Report (UFSAR), and Technical Specifications (TSs) to ensure that operator actions defined in adverse weather procedures maintained the readiness of essential systems; (3) reviewed maintenance records to determine that applicable surveillance requirements were current before the anticipated severe thunderstorms developed; and (4) reviewed plant modifications, procedure revisions, and operator workarounds to determine if recent facility changes challenged plant operation.

Documents reviewed by the inspectors included:

- Off-Normal Event Procedure 05-1-02-VI-2, "Hurricanes, Tornados, and Severe Weather," Revision 106
- Corporate Procedure ENS-EP-302, "Severe Weather Response," Revision 4

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial System Walkdowns

a. Inspection Scope

The inspectors: (1) walked down portions of the three listed risk important systems and reviewed plant procedures and documents to verify that critical portions of the selected systems were correctly aligned; and (2) compared deficiencies identified during the walkdown to the licensee's UFSAR and corrective action program (CAP) to ensure problems were being identified and corrected.

- On October 26, 2006, the inspectors walked down the reactor water cleanup system following a system outage for planned maintenance.
- On December 4, 2006, the inspectors walked down Train B of the control room air conditioning and standby fresh air system following planned maintenance.
- On December 19, 2006, the inspectors walked down Train B of the drywell purge system while Train A was out of service due to unplanned maintenance.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed three samples.

b. Findings

No findings of significance were identified.

.2 Complete System Walkdown

a. Inspection Scope

The inspectors: (1) reviewed plant procedures, drawings, the UFSAR, TSs, and vendor manuals to determine the correct alignment of the standby service water system; (2) reviewed outstanding design issues, operator workarounds, and UFSAR documents to determine if open issues affected the functionality of the standby service water system; and (3) verified that the licensee was identifying and resolving equipment alignment problems.

Documents reviewed by the inspectors included:

- P&I Diagram M-1061A, "Standby Service Water System," Revision 61
- P&I Diagram M-1061B, "Standby Service Water System," Revision 47
- P&I Diagram M-1061C, "Standby Service Water System," Revision 36
- P&I Diagram M-1061D, "Standby Service Water System," Revision 38
- System Operating Instruction 04-1-01-P41-1, "Standby Service Water System," Revision 124

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

Quarterly Inspection

The inspectors walked down the seven listed plant areas to assess the material condition of active and passive fire protection features and their operational lineup and readiness. The inspectors: (1) verified that transient combustibles and hot work activities were controlled in accordance with plant procedures; (2) observed the condition of fire detection devices to verify they remained functional; (3) observed fire suppression systems to verify they remained functional and that access to manual actuators was unobstructed; (4) verified that fire extinguishers and hose stations were provided at their designated locations and that they were in a satisfactory condition; (5) verified that passive fire protection features (electrical raceway barriers, fire doors, fire dampers, steel fire proofing, penetration seals, and oil collection systems) were in a satisfactory material condition; (6) verified that adequate compensatory measures were established for degraded or inoperable fire protection features and that the compensatory measures were commensurate with the significance of the deficiency; and (7) reviewed the UFSAR to determine if the licensee identified and corrected fire protection problems.

- October 2, 2006, Reactor Heat Removal A Pump Room (Room 1A103)
- October 2, 2006, Equipment Drain Transfer Room (Room 1A107)
- October 3, 2006, Reactor Heat Removal B Heat Exchanger Room (Room 1A206)
- October 3, 2006, Division II Switchgear Room (Room 1A207)

- October 3, 2006, Reactor Core Isolation Cooling Pump Room (Room 1A104)
- October 4, 2006, Division I Switchgear Room (Room 1A219)
- November 29, 2006, Auxiliary Building Elevator Shaft

Documents reviewed by the inspectors included:

- Grand Gulf Nuclear Station Fire Pre-plans, Revision 15
- Procedure 10-S-03-4, "Fire Prevention: Control of Combustible Material," Revision 14
- Surveillance Procedure 06-ME-SP64-R-0045, "Ventilation System Fire Dampers Inspection," Revision 106
- Plant Drawing M-1866, "Blockouts and Penetrations, Auxiliary Building El. 166'-0" Area 10," Revision 20
- Plant Drawing M-1466, Heating Ventilation and Air Conditioning, Auxiliary Building El. 166'-0" Area 10," Revision 15

The inspectors completed seven samples.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

Semiannual Internal Flooding

a. Inspection Scope

The inspectors: (1) reviewed the UFSAR, the flooding analysis, and plant procedures to assess seasonal susceptibilities involving internal flooding; (2) reviewed the UFSAR and CAP to determine if the licensee identified and corrected flooding problems; (3) inspected bunkers and manholes to verify the adequacy of: (a) sump pumps, (b) level alarm circuits, (c) cable splices subject to submergence, and (d) drainage; (4) verified that operator actions for coping with flooding can reasonably achieve the desired outcomes; and (5) walked down the below listed areas to verify the adequacy of: (a) equipment seals located below the floodline, (b) floor and wall penetration seals, (c) watertight door seals, (d) common drain lines and sumps, (e) sump pumps, level alarms, and control circuits, and (f) temporary or removable flood barriers.

- October 12, 2006, Residual heat removal system Train B pump room

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07A)

a. Inspection Scope

The inspectors reviewed licensee programs, verified performance against industry standards, and reviewed critical operating parameters and maintenance records for the Division I drywell purge compressor oil cooler and control room air conditioning Train A heat exchanger. The inspectors verified that: (1) performance tests were satisfactorily conducted for heat exchangers/heat sinks and reviewed for problems or errors; (2) the licensee utilized the periodic maintenance method outlined in Electric Power Research Institute NP-7552, "Heat Exchanger Performance Monitoring Guidelines"; (3) the licensee properly utilized biofouling controls; (4) the licensee's heat exchanger inspections adequately assessed the state of cleanliness of their tubes, and (5) the heat exchanger was correctly categorized under the Maintenance Rule.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

a. Inspection Scope

The inspectors observed testing and training of senior reactor operators and reactor operators to assess training, operator performance, and the evaluator's critique. Specifically, the training scenarios observed involved a variety of failures and events that could be chosen by simulator instructors to exercise the shift technical advisor overview function. This exercise also involved simulating human error in the operating crew's decision-making process, thus allowing the shift technical advisor to identify and correct the error.

Documents reviewed by the inspectors included:

- Lesson Plan GSMS-LOR-STA00, "Shift Technical Advisor Training and Examination Scenarios," Revision 1

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors reviewed the following two systems in order to: (1) verify the appropriate handling of structure, system, and component (SSC) performance or condition problems; (2) verify the appropriate handling of degraded SSC functional performance; (3) evaluate the role of work practices and common cause problems; and (4) evaluate the handling of SSC issues reviewed under the requirements of the maintenance rule; 10 CFR Part 50, Appendix B; and the TSs.

- November 28, 2006, Plant Air System (P51)
- December 5, 2006, Leak Detection System (E31)

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed two samples.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

.1 Risk Assessment and Management of Risk

a. Inspection Scope

The inspectors reviewed the one listed assessment activity to verify: (1) performance of a risk assessment when required by 10 CFR 50.65(a)(4) and licensee procedures prior to changes in plant configuration for maintenance activities and plant operations; (2) the accuracy, adequacy, and completeness of the information considered in the risk assessment; (3) that the licensee recognized, and/or entered as applicable, the appropriate licensee-established risk category according to the risk assessment results and licensee procedures; and (4) that the licensee-identified and corrected problems related to maintenance risk assessments.

- Work Order (WO) 94052, Division I reactor protection system relay replacement
Documents reviewed by the inspectors included:
- GGNS Equipment Out of Service Risk Monitor User's Manual (Model 2d),
February 14, 2006

- Administrative Procedure 01-S-18-6, "Risk Assessment of Maintenance Activities," Revision 3

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

.2 Emergent Work Control

a. Inspection Scope

For the work activity listed below, the inspectors: (1) verified that the licensee performed actions to minimize the probability of initiating events and maintained the functional capability of mitigating systems and barrier integrity systems; (2) verified that emergent work-related activities such as troubleshooting, work planning/scheduling, establishing plant conditions, aligning equipment, tagging, temporary modifications, and equipment restoration did not place the plant in an unacceptable configuration; and (3) reviewed the UFSAR to determine if the licensee identified and corrected risk assessment and emergent work control problems.

- WO 95184, Division I containment hydrogen analyzer instrument line primary containment isolation valve control power failure
- WO 97315, Division II load shedding and sequencing panel test light failure

The inspectors completed two samples.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors: (1) reviewed plant status documents, such as operator shift logs, emergent work documentation, deferred modifications, and standing orders, to determine if an operability evaluation was warranted for degraded components; (2) referred to the UFSAR and design basis documents to review the technical adequacy of licensee operability evaluations; (3) evaluated compensatory measures associated with operability evaluations; (4) determined degraded component impact on any TS; (5) used the Significance Determination Process to evaluate the risk significance of degraded or inoperable equipment; and (6) verified that the licensee has identified and implemented appropriate corrective actions associated with degraded components.

- Condition Report CR-GGN-2006-03940, Error in emergency core cooling system pump and engineered safety features room cooler calculations
- Condition Report CR-GGN-2006-03991, Degraded air flow in the fuel pool cooling and cleanup room cooler
- Condition Report CR-GGN-2006-04198, Reactor water cleanup containment isolation valve failure
- Condition Report CR-GGN-2006-04660, Reactor core flow degradation
- Condition Report CR-GGN-2006-04698, Control rods experiencing friction during stroke time testing due to suspected channel bow

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed five samples.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors selected the four listed postmaintenance test activities of risk significant systems or components. For each item, the inspectors: (1) reviewed the applicable licensing basis and/or design-basis documents to determine the safety functions; (2) evaluated the safety functions that may have been affected by the maintenance activity; and (3) reviewed the test procedure to ensure it adequately tested the safety function that may have been affected. The inspectors either witnessed or reviewed test data to verify that acceptance criteria were met, plant impacts were evaluated, test equipment was calibrated, procedures were followed, jumpers were properly controlled, test data results were complete and accurate, test equipment was removed, the system was properly realigned, and deficiencies during testing were documented. The inspectors also reviewed the UFSAR to determine if the licensee identified and corrected problems related to postmaintenance testing.

- WO 91592, Postmaintenance test following replacement of hydraulic control unit scram valve diaphragm
- WO 50325883, Postmaintenance test following replacement of reactor core isolation cooling steam supply bypass valve and the trip/throttle valve motors
- WO 94533, Postmaintenance test following replacement of a defective GM tube and calibration of the containment ventilation radiation monitor

- WO 88849, Postmaintenance test following replacement of the reactor core isolation cooling system trip and throttle control valve
- WO 85335, Postmaintenance testing following control rod drive indicating light socket replacement

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed five samples.

b. Findings

Introduction: The inspectors reviewed a Green, self-revealing, noncited violation (NCV) of TS 5.4.1(a) for failure to follow station maintenance procedures while troubleshooting the control rod drive (CRD) Pump A hand switch green indicating light socket.

Description: On November 16, 2006, a maintenance supervisor was in the control room walking down control panels and reviewing deficiency tags. The maintenance supervisor noticed a deficiency tag on the CRD Pump A hand switch green indicating light. The deficiency tag indicated that the light socket was defective. It was suspected that debris, remnants from a previous broken bulb, was stuck in the socket. A work request had been written to repair the socket detailing this information. A conversation ensued between a nonlicensed operator and the maintenance supervisor regarding light bulbs used for a new air compressor in the plant. This conversation led the maintenance supervisor to suspect that the wrong bulb may have been installed in the CRD Pump A hand switch green indicating light. The shift manager was unaware that troubleshooting efforts for the CRD Pump A green indicating light socket were in progress.

Although the deficiency tag indicated that a different problem existed and that a work request had been written, the maintenance supervisor was confident that the problem was an incorrect bulb. Neither the work request nor any other reference documents were consulted. At the request of the maintenance supervisor, a control room operator removed the bulb from the CRD Pump A hand switch green indicating light and replaced the bulb with a different type. When the light failed to illuminate as expected, they realized that, with the CRD Pump A running, the green indicating bulb should not light. At this point, the control room operator and the maintenance supervisor decided to test the new style bulb in the nonrunning CRD Pump B hand switch green indicating light socket. The control room operator removed the CRD Pump B green indicating light bulb and the maintenance supervisor placed the new bulb into the socket. The socket immediately short circuited, causing extensive arcing and sparking and some residual smoke around the panel. Several Division 2 annunciators alarmed and there was physical damage to the light socket, including burn marks on the panel; however, no plant equipment tripped or was isolated. After further investigation, the licensee determined that the maintenance supervisor had installed a 25 volt dc light bulb into the lamp socket instead of the required 120 volt ac light bulb. Neither the work request for the CRD Pump A green indicating light nor any other reference documents were consulted.

Analysis: The performance deficiency associated with this violation is a failure to follow station procedures while troubleshooting the CRD Pump A green indicating light. The finding is more than minor since it affects the human performance attribute of the mitigating systems cornerstone and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Additionally, improper maintenance practices on control room equipment, if left uncorrected, could lead to a more significant safety concern. Using the NRC Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, inspectors determined that the finding has very low safety significance because it did not result in a loss of safety function. This finding has a crosscutting aspect in the area of human performance associated with work practices in that licensee personnel proceeded to troubleshoot the bulb in the face of uncertainty surrounding the required bulb type and expected system response.

Enforcement: TS 5.4.1(a) requires written procedures to be implemented as recommended by Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Section 5.11[8](h) of Procedure EN-OP-115, "Conduct of Operations," Revision 2, requires operators to replace burned out indicating lamps with the proper bulb. Contrary to this requirement, on November 16, 2006, a control room operator installed an incorrect bulb causing arcing and sparking in a control room panel and several spurious annunciators. Because this violation was of very low safety significance and was entered into the CAP as CR-GGN-2006-4474, this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000416/2006005-01, Failure to Follow Station Procedures for Conducting Maintenance Activities.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed the UFSAR, procedure requirements, and TSs to ensure that the four listed surveillance activities demonstrated that the SSCs tested were capable of performing their intended safety functions. The inspectors either witnessed or reviewed test data to verify that the following significant surveillance test attributes were adequate: (1) preconditioning; (2) evaluation of testing impact on the plant; (3) acceptance criteria; (4) test equipment; (5) procedures; (6) jumper/lifted lead controls; (7) test data; (8) testing frequency and method demonstrated TS operability; (9) test equipment removal; (10) restoration of plant systems; (11) fulfillment of ASME Code requirements; (12) updating of performance indicator data; (13) the accuracy of engineering evaluations, root causes, and bases for returning tested SSCs not meeting the test acceptance criteria; (14) reference setting data; and (15) annunciator and alarm setpoints. The inspectors also verified that the licensee identified and implemented any needed corrective actions associated with the surveillance testing.

- October 10, 2006, Reactor heat removal quarterly valve inservice testing per Surveillance Procedure 06-OP-E12-Q-0006, "LPCI Subsystem B MOV Functional Test," Revision 107

- October 13, 2006, Standby gas treatment system valve operability testing per Surveillance Procedure 06-OP-1T48-Q-0002, "Standby Gas Treatment System A Valve Test," Revision 103
- October 13, 2006, Suppression pool makeup system valve operability testing per Surveillance Procedure 06-OP-1E30-Q-0001, "Suppression Pool Makeup Valve Operability Test," Revision 101
- December 7, 2006, Control rod friction testing for channel bow per Equipment Performance Instruction 04-1-03-C11-7, "Control Rod Settle and Insertion Test," Revision 004

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed four samples.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

For the two listed drills contributing to Drill/Exercise Performance and emergency response organization performance indicators, the inspectors: (1) observed the training evolution to assess classification, notification, and Protective Action Requirement development activities; (2) compared identified weaknesses and deficiencies against licensee identified findings to determine whether the licensee is properly identifying failures; and (3) determined whether licensee performance is in accordance with the guidance of the Nuclear Energy Institute 99-02, "Voluntary Submission of Performance Indicator Data," acceptance criteria.

- On October 18, 2006, the inspectors observed the emergency response organization during the force-on-force exercise documented in NRC Inspection Report 05000416/2006201. This included the emergency response organization simulating activation of the Technical Support Center and the notification of offsite authorities.
- On November 1, 2006, the inspectors observed the emergency response organization's quarterly drill which simulated a fire and subsequent anticipated transient without scram, core damage, and containment breach. The inspectors also observed a shift turnover between two emergency response organization teams.

Documents reviewed by the inspectors included:

- Emergency Plan Procedure 10-S-01-1, "Activation of the Emergency Plan," Revision 115
- 2006 4th Quarter Emergency Preparedness Drill Evaluator's Summary
- Drill Emergency Notification Forms
- December 13, 2006, Memorandum to M. F. Guynn from R. Van Den Akker, "2006 4th Quarter ERO Training Drill Report"
- Condition Report CR-GGN-2006-04274
- Condition Report CR-GGN-2006-04336

The inspectors completed two samples.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed a daily screening of items entered into the licensee's CAP. This assessment was accomplished by reviewing WOs and condition reports and attending corrective action review and work control meetings. The inspectors: (1) verified that equipment, human performance, and program issues were being identified by the licensee at an appropriate threshold and that the issues were entered into the CAP; (2) verified that corrective actions were commensurate with the significance of the issue; and (3) identified conditions that might warrant additional follow-up through other baseline inspection procedures.

b. Findings

No findings of significance were identified.

.2 Selected Issue Follow-up Inspection

a. Inspection Scope

In addition to the routine review, the inspectors reviewed the cumulative effects of operator workarounds to determine: (1) the reliability, availability, and potential for misoperation of a system; (2) if multiple mitigating systems could be affected; (3) the ability of operators to respond in a correct and timely manner to plant transients and accidents; and (4) if the licensee has identified and implemented appropriate corrective actions associated with operator workarounds.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings and Observations

No findings of significance were identified.

.3 Semiannual Trend Review

a. Inspection Scope

The inspectors completed a semiannual trend review of repetitive or closely related issues that were documented in condition reports, maintenance WOs, system health reports, and corrective action trend reports to identify trends that might indicate the existence of more safety significant issues. The inspectors' review consisted of the 6-month period from June 1 through December 31, 2006. When warranted, some of the samples expanded beyond those dates to fully assess the issue. The inspectors compared and contrasted their results with the results contained in the licensee's quarterly trend reports for the second and third quarter of 2006. Corrective actions associated with a sample of the issues identified in the licensee's trend report were reviewed for adequacy. The review also included issues documented outside the corrective action process, including repetitive and/or rework maintenance lists, departmental problem lists, system health reports, quality assurance audits/surveillances, self-assessment reports, and maintenance rule assessments.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings and Observations

No findings of significance were identified.

4OA3 Followup of Events and Notices of Enforcement Discretion (71153)

.1 Personnel Performance

a. Inspection Scope

The inspectors responded to an unplanned transient on November 8, 2006, to: (1) evaluate operator performance by reviewing operator logs, plant computer data, and strip charts; (2) evaluate the initiating cause of the transient; and (3) determine if operator response was appropriate and in accordance with procedures.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

Introduction: The inspectors reviewed a Green, self-revealing finding for failure to implement preventive maintenance on the bus duct cooling system components prior to system failures, causing a plant transient.

Description: On November 8, 2006, the station lowered reactor power to 75 percent in order to maintain isophase bus bar temperatures below their rated design limits due to a failure of the isophase bus duct cooling system. The isophase bus duct cooling system employs two redundant forced-air cooling trains, each consisting of a blower, a heat exchanger, a cooling water flow control valve, and associated dampers. The cooling water system combines on the discharge side of the heat exchangers and uses a single common flow switch. The inspectors determined that the licensee failed to follow the vendor manual recommendations for system operation and preventive maintenance, which led to a degraded cooling system. A series of events challenged both trains of the system and ended with an unplanned plant power reduction.

- On October 22, 2006, the Train A isophase bus duct cooler fan shaft separated from the motor with the motor running. The standby isophase bus duct cooling Train B was placed into service.
- Two days later on October 24, 2006, a vibration analysis found that the Train B motor was experiencing high vibrations. Although the vendor manual recommended vibration analysis on an annual basis, no previous vibration data had been taken, leaving the licensee with no vibration data for comparison. As compensatory action, the licensee implemented daily fan shaft bearing vibration monitoring and operator rounds to check the bus duct temperatures twice per shift.
- On November 8, 2006, in order to remove Train B from service due to continuing high vibrations, operations swapped to bus duct Train A once the corrective maintenance, including replacement of the motor, shaft, and fan assembly was complete. No system anomalies were discovered during postmaintenance testing. During the system swap, the operator observed cooling water control valve

movement on the Train A flow control valve. The operator assumed that the valve did a full open stroke, but in reality the valve had only partially opened. In addition, the associated flow switch had concurrently failed upscale, inhibiting a low flow alarm that should have annunciated.

- Later in the evening of November 8, 2006, the turbine building operator noticed that both bus duct cooling train flow control valves were closed. The operator checked the isophase bus bar temperatures and discovered that the West bus bar was 135 degrees Celsius and the East bar was 115 degrees Celsius. The design rating, as set by Institute of Electrical and Electronics Engineers C37.23-1987, is 105 degrees Celsius. The bus duct coolers had limited cooling water flow for approximately 6 hours. Operations placed Train B of bus duct cooling back in service; however, the train could not provide enough cooling to return the isophase bus bar temperatures below the design limit. Consequently, reactor power was reduced to approximately 75 percent to reduce current on the generator to main transformer busses, thereby lowering heat output and restoring bus duct temperature.

Vendor manuals recommend fan shaft lubrication on a 3-month basis and annual preventive maintenance and inspections of system components. The inspectors determined that preventive maintenance had only been performed on the blower motors. The licensee had failed to perform preventive maintenance on the blower couplings, blower bearings, heat exchangers, cooling water flow control valves and valve actuators, system dampers, or the flow switch from the beginning of plant operation. In addition to the preventive maintenance recommendations, the forced-air cooling vendor manual also recommends periodically operating standby system trains and components for 30 minutes, once a month. The inspectors discovered that no operating strategy existed to periodically alternate isophase bus duct cooling system trains, and Train B had not been in operation for several years prior to being placed in service on October 22, 2006.

Analysis: The performance deficiency associated with this finding was a failure to follow vendor recommendations for the operation and maintenance of the bus duct cooling system. The finding is more than minor since it affects the equipment performance attribute of the initiating events cornerstone and affects the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions. Using the NRC Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding has a very low safety significance since it did not contribute to the likelihood of a loss of coolant accident, did not contribute to a loss of mitigation equipment, and did not increase the likelihood of a fire or internal/external flood.

Enforcement: Because the affected equipment was nonsafety-related, no violation of regulatory requirements occurred. This issue was entered into the Corrective Action Program as CR-GGN-2006-3996. This finding is identified as Finding FIN 05000416/2006005-02, Neglect of Bus Duct Cooling System Results in Unplanned Power Reduction.

.2 Event Report Review

(Closed) Licensee Event Report 05000416/2005002-00, Incorrect Assumption Used in Development of Air Operated Valve Program

The inspectors determined that a licensee-identified violation of very low safety significance (Green) occurred. This issue is documented in Section 4OA7 of NRC Integrated Inspection Report 05000416/2005003. This licensee event report is closed.

4OA5 Other Activities

.1 (Closed) Temporary Instruction 2515/169: Mitigating Systems Performance Index (MSPI) Verification

a. Inspection Scope

The inspectors sampled licensee data to verify that the licensee correctly implemented the MSPI guidance for reporting unavailability and unreliability of the monitored safety systems. The monitored systems included the emergency alternating current power, high pressure injection (HPCI), heat removal (RCIC), residual heat removal, and cooling water (SW). The inspectors reviewed operating logs, limiting condition of operation database records, maintenance records, condition reports, surveillance test data, and the maintenance rule database to verify that the licensee properly accounted for planned unavailability, unplanned unavailability, and equipment failures.

Documents reviewed by the inspectors are listed in the attachment.

(1) For the sample selected, did the licensee accurately document the baseline planned unavailability hours for the MSPI systems?

No. The inspectors validated the baseline planned unavailability hours for each of the five monitored systems and identified a generic error in the methodology used to determine reported baseline planned unavailability data. Per Nuclear Energy Institute 99-02, unavailability data that is designated as "short duration unavailability," which includes surveillance tests that result in less than 15 minutes of unavailability time per train, need not be counted as unavailable hours. The inspectors discovered that the licensee was including the short duration unavailability in the calculation for the baseline planned unavailability time and not including it in the submitted quarterly unavailability data. This would have a nonconservative impact on the unavailability index calculation. The licensee has documented this discrepancy in Condition Report CR-GGNS-2006-04606. The licensee plans to correct this discrepancy during a revision to the MSPI Basis Document in the next quarter.

(2) For the sample selected, did the licensee accurately document the actual unavailability hours for the MSPI systems?

Yes.

- (3) For the sample selected, did the licensee accurately document the actual unreliability information for each MSPI monitored component?

Yes.

- (4) Did the inspector identify significant errors in the reported data, which resulted in a change to the indicated index color? Describe the actual condition and corrective actions taken by the licensee, including the date when the revised PI information was submitted to the NRC.

The licensee has not performed a calculation to verify that the index has exceeded the Green to White threshold due to the discrepancy documented in question one. The licensee has documented in the condition report that the "differences should be very small, insignificant, and will not change Grand Gulf's current MSPI status." The licensee plans to submit a revision to the MSPI Basis Document in the next quarter.

- (5) Did the inspector identify significant discrepancies in the Basis Document which resulted in: (1) a change to the system boundary; (2) an addition of a monitored component; or (3) a change in the reported index color? Describe the actual condition and corrective actions taken by the licensee, including the date of when the Basis Document was revised.

No such issues were identified.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

On January 10, 2007, the resident inspectors presented the inspection results to Mr. W. Brian, Vice President, Operations, and members of his staff, who acknowledged the findings. The inspectors confirmed that proprietary information was not provided or examined during the inspections by the resident inspectors.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

C. Abbott, Supervisor, Quality Assurance
C. Bottemiller, Manager, Plant Licensing
R. Brian, Vice President, Operations
M. Causey, Senior Lead Technical Specialist
R. Collins, Manager, Operations
D. Coulter, Licensing Specialist, Plant Licensing
L. Eaton, Senior Lead Engineer
C. Ellsaesser, Manager, Planning and Scheduling
M. Guynn, Manager, Emergency Preparedness
E. Harris, Acting Director, Nuclear Safety Assurance
M. Krupa, Acting General Manager, Plant Operations
M. Larson, Senior Licensing Engineer
J. Miller, Manager, Training
J. Robertson, Manager, Refueling Services
M. Rohrer, Manager, System Engineering
T. Tankersley, Manager, Training
D. Wiles, Director, Engineering
D. Wilson, Supervisor, Design Engineering
R. Wilson, Superintendent, Radiation Protection
P. Worthington, Supervisor, Engineering

NRC personnel

W. Walker, Senior Project Engineer, Reactor Project Branch C
R. Bywater, Senior Reactor Analyst, Region IV

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000416/2006005-01	NCV	Failure to Follow Station Procedures for Conducting Maintenance Activities
05000416/2006005-02	FIN	Neglect of Bus Duct Cooling System Results in Unplanned Power Reduction

Closed

05000416/2005-002-00 LER Incorrect Assumption Used in Development of Air Operated Valve Program

LIST OF DOCUMENTS REVIEWED

In addition to the documents referred to in the inspection report, the following documents were selected and reviewed by the inspectors to accomplish the objectives and scope of the inspection and to support any findings:

Section 1R04: Equipment Alignments

P&I Diagram M-1079, "Reactor Water Cleanup System," Revision 43
P&I Diagram M-1080A, "Filter/Demineralizer System," Revision 32
P&I Diagram M-1080B, "Filter/Demineralizer System," Revision 16
P&I Diagram M-0049, "Control Room HVAC System," Revision 49
Procedure 04-1-01-G33-1, "Reactor Water Cleanup & Filter/Demineralizer," Revision 128
Procedure 04-S-01-Z51-1, "Control Room HVAC System," Revision 42
Procedure 04-1-01-E61-1, "Combustible Gas Control System," Revision 39
Condition Report CR-GGN-2006-4346

Section 1R06: Flood Protection Measures

Work Order WO 95481
Work Order WO 51038512
Condition Report CR-GGN-2006-3865
Condition Report CR-GGN-2004-2894
Condition Report CR-GGN-2003-3611
P&ID M-1094B, "Floor and Equipment Drains," Revision 21
Engineering Modification ER-2004-0367
Procedure 04-1-03-E12-12, "RHR B Room Sump Pump Functional Check," Revision 0

Section 1R07: Heat Sink Performance

Work Order 89441
Engineering Modification ER-GG-2006-0209
Engineering Modification ER-GG-2004-0443
Condition Report CR-GGN-2006-3397
Condition Report CR-GGN-1999-1290
Calculation MC-QSZ51-96006, "Thermal Performance of the CRAC System," Revision 2
Calculation MC-QSZ51-01001, "Thermal Performance Requirement of the CRAC System," Revision 1
Calculation MC-QSZ51-01023, "Supplement to Heat Exchanger ASME Code Calculation for Shell Side Performance," Revision 0

Section 1R12: Maintenance Rule

NS-DC-121, "Maintenance Rule," Revision 2
Maintenance Rule Failure Database for Systems P51 and E31
P&ID —1126, "Plant Air System," Revision 2
Procedure 04-1-01-P51-1, "Plant Air System," Revision 5
Work Order 58837
Condition Report CR-GGN-2005-0811
Condition Report CR-GGN-2006-2589
Condition Report CR-GGN-2006-3687

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedure 01-S-18-6, "Risk Assessment of Maintenance Activities," Revision 3
Procedure 18-S-01-1, "Special Test Instructions," Revision 2
Work Order 95184
Work Order 97315
P&ID E-1186-024, "Combustible Gas Control System," Revision 11

Section 1R15: Operability Determinations

Procedure EN-OP-104, "Operability Determinations," Revision 1
ER-GG-2001-0284
Condition Report CR-GGN-2006-1276
Condition Report CR-GGN-2005-3287
Condition Report CR-GGN-2005-3387
Condition Report CR-GGN-2006-3928
Condition Report CR-GGN-2006-3996
Condition Report CR-GGN-2006-3928
Condition Report CR-GGN-2006-3996
NRC Information Notice 89-69, "Shadow Corrosion Resulting in Fuel Channel Bowing"

Section 1R19: Postmaintenance Testing

Work Order 92485
Condition Report CR-GGN-2005-5211
Condition Report CR-GGN-2006-4016
Condition Report CR-GGN-2006-1028
Condition Report CR-GGN-2006-4474
ER-GG-2006-0198
Procedure 07-S-14-416, "Maintenance of Hiller Air Actuators," Revision 10
Procedure 06-OP-1E51-Q-0002, "RCIC Quarterly Valve Operability Test," Revision 110
Procedure 07-S-12-81, "Setting of Limitorque Valve Operators," Revision 10
Procedure 07-S-01-205, "Conduct of Maintenance Activities," Revision 108
Procedure 06-CH-1D17-A-0025, "Gaseous Monitor Calibration," Revision 104
Procedure 08-S-03-22, "Rad Monitor System Alarm Setpoint Control," Revision 111
Procedure 06-IC-1D17-A-0013, "GE Gaseous Effluent Monitor Calibration," Revision 105
EN-WM-100, "Work Request Generation, Screening, and Classification," Revision 1

EN-WM-101, "On-Line Work Management Process," Revision 1
EN-OP-115, "Conduct of Operations," Revision 2

Section 1R22: Surveillance Testing

Procedure 06-OP-1T48-Q-0002, "Standby Gas Treatment System A Valve Test," Revision 103
Procedure 06-OP-1E12-Q-0006, "LPCI/RHR B MOV Functional Test," Revision 107
Procedure 06-OP-1E30-Q-0001, "Suppression Pool Makeup Valve Operability," Revision 101
Procedure 04-1-03-C11-7, "Control Rod Settle and Insertion Test," Revision 4
Work Order 51039433
Work Order 51038048
Work Order 51039999

Section 4OA2: Identification and Resolution of Problems

Condition Report CR-GGN-2006-4341
Condition Report CR-GGN-2006-4333
Condition Report CR-GGN-2006-5364
Condition Report CR-GGN-2006-4387
Condition Report CR-GGN-2006-4362
Condition Report CR-GGN-2006-4599
Procedure EN-LI-102, "Corrective Action Process," Revision 7

Section 4OA3: Followup of Events and Notices of Enforcement Discretion

Condition Report CR-GGN-2006-3996
Condition Report CR-GGN-2005-1568
Condition Report CR-GGN-2005-1815
Condition Report CR-GGN-2006-4482
Engineering Report 99/0014
Engineering Modification ER-GG-97-0022
Procedure 04-1-01-R24-1, "Isophase Bus Cooling System," Revision 14
Procedure 01-S-17-42, "Trip Critical Program," Revision 5
Procedure 01-S-17-11, "Preventive Maintenance Program," Revision 10
Procedure DC-300, "Periodic Maintenance Program," Revision 0
Procedure EN-DC-324, "Preventive maintenance Program," Revision 1
Instruction 04-1-02-1H13-P680-9A-E15, "Isophase Bus Trouble," Revision 140
P&ID E-1104-02, "Isophase Bus Cooling System," Revision 4
Work Order WO 96492
Work Order WO 96720
Work Order WO 97817
Work Order WO 97862
Vendor Manual 460000352, "Delta-Star Metal Enclosed Bus," Revision 0
Vendor Manual 00152407, "Forced Air Cooling Equipment," Revision 0

Section 4OA5: Other Activities

GGNS MSPI Derivation Reports

Engineering Report GGNS-SA-06-002, "GGNS MSPI Basis Document," Revision 0

Procedure 04-S-03-P81-1, "Prelube of Division III Diesel Generator," Revision 21

Procedure 06-OP-1P75-M-0001/2, "Standby Diesel Generator Functional Test," Revision 127/4

Condition Report CR-GGN-2006-3755

LIST OF ACRONYMS

CAP	corrective action program
CFR	<i>Code of Federal Regulations</i>
CRD	control rod drive
GGNS	Grand Gulf Nuclear Station
HPCI	high-pressure coolant injection
MSPI	mitigating systems performance index
NCV	noncited violation
NRC	U.S. Nuclear Regulatory Commission
RCIC	reactor core isolation cooling
SSC	structure, system, and component
SW	service water
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
WO	work order