



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
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August 2, 2007

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SUBJECT: GRAND GULF NUCLEAR STATION - NRC INTEGRATED INSPECTION  
REPORT 05000416/2007003

Dear Mr. Brian:

On June 30, 2007, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Grand Gulf Nuclear Station facility. The enclosed integrated report documents the inspection findings, which were discussed on July 12, 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 six NRC identified and self-revealing findings of very low safety significance (Green). Five of these findings were determined to involve violations of NRC requirements; however, because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating these findings as noncited violations (NCVs) consistent with Section VI.A of the NRC Enforcement Policy. If you contest these NCVs, 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 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  
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Docket: 50-416  
License: NPF-29

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SUNSI Review Completed: MCH ADAMS: ☒ Yes ☐ No Initials: MCH

☒ Publicly Available ☐ Non-Publicly Available ☐ Sensitive ☒ Non-Sensitive

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RIV:RI:DRP/C	SRI:DRP/C	C:SPE:DRP/C	C:DRS/EB1	C:DRS/PSB
AJBarrett	GBMiller	WCWalker	DAPowers	MPShannon
<b>/T-WCWalker for/</b>	<b>/RA MCHay for/</b>	<b>/RA MCHay for/</b>	<b>/RA/</b>	<b>/RA/</b>
08/02/07	07/30/07	07/30/07	07/30/07	07/30/07
C:DRS/OB	C:DRS/EB2	C:DRP/C		
ATGody	LJSmith	MCHay		
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07/29/07	07/27/07	07/30/07		

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 50-416

Licenses: NPF-29

Report No.: 05000416/2007003

Licensee: Entergy Operations, Inc.

Facility: Grand Gulf Nuclear Station

Location: Waterloo Road  
Port Gibson, Mississippi 39150

Dates: April 1 through June 30, 2007

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## SUMMARY OF FINDINGS

IR05000416/2007003; 4/1/07 - 6/30/07; Grand Gulf Nuclear Station -- Integrated Resident and Regional Report; Maintenance Effectiveness, Refueling and Outage Activities, Access Control to Radiologically Significant Areas, Identification and Resolution of Problems.

This report covered a 3-month period of inspection by resident inspectors and Regional office inspectors. These inspection activities identified six Green findings, five of which were noncited violations. 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: Mitigating Systems

- Green. The inspectors identified a Green noncited violation involving the failure to adequately monitor the performance of the leakage detection system in accordance with 10CFR50.65(a)(2). Specifically, the licensee failed to account for the functional failure of a temperature switch which resulted in exceeding the performance criteria for the leakage detection system. The licensee entered this issue in their corrective action program as Condition Report CR-GGN-2007-2955.

This finding was greater than minor since violations of 10 CFR Part 50.65(a)(2) necessarily involve degraded system performance which, if left uncorrected, could become a more significant safety concern. This finding has very low safety significance because the maintenance rule aspect of the finding did not lead to an actual loss of safety function of the system nor did it cause a component to be inoperable. This finding has a crosscutting aspect in the area of human performance associated with work practices in that the licensee failed to use human error prevention techniques such as self checking and peer checking when utilizing the maintenance rule database (H.4(a)). (Section 1R12)

- Green. A self-revealing Green finding was identified for inadequate foreign material controls during maintenance. Specifically, a foreign material exclusion device was left inside the reactor feed Pump B lube oil system following maintenance activities, which prevented placing the pump in service during reactor startup. The licensee entered this issue in their corrective action program as Condition Report CR-GGN-2007-2158.

The finding was more than minor because it was associated with the human performance attribute of the mitigating systems cornerstone and impacted the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events. The inspectors determined this finding required a Phase 2 analysis because it resulted in the loss of function of a single train of the power conversion system (reactor feed) for greater than 24 hours. Based on the results of the



Phase 2 analysis, the finding was determined to have very low safety significance because of the availability of the condensate booster pumps and emergency core cooling systems. The cause of this finding has a crosscutting aspect in the area of human performance associated with resources because licensee personnel were not adequately trained to consistently implement the foreign material exclusion program (H.2(b)). (Section 1R20)

- Green. The inspectors identified a Green noncited violation of Technical Specification 5.4.1(a) involving the failure to identify loose and missing fasteners on the standby service water Train B bus feeder breaker. The licensee entered this issue in their corrective action program as Condition Report CR-GGN-2007-3081.

This finding was more than minor because the failure to ensure that loose parts are not present in safety related breakers, if left uncorrected, could become a more significant safety concern. Using the Significance Determination Process Phase 1 Screening Worksheet in Appendix A of Inspection Manual Chapter 0609, the inspectors determined the finding was of very low safety significance because it did not result in a loss of operability. (Section 4OA2.2)

#### Cornerstone: Barrier Integrity

- Green. The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, involving the failure to correct a crack in the ceiling of the reactor water cleanup heat exchanger room internal to the containment building structure. Specifically, the licensee identified the crack in 1987 but failed to complete planned corrective actions to evaluate or repair the crack during Refueling Outage 2. The licensee entered this issue into their corrective action program as Condition Report CR-GGN-2007-1970.

This finding was more than minor because the reactor water cleanup (RWCU) ceiling crack represented a degrading condition that if left uncorrected could become a more significant safety concern. The inspectors determined this finding affected the Barrier Integrity cornerstone. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, this finding was of very low safety significance since it did not represent an actual open pathway in the physical integrity of the reactor containment or an actual reduction in defense-in-depth for the atmospheric pressure control or hydrogen control functions of the reactor containment. (Section 1R20)

#### Cornerstone: Occupational Radiation Safety

- Green. The inspectors reviewed a self-revealing, noncited violation of 10 CFR Part 20.1501(a) because the licensee failed to evaluate the radiological hazard of foreign material retrieval from the reactor vessel. A contract radiation protection technician misinterpreted his survey instrument readings, picked up a bolt with a radiation dose rate of 19.9 rem per hour, and received a shallow dose equivalent of 41 millirems. The radiation protection technician was alerted to the problem by an electronic dosimeter alarm. As corrective action, the licensee revised the appropriate

radiation work permit template to incorporate a dose rate limit for items removed from pools and included a discussion of the violation in radiation protection training.

This finding is greater than minor because it is associated with the occupational radiation safety program and process attribute and affected the cornerstone objective, in that the lack of knowledge of radiological conditions could increase personnel dose. Using the Occupational Radiation Safety Significance Determination Process, the inspectors determined that this finding was of very low safety significance because it did not involve: (1) an as low as is reasonably achievable (ALARA) planning or work control issue; (2) an overexposure; (3) a substantial potential for overexposure; or (4) an impaired ability to assess dose. Additionally, this finding has a crosscutting aspect in the area of human performance associated with work practices because the workers failed to use error prevention techniques such as peer checking and self checking (H.4(a)). (Section 2OS1)

- Green. The inspectors reviewed a self-revealing, noncited violation of Technical Specification 5.7.1 resulting from a failure to post and control a high radiation area. Room 0R123 on the 93-foot elevation of the radwaste building had dose rates as high as 265 millirems per hour at 30 centimeters from the G17D069 filter housing and was not posted and controlled as a high radiation area. The licensee was alerted to the situation when the electronic dosimeters of two radwaste operators alarmed when they entered the higher dose rates. Poor communications between operations and radiation protection personnel contributed to the failure to identify the high radiation area. Radiation protection supervisors stated they were unaware at the time of the operators' dose rate alarms that reactor water cleanup reject flow was approximately twice the normal flow rate and both of the reactor water cleanup demineralizers had been out of service from approximately 3:00 p.m. on May 19 until 9:00 a.m. on May 20, 2007. As immediate corrective action, the area was barricaded and conspicuously posted as a high radiation area. Additional planned corrective actions were still being evaluated.

This finding is greater than minor because it is associated with the occupational radiation safety program and process attribute and affected the cornerstone objective, in that the failure to post and control a high radiation area had the potential to increase personnel dose. Using the Occupational Radiation Safety Significance Determination Process, the inspectors determined that this finding was of very low safety significance because it did not involve: (1) an as low as is reasonably achievable (ALARA) planning or work control issue; (2) an overexposure; (3) a substantial potential for overexposure; or (4) an impaired ability to assess dose. Additionally, this finding has a crosscutting aspect in the area of human performance associated with work control because the licensee failed to ensure proper communication, coordination, and cooperation during activities in which interdepartmental coordination was necessary to assure plant and human performance (H.3(b)). (Section 2OS1)

B. Licensee-Identified Violations

Violations of very low safety significance which were identified by the licensee have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and corrective actions are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status

Grand Gulf Nuclear Station was in a refueling outage at the beginning of the inspection period. The plant returned to full power on April 19, 2007. On May 19, 2007, the plant experienced an automatic reactor scram due to a turbine trip following loss of condenser vacuum resulting from a condenser boot seal failure. Following repairs, the plant was restarted on May 24, 2007, and returned to full power on May 28, 2007. The plant remained at or near full rated thermal power for the remainder of the inspection period 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)

##### .1 Readiness For Impending Adverse Weather Conditions

###### a. Inspection Scope

On June 8, 2007, 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 Safety Analysis Report (USAR), and Technical Specifications (TS) 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:

Procedure 05-1-02-VI-2, "Hurricanes, Tornadoes, and Severe Weather," Revision 108  
Procedure ENS-EP-302, "Severe Weather Response," Revision 4

The inspectors completed one site 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 CAP to ensure problems were being identified and corrected.

- April 9, 2007, the inspectors walked down portions of the high pressure core spray system following a system maintenance outage.
- April 10, 2007, the inspectors walked down portions of the control rod drive system following a system maintenance outage.
- June 17, 2007, the inspectors walked down portions of the Division II emergency diesel generator (EDG) while the Division I EDG was out of service for planned maintenance.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed three samples.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

Quarterly Inspection

The inspectors walked down the six 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.

- Auxiliary building corridor (Room 1A215)
- Division II EDG room (Room 1D303)
- Control room dining area and kitchen (Room 1OC511)
- Main control room (Room 1OC503)
- Control building electrical space (Room 1OC518)
- Auxiliary instrument shop (Room 1OC507)

Documents reviewed by the inspectors included:

- Procedure 10-S-03-4, "Control of Combustible Material," Revision 14
- Grand Gulf Nuclear Station Fire Pre-Plans, Revision 15
- Calculation MC-QSP64-86058, "Combustible Heat Load Calculation," Revision 44
- Procedure 01-S-10-1, "Fire Protection Plan," Revision 102
- Procedure 10-S-03-9, "Control of Fire Pre-Plans," Revision 2

The inspectors completed six samples.

#### Annual Inspection

On June 13, 2007, the inspectors observed a fire brigade drill to evaluate the readiness of licensee personnel to prevent and fight fires, including the following aspects: (1) the number of personnel assigned to the fire brigade, (2) use of protective clothing, (3) use of breathing apparatuses, (4) use of fire procedures and declarations of emergency action levels, (5) command of the fire brigade, (6) implementation of pre-fire strategies and briefs, (7) access routes to the fire and the timeliness of the fire brigade response, (8) establishment of communications, (9) effectiveness of radio communications, (10) placement and use of fire hoses, (11) entry into the fire area, (12) use of fire fighting equipment, (13) searches for fire victims and fire propagation, (14) smoke removal, (15) use of pre-fire plans, (16) adherence to the drill scenario, (17) performance of the post-drill critique, and (18) restoration from the fire drill. The licensee simulated a fire in the lube oil issue facility. Documents reviewed by the inspectors included:

- Procedure 10-S-03-7, "Fire Protection Training Program," Revision 10
- Grand Gulf Nuclear Station Fire Pre-Plans, Revision 15

The inspectors completed one sample.

#### b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

.1 Semi-annual 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 underground bunkers/manholes to verify the adequacy of (a) sump pumps, (b) level alarm circuits, (c) cable splices subject to submergence, and (d) drainage for bunkers/manholes; (4) verified that operator actions for coping with flooding can reasonably achieve the desired outcomes; and (5) walked down the below listed area 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.

- May 29, 2007, Turbine building design circulating water system line break

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 Regualification (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. The training scenario, GSMS-LOR-0182, Revision 2, involved a loss of offsite power, station blackout, and a loss of fuel pool cooling.

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 maintenance rule scoped systems that have displayed performance problems 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 TS.

- Leakage detection system (E31)

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

### b. Findings

Introduction: The inspectors identified a Green noncited violation for the failure to adequately monitor the performance of the leakage detection system in accordance with 10CFR50.65(a)(2). Specifically, the licensee failed to account for the functional failure of a temperature switch which resulted in exceeding the performance criteria for the leakage detection system.

Description: On May 30, 2007, while reviewing the maintenance rule failure evaluations for the leakage detection system, the inspectors noted that the list did not include a failure of a leak detection system temperature switch on June 9, 2006. The affected switch has a safety function to isolate the reactor core isolation cooling (RCIC) system from reactor steam when a high room temperature is detected. In this case, the switch failed upscale but did not initiate a RCIC system isolation. In response to the inspectors' concerns, the licensee determined that the maintenance rule database included a determination that the temperature switch failure was a maintenance preventable functional failure, but the failure had not been included in the evaluation report for the site expert panel due to a database transfer error. After consideration of the additional failure by the expert panel, the licensee set performance goals and began monitoring the leakage detection system per 10 CFR Part 50.65a(1).

Analysis: The failure to effectively monitor the performance of the leakage detection system was a performance deficiency. This finding was greater than minor since violations of 10 CFR Part 50.65(a)(2) necessarily involve degraded system performance which, if left uncorrected, could become a more significant safety concern. This finding has very low safety significance because the maintenance rule aspect of the finding did not lead to an actual loss of safety function of the system nor did it cause a component to be inoperable. This finding has a crosscutting aspect in the area of human



performance associated with work practices in that the licensee failed to use human error prevention techniques such as self checking and peer checking when utilizing the maintenance rule database (H.4(a)).

Enforcement: 10 CFR Part 50.65(a)(1) requires, in part, that holders of an operating license shall monitor the performance or condition of SSCs within the scope of the rule against licensee-established goals in a manner sufficient to provide reasonable assurance that such SSCs are capable of fulfilling their intended safety functions. 10 CFR Part 50.65(a)(2) requires, in part, that monitoring specified in paragraph (a)(1) is not required where it has been demonstrated the performance or condition of an SSC is being effectively controlled through appropriate preventive maintenance, such that the SSC remains capable of performing its intended function. Contrary to the above, the licensee failed to demonstrate that performance of the leakage detection system was being effectively controlled through appropriate scheduled maintenance. Specifically, the licensee failed to appropriately account for a functional failure of a temperature switch on June 9, 2006, which demonstrated that the performance of the system was not being effectively controlled and goal setting and monitoring was required. However, because this finding was of very low safety significance and has been entered in the corrective action program as Condition Report CR-GGN-2007-2955, this violation is being treated as an NCV, consistent with Section IV.A.1 of the NRC Enforcement Policy: NCV 05000416/2007003-01, Failure to Adequately Monitor the Performance of the Leakage Detection System.

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

.1 Risk Assessment and Management of Risk

a. Inspection Scope

The inspectors reviewed the four listed assessment activities to verify: (1) performance of risk assessments 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.

- WO 51034108, Transformer ESF 21 planned maintenance
- WO 51083253, Reactor core isolation cooling (RCIC) time-response testing
- WO 51088980, Standby service water Fan A bearing lubrication
- WO 113933, Switchyard breaker maintenance

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed four samples.

b. Findings

No findings of significance were identified.

.2 Emergent Work Control

a. Inspection Scope

For the two work activities 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 96760, Main transformer fan bank corrective maintenance
- WO 114461, RCIC system temperature switch failure

Documents reviewed by the inspectors are listed in the attachment.

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 plants 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.

- CR-GGN-2007-1840, Division I EDG jacket water leak
- CR-GGN-2007-1931, Division II EDG oil leak
- CR-GGN-2007-2060, Nitrogen in hydraulic control units
- CR-GGN-2007-2446, Standby service water Fan A oil level low

- CR-GGN-2007-2615, RCIC check valve slow to close
- CR-GGN-2007-2828, Valve E12F053B leaking past seat

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed six samples.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors selected the six 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 re-aligned, and deficiencies during testing were documented. The inspectors also reviewed the UFSAR to determine if the licensee identified and corrected problems related to post-maintenance testing.

- WO 107927, Vent control rod drive exhaust header piping
- WO 51033529, Reactor feed Pump B lube oil maintenance
- WO 111068, RCIC turbine exhaust check valve maintenance
- WO 102139, Replace standby service water Valve P41F082A
- WO 51195690, Rebuild containment isolation Valve G41F019
- WO 89130, Replace Division I EDG cylinder heads

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed six samples.

b. Findings

No findings of significance were identified.

## 1R20 Refueling and Outage Activities (71111.20)

### a. Inspection Scope

#### Refueling Outage 15

The inspectors reviewed the following risk significant refueling items or outage activities to verify defense in depth commensurate with the outage risk control plan and compliance with the TS: (1) the risk control plan; (2) tagging/clearance activities; (3) reactor coolant system instrumentation; (4) electrical power; (5) decay heat removal; (6) spent fuel pool cooling; (7) inventory control; (8) reactivity control; (9) containment closure; (10) reduced inventory conditions; (11) refueling activities; (12) heatup and restart activities; (13) control of heavy loads per Operating Experience Smart Sample FY-2007-03; and (14) licensee identification and implementation of appropriate corrective actions associated with refueling and outage activities. The inspectors containment inspections included observations of the containment sump for damage and debris; and supports, braces, and snubbers for evidence of excessive stress, water hammer, or aging. Documents reviewed by the inspectors are listed in the attachment.

#### Forced Outage 07-01

The inspectors reviewed the following risk significant refueling items or outage activities to verify defense in depth commensurate with the outage risk control plan and compliance with the TS: (1) tagging/clearance activities; (2) electrical power; (3) decay heat removal; (4) inventory control; (5) reactivity control; (6) heatup and cooldown activities; (7) restart activities; and (8) licensee identification and implementation of appropriate corrective actions associated with refueling and outage activities. Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed two samples.

### b. Findings

#### Failure to Repair Crack in Containment Building Structure

Introduction. The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, involving the failure to correct a crack in the ceiling of the reactor water cleanup heat exchanger room internal to the containment building structure. Specifically, the licensee identified the crack in 1987 but failed to complete planned corrective actions to evaluate or repair the crack in Refueling Outage 2.

Description. On April 6, 2007, while walking down areas that would be normally inaccessible during plant operation, the inspectors discovered a crack in the concrete ceiling of the reactor water cleanup (RWCU) heat exchanger room. The room is internal to the reactor containment building, which is designed as a safety related, seismic category 1 structure. The ceiling of the RWCU heat exchanger room is a four foot thick reinforced concrete slab that provides support for the steam separator storage area of the upper containment pool and is an integrated part of the drywell structure. The crack

was approximately seven feet long and had a maximum gap of one-half inch near the center of the crack. The inspectors noted water dripping from the crack, forming stalactites on the ceiling and leaving mineral deposits on the cable trays and the piping below.

In response to the inspectors' concerns, the licensee inspected the crack and sampled a stalactite for chemical analysis. The licensee determined the crack was caused by shrinkage during the original concrete pour and was not induced through stress. The analysis of the stalactite material showed a high amount of calcium carbonate, indicating chemical leaching of the concrete. Additionally, sampling results indicated the water in the crack was due to condensation and not from upper containment pool leakage.

The inspectors reviewed historical deficiency documents and noted that the crack had been previously identified in 1987. The original disposition from 1987 stated that the crack would be evaluated and/or repaired prior to restart of the plant following Refueling Outage 2. The inspectors determined that the licensee failed to evaluate or repair the crack as stated in the deficiency document.

As part of the corrective actions in condition report CR-GGN-2007-1970 written in response to this issue, the licensee plans to re-coat the ceiling and pressure grout the crack to prevent further water intrusion. The licensee will also perform rebound hammer tests to quantify the amount of concrete degradation due to chemical leaching.

Analysis. The inspectors determined that the failure to correct a crack in a safety-related structure was a performance deficiency. This finding was more than minor because the RWCU ceiling crack represented a degrading condition that if left uncorrected would continue to degrade and could become more significant safety concern. The inspectors determined this finding affected the Barrier Integrity cornerstone. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, this finding was of very low safety significance since it did not represent an actual open pathway in the physical integrity of the reactor containment or an actual reduction in defense-in-depth for the atmospheric pressure control or hydrogen control functions of the reactor containment.

Enforcement. 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that conditions adverse to quality are promptly identified and corrected. Contrary to this requirement, the licensee failed to correct a crack in the containment building structure identified in 1987. Since this violation is of very low safety significance and has been entered in the licensee's corrective action program as CR-GGN-2007-1970, this violation is being treated as an NCV, consistent with Section VI.A of the Enforcement Policy: NCV 05000416/2007003-02, Failure to Repair Crack in Containment Building Structure.

## Inadequate Foreign Material Controls During Reactor Feed Pump Maintenance

Introduction. A self-revealing Green finding was identified involving inadequate foreign material controls during maintenance. Specifically, a foreign material exclusion device was left inside the reactor feed Pump B lube oil system following maintenance activities, which prevented placing the pump in service during reactor startup.

Description. The two turbine driven feed pumps at Grand Gulf are each provided with three lube oil pumps. During RF15, the licensee performed planned maintenance on all three pumps and their associated check valves for reactor feed Pump B. During post-maintenance testing on April 8, 2007, the pumps would not develop the required discharge pressure. The licensee determined the discharge check valve for one of the lube oil pumps had been installed backwards, and the resulting back pressure had cracked the pump's discharge flange. While completing repairs, licensee mechanics noted the discharge flanges for the other two lube oil pumps were also cracked. The licensee determined the work packages for all three lube oil pump installations had incorrectly specified a torque value that was too high. As a result, all of the pump flanges had been overtorqued, causing stress cracks in the flange material. The inspectors noted this error likely would not have been discovered had the check valve not been installed backwards. After all three pump flanges had been repaired and the check valve orientation corrected, licensee mechanics started the lube oil system and turned the feed pump over to Operations to place in service.

While attempting to place reactor feed Pump B in service during reactor startup on April 11, 2007, operators were unable to reset the turbine trip mechanism. During the investigation into the inability to place the feed pump in service, licensee maintenance workers discovered a foreign material exclusion device (pipe plug) lodged inside a flow orifice leading to the turbine trip mechanism. This plug blocked lube oil flow, preventing the reset of the turbine trip mechanism. The licensee determined the plug was most likely left in the system following the maintenance on one of the lube oil pump discharge check valves. Licensee mechanics removed the plug, and reactor feed Pump B was placed in service on April 17, 2007.

As part of the cause evaluation in Condition Report CR-GGN-2007-2158 initiated in response to this issue, the licensee identified inconsistent use and documentation of foreign material exclusion controls in the work packages associated with the reactor feed pump lube oil system maintenance. The licensee further identified a weakness in the knowledge and implementation of the foreign material exclusion program, as evidenced by the assignment of different levels of foreign materials controls to the same job site by different maintenance supervisors. Corrective actions taken or planned by the licensee include additional work package controls and additional training for maintenance personnel on foreign material exclusion controls.

Analysis. The failure to properly implement foreign material exclusion controls was a performance deficiency. The inspectors determined this finding impacted the mitigating systems cornerstone but did not affect the initiating events cornerstone since the feed pump could not be placed in service. The finding was more than minor because it was associated with the human performance attribute of the mitigating systems cornerstone

and impacted the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events. Additionally, the failure to properly implement foreign material controls, if left uncorrected, could become a more significant safety concern. Using the Significance Determination Process Phase 1 Screening Worksheet in Appendix A of Inspection Manual Chapter 0609, the inspectors determined this finding required a Phase 2 analysis because it resulted in the loss of function of a single train of the power conversion system (reactor feed) for greater than 24 hours. The inspectors performed a Phase 2 analysis using Appendix A, "Technical Basis for At-Power Significance Determination Process," and the Phase 2 worksheets for Grand Gulf. The inspectors assumed the duration of the reactor feed Pump B unavailability was five days. Additionally, the inspectors assumed reactor feed Pump A was unaffected, and operators would not be able to recover reactor feed Pump B during an event. Based on the results of the Phase 2 analysis, the finding was determined to have very low safety significance due to the availability of the condensate booster pumps and emergency core cooling systems. These results were validated by a senior reactor analyst.

The cause of this finding has a crosscutting aspect in the area of human performance associated with resources because licensee personnel were not adequately trained to consistently implement the foreign material exclusion program (H.2(b)).

Enforcement. No violation of regulatory requirements occurred since the affected equipment was not safety-related. This finding was entered into the licensee's corrective action program as CR-GGN-2007-2158 and is identified as FIN 05000416/2007003-03, Inadequate Foreign Material Controls During Reactor Feed Pump Maintenance.

## 1R22 Surveillance Testing (71111.22)

### a. Inspection Scope

The inspectors reviewed the UFSAR, procedure requirements, and TS to ensure that the six 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 (PI) data; (13) engineering evaluations, root causes, and bases for returning tested SSCs not meeting the test acceptance criteria were correct; (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.

- April 3, 2007, Division 1 EDG surveillance test per Procedure 06-OP-1P75-R-003, "Standby Diesel Generator 18 Month Functional Test," Revision 111

- April 11, 2007, RCIC low pressure surveillance test per Procedure 06-OP-1E51-C-0005, "RCIC Pump Low Pressure Flow Verification Test," Revision 105
- May 9, 2007, APRM surveillance per Procedure 06-IC-1C51-SA-0001, "Average Power Range Monitor Calibration," Revision 108
- June 17, 2007, Core flow surveillance per Procedure 06-RE-1B33-D-0001, "Jet Pump Functional Test," Revision 108
- April 4, 2007, Local leak rate test of containment isolation Valve G36F106 per Procedure 06-ME-1M61-V-0001, "Local Leak Rate Test Low Flow Air," Revision 8
- April 23, 2007, Residual heat removal system quarterly inservice test surveillance per Procedure 06-OP-1E12-Q-0023, "RHR A Quarterly Functional Test," Revision 114

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed six samples.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors reviewed the UFSAR, plant drawings, procedure requirements, and TS to ensure that the below listed temporary modification was properly implemented. The inspectors: (1) verified that the modification did not have an affect on system operability/availability; (2) verified that the installation was consistent with modification documents; (3) ensured that the post-installation test results were satisfactory and that the impact of the temporary modification on permanently installed SSCs was supported by the test; (4) verified that the modification was identified on control room drawings and that appropriate identification tags were placed on the affected drawings; and (5) verified that appropriate safety evaluations were completed. The inspectors verified that the licensee identified and implemented any needed corrective actions associated with temporary modifications.

- April 24, 2007, RF15 temporary power supply to safety related battery charger per Temporary Alteration 2006-018



Documents reviewed by the inspectors included:

- Procedure 04-1-L11-1, "Plant DC Systems," Revision 119
- Condition Report CR-GGN-2006-3937
- Work Order 55397
- Drawing E1018, "One Line Meter and Relay Diagram," Revision 11

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

Cornerstone: Emergency Preparedness

a. Inspection Scope

The inspector performed an in-office review of Revision 57 to the Grand Gulf Nuclear Station Emergency Plan, submitted September 28, 2006. This revision incorporated a change of emergency action level scheme based on NEI 99-02, "Methodology for Development of Emergency Action Levels," Revision 4, as previously approved by the NRC by letter dated July 27, 2005, and updated two memorandums of agreement with offsite agencies.

The revision was compared to the previous revision, NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, to the criteria of NEI 99-01, "Methodology for Development of Emergency Action Levels," Revision 4, and to the standards in 10 CFR 50.47(b) to determine if the revision was adequately conducted following the requirements of 10 CFR 50.54(q). This review was not documented in a Safety Evaluation Report and did not constitute approval of licensee changes, therefore these revisions are subject to future inspection.

The inspector completed one sample during the inspection.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

For the listed simulator-based training evolution contributing to Drill/Exercise Performance and emergency response organization PIs, 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 (NEI) 99-02, "Voluntary Submission of Performance Indicator Data," acceptance criteria.

- May 17, 2007, Anticipated transient without scram with steam line break in the auxiliary building steam tunnel per GSMS-LOR-00195.04, Revision 2.

Documents reviewed by the inspectors included:

- Drill Emergency Notification Forms
- Condition Report CR-GGN-2007-2607
- Procedure 10-S-01-1, "Activation of the Emergency Plan," Revision 115

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control To Radiologically Significant Areas (71121.01)

a. Inspection Scope

This area was inspected to assess the licensee's performance in implementing physical and administrative controls for airborne radioactivity areas, radiation areas, high radiation areas, and worker adherence to these controls. The inspectors used the requirements in 10 CFR Part 20, the Technical Specifications, and the licensee's procedures required by Technical Specifications as criteria for determining compliance. During the inspection, the inspectors interviewed the radiation protection manager, radiation protection supervisors, and radiation workers. The inspectors performed independent radiation dose rate measurements and reviewed the following items:

- Controls (surveys, posting, and barricades) of radiation, high radiation, or airborne radioactivity areas
- Physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools
- Corrective action documents related to access controls
- Licensee actions in cases of repetitive deficiencies or significant individual deficiencies
- Posting and locking of entrances to all accessible high dose rate - high radiation areas and very high radiation areas

The inspectors completed 7 of the required 21 samples.

b. Findings

- .1 Introduction. The inspectors reviewed a self-revealing, noncited violation of 10 CFR Part 20.1501(a) because the licensee failed to evaluate the radiological hazard of foreign material retrieval from the reactor vessel. The violation had very low safety significance.

Description. On March 29, 2007, a contract radiation protection technician and two vendor workers retrieved foreign material from the reactor vessel. This evolution was performed from the auxiliary platform using underwater cameras and pneumatic pliers. The vendor workers identified a bolt which they thought was the one dropped during other evolutions two days earlier. The bolt was collected with the pneumatic pliers and placed in a bucket (approximately 10 inches tall). The radiation protection technician measured a dose rate of 600 mR/hr at the plane of the bucket opening. This dose rate was similar to the dose rates of other items brought out of the water, such as underwater cameras, tape, and rope. The radiation protection technician informed the vendor workers to place the bucket in the trash can on the auxiliary platform. The radiation protection technician measured dose rates again in the range of 300 to 500 mR/hr and assumed the dose rates were from the tape or rope on the air pliers that were being used for the foreign material retrieval. The radiation protection technician reached into the bucket and removed the bolt and placed it on a console cabinet in the area. One of the vendor workers approached, stating he wanted to inspect the bolt. The vendor worker's electronic dosimeter began to alarm. The second vendor worker heard the alarm and notified the radiation protection technician and first vendor worker of the alarming condition. The radiation protection technician informed the two vendor workers to back away and then measured dose rates from the bolt. The radiation protection technician noted the survey instrument indicating "15 to 20," but was unable to see which scale the meter was on because of poor lighting in the area. Additionally, the light on the meter did not work. The radiation protection technician backed away into a better lighted area and noted the meter was on the R/hr scale. The radiation protection technician performed another survey of the bolt and measured 19.9 R/hr on contact and 391 mR/hr at 30 cm. Using a decontamination rag, the radiation protection technician picked up the bolt and placed it back in the bucket and then placed the bucket under water. The licensee evaluated the radiation protection technician's dose and determined the individual received a shallow dose equivalent of 41 millirems.

Analysis. The failure to perform an adequate survey is a performance deficiency. This finding is greater than minor because it is associated with the occupational radiation safety program and process attribute and affected the cornerstone objective, in that the lack of knowledge of radiological conditions could increase personnel dose. This occurrence involved workers unplanned, unintended dose or potential for such dose which could have been significantly greater as a result of a single minor, reasonable alteration of circumstances, therefore this finding was evaluated using the Occupational Radiation Safety Significance Determination Process. The inspectors determined that this finding was of very low safety significance because it did not involve: (1) an as low as is reasonably achievable (ALARA) planning or work control issue; (2) an overexposure; (3) a substantial potential for overexposure; or (4) an impaired ability to assess dose. Additionally, this finding has a crosscutting aspect in the area of human performance

associated with work practices because the workers failed to use error prevention techniques such as self and peer checking (H.4(a)). The finding was self-revealing because the personnel were alerted to the high dose rate condition by the alarming electronic dosimeters.

Enforcement. Part 20.1501(a) of Title 10 of the Code of Federal Regulations requires that each licensee make or cause to be made surveys that may be necessary for the licensee to comply with the regulations in 10 CFR Part 20 and that are reasonable under the circumstances to evaluate the extent of radiation levels, concentrations or quantities of radioactive materials, and the potential radiological hazards that could be present. Pursuant to 10 CFR 20.1003, a "survey" means an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation. Part 20.1201(a) of Title 10 of the Code of Federal Regulations states, in part, that the licensee shall control the occupational dose to individual adults to specified limits. The licensee violated 10 CFR 20.1501(a), when a radiation protection technician failed to perform an adequate survey of a bolt retrieved from the refueling pool. As corrective action, the licensee revised the appropriate radiation work permit template to incorporate a dose rate limit for items being removed from the pools and included a discussion of the event in radiation protection training. Because this failure to perform radiological surveys is of very low safety significance and has been entered into the licensee's corrective action program as CR GGN-2007-1677, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000416/2007003-04, Failure to Evaluate the Radiological Hazard Caused by Foreign Material Retrieval from the Reactor Vessel.

- .2 Introduction. The inspectors reviewed a self-revealing, noncited violation of Technical Specification 5.7.1 resulting from a failure to post and control a high radiation area. The violation had very low safety significance.

Description. On May 24, 2007, radwaste operations personnel began a tagout of the G17D069 filters in the liquid radwaste system. The filters were located in Room 0R123 on the 93-foot elevation of the radwaste building. The tagout initiator received an electronic dosimeter dose rate alarm (348 millirems per hour) while conducting the tagout. The radwaste operator asked a second radwaste operator to verify the tagout was completed properly. The first radwaste operator failed to mention the dosimeter alarm to the second operator, and when the second operator verified the tagout, the second radwaste operator also received an electronic dosimeter dose rate alarm (374 millirems per hour). Radiation protection personnel learned of the first dose rate alarm when the first radwaste operator attempted to log out of the radiological controlled area and received an alarm on the access control computer. However, there was inadequate time to prevent the second radwaste operator from entering the same area and receiving a dose rate alarm. Radiation protection personnel surveyed the area and measured dose rates as much as 265 millirems per hour at 30 centimeters from the G17D069 filter housing. General area dose rate was 110 millirems per hour in the vicinity of the filters. As immediate corrective action, the area was barricaded and conspicuously posted as a high radiation area.

The inspectors determined poor communications between the operations personnel and radiation protection personnel contributed to the failure to identify the high radiation area. Radiation protection supervisors stated they did not require more frequent surveys of the

radwaste area because they were unaware at the time of the radwaste operators' dose rate alarms that reactor water cleanup reject flow was approximately twice the normal flow rate (40 to 50 gallons per minute rather than 22 to 25 gallons per minute), and that both of the reactor water cleanup demineralizers were out of service from approximately 3:00 p.m. on May 19 until 9:00 a.m. on May 20, 2007. The increased flow and the lack of filtration caused the higher dose rates, according to radiation protection personnel.

Analysis. The failure to barricade and conspicuously post a high radiation area is a performance deficiency. This finding is greater than minor because it is associated with the occupational radiation safety program and process attribute and affected the cornerstone objective, in that the failure to barricade and conspicuously post a high radiation area had the potential to increase personnel dose. This occurrence involved workers unplanned, unintended dose or potential for such dose which could have been significantly greater as a result of a single minor, reasonable alteration of circumstances, therefore this finding was evaluated using the Occupational Radiation Safety Significance Determination Process. The inspectors determined that this finding was of very low safety significance because it did not involve: (1) an ALARA planning or work control issue; (2) an overexposure; (3) a substantial potential for overexposure; or (4) an impaired ability to assess dose. Additionally, this finding has a crosscutting aspect in the area of human performance associated with work control because the licensee failed to ensure proper communication, coordination, and cooperation during activities in which interdepartmental coordination is necessary to assure plant and human performance (H.3(b)). The finding was self-revealing because the licensee was alerted to the high radiation area condition by the alarming electronic dosimeters.

Enforcement. Technical Specification 5.7.1 requires, in part, that the licensee barricade and conspicuously post high radiation areas. The licensee violated this requirement when it failed to post and control a high radiation area in Room 0R123 in the radwaste building. Corrective actions were still being evaluated. Because this violation was of very low safety significance and has been entered into the licensee's corrective action program as CR-GGN-2007-00129 and CR-GGN-2007-03361, it is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000416/2007003-0X, "Failure to Post and Control a High Radiation Area."

## 2OS2 ALARA Planning and Controls (71121.02)

### a. Inspection Scope

The inspectors assessed licensee performance with respect to maintaining individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements in 10 CFR Part 20 and the licensee's procedures required by technical specifications as criteria for determining compliance. The inspectors interviewed licensee personnel and reviewed:

- Current 3-year rolling average collective exposure
- Site-specific ALARA procedures
- Three work activities of highest exposure significance completed during the last outage

- ALARA work activity evaluations, exposure estimates, and exposure mitigation requirements
- Intended versus actual work activity doses and the reasons for any
- Assumptions and basis for the current annual collective exposure estimate, the methodology for estimating work activity exposures, the intended dose outcome, and the accuracy of dose rate and man-hour estimates
- Method for adjusting exposure estimates, or re-planning work, when unexpected changes in scope or emergent work were encountered
- Source-term control strategy or justifications for not pursuing such exposure reduction initiatives
- Corrective action documents related to the ALARA program and follow-up activities, such as initial problem identification, characterization, and

The inspectors completed 7 of the required 15 samples and 2 of the optional samples.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

Cornerstone: Mitigating Systems

The inspectors sampled licensee submittals for the performance indicator listed below for the period from April 2006 through March 2007. The definitions and guidance of Nuclear Energy Institute 99-02, "Regulatory Assessment Indicator Guideline," Revision 2, were used to verify the licensee's basis for reporting each data element in order to verify the accuracy of PI data reported during the assessment period. The inspectors reviewed licensee event reports, out-of-service logs, operating logs, and the maintenance rule database as part of the assessment.

- Safety System Functional Failures

The inspectors completed one sample in this cornerstone.

Cornerstone: Barrier Integrity

The inspectors sampled licensee submittals for the performance indicators listed below for the period from April 2006 through March 2007. The definitions and guidance of Nuclear Energy Institute 99-02, "Regulatory Assessment Indicator Guideline," Revision 2, were used to verify the licensee's basis for reporting each data element in order to verify

the accuracy of PI data reported during the assessment period. The inspectors: (1) reviewed RCS chemistry sample analyses for dose equivalent Iodine-131 and compared the results to the TS limit; (2) observed a chemistry technician obtain and analyze a RCS sample; (3) reviewed operating logs and surveillance results for measurements of RCS identified leakage; and (4) observed a surveillance test that determined RCS identified leakage.

- Reactor Coolant System Specific Activity

#### Cornerstone: Occupational Radiation Safety

##### Occupational Exposure Control Effectiveness

The inspectors reviewed licensee documents from January 1 through March 30, 2007. The review included corrective action documentation that identified occurrences in locked high radiation areas (as defined in the licensee's technical specifications), very high radiation areas (as defined in 10 CFR 20.1003), and unplanned personnel exposures (as defined in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Indicator Guideline," Revision 4). Additional records reviewed included ALARA records and whole body counts of selected individual exposures. The inspectors interviewed licensee personnel that were accountable for collecting and evaluating the performance indicator data. In addition, the inspectors toured plant areas to verify that high radiation, locked high radiation, and very high radiation areas were properly controlled. Performance indicator definitions and guidance contained in NEI 99-02, Revision 4, were used to verify the basis in reporting for each data element.

The inspectors completed one sample in this cornerstone.

#### Cornerstone: Public Radiation Safety

##### Radiological Effluent Technical Specification/Offsite Dose Calculation Manual Radiological Effluent Occurrences

The inspectors reviewed licensee documents from January 1, 2007 through March 30, 2007. Licensee records reviewed included corrective action documentation that identified occurrences for liquid or gaseous effluent releases that exceeded performance indicator thresholds and those reported to the NRC. The inspectors interviewed licensee personnel that were accountable for collecting and evaluating the performance indicator data. Performance indicator definitions and guidance contained in NEI 99-02, Revision 4, were used to verify the basis in reporting for each data element.

The inspectors completed one sample in this cornerstone.

#### b. Findings

No findings of significance were identified.

#### 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 work orders 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 selected the listed issue for a more in-depth review. The inspectors considered the following during the review of the licensee's actions: (1) complete and accurate identification of the problem in a timely manner; (2) evaluation and disposition of operability/reportability issues; (3) consideration of extent of condition, generic implications, common cause, and previous occurrences; (4) classification and prioritization of the resolution of the problem; (5) identification of root and contributing causes of the problem; (6) identification of corrective actions; and (7) completion of corrective actions in a timely manner.

- CR-GGN-2006-1754, Loose Bolts on Standby Service Water Train B Feeder Breaker

Documents reviewed by the inspectors are listed in the attachment.

###### b. Findings and Observations

Introduction. The inspectors identified a Green noncited violation of Technical Specification 5.4.1(a) involving the failure to identify loose and missing fasteners on the standby service water Train B bus feeder breaker.

Description. On May 1, 2006, an operator noted one bolt missing and a second bolt loose on the racking mechanism of the 4.16kV feeder breaker for standby service water Train B. The missing bolt was later located on the floor of the breaker cubicle. The licensee performed an apparent cause determination as part of Condition Report CR-GGN-2006-1754 and concluded the bolt had fallen out of the racking mechanism because the associated lock washer and nut had not been installed following a rebuild of the breaker in 2002. The licensee issued a work order to replace the missing bolt and to tighten the loose bolt during the next system outage.



On May 15, 2007, a licensee electrician walking through the Division II switchgear room noticed a bolt on the floor in front of the standby service water Train B bus feeder breaker. The licensee determined this bolt was from the breaker racking mechanism and was the same bolt that had been identified as loose in May 2006. The licensee replaced both bolts using the work order from May 2006. As part of the long term corrective actions identified in Condition Report CR-GGN-2007-3081 written for the second missing bolt, the licensee planned to continue periodic breaker inspections per Procedure 07-S-12-42, "Inspection and Testing of ITE 5kV Power Circuit Breakers," Revision 5.

The inspectors reviewed the work history for the affected breaker and noted the periodic inspection per Procedure 07-S-12-42 was last performed for the affected breaker in July 2003 as Work Order 50326357. The inspectors concluded that although the procedure included steps to check for missing parts and to ensure bolting is tight, this inspection had failed to identify the missing fasteners and loose bolt. Additionally, the inspectors noted a similar instance in November 2006 in which periodic inspections failed to ensure all fasteners remained secure inside the high pressure core spray pump supply breaker. This event is described in Section 4OA7 of NRC Inspection Report 05000416/2007002. The licensee initiated Condition Report CR-GGN-2007-3081 to address the inspectors' concerns related to breaker inspection and maintenance effectiveness.

Analysis. The failure to follow procedures was a performance deficiency. This finding was more than minor because the failure to ensure that loose parts are not present in safety related breakers, if left uncorrected, could become a more significant safety concern. Using the Significance Determination Process Phase 1 Screening Worksheet in Appendix A of Inspection Manual Chapter 0609, the inspectors determined the finding was of very low safety significance because it did not result in a loss of operability.

Enforcement. Technical Specification 5.4.1(a) requires written procedures to be implemented as recommended by Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Appendix A recommends procedures governing maintenance practices. Steps 7.5.4 and 7.5.6 of Procedure 07-S-12-42, "Inspection and Testing of ITE 5kV Power Circuit Breakers," Revision 5, require inspection of the breaker assembly to ensure no loose fasteners are present. Contrary to this requirement, inspections of the standby service water Train B bus feeder breaker in July 2003 failed to identify loose and missing fasteners on the breaker assembly. Because this violation was of very low safety significance and was entered in the corrective action program as CR-GGN-2007-3081, this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000416/2007003-06, Failure to Follow Procedure for Safety-Related Breaker Inspections.

### .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 work orders, 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 six month period from January 1 through June 30, 2007. When warranted, some of the

samples expanded beyond those dates to fully assess the issue. The inspectors reviewed the following issues:

- Riley temperature switch failures
- Fire and security door degradation
- Control rod drive hydraulic system filter replacements
- Standby liquid control pump oil particulates

The inspectors compared and contrasted their results with the results contained in the licensee's quarterly trend reports. Corrective actions associated with a sample of the issues identified in the licensee's trend report were reviewed for adequacy. Documents reviewed by the inspectors are listed in the attachment.

b. Findings and Observations

No findings of significance were identified.

.4 Selected Issue Follow-Up Inspection

a. Inspection Scope

The inspector evaluated the effectiveness of the licensee's problem identification and resolution process with respect to the following inspection areas:

- Access Control to Radiologically Significant Areas (Section 2OS1)
- ALARA Planning and Controls (Section 2OS2)

b. Findings and Observations

Section 2OS1 describes a finding resulting from a failure to barricade and conspicuously post a high radiation area. The finding was initially documented as an electronic alarming dosimeter dose rate alarm in CR-GGN-2007-02842. This condition report was closed to CR-GGN-2007-00129, Corrective Action 35. Neither condition report addressed the apparent communication problem between the operations group and radiation protection personnel which was identified during the inspection and determined to be a human performance cross-cutting aspect.

4OA3 Event Follow-up (71153)

.1 Personnel Performance During Nonroutine Evolutions, Events, and Transients

a. Inspection Scope

The inspectors: (1) reviewed operator logs, plant computer data, and/or strip charts for the below listed evolutions to evaluate operator performance in coping with nonroutine events and transients; (2) verified that operator actions were in accordance with the response required by plant procedures and training; and (3) verified that the licensee has identified and implemented appropriate corrective actions associated with personnel performance problems that occurred during the events sampled.

- On May 19, 2007, the inspectors reviewed operator performance in the control room following an unplanned, automatic scram due to a loss of condenser vacuum. The inspectors reviewed plant parameters, operator logs and operator response to the event, including adherence to and quality of plant procedures used during the event.
- On May 30, 2007, the inspectors reviewed operator performance associated with the unplanned trip of a plant service water pump. The inspectors reviewed plant parameters, operator logs, and operator actions associated with off-normal event Procedure 05-1-02-V-11, "Loss of Plant Service Water," Revision 27.

The inspectors completed two samples.

b. Findings

No findings of significance were identified.

.2 (Closed) LER 05000416/2007-001-00: Failure to Comply with Technical Specification 3.3.8.1 - Function 1.b - Loss of Voltage Time Delay

On March 24, 2007, the licensee identified that the Division 2 emergency bus feeder breaker would open at a 0.35 second time delay upon receipt of a loss of voltage signal contrary to the required Technical Specification 3.3.8.1 Function 1.b allowable value of greater than or equal to 0.4 seconds and less than or equal to 1.0 second. The licensee determined the cause to be a previously unrecognized secondary set of protective relays on the breaker that masked the operation of the primary protective relays associated with the load shedding and sequencing system. As immediate corrective actions, the licensee re-calibrated the secondary relays to open after the primary relays and successfully completed the surveillance test. This finding is more than minor because it had a credible impact on safety, in that a shorter time delay could initiate a bus transfer on both safety divisions, causing an unnecessary plant transient. This finding is of 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. The enforcement aspects of this finding are discussed in Section 4OA7. This LER is closed.

4OA6 Meetings, Including Exit

On April 5, 2007, the emergency preparedness inspector conducted a telephonic exit meeting to present the inspection results to Mr. C. Bottemiller, Manager, Plant Licensing, and other members of his staff, who acknowledged the findings. The inspector confirmed that proprietary information was not provided or examined during the inspection.

On June 29, 2007, the health physics inspectors presented the occupational radiation safety inspection results to Mr. R. Brian, Vice President of Operations, and other members of his staff who acknowledged the findings. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

On July 12, 2007, the resident inspectors presented the inspection results to Mr. J. Reed, General Manager, Plant Operations, and others who acknowledged the findings.

Proprietary information was reviewed by the inspectors and was returned to the licensee at the end of the inspection.

#### 4OA7 Licensee-Identified Violations

The following violations of very low significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as NCVs.

- Technical Specification 5.4.1(a) requires written procedures to be implemented as recommended by Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Appendix A recommends procedures for containment local leak rate tests (LLRTs). Attachment III of Special Process Instruction, 07-S-74-P11-1, "LLRT Valve Alignment for Condensate and Refueling Water Storage and Transfer Penetrations," Revision 3, requires valves to be restored to the pre-LLRT position. Contrary to this requirement, the fire water isolation valves to containment were not restored to the open position following an LLRT conducted on April 8, 2007. As a result, all fire protection water to the containment, consisting of sixteen fire hose stations and a fixed fire suppression water sprinkler for the containment cooling filter train, was unavailable for six days. This condition was discovered and corrected during performance of surveillance Procedure 06-OP-SP64-M-011, "Fire Protection System Valve Lineup Verification," Revision 108, on April 14, 2007. This event was documented in the corrective action program as Condition Report CR-GGN-2007-2154. This finding could not be analyzed using the SDP since Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," does not address manual fire suppression deficiencies and the containment cooling filter train is not required for hot or cold shutdown. Therefore, in accordance with NRC Inspection Manual Chapter 0612, "Power Reactor Inspection Reports," Section 05.04.c, regional management reviewed this finding and determined that it was of very low risk significance.
- Technical Specification 3.3.8.1 requires loss of power instrumentation for the emergency bus undervoltage time delay relays to be tested every 18 months to verify system operability. Contrary to this requirement, the protective time delay function of the loss of power instrumentation was not tested due to the shorter time delay of a set of secondary protective relays which masked the timing of the primary protective relays. The secondary relays actuated the bus undervoltage signal in less than the minimum time allowed by TS. This condition was discovered and corrected during performance of Procedure 06-OP-1P75-R-004, "SDG 12 18-Month Functional Test," Revision 112. The licensee entered this issue in the corrective action program as Condition Report CR-GGN-2007-1405. This finding is of 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.
- Technical Specification 5.4.1 requires procedures be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Appendix A, Section 9, recommends, "Procedures for maintenance." Procedure 01-S-02-3 "Conduct of Maintenance Activities" implements this requirement and states, in Section 2.5.2, "Maintenance journeymen are responsible for ensuring procedure adherence

during all maintenance evolutions.” Work Order Package 0009354701, “1N11F015 Remove Act, Cutout and Repl Vlv, Install Act,” Step 4.5, states, “Notify HP before steam leak-off flange is disassembled.” On April 4, 2007, radiation protection personnel identified that a mechanic and two pipe fitters had failed to inform radiation protection personnel before disassembling the steam leak-off flange and becoming contaminated. The licensee took disciplinary action against the workers. The finding was documented in Condition Report CR-GGN-2007-1872 and was evaluated using the Occupational Radiation Safety Significance Determination Process. The inspectors determined that this finding was of very low safety significance because it did not involve: (1) an as low as is reasonably achievable (ALARA) planning or work control issue; (2) an overexposure; (3) a substantial potential for overexposure; or (4) an impaired ability to assess dose.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee Personnel

C. Abbott, Acting Manager, 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  
T. Curtis, Supervisor, Radiation Protection  
L. Eaton, Senior Lead Engineer  
C. Ellsaesser, Manager, Planning and Scheduling  
M. Guynn, Manager, Emergency Preparedness  
E. Harris, Manager, Corrective Action and Audits  
M. Krupa, Director, Engineering  
M. Larson, Senior Licensing Engineer  
J. Reed, General Manager, Plant Operations  
M. Rohrer, Manager, System Engineering  
T. Tankersley, Manager, Training  
D. Townsend, Senior Emergency Planner  
W. Trichell, Supervisor, Radiation Protection  
K. Walker, Superintendent, Reactor Engineering  
D. Wilson, Supervisor, Design Engineering  
R. Wilson, Superintendent, Radiation Protection  
P. Worthington, Supervisor, Engineering  
E. Wright, Senior Health Physics/Chemistry Specialist

#### 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

None

#### Opened and Closed

05000416/2007003-01	NCV	Failure to Adequately Monitor the Performance of the Leakage Detection System (1R12)
05000416/2007003-02	NCV	Failure to Repair Crack in Containment Building Structure (1R20)
05000416/2007003-03	FIN	Inadequate Foreign Material Controls During Reactor Feed Pump Maintenance (1R20)

05000416/2007003-04	NCV	Failure to Evaluate the Radiological Hazard Caused by Foreign Material Retrieval from the Reactor Vessel (2OS1)
05000416/2007003-05	NCV	Failure to Post and Control a High Radiation Area (2OS1)
05000416/2007003-06	NCV	Failure to Follow Procedure for Safety-Related Breaker Inspections (4OA2)

Closed

05000416/2007-001-00	LER	Failure to Comply with Technical Specification 3.3.8.1 - Function 1.b - Loss of Voltage Time Delay (4OA3)
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Discussed

None

### **LIST OF DOCUMENTS REVIEWED**

In addition to the documents called out 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 Alignment

Procedures

04-1-01-P75-1, "Standby Diesel Generator System," Revision 74  
 04-1-01-C11-1, "Control Rod Drive Hydraulic System," Revision 128  
 04-1-01-E22-1, "High Pressure Core Spray System," Revision 109

Drawings

M-1070C, "Standby Diesel Generator System," Revision 19  
 M-1081A, "Control Rod Drive Hydraulic System," Revision 38  
 M-1086, "High Pressure Core Spray System," Revision 30

CR-GGN-2007-0956  
 CR-GGN-2007-2024

Section 1R06: Flood Protection Measures

GGNS Safety Evaluation Report Section 10.4.5  
 Regulatory Guide 1.102

Condition Reports

CR-GGN-2007-2172  
 CR-GGN-2007-0129  
 CR-GGN-2007-2854  
 CR-GGN-2007-2940

#### Section 1R12: Maintenance Rule

EN-DC-203, "Maintenance Rule Program," Revision 0  
EN-DC-204, "Maintenance Rule Scope and Basis," Revision 0  
EN-DC-205, "Maintenance Rule Monitoring," Revision 0  
EN-DC-206, "Maintenance Rule (a)(1) Process," Revision 0  
Maintenance Rule Failure Database for System E31

Condition Reports  
CR-GGN-2007-2955  
CR-GGN-2007-2990  
CR-GGN-2006-2440  
CR-GGN-2007-1603

Work Order 89468

#### Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures  
01-S-18-6, "Risk Assessment of Maintenance Activities," Revision 4  
18-S-01-1, "Special Test Instructions," Revision 2  
EN-WM-101, "On-Line Work Management Process," Revision 1  
EN-WM-102, "Work Implementation and Closeout," Revision 0

Work Order 96760  
Condition Report CR-GGN-2007-2310

#### Section 1R15: Operability Determinations

EN-OP-104, "Operability Determinations," Revision 2  
EN-LI-102, "Corrective Action Process," Revision 8  
CR-GGN-2007-2828  
CR-GGN-2007-1840  
CR-GGN-2007-1851  
Calculation MC-Q1P75-98030, "Standby Diesel Generator Jacket Water," Revision 1  
Drawing M-1070C, "Standby Diesel Generator," Revision 18

#### Section 1R19: Postmaintenance Testing

WO 102139  
WO 51033529

CR-GGN-2007-2041  
CR-GGN-2007-2065

Drawings  
M-1061C, "Standby Service Water System," Revision 36  
FSK-S-1061C-117-B, "Standby Service Water from HBC105 to Cooler B003-A," Revision 9  
FSK-S-1061C-079-B, "DRW Drain for RHR Room Cooler Q1T51B003-A," Revision 8



## Section 1R20: Refueling and Outage Activities

03-1-01-5, "Refueling," Revision 117  
03-1-01-1, "Cold Shutdown to Generator Carrying Minimum Load," Revision 135  
03-1-01-6, "Reactor Vessel Inservice Leak Test," Revision 116  
EN-OP-102, "Protective and Caution Tagging," Revision 5  
EN-DC-313, "Procurement Engineering Process," Revision 0  
EN-MA-118, "Foreign Material Exclusion," Revision 2  
07-S-74-P11-1, "LLRT Valve Alignments," Revision 3  
M-1085A, "Residual Heat Removal System," Revision 67  
M-1085C, "Residual Heat Removal System," Revision 17  
01-S-06-26, "Post-Trip Analysis," Revision 16  
MP&L-C-301.3, "Technical Specification for Forming, Placing, Finishing, and Curing of Concrete," Revision 0

### Condition Reports

CR-GGN-2007-1293  
CR-GGN-2007-1942  
CR-GGN-2007-1568  
CR-GGN-2007-2158  
CR-GGN-2007-2187  
CR-GGN-2007-2605  
CR-GGN-2007-2756  
MNCR-87/0237

### Work Orders

51055792  
89975  
89962  
107347  
107696  
51033529

## Section 1R22: Surveillance Testing

06-RE-1B33-D-0001, "Jetpump Functional Test," Revision 108  
06-ME-1M61-V-1G36F1ACP, "Local Leak Rate Test," Revision 8

CR-GGN-2007-2885  
CR-GGN-2007-1821  
CR-GGN-2007-1839

WO 51087514  
WO 89967

## Section 2OS1: Access Controls to Radiologically Significant Areas

### Corrective Action Documents

2007-1808, 2007-1875, 2007-1876, 2007-2168, 2007-2169, 2007-2764, 2007-2842

Radiation Work Permits  
2007-1800 All Turbine Building Activities

Procedures  
EN-RP-100 Radworker Expectations, Revision 0  
EN-RP-101 Access Control for Radiologically Controlled Areas, Revision 1  
EN-RP-102 Radiological Control, Revision 0  
01-S-08-2 Exposure and Contamination Control, Revision 117

#### Section 2OS2: ALARA Planning and Controls

Radiation Work Permits  
1403 Reactor Vessel Disassembly and Reassembly  
1516 ISI for All Areas

Procedures  
EN-RP-105 Radiation Work Permits, Revision 1  
EN-RP-110 ALARA Program, Revision 2

#### Section 4OA2: Identification and Resolution of Problems

07-S-12-42, "Inspection and Testing of ITE 5kV Power Circuit Breakers," Revision 5

CR-GGN-2007-2665  
CR-GGN-2007-3081  
CR-GGN-2006-1754  
CR-GGN-2007-2843  
CR-GGN-2007-0229  
CR-GGN-2006-2856  
CR-GGN-2005-5062  
CR-GGN-2005-0019

WO 50326357  
WO 87108

#### Section 4OA3: Event Followup

06-OP-1P75-R-0004, "SDG 12 18-Month Functional Test", Revision 112  
06-EL-1P81-R-0001, "ESF Bus Undervoltage and Time Delay Relay Calibration," Revision 102  
Work Order 51033975  
Work Order 105940

CR-GGN-2005-4665  
CR-GGN-2007-1405  
CR-GGN-2007-2904

E-1109-05, "ESF System Incoming Breaker 152-1601 Schematic," Revision 13  
E-1109-18, "ESF System Metering and Relaying," Revision 9  
E-1120-10, "Load Shedding and Sequencing System," Revision 1