



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION IV  
1600 E. LAMAR BLVD.  
ARLINGTON, TX 76011-4511

April 28, 2016

Mr. Kevin Mulligan  
Site Vice President Operations  
Entergy Operations, Inc.  
Grand Gulf Nuclear Station  
P.O. Box 756  
Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION – NRC INTEGRATED INSPECTION  
REPORT 05000416/2016001

Dear Mr. Mulligan:

On March 31, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Grand Gulf Nuclear Station, Unit 1. On March 31, 2016, the NRC inspectors discussed the results of this inspection with you and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report. The NRC inspectors did not identify any findings or violations of more than minor significance.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public

K. Mulligan

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Sincerely,

***/RA/***

Greg Warnick, Chief  
Project Branch C  
Division of Reactor Projects

Docket No. 50-416  
License No. NPF-29

Enclosure:

Inspection Report 05000416/2016001

w/ Attachments:

1. Supplemental Information
2. Inservice Inspection Document Request

cc w/ encl: Electronic Distribution

K. Mulligan

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Letter to Kevin Mulligan from Greg Warnick dated April 28, 2016

SUBJECT: GRAND GULF NUCLEAR STATION – NRC INTEGRATED INSPECTION  
REPORT 05000416/2016001

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000416  
License: NPF-29  
Report: 05000416/2016001  
Licensee: Entergy Operations, Inc.  
Facility: Grand Gulf Nuclear Station, Unit 1  
Location: 7003 Baldhill Road  
Port Gibson, MS 39150  
Dates: January 1 through March 31, 2016  
Inspectors: M. Young, Senior Resident Inspector  
N. Day, Resident Inspector  
L. Brandt, Project Engineer  
J. Drake, Senior Reactor Inspector  
M. Stafford, Project Engineer  
C. Young, Senior Project Engineer  
Approved By: Greg Warnick  
Chief, Project Branch C  
Division of Reactor Projects

## **SUMMARY**

IR 05000416/2016001; 01/01/2016 – 03/31/2016; Grand Gulf Nuclear Station; Integrated Inspection Report

The inspection activities described in this report were performed between January 1 and March 31, 2016, by the resident inspectors at the Grand Gulf Nuclear Station and inspectors from the NRC's Region IV office. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

No findings were identified.

## PLANT STATUS

The Grand Gulf Nuclear Station began the inspection period at 87 percent power.

On January 1, 2016, the operators reduced power to approximately 59 percent to perform power suppression testing. Upon completion, operators performed power ascension activities to reach 100 percent power on January 9, 2016.

On February 19, 2016, the operators commenced a planned shutdown from 95 percent power for Refueling Outage 20.

On March 28, 2016, the licensee completed Refueling Outage 20. Operators commenced power ascension and restart activities.

On March 29, 2016, at approximately 35 percent power, a turbine trip occurred that resulted in a reactor scram. The turbine trip was due to indication of a high differential current on phase B of the main transformer.

On March 30, 2016, operators commenced power ascension, and on March 31, 2016, Grand Gulf Nuclear Station was at approximately 49 percent power.

## REPORT DETAILS

### 1. REACTOR SAFETY

#### Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R01 Adverse Weather Protection (71111.01)

##### Readiness for Impending Adverse Weather Conditions

##### a. Inspection Scope

On January 21, February 23, and March 17, 2016, the inspectors completed inspections of the station's readiness for impending adverse weather conditions. The inspectors reviewed plant design features, the licensee's procedures to respond to tornadoes and high winds, and the licensee's implementation of these procedures. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant.

These activities constituted three samples of readiness for impending adverse weather conditions, as defined in Inspection Procedure 71111.01.

##### b. Findings

No findings were identified.

## **1R04 Equipment Alignment (71111.04)**

### **.1 Partial Walkdown**

#### **a. Inspection Scope**

The inspectors performed partial system walkdowns of the following risk-significant systems:

- February 23, 2016, fuel pool cooling and cleanup system, trains A and B
- March 16, 2016, engineered safety features transformer 12, switch and breaker lineup while engineered safety features transformer 21 was removed from service
- March 30, 2016, high pressure core spray valve alignment due to a Level 8 on reactor water level wide range indicator

The inspectors reviewed the licensee's procedures and system design information to determine the correct lineup for the systems. They visually verified that critical portions of the systems or trains were correctly aligned for the existing plant configuration.

These activities constituted three partial system walkdown samples, as defined in Inspection Procedure 71111.04.

#### **b. Findings**

No findings were identified.

### **.2 Complete Walkdown**

#### **a. Inspection Scope**

On March 1-2, 2016, the inspectors performed a complete system walkdown inspection of the alternate decay heat removal system. The inspectors reviewed the licensee's procedures and system design information to determine the correct system lineup for the existing plant configuration. The inspectors also reviewed open items tracked by the licensee's operations and engineering departments. The inspectors then visually verified that the system was correctly aligned for the existing plant configuration.

These activities constituted one complete system walkdown sample, as defined in Inspection Procedure 71111.04.

#### **b. Findings**

No findings were identified.



## **1R05 Fire Protection (71111.05)**

### a. Inspection Scope

The inspectors evaluated the licensee's fire protection program for operational status and material condition. The inspectors focused their inspection on four plant areas important to safety:

- January 22, 2016, fire area 25A, fire zones OC702 and OC712, upper cable spreading room and HVAC room
- February 16, 2016, fire area 19, fire zone 1A403, 166' elevation corridors
- February 16, 2016, fire area 6, fire zone 1A201, 119' elevation corridors
- March 15, 2016, fire area 10, fire zone 1A119, low pressure core spray room

For each area, the inspectors evaluated the fire plan against defined hazards and defense-in-depth features in the licensee's fire protection program. The inspectors evaluated control of transient combustibles and ignition sources, fire detection and suppression systems, manual firefighting equipment and capability, passive fire protection features, and compensatory measures for degraded conditions.

These activities constituted four quarterly inspection samples, as defined in Inspection Procedure 71111.05.

### b. Findings

No findings were identified.

## **1R07 Heat Sink Performance (71111.07)**

### a. Inspection Scope

On March 28, 2016, the inspectors completed an inspection of the readiness and availability of risk-significant heat exchangers. The inspectors observed the licensee's inspection of the residual heat removal train B heat exchangers and the material condition of the heat exchanger internals. Additionally, the inspectors walked down the residual heat removal train B heat exchangers to observe their performance and material condition.

These activities constituted completion of one heat sink performance annual review sample, as defined in Inspection Procedure 71111.07.

### b. Findings

No findings were identified.

## 1R08 Inservice Inspection Activities (71111.08)

### .1 Nondestructive Examination Activities and Welding Activities

#### a. Inspection Scope

The inspectors directly observed the following nondestructive examinations:

<u>SYSTEM</u>	<u>WELD/COMPONENT IDENTIFICATION</u>	<u>EXAMINATION TYPE</u>
Low Pressure Core Spray	N5 B	Automated Phased Array Ultrasonic Test
Recirculation	1B33C001B-B3LUG1	Penetrant Test
Feedwater	1B21G030-15-8-1	Ultrasonic Test
Feedwater	1B21G030-15-8-2	Ultrasonic Test
Steam Dryer	SD-OD-HAD H2	Electronic Visual Test 1
Low Pressure Core Injection	LPCI-6-1d	Electronic Visual Test 1

The inspectors reviewed records for the following nondestructive examinations:

<u>SYSTEM</u>	<u>WELD IDENTIFICATION</u>	<u>EXAMINATION TYPE</u>
Feedwater	1B21G001W1	Ultrasonic Testing
Reactor Core Isolation Cooling	1E51G004W4	Ultrasonic Testing
Residual Heat Removal	1E12G015W58	Ultrasonic Testing
Reactor Water Cleanup	1G33G011-3-11-2	Ultrasonic Testing
Reactor Pressure Vessel	Flange Ligaments 26-76	Ultrasonic Testing
Emergency Diesel Generator Division II	1P75B004B	Visual Testing
Reactor Core Isolation Cooling	HBB-259 FW-904	Radiographic Testing
Reactor Core Isolation Cooling	HBB-259 FW-938	Radiographic Testing
Reactor Core Isolation Cooling	HBB-259 FW-939	Radiographic Testing
Reactor Core Isolation Cooling	HBB-259 FW-940	Radiographic Testing

<u>SYSTEM</u>	<u>WELD IDENTIFICATION</u>	<u>EXAMINATION TYPE</u>
Reactor Core Isolation Cooling	HBB-259 FW-942	Radiographic Testing

During the review and observation of each examination, the inspectors verified that activities were performed in accordance with the ASME Code requirements and applicable procedures. The licensee identified two relevant indications that were previously examined. The licensee evaluated and accepted the indications in accordance with ASME Code requirements. The inspectors also verified the qualifications of all nondestructive examination technicians performing the inspections were current.

The inspectors observed one weld on main steam line drain valve F049. No welds on the reactor coolant system pressure boundary were observed.

The inspectors directly observed a portion of the following welding activity:

<u>SYSTEM</u>	<u>WELD IDENTIFICATION</u>	<u>WELD TYPE</u>
Main Steam	1N11F049 Weld 902	Gas Tungsten Arc Welding

The inspectors verified, by review, that the welding procedure specifications and the welders had been properly qualified in accordance with ASME Code, Section IX, requirements. The inspectors also verified, through observation and record review, that essential variables for the welding process were identified, recorded in the procedure qualification record, and formed the bases for qualification of the welding procedure specifications.

The inspectors reviewed weld data sheets for the following welding activities:

<u>SYSTEM</u>	<u>WELD IDENTIFICATION</u>	<u>WELD TYPE</u>
Main Steam	1N11F049 Weld 902	Gas Tungsten Arc Welding
Reactor Core Isolation Cooling	HBB-259 Weld 900	Gas Tungsten Arc Welding
Reactor Core Isolation Cooling	HBB-259 Weld 900	Gas Tungsten Arc Welding
Reactor Core Isolation Cooling	HBB-259 Weld 901	Gas Tungsten Arc Welding
Reactor Core Isolation Cooling	HBB-259 Weld 902	Gas Tungsten Arc Welding
Reactor Core Isolation Cooling	HBB-259 Weld 941	Gas Tungsten Arc Welding

These activities constituted completion of one inservice inspection sample, as defined in Inspection Procedure 71111.08.

b. Findings

No findings were identified.

.2 Identification and Resolution of Problems (71111.08-02.05)

a. Inspection Scope

The inspectors reviewed six condition reports that dealt with inservice inspection activities and found that the corrective actions taken or proposed were appropriate. The specific condition reports reviewed are listed in the List of Documents Reviewed section at the end of this report. From this review, the inspectors concluded that the licensee has an appropriate threshold for entering inservice inspection issues into the corrective action program and has procedures that direct a root cause evaluation when necessary. The licensee also has an effective program for applying industry inservice inspection operating experience.

b. Findings

No findings were identified.

**1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11)**

.1 Review of Licensed Operator Requalification

a. Inspection Scope

On February 2, 2016, the inspectors observed simulator training for an operating crew. The operating crew completed a training scenario that included establishment of shutdown cooling, loss of shutdown cooling and entry into the associated off-normal event procedure, and withdrawing control rods to reach criticality. The inspectors assessed the performance of the operators and the evaluators' critique of their performance.

These activities constituted completion of one quarterly licensed operator requalification program sample, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

.2 Review of Licensed Operator Performance

a. Inspection Scope

The inspectors observed the operators' performance of the following activities:

- On February 19, 2016, the inspectors observed the performance of on-shift licensed operators in the plant's main control room. At the time of the observations, the plant was in a period of heightened activity and risk due to a scheduled plant scram for the start of Refueling Outage 20.
- On March 25, 2016, the inspectors observed the performance of on-shift licensed operators in the plant's main control room. At the time of the observations, the plant was in a period of heightened activity and risk because of reactivity manipulations to start the plant up following Refueling Outage 20.

In addition, the inspectors assessed the operators' adherence to plant procedures, including Procedure EN-OP-115, "Conduct of Operations," Revision 16, and other operations department policies.

These activities constituted completion of two quarterly licensed operator performance samples, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed two risk assessments performed by the licensee prior to changes in plant configuration and the risk management actions taken by the licensee in response to elevated risk:

- February 24, 2016, Refueling Outage 20 risk assessment
- March 9, 2016, refueling outage operations with the potential to drain the reactor vessel, a yellow shutdown operations risk potential, while the licensee performed inspection of secondary containment and standby gas treatment system, trains A and B

The inspectors verified that these risk assessments were performed timely and in accordance with the requirements of 10 CFR 50.65 (the Maintenance Rule) and plant procedures. The inspectors reviewed the accuracy and completeness of the licensee's risk assessments and verified that the licensee implemented appropriate risk management actions based on the result of the assessments.

Additionally, on January 27, 2016, the inspectors observed one emergent work activity that had the potential to cause an initiating event. Specifically, the licensee had to place the reactor protection system train A to the alternate source of power due to high voltage indications on the normal source of power.

The inspectors verified that the licensee appropriately developed and followed a work plan for these activities. The inspectors verified that the licensee took precautions to minimize the impact of the work activities on unaffected structures, systems, and components.

These activities constituted completion of three maintenance risk assessments and emergent work control inspection samples, as defined in Inspection Procedure 71111.13.

b. Findings

No findings were identified.

**1R15 Operability Determinations and Functionality Assessments (71111.15)**

a. Inspection Scope

The inspectors reviewed three operability determinations and functionality assessments that the licensee performed for degraded or nonconforming structures, systems, or components:

- January 13, 2016, operability assessment for the 119' drywell air lock outer door being inoperable due to degraded seals
- February 18, 2016, operability assessment of the standby liquid control system, trains A and B, due to incorrect inservice test pressure
- February 23, 2016, functionality assessment of the engineered safety features switchgear room cooler, 1T46B005A, due to high vibrations

The inspectors reviewed the timeliness and technical adequacy of the licensee's evaluations. Where the licensee determined the degraded structure, system, or component to be operable or functional, the inspectors verified that the licensee's compensatory measures were appropriate to provide reasonable assurance of operability or functionality. The inspectors verified that the licensee had considered the effect of other degraded conditions on the operability or functionality of the degraded structure, system, or component.

These activities constituted completion of three operability and functionality review samples, as defined in Inspection Procedure 71111.15.

b. Findings

No findings were identified.

**1R18 Plant Modifications (71111.18)**

a. Inspection Scope

On March 18, 2016, the inspectors completed their review of the Fukushima FLEX modification for inventory control. The modifications consisted of installation of new valves and piping in the standby service water train C and division III diesel generator systems. The inspectors reviewed the design and implementation of the modifications. The inspectors verified that work activities involved in implementing the modifications did not adversely impact operator actions that may be required in response to an emergency or other unplanned event. The inspectors verified that post-modification testing was

adequate to establish the operability of the structures, systems, and components, as modified.

These activities constituted completion of one permanent plant modifications sample, as defined in Inspection Procedure 71111.18.

b. Findings

No findings were identified.

**1R19 Post-Maintenance Testing (71111.19)**

a. Inspection Scope

The inspectors reviewed three post-maintenance testing activities that affected risk-significant structures, systems, or components:

- January 19, 2016, 199' elevation primary containment air lock outer door leakage test following replacement of degraded seals
- March 7, 2016, division I diesel generator following removal, calibration, and reinstallation of sync check relay, 16AB-125
- March 7, 2016, residual heat removal system train B containment spray sparger inlet valve, E12F028B, functional and local leakage rate tests following valve internals inspection, cleaning, and reassembly

The inspectors reviewed licensing- and design-basis documents for the structures, systems, or components and the maintenance and post-maintenance test procedures. The inspectors observed the performance of the post-maintenance tests to verify that the licensee performed the tests in accordance with approved procedures, satisfied the established acceptance criteria, and restored the operability of the affected structures, systems, or components.

These activities constituted completion of three post-maintenance testing inspection samples, as defined in Inspection Procedure 71111.19.

b. Findings

No findings were identified.

**1R20 Refueling and Other Outage Activities (71111.20)**

a. Inspection Scope

During the station's refueling outage that concluded on March 28, 2016, the inspectors evaluated the licensee's outage activities. The inspectors verified that the licensee considered risk in developing and implementing the outage plan, appropriately managed personnel fatigue, and developed mitigation strategies for losses of key safety functions. This verification included the following:

- Review of the licensee's outage plan prior to the outage
- Review and verification of the licensee's fatigue management activities
- Monitoring of shutdown and cooldown activities
- Verification that the licensee maintained defense-in-depth during outage activities
- Observation and review of operations with potential to drain the reactor vessel
- Observation and review of fuel handling activities
- Monitoring of heatup and startup activities

These activities constituted completion of one refueling outage sample, as defined in Inspection Procedure 71111.20.

b. Findings

No findings were identified.

**1R22 Surveillance Testing (71111.22)**

a. Inspection Scope

The inspectors observed nine risk-significant surveillance tests and reviewed test results to verify that these tests adequately demonstrated that the structures, systems, and components were capable of performing their safety functions:

Inservice tests:

- January 14, 2016, standby liquid control system pump A, quarterly surveillance and inservice testing
- March 26, 2016, reactor core isolation cooling pump flow verification surveillance test

Containment isolation valve surveillance tests:

- March 9, 2016, feedwater isolation check valve B21F032B local leak rate test
- March 14, 2016, residual heat removal outboard suction isolation valve E12F008

Other surveillance tests:

- February 29, 2016, division III 125V DC battery bank 1C3, 24 month battery resistance surveillance test
- March 7–8, 2016, division II simulated loss of offsite power/loss of coolant accident surveillance test
- March 9–10, 2016, division I simulated loss of offsite power/loss of coolant accident surveillance test
- March 22–23, 2016, containment spray trains A and B nozzle obstruction verification surveillance test
- March 23, 2016, control rod scram time testing surveillance test



The inspectors verified that these tests met technical specification requirements, that the licensee performed the tests in accordance with their procedures, and that the results of the test satisfied appropriate acceptance criteria. The inspectors verified that the licensee restored the operability of the affected structures, systems, and components following testing.

These activities constituted completion of nine surveillance testing inspection samples, as defined in Inspection Procedure 71111.22.

b. Findings

No findings were identified.

**4. OTHER ACTIVITIES**

**Cornerstones: Initiating Events**

**40A1 Performance Indicator Verification (71151)**

.1 Unplanned Scrams per 7000 Critical Hours (IE01)

a. Inspection Scope

The inspectors reviewed licensee event reports for the period of January 1 through December 31, 2015, to determine the number of scrams that occurred. The inspectors compared the number of scrams reported in these licensee event reports to the number reported for the performance indicator. Additionally, the inspectors sampled monthly operating logs to verify the number of critical hours during the period. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned scrams per 7000 critical hours performance indicator, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.2 Unplanned Power Changes per 7000 Critical Hours (IE03)

a. Inspection Scope

The inspectors reviewed operating logs and corrective action program records for the period of January 1 through December 31, 2015, to determine the number of unplanned power changes that occurred. The inspectors compared the number of unplanned power changes documented to the number reported for the performance indicator. Additionally, the inspectors sampled monthly operating logs to verify the number of critical hours during the period. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned power changes per 7000 critical hours performance indicator, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.3 Unplanned Scrams with Complications (IE04)

a. Inspection Scope

The inspectors reviewed the licensee's basis for including or excluding in this performance indicator each scram that occurred between January 1 through December 31, 2015. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned scrams with complications performance indicator, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

**40A2 Problem Identification and Resolution (71152)**

.1 Routine Review

a. Inspection Scope

Throughout the inspection period, the inspectors performed daily reviews of items entered into the licensee's corrective action program and periodically attended the licensee's condition report screening meetings. The inspectors verified that licensee personnel were identifying problems at an appropriate threshold and entering these problems into the corrective action program for resolution. The inspectors verified that the licensee developed and implemented corrective actions commensurate with the significance of the problems identified. The inspectors also reviewed the licensee's problem identification and resolution activities during the performance of the other inspection activities documented in this report.

b. Findings

No findings were identified.

.2 Annual Follow-up of Selected Issues

a. Inspection Scope

The inspectors selected one issue for an in-depth follow-up:

- On January 25, 2016, the inspectors reviewed an apparent cause evaluation associated with Condition Report CR-GGN-2015-06047. The apparent cause

evaluation assessed Grand Gulf's categorization of adverse conditions and reporting loss of safety functions as required per 10 CFR 50.72, "Immediate Notification Requirements for Operating Nuclear Power Reactors."

The inspectors focused on the extent of condition review, as well as evaluation techniques used to determine the causes. Overall, the inspectors agreed with the causes, however, questioned some of the techniques that were used to determine the cause. For example, the Barrier Analysis technique was chosen to aid in the determination. However, as described in Procedure EN-LI-118, "Cause Evaluation Process," Revision 22, this technique works well in combination with Event and Causal Factor Charting, which was not used as a technique.

Also, the inspectors determined the documented extent of condition was inappropriate in that a condition report search of only reportable conditions for the past five years was used. The documented extent of condition did not discuss a search for equipment failures or other conditions that would result in shift operations making an inappropriate operability determination, that would result in the loss of safety function and require a report. The inspectors concluded these circumstances are how station personnel missed recent reportability requirements.

The issues with the apparent cause evaluation were discussed with the licensee on January 25, 2016. The licensee initiated condition report CR-GGN-1-2016-00440, and amended the apparent cause evaluation to discuss the additional open corrective action of performing an appropriate extent of condition review, which is due April 28, 2016.

These activities constituted completion of one annual follow-up sample, as defined in Inspection Procedure 71152.

b. Findings

No findings were identified.

**40A3 Follow-up of Events and Notices of Enforcement Discretion (71153)**

.1 Undervoltage Condition on Division II 4160 V Bus Resulted in Automatic Start of Division II Diesel Generator

a. Inspection Scope

On March 17, 2016, Grand Gulf Nuclear Station was in Mode 5 and in Refuelling Outage 20. A lightning strike or equipment malfunction occurred on the Port Gibson 115 kV offsite power line, which caused an undervoltage condition on the safety-related, division II, 4160 V bus, and a subsequent auto-start of the engineered safety features division II diesel generator. During this event, the licensee lost the shutdown cooling train that was supplying cooling. The operators recovered shutdown cooling within four minutes, resulting in no increase in water temperature. The licensee considered this a loss of safety function and made Event Notification Report 51800. The plant equipment responded appropriately. No emergency core cooling systems

actuated. The licensee entered this event into their corrective action process as condition report CR-GGN-1-2016-02513.

b. Findings

No findings were identified.

.2 Reactor Scram Following a Turbine Trip Caused by Indicated High Differential Current on Phase B of the Main Transformer

a. Inspection Scope

On March 29, 2016, the inspectors responded to the Grand Gulf Nuclear Station control room to observe recovery actions following the reactor scram. At approximately 11:23 a.m., the reactor was at 35 percent power when a turbine trip occurred that resulted in a reactor scram. The turbine trip was due to indication of a high differential current on phase B of the main transformer. The plant equipment responded appropriately. There were no emergency core cooling systems that actuated and no engineered safety features equipment that activated.

The inspectors independently reviewed data logs, observed procedure usage, and observed control room indications to confirm the initiating cause of the trip. The preliminary cause was identified to be a current transformer wiring issue on the phase B of the main transformer. The licensee corrected the current transformer wiring and monitored the transformer during power ascension activities, with no anomalies noted. The licensee entered this event into their corrective action process as Condition Report CR-GGN-1-2016-02950.

b. Findings

No findings were identified.

These activities constituted completion of two event follow-up samples, as defined in Inspection Procedure 71153.

#### **40A6 Meetings, Including Exit**

##### Exit Meeting Summary

On March 4, 2016, the inspectors presented the results of the inservice inspection activities to Mr. P. Williams, Director, Engineering, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On March 31, 2016, the inspectors presented the inspection results to Mr. K. Mulligan, Site Vice President Operations, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Licensee Personnel

K. Baker, Supervisor, Engineering  
M. Briley, Corporate Supervisor, Nondestructive Examinations  
R. Busick, Senior Manager, Operations  
T. Coles, Engineer, Regulatory Assurance  
A. Kelly, Implementer, Inservice Inspection Program  
K. Mulligan, Site Vice President Operations  
J. Nadeau, Manager, Regulatory Assurance  
K. Peterson, Project Manager, Engineering  
J. Seiter, Manager, Emergency Preparedness  
T. Sherman, Program Manager  
S. Sweet, Licensing Engineer, Regulatory Assurance  
P. Williams, Director, Engineering

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

None

## LIST OF DOCUMENTS REVIEWED

### Section 1R01: Adverse Weather Protection

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EN-FAP-EP-010	Severe Weather Response	3
05-1-02-VI-2	Hurricanes, Tornados, and Severe Weather	128
05-1-02-VI-1	Flooding	111
04-1-01-P44-1	Plant Service Water/Radial Well System	104

### Section 1R04: Equipment Alignment

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
04-1-01-G41-1	Fuel Pool Cooling and Cleanup System	76
04-S-01-R27-1	500/115 kV System	32
04-1-01-E12-2	Shutdown Cooling and Alternate Decay Heat Removal Operation	58
04-1-01-P44-1, Attachment 1	Plant Service Water Radial Wells Manual Valve Lineup Checksheet	105

#### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-1088C	Fuel Pooling Cooling & Cleanup System Unit 1	22
M-1088D	Fuel Pooling Cooling and Cleanup System	11
M-1072H	Plant Service Water Unit 1	9
M-1088E	Fuel Pool Cooling and Cleanup System	21
M-1085D	Residual Heat Removal System	4

#### Condition Reports (CR-GGN-1-)

2010-00142	2010-00756	2010-00790	2010-02336	2010-02356
2010-02552	2010-03264	2010-03799	2010-05000	2010-05185
2010-05196	2010-05208	2010-05476	2010-06366	2011-00403
2011-02944	2011-07759	2012-00234	2012-00407	2012-00877
2012-00928	2012-01226	2012-01266	2012-04314	2011-08330

2012-05451	2012-05607	2012-05618	2012-05855	2012-09203
2012-10371	2012-12491	2012-12678	2012-12694	2012-12740
2013-00876	2014-00337	2014-00379	2014-03087	2014-04713
2015-03038	2015-06275	2015-07290	2015-07362	2016-01005
2016-01260	2016-02518			

**Section 1R05: Fire Protection**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
GG USFAR	Grand Gulf Nuclear Station Appendix 9A Fire Hazards Analysis Report	
Fire Pre-Plan C-16	Upper Cable Spreading Room (U-1) OC702 and HVAC Room OC712, Area 25A, Elevation 189	1
Fire Pre-Plan A-31	South East Passage	1
Fire Pre-Plan A-12	East Passage	2
Fire Pre-Plan A-10	LPCS Room and Pipe Penetration	2
EN-DC-127	Hot Work Permit	15
10-S-03-8	Fire Watch Program	13

Miscellaneous

Date

LCOTR 1-FTR-15-0154	
LCOTR 1-FTR-15-0225	
LCOTR 1-FTR-16-0045	
LCOTR 1-FTR-16-0076	
Fire and Smoke Detection Drawings for Zone 2-8 and Zone 2-18	
Fire Watch Check Sheet for Areas 1A201 and 1A403	February 16, 2016

Work Orders (WO)

398999

## Section 1R07: Heat Sink Performance

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EN-DC-316	Heat Exchanger Performance and Condition Monitoring	7
EN-EP-S-039-G	Testing Standard for Safety-Related Heat Exchangers Cooled by Standby Service Water	2
SERI-89/0030	Engineering Report for NPE Review of the Requirements of NRC Generic Letter 89-13	

### Calculations

<u>Number</u>	<u>Title</u>	<u>Revision</u>
22A3880	ASME and TEMA Code Calculations for Residual Heat Removal Exchanger	0

### Work Orders (WO)

422140

### Condition Reports (CR-GGN-1-)

2008-05026      2016-01849

## Section 1R08: Inservice Inspection Activities

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
CEP-CII-003	General Visual Examinations of Class MC Components	305
CEP-NDE-0400	Manual Ultrasonic Examination	6
CEP-NDE-0404	Manual Ultrasonic Examination of Bolts and Studs (ASME XI)	5
CEP-NDE-0407	Straight Beam Ultrasonic Examination of Ferritic Piping Welds (ASME XI)	6
CEP-NDE-0424	Manual Ultrasonic Examination of Reactor Vessel Flange Ligament Areas (ASME XI)	3
CEP-NDE-0731	Magnetic Particle Examination (MT) for ASME Section XI	5
CEP-NDE-0903	VT-3 Examination	5
WPS-CS-1/1-B	Welding Procedure Specifications	0



Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
WPS-CS-1/1-C	Welding Procedure Specifications	0
CEP-NDE-0255	Radiographic Examination of ASME, ANSI, AWS Welds and Components	8
CEP-NDE-0901	VT-1 Examination	4
GE-ADM-1005	Procedure for Zero Reference and Data Recording for Nondestructive Examinations	0
GEH-TP-401	Procedure For The Operation and Maintenance of the SP2K Nova Scanner (EC202)	1
GEH-UT-249	Procedure For Automated Phased Array Ultrasonic Examination of Weld Overlaid Dissimilar Metal and Austenitic Welds	1
EN-LI-102	Corrective Action Program	25
EN-IS-111	General Industrial Safety Requirements	13

Miscellaneous

<u>Title</u>	<u>Date</u>
Self-Assessment GGNS ASME Section XI Repair and Replacement (R&R) Program	September 23, 2015
Self-Assessment GGNS American Society of Mechanical Engineers (ASME) Section XI, Inservice Inspection (ISI) Program	August 5, 2015

Condition Reports (CR-GGN-1-)

2002-01775	2014-01906	2014-01981	2014-05074	2014-05200
2014-05208	2014-05283	2016-01258	2016-01661	2016-01662
2016-01708	2016-01710	2016-01711	2016-01712	

**Section 1R11: Licensed Operator Requalification Program and Licensed Operator Performance**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
05-1-02-III-1	Inadequate Decay Heat Removal	43
03-1-01-2	Power Operations	163
03-1-01-3	Plant Shutdown	129

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
04-1-01-N21-1	Feedwater System	73, 74

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

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
	Safety Assessment of the RF20 Outage Schedule	1
EN-OP-119	Protected Equipment Postings	7
EN-WM-104	Online Risk Assessment	12
	Grand Gulf Shutdown Operations Protection Plan	18

Condition Report (CR-GGN-1-)

2016-00496

**Section 1R15: Operability Determinations and Functionality Assessments**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EN-OP-104	Operability Determination Process	10
GGNS-MS-02	Mechanical Standard	52
06-OP-1C41-Q-0001	Standby Liquid Control Functional Test	126
17-S-05-C41	System Pressure Test Standby Liquid Control System (C41)	7

Drawing

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-1082	Standby Liquid Control System	28

Calculation

<u>Number</u>	<u>Title</u>	<u>Revision</u>
MC-Q1T46-13001	ESF Switchgear Room Temperatures with one Room Coolers Out of Service (CR-2013-3029)	1

Work Orders (WO)

00405579      52661136      00437314

Condition Reports (CR-GGN-1-)

2016-00209      2016-00979      2013-03029      2016-00984      2016-00985  
2016-00533

**Section 1R18: Plant Modifications**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EC-50279	Child EC2 – FLEX SSW Loop C Tie-ins	0
EC-50277	Flex Piping Base EC	0

**Section 1R19: Post-Maintenance Testing**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
06-ME-1M23-V-0001	Containment and Drywell Airlock Seal Leak Test	108
06-ME-1M23-V-0001	Containment and Drywell Airlock Seal Leak Test	109
07-S-14-374	Personnel Airlock Inflatable Seal Replacement	11
06-OP-1P75-M-0002	Standby Diesel Generator 12 Functional Test	136
06-OP-1E12-Q-0006	LPCI/RHR Subsystem B MOV Functional Test	112
06-OP-1M61-V-0002	Local Leak Rate Test – AIR	8

Condition Reports (CR-GGN-1-)

2016-00252      2016-00134      2016-00155      2016-00210

Work Orders (WO)

52668454 01      52668455 01      52610658 01      00435190 01      52676172 01  
00416212 01      00411238      5256482 01

## Section 1R20: Refueling and Other Outage Activities

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
SOPP	Shutdown Operations Protection Plan	18
	RF20 Refueling Outage Action Plan	0
01-S-07-9	Industrial Safety & Housekeeping Inspection	30
03-1-01-1	Cold Shutdown to Generator Carrying Minimum Load	169
03-1-01-6	Reactor Vessel In-Service Leak Test	123
EN-OM-123	Fatigue Management Program	12

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-1079	Reactor Water Cleanup System	50
M-1085A	Residual Heat Removal System	70
M-1085B	Residual Heat Removal System	63
M-1085C	Residual Heat Removal System	20

### Work Order (WO)

00439170 01

### Condition Reports (CR-GGN-1-)

2016-02876	2016-02877	2016-02928	2016-02958	2016-02973
2016-02960	2016-02950			

## Section 1R22: Surveillance Testing

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
06-EL-1L11-R-0001	125 Volt Battery Bank Physical Condition Check	104
06-RE-SC11-V-0402	Control Rod Scram Testing	120
06-RE-SC11-V-0402	Control Rod Scram Testing	121
06-ME-1E12-R-004	Containment Spray A Nozzle Obstruction Verification	102

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
06-ME-1E12-R-005	Containment Spray B Nozzle Obstruction Verification	102
06-OP-1P75-R0004	Standby Diesel Generator 12 Functional Test – LOP/LOCA	125
06-OP-1P75-R0004	Standby Diesel Generator 11 Functional Test – LOP/LOCA	126
06-OP-1M61-V-0004	Local Leak Rate Test – High Pressure Water Hydro Pump	2
06-OP-1E38-C-0002	Outboard Feedwater Leakage Control Valve Operability Check	112
06-OP-1M61-V-0002	Local Leak Rate Test – Air Using Graftel 9623-7 Leak Rate Monitor	8
04-1-05-E12-4	LLRT Alignment Instructions for RHR Shutdown Cooling Penetrations – Attachment 1	1
06-OP-1E51-C-005	RCIC Pump Low Flow Pressure Flow Verification Test	109

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-1083B	Reactor Core Isolation Cooling System	40

Condition Reports (CR-GGN-1-)

2016-02055	2016-02058	2016-02289	2016-02099	2015-07436
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Work Orders (WO)

52545505 01	52654283	52566579 01	00128779 06	00440925 01
52564646	00383449 14	00421377	52570008	

**Section 40A1: Performance Indicator Verification**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
EN-LI-114	Performance Indicator Process, Unit 1	6
EN-LI-114	NRC Performance Indicator Technique/Data Sheet – Unplanned Scrams per 7,000 Critical Hours	1 <sup>st</sup> Quarter 2015

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
EN-LI-114	NRC Performance Indicator Technique/Data Sheet – Unplanned Scrams per 7,000 Critical Hours	2 <sup>nd</sup> Quarter 2015
EN-LI-114	NRC Performance Indicator Technique/Data Sheet – Unplanned Scrams per 7,000 Critical Hours	3 <sup>rd</sup> Quarter 2015
EN-LI-114	NRC Performance Indicator Technique/Data Sheet – Unplanned Scrams per 7,000 Critical Hours	4 <sup>th</sup> Quarter 2015
EN-LI-114	NRC Performance Indicator Technique/Data Sheet – Unplanned Scrams with Complications	1st Quarter 2015
EN-LI-114	NRC Performance Indicator Technique/Data Sheet – Unplanned Scrams with Complications	2nd Quarter 2015
EN-LI-114	NRC Performance Indicator Technique/Data Sheet – Unplanned Scrams with Complications	3rd Quarter 2015
EN-LI-114	NRC Performance Indicator Technique/Data Sheet – Unplanned Scrams with Complications	4th Quarter 2015
EN-LI-114	NRC Performance Indicator Technique/Data Sheet – Unplanned Power Changes per 7,000 Critical Hours	1st Quarter 2015
EN-LI-114	NRC Performance Indicator Technique/Data Sheet – Unplanned Power Changes per 7,000 Critical Hours	2nd Quarter 2015
EN-LI-114	NRC Performance Indicator Technique/Data Sheet – Unplanned Power Changes per 7,000 Critical Hours	3rd Quarter 2015
EN-LI-114	NRC Performance Indicator Technique/Data Sheet – Unplanned Power Changes per 7,000 Critical Hours	4th Quarter 2015

**Section 40A2: Problem Identification and Resolution**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EN-LI-102	Corrective Action Program	25
EN-LI-118	Cause Evaluation Process	22

Condition Reports (CR-GGN-1-)

2015-05972	2015-06047	2015-04423	2015-05661	2015-05625
2015-05789	2015-05826	2015-05840	2015-05862	2015-07209
2015-07211	2015-06043	2015-06981	2015-06982	2015-05661
2016-00440	2016-02312			

### Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
05-1-02-I-1	Reactor Scram	125
05-S-01-EP-2	Emergency Procedure RPV Control	45
05-1-02-I-2	Turbine and Generator Trips	36
01-S-06-26	Post-Trip Analysis GGNS Unit 1 Scram No.*137	March 30, 2016
04-1-01-C11-2	Rod Control and Information System	40
05-1-02-IV-1	Control Rod/Drive Malfunctions	117

#### Condition Reports (CR-GGN-1-)

2016-002973	2016-03001	2016-02958
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## INSERVICE INSPECTION DOCUMENT REQUEST

Inspection Dates: February 29, 2016, through March 9, 2016

Inspection Procedures: IP 71111.08 "Inservice Inspection (ISI) Activities"

Inspectors: Jim Drake

### A. Information Requested for the In-Office Preparation Week

The following information should be sent to the Region IV office in hard copy or electronic format (ims.certrec.com preferred), in care of James Drake, by January 18, 2016, to facilitate the selection of specific items that will be reviewed during the on-site inspection week. The inspector will select specific items from the information requested below and then request from your staff additional documents needed during the on-site inspection week (Section B of this enclosure). We ask that the specific items selected from the lists be available and ready for review on the first day of inspection. Please provide requested documentation electronically if possible. If requested documents are large and only hard copy formats are available, please inform the inspector(s), and provide subject documentation during the first day of the on-site inspection. If you have any questions regarding this information request, please call the inspector as soon as possible.

Office phone: 817-200-1558, E-mail: James.Drake@nrc.gov

### A.1 ISI/Welding Programs and Schedule Information

- a) A detailed schedule (including preliminary dates) of:
  - i) Nondestructive examinations planned for ASME Code class systems and containment, performed as part of your ASME Section XI risk-informed (if applicable) and augmented inservice inspection programs during the upcoming outage.  
  
Provide a status summary of the nondestructive examination inspection activities vs. the required inspection period percentages for this Interval by category per ASME Section XI IWX-2400 (do not provide separately if other documentation requested contains this information).
  - ii) Welding activities that are scheduled to be completed during the upcoming outage (ASME Code class structures, systems, or components).
  - iii) Examinations associated with the Boiling Water Reactor Vessel and Internals Project program (i.e., In-Vessel Visual Inspections).
- b) A copy of ASME Section XI Code Relief Requests and associated NRC safety evaluations applicable to the examinations identified above.



- c) A list of nondestructive examination reports (ultrasonic, radiography, magnetic particle, dye penetrate, Visual VT-1, VT-2, and VT-3), which have identified relevant conditions on ASME Code Class systems since the beginning of the last refueling outage. This should include the previous Section XI pressure test(s) conducted during start up and any evaluations associated with the results of the pressure tests. The list of nondestructive examination reports should include a brief description of the structures, systems, and components where the relevant condition was identified.
- d) A list with a brief description (e.g., system, material, pipe size, weld number, and nondestructive examination performed) of the welds in ASME Code Class systems which have been fabricated due to component repair/replacement activities since the beginning of the last refueling outage, or are planned to be fabricated this refueling outage.
- e) If reactor vessel weld examinations required by the ASME Code are scheduled to occur during the upcoming outage, provide a detailed description of the welds to be examined and the extent of the planned examination. Please also provide reference numbers for applicable procedures that will be used to conduct these examinations.
- f) A copy of any 10 CFR Part 21 reports applicable to your structures, systems, and components within the scope of Section XI of the ASME Code that have been identified since the beginning of the last refueling outage.
- g) A list of any temporary non-code repairs in service (e.g., pinhole leaks).
- h) Copies of the most recent self-assessments for the inservice inspection, welding, and Alloy 600 programs.
- i) Copies of nondestructive examination (including calibration and flaw characterization/sizing procedures) and welding procedures that will be used during the refueling outage.

A.2 Additional Information Related to All Inservice Inspection Activities

- a) A list with a brief description of inservice inspection-related issues (e.g., condition reports) entered into your corrective action program since the beginning of the last refueling outage (for the applicable unit). For example, a list based upon data base searches using key words related to piping, such as inservice inspection, ASME Code, Section XI, nondestructive examination, cracks, wear, thinning, leakage, rust, corrosion, or errors in piping/nondestructive examinations.
- b) Provide names and phone numbers for the following program leads:

Inservice inspection contacts (examination, planning)  
 Containment Exams  
 Snubbers and Supports  
 Repair and Replacement Program Manager

Licensing Contact  
Site Welding Engineer

B. Information to be Provided On-site to the Inspector(s) at the Entrance Meeting:

B.1 Inservice Inspection / Welding Programs and Schedule Information

- a) Updated schedules for inservice inspection/nondestructive examination activities, planned welding activities, and schedule showing contingency repair plans, if available.
- b) For ASME Code Class welds selected by the inspector from the lists provided from section A of this enclosure, please provide copies of the following documentation for each subject weld:
  - i) Weld data sheet (traveler)
  - ii) Weld configuration and system location
  - iii) Applicable Code Edition and Addenda for weldment
  - iv) Applicable Code Edition and Addenda for welding procedures
  - v) Applicable welding procedure specifications used to fabricate the welds
  - vi) Copies of procedure qualification records supporting the welding procedure specifications from B.1.b.v.
  - vii) Copies of mechanical test reports identified in the procedure qualification records above
  - viii) Copies of the nonconformance reports for the selected welds (if applicable)
  - ix) Radiographs of the selected welds and access to equipment to allow viewing radiographs (if radiographic was performed)
  - x) Copies of the preservice examination records for the selected welds
  - xi) Copies of welder performance qualifications records applicable to the selected welds, including documentation that welder maintained proficiency in the applicable welding processes specified in the welding procedure specifications (at least six months prior to the date of subject work).
  - xii) Copies of nondestructive examination personnel qualifications (visual test, penetrant test, ultrasonic test, and radiographic test), as applicable
- c) For the inservice inspection-related corrective action issues selected by the

inspector(s) from Section A of this enclosure, provide a copy of the corrective actions and supporting documentation.

- d) For the nondestructive examination reports with relevant conditions on ASME Code class systems selected by the inspector from Section A above, provide a copy of the examination records, examiner qualification records, and associated corrective action documents.
- e) A copy of (or ready access to) most current revision of the inservice inspection program manual and plan for the current interval.
- f) For the nondestructive examinations selected by the inspector from Section A of this enclosure, provide copy of documentation supporting the procedure qualification (e.g., the Electric Power Research Institute performance demonstration qualification summary sheets). Also, include qualification documentation of the specific equipment to be used (e.g., ultrasonic unit, cables, and transducers including serial numbers) and nondestructive examination personnel qualification records.
- g) If site-specific training for fall protection and/or confined space entry is required, please make arrangements for the inspector to attend the training upon arrival at the site to support the nondestructive examination/welding work schedules.

## B.2 Codes and Standards

- a) Ready access to (i.e., copies provided to the inspector(s) for use during the inspection at the on-site inspection location, or room number and location where available):
  - i) Applicable editions of the ASME Code (Sections V, IX, and XI) for the inservice inspection program and the repair/replacement program.
  - ii) Any other applicable Electric Power Research Institute and industry standards referenced in the plant procedures for welding and nondestructive examination activities.