



Entergy Operations, Inc.
P. O. Box 756
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GNRO-2014/00009

February, 3, 2014

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Kevin Mulligan
Vice President, Operations
Grand Gulf Nuclear Station
Tel. (601) 437-7500

SUBJECT: Request for Additional Information Regarding Response to Bulletin 2012-01, "Design Vulnerability in Electric Power System"), dated December 20, 2013.
Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

REFERENCES:

1. Request for Additional Information Regarding Response to Bulletin 2012-01, "Design Vulnerability In Electric Power System"), dated December 20, 2013, (Accession No. ML13351A314).
2. U.S. Nuclear Regulatory Commission (NRC) Bulletin 2012-01, "Design Vulnerability in Electric Power System", dated July 27, 2012, (Accession No. ML12074A115),

Dear Sir or Madam:

Entergy Operations, Inc. is providing, in the Attachment, the response to Reference 1, Request for Additional Information.

This letter contains one new commitment, Grand Gulf Nuclear Station, Unit 1 (GGNS) will follow the generic schedule provided in the Industry Open Phase Condition (OPC) Initiative. Full implementation will be achieved by 12/31/2017. If you have any questions or require additional information, please contact Thomas Thornton at 601-437-6176.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 3rd day of February, 2014.

Sincerely,



KM/jas

Attachments : 1 Response to Request for Additional Information
2 Commitment List

cc: (see next page)

cc: U.S. Nuclear Regulatory Commission
ATTN: Mr. Steven Reynolds
Acting Regional Administrator, Region IV
1600 East Lamar Boulevard
Arlington, TX 76011-4511

NRC Senior Resident Inspector
Grand Gulf Nuclear Station
Port Gibson, MS 39150

U. S. Nuclear Regulatory Commission
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Attachment 1 to

GNRO-2014/00009

Response to Request for Additional Information

The format for the Requests for Additional Information (RAI) responses below is as follows. The RAI is listed in its entirety as received from the Nuclear Regulatory Commission (NRC). This is followed by the Grand Gulf Nuclear Station (GGNS) RAI response to the individual question.

RAI-1

Provide a summary of all interim corrective actions that have been taken since the January 30, 2012, event at Byron Station, Unit 2, to ensure that plant operators can promptly diagnose and respond to open phase conditions on the offsite power circuits for Class-1E vital buses until permanent corrective actions are completed.

Response:

Lessons learned from the events at Byron station were reviewed and various interim corrective actions evaluated for safety and efficiency at GGNS. Based on the plant's offsite power configuration, electrical design details, and on lessons learned, the following actions were taken to ensure plant operators can promptly diagnose and respond to open phase conditions (OPC):

- Operations Standing Order 14-002, "Guidelines for Single Failed Phase Event", was written to provide guidance and instruction on the symptoms, mitigation, and diagnosis strategy in the event of a single failed open phase similar to that which occurred at the Byron station.
- Verified Operations Rounds included walk downs of transformer yards to inspect for possible open circuit on the phases.
- Operating Experience (OE) was communicated to the Operations department as a part of the Corrective Action process (CR-GGN-2012-01836).
- Verified simulator scenarios bound the expected conditions for a loss of voltage and degraded voltage as supplied to the ESF bus(es). No additional training is necessary pending results of forthcoming evaluation, due December 31, 2014 as part of the Open Phase Condition.
- Verified that Entergy Mississippi, Inc. monitors devices in the GGNS switchyard from two separate supervisory locations that enable the detection of degraded power being supplied to the plant.
- Verified the Ohio Brass Post-Stacking Insulator Assembly identified as having a manufacturing defect is not installed at GGNS.
- A review of Operation Department procedures that respond to suspected grid disturbances was performed to ensure example symptoms of grid instability and response actions for operators were appropriate in determining a loss of phase event.
 - o At the first sign of Grid Instability the two supervisory resources, System Operations Center and Mississippi Transmission Operations Center, are to be consulted to determine reason and extent of instability.
 - o Weekly switchyard walkdowns are performed by Operations department personnel to record winding temperatures and to perform other generic checks.
 - o Verified guidance existed in Operational procedures that allowed determination of grid disturbances.

GGNS Engineering Review:

GGNS performed an initial review of transformer configuration and protective relay settings with respect to the Class-1E vital buses (15AA, 16AB, and 17AC).

- GGNS employs one-out-of-two taken twice logic so that either a loss of voltage or degradation of voltage on any of the three phases at the Engineered Safety Features (ESF) bus will actuate the divisional protective relaying. For Division I (15AA) and Division II (16AB), the ESF response of the Load Shedding and Sequencing System (LSS) during a degraded bus voltage

condition is to shed selected Class 1E and non-Class 1E loads, start the standby power source (diesel generator), separate the ESF bus from the degraded off-site power source, and finally sequence major loads back to the ESF bus as required. For Division III (17AC), upon detection of a loss of voltage or degraded voltage condition the off-site power source is automatically tripped and connected to the standby power source (diesel generator).

- Three individual, qualified off-site power sources supply power to GGNS. Two of the qualified sources are 500 kilovolt (kV) lines powering a ring bus to which Station Transformer (ST) 11 and ST-21 are connected. The third qualified line is 115-kV and supplies power to ESF transformer 12 (ESF-12). ST-11 and ST-12 supply the power required for GGNS site loads.
- Offsite power is stepped down from the 500-kV level to the 4.16-kV level through a series of transformers. The preferred line-ups have all three ESF buses powered by either ST-11 or ST-21. It is not allowed for 15AA and 16AB to be lined up to the same Station Transformer during normal operations.

RAI-2

Provide a status and schedule for completion of plant design changes and modifications to resolve issues with an open phase of electric power.

Response:

Status

All holders of operating licenses and combined licenses for nuclear power reactors are investigating options being researched by several vendors (PSC2000, EPRI, Schweitzer, etc.) to detect OPC faults. There is currently no generic, off-the-shelf technology that has been proven to detect all the required open phase fault conditions for all plant and transformer designs.

All holders of operating licenses and combined licenses for nuclear power reactors are fully engaged in the development of the NEI OPC Guidance Document, as well as development of enhancements to software tools being used to analyze OPC faults.

With the goal of ensuring accurate detection without compromising nuclear safety or increasing plant risk, this new OPC technology is being thoroughly evaluated, will be tested, and will provide reasonable assurance of precluding false operation of automatic features.

Funding has been obtained for Vulnerability studies of the OPC faults for GGNS. The due date for the completion of the study is 12/31/2014, which is in line with the NEI Open Phase Condition Initiative requirements.

Schedule

GGNS has committed to the generic schedule provided in the Industry OPC Initiative.

It is our intention to meet the milestones of this schedule; however, deviations may be required to accommodate outage schedules, software and hardware availability, manufacturer's delivery capabilities, licensing delays, etc.

Any deviation from the Industry OPC Initiative schedule will be documented through the deviation/exemption process addressed in the NEI OPC Guidance Document.

**Attachment 2 to
GNRO-2014/00009
Commitment List**

Commitment List

This table identifies actions discussed in this letter for which Entergy commits to perform. Any other actions discussed in this submittal are described for the NRC's information and are **not** commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
Grand Gulf Nuclear Station, Unit 1 (GGNS) will follow the generic schedule provided in the Industry Open Phase Condition (OPC) Initiative. Full implementation will be achieved by 12/31/2017.	X		12/31/2017