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GNRO-2014/00060

August 26, 2014

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

**SUBJECT:** Entergy's Third Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)  
Grand Gulf Nuclear Station, Unit 1  
Docket No. 50-416  
License No. NPF-29

- REFERENCES:**
1. NRC Order Number EA-12-049, *Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, dated March 12, 2012 (ML12054A735)
  2. Entergy Letter to NRC, *Overall Integrated Plan in Response to March 12, 2012, Commission Order Modifying License with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)*, dated February 27, 2013 (GNRO-2013/00015, ML13059A316)
  3. Entergy Letter to NRC, *Entergy's First Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)*, dated August 28, 2013 (GNRO-2013/0060, ML13240A264)
  4. Entergy Letter to NRC, *Entergy's Second Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)*, dated February 28, 2014 (GNRO-2014/00011, ML14059A080)

Dear Sir or Madam:

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Entergy. Reference 1 was immediately effective and directs Entergy to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event.

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan (Reference 2). References 3 and 4 provided the first and second six-month status reports. The purpose of this letter is to provide the third six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The attached report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

This letter contains no new regulatory commitments. Should you have any questions regarding this submittal, please contact Mr. James J. Nadeau, Regulatory Assurance Manager, at (601) 437-2103.

I declare under penalty of perjury that the foregoing is true and correct; executed on August 28, 2014.

Sincerely,



KJM/ras

Attachment: Grand Gulf Nuclear Station's Third Six Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

cc: U. S. Nuclear Regulatory Commission  
ATTN: Kriss Kennedy  
Deputy Regional Administrator, Region IV  
1600 East Lamar Boulevard  
Arlington, TX 76011-4511

U. S. Nuclear Regulatory Commission  
Attn: Director, Office of Nuclear Reactor Regulation  
Washington, DC 20555-0001

U. S. Nuclear Regulatory Commission  
ATTN: Mr. Alan Wang, NRR/DORL  
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U. S. Nuclear Regulatory Commission  
ATTN: Jessica A. Kratchman  
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NRC Senior Resident Inspector  
Grand Gulf Nuclear Station  
Port Gibson, MS 39150

**Attachment to GNRO-2014/00060**

**Grand Gulf Nuclear Station's Third Six Month Status Report for the  
Implementation of Order EA-12-049, Order Modifying Licenses with Regard to  
Requirements for Mitigation Strategies for Beyond-Design-Basis External Events**

**Grand Gulf Nuclear Station's  
Third Six-Month Status Report for the Implementation of Order EA-12-049,  
Order Modifying Licenses with Regard to Requirements for Mitigation  
Strategies for Beyond-Design-Basis External Events**

## **1 Introduction**

Grand Gulf Nuclear Station (GGNS) developed an Overall Integrated Plan (Reference 1), documenting the diverse and flexible strategies (FLEX), in response to Reference 2. This attachment provides an update of milestone accomplishments since submittal of the Overall Integrated Plan, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

## **2 Milestone Accomplishments**

The following milestone(s) have been completed since the development of the Overall Integrated Plan (Reference 1), and are current as of August 20, 2014:

- Submit Six-Month Status Report 1 – August 2013
- Submit Six-Month Status Report 2 —February 2014
- Submit Six-Month Status Report 3 — Complete with submission of this document in August 2014

## **3 Milestone Schedule Status**

The following provides an update to Attachment 2 of the Overall Integrated Plan. It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed.

Target completion dates have been added to the following milestones for which no dates were previously included:

- Perform Staffing Analysis
- Purchase
- Procure
- Develop Strategies / Contract with NSRC
- Issue GG FSGs
- Create Maintenance Procedures
- Procedure Changes Training Material Complete
- Develop Training Plan
- Implement Training

These milestone target dates do not impact the Order implementation date.

| <b>Milestone</b>                             | <b>Target Completion Date<sup>†</sup></b> | <b>Activity Status</b> | <b>Revised Target Completion Date</b> |
|--|---|------------------------|---------------------------------------|
| <b>Submit 60 Day Status Report</b>           | Oct 2012                                  | Complete               |                                       |
| <b>Submit Overall Integrated Plan</b>        | Feb 2013                                  | Complete               |                                       |
| <b>Submit Six-Month Updates:</b>             |   |                        |                                       |
| Report 1                                     | Aug 2013                                  | Complete               |                                       |
| Report 2                                     | Feb 2014                                  | Complete               |                                       |
| Report 3                                     | Aug 2014                                  | Complete               |                                       |
| Report 4                                     | Feb 2015                                  | Not Started            |                                       |
| Report 5                                     | Aug 2015                                  | Not Started            |                                       |
| Report 6                                     | Feb 2016                                  | Not Started            |                                       |
| Report 7                                     | Deleted                                   | Deleted                | Deleted*                              |
| <b>Perform Staffing Analysis</b>             |   | Not Started            | July 2015                             |
| <b>Modifications</b>                         |   |                        |                                       |
| Develop Mods (Design Start)                  | May 2014                                  | Complete               |                                       |
| Develop Strategies                           | Nov 2014                                  | Started                |                                       |
| Develop Mods (Design Complete)               | Nov 2014                                  | Not Started            |                                       |
| Implementation Outage**                      | Mar 2016                                  | Not Started            |                                       |
| Implement Mods                               | Mar 2016                                  | Not Started            |                                       |
| <b>On-site FLEX Equipment</b>                |   |                        |                                       |
| Purchase                                     |   | Started                | Feb 2015                              |
| Procure                                      |   | Started                | Dec 2015                              |
| <b>Off-site FLEX Equipment</b>               |   |                        |                                       |
| Develop Strategies / Contract with NSRC      |   | Started                | July 2015                             |
| <b>Procedures</b>                            |   |                        |                                       |
| Issue GG FSGs                                |   | Not Started            | May 2015                              |
| Create Maintenance Procedures                |   | Not Started            | June 2015                             |
| Procedure Changes Training Material Complete |   | Not Started            | May 2015                              |
| <b>Training</b>                              |   |                        |                                       |
| Develop Training Plan                        |   | Not Started            | March 2015                            |
| Implement Training                           |   | Not Started            | Feb 2016                              |

| Milestone                  | Target Completion Date <sup>†</sup> | Activity Status | Revised Target Completion Date |
|----------------------------|-------------------------------------|-----------------|--------------------------------|
| Validation / Demonstration | Mar 2016                            | Not Started     |                                |
| Submit Completion Report   | Aug 2016                            | Not Started     |                                |

\*Deleted due to Completion Report being submitted in August 2016.

\*\*Full compliance since second refueling outage is before 12/31/2016.

<sup>†</sup>Target Completion Date is the last submitted date from either the overall integrated plan or previous six-month status report.

## 4 Changes to Compliance Method

In preparation for the design phase of the FLEX project at GGNS, changes have been identified to the compliance strategies as described in the original OIP (Reference 1). The significant changes are described below. The changes will be incorporated into a future or the final OIP update.

- The Phase 2 core cooling and containment integrity strategy described on Pages 17 and 31 of the OIP was based on a “feed and bleed” approach with water feeding the reactor via FLEX pumps drawing from the Ultimate Heat Sink (UHS) and the alternate decay heat removal (ADHR) pumps bleeding suppression pool water back to the UHS. Entergy has revised the Phase 2 strategy to a “feed and vent” strategy. The revised strategy maintains feeding coolant to the vessel for core cooling in the same manner, but replaces the bleeding of suppression pool water back to the UHS with venting of steam through the containment vent path. Neither the ADHR nor the suppression pool makeup systems are used as part of the simplified response for the revised “feed and vent” strategy.
- The Phase 2 core cooling discussion on Page 17 of the OIP states that the FLEX pump discharge connection will be made to the High Pressure Core Spray (HPCS) Service Water (SW) piping inside the Standby Service Water (SSW) pump house via connection points on the side of the pump house. The FLEX pump discharge connection will now be made in the seismically qualified, missile protected HPCS SW return line in SSW Valve Room A instead.
- The FLEX Phase 3 strategy for core cooling and containment integrity as described on pages 24 and 35 of the OIP has been revised. The original primary Phase 3 strategy utilizes Residual Heat Removal (RHR) in alternate shutdown cooling mode powered from a National SAFER Resource Center (NSRC) portable diesel generator (PDG) connected to the Division 2 safety related 4160V bus and supplying the RHR B heat exchanger with service water from NSRC pumps. NSRC heat removal equipment was to be used to cool the return water from the RHR heat exchanger before being discharged to the UHS. The original alternate strategy maintained the Phase 2 equipment in service using Phase 3 NSRC equipment to cool and makeup to the UHS.

The revised Phase 3 primary strategy for core cooling and maintaining containment integrity is continued operation of the Phase 2 “feed and vent”

strategy discussed in the first bullet above with offsite equipment used to makeup to the UHS. The plant recovery strategy will continue to rely on operation of RHR powered from a 4160V NSRC PDG connected to the Division 2 safety related bus with NSRC equipment providing service water flow. This will be accomplished by portable equipment and procedures rather than permanent plant modifications. In addition, with the revised Phase 2 strategy no longer reliant on bleeding suppression pool water to the UHS, the safety related, seismically qualified, missile protected SSW cooling towers will be utilized in lieu of NSRC heat removal equipment.

## 5 Need for Relief/Relaxation and Basis for the Relief/Relaxation

GGNS expects to comply with the order implementation date and no relief/relaxation is required at this time.

## 6 Open Items from Overall Integrated Plan and Interim Staff Evaluation

The following tables provide a summary and status of any open items documented in the Overall Integrated Plan and any open items or confirmatory items documented in the Interim Staff Evaluation (ISE). A fourth table includes a listing of Audit Questions and the status of each item.

| Overall Integrated Plan Open Items  | Status      |
|---|-------------|
| 1. Structure, content and details of the National SAFER Resource Center (NSRC) Grand Gulf Response Plan will be determined. | Not Started |

| Interim Staff Evaluation Open Items |  | Status  |
|-------------------------------------|--|---|
| 3.1.2.A                             | Since the GGNS Probable Maximum Precipitation is greater than the grade elevation and sandbags are needed to protect against flooding, it is unclear how GGNS can be designated as a "dry" site. Since the licensee identified GGNS as a dry site, licensee information related to NEI 12-06 guidelines identified in this report, Sections 3.1.2.1, 3.1.2.2, and 3.1.2.3 (storage, deployment, and procedural interfaces, respectively) are not discussed. If the resolution of this Open Item results in GGNS not being categorized as a "dry" site, the guidelines of the NEI 12-06 Sections related to these report sections will need to be addressed by the licensee as part of that resolution. | This Open Item was addressed in Section 4 of GGNS's second six month FLEX status report (Reference 5 of section 8). |



| <b>Interim Staff Evaluation Confirmatory Items</b> |  | <b>Status</b>  |
|--|--|--|
| 3.1.1.1.A  | Confirm that the storage facilities and plans will conform to the guidance in NEI 12-06, Section 5.3.1, for protection from seismic events.  | This Confirmatory Item was addressed in Section 4 of GGNS's second six month FLEX status report (Reference 5 of section 8) |
| 3.1.3.1.A  | Confirm that at least one of the two FLEX equipment storage buildings would not be damaged by tornado missiles, based on the guidance in NEI 12-06, Section 7.3.1.   | This Confirmatory Item was addressed in Section 4 of GGNS's second six month FLEX status report (Reference 5 of section 8) |
| 3.1.3.2.A  | Confirm that procedures address UHS usability when wind generated debris is present in the UHS.  | In Progress<br>This item will be addressed by update to AQ GGN-052 response when information is available                  |
| 3.2.1.1.A  | Confirm that the final Modular Accident Analysis Program Revision 4 (MAAP4) analysis of the RCS response conforms to the NEI position paper dated June 2013, entitled "Use of Modular Accident Analysis Program (MAAP) in Support of Post-Fukushima Applications" (ADAMS Accession Number ML13190A201) and the MAAP4 limitations of the NRC endorsement letter, dated October 3, 2013 (ADAMS Accession No. ML13275A318). | In Progress<br>This item will be addressed by update to AQ GGN-019 response when information is available                  |
| 3.2.1.2.A  | Confirm that the MAAP4 analysis includes appropriate recirculation pump seal leakage.  | In Progress<br>This item will be addressed by update to AQ GGN-025 response when information is available                  |
| 3.2.1.3.A  | Confirm that the final Sequence of Events (SOE) reflects the results of the final MAAP4 analysis of the RCS response and the licensee provides reasonable assurance by some means (e.g. by walkthrough) that the timing of the actions in the SOE is achievable.   | In Progress<br>This item will be addressed by update to AQ GGN-026 response when information is available                  |
| 3.2.1.4.A  | Confirm that operation with the suppression pool temperature at its calculated maximum temperature will not impact the mitigation strategies, especially RCIC operation and structural integrity of the suppression pool.  | In Progress<br>This item will be addressed by update to AQ GGN-024 response when information is available                  |

| <b>Interim Staff Evaluation Confirmatory Items</b> |  | <b>Status</b>   |
|--|--|---|
| 3.2.1.8.A  | Confirm that the hydraulic calculations for the FLEX pumps demonstrate that the required flow rates can be achieved.   | In Progress<br>This item will be addressed by update to AQ GGN-034 response when information is available |
| 3.2.2.A  | Confirm that the SFP area ventilation calculation demonstrates that portable ventilation is not required in the SFP area, or that the licensee provides a strategy to use portable ventilation.    | In Progress<br>This item will be addressed by update to AQ GGN-039 response when information is available |
| 3.2.3.A  | Confirm that the licensee's strategy for maintaining containment capabilities considers the results of the final MAAP4 analysis for RCS leakage and the containment venting strategy.              | In Progress<br>This item will be addressed by update to AQ GGN-026 response when information is available |
| 3.2.4.2.A  | Confirm that the RCIC room heat up calculation for ELAP uses appropriate heat loads and shows an acceptable room temperature.  | In Progress<br>This item will be addressed by update to AQ GGN-045 response when information is available |
| 3.2.4.4.A  | Confirm that any required upgrades to the site's communications systems have been completed, as noted in the NRC's review of the GGNS communications assessment (ADAMS Accession No. ML13129A132). | NRC Confirmatory Action   |
| 3.2.4.8.A  | Confirm that the licensee's analyses for size and loading of FLEX generators shows acceptable results.   | In Progress<br>This item will be addressed by update to AQ GGN-034 response when information is available |
| 3.2.4.8.B  | Confirm that the licensee's final proposed connections of FLEX Phase 2 and 3 electrical equipment to the permanent plant equipment are acceptable.   | In Progress<br>This item will be addressed by update to AQ GGN-053 response when information is available |
| 3.2.4.9.A  | Confirm that the licensee has plans to refuel FLEX equipment based on the fuel oil consumption rates.  | In Progress<br>This item will be addressed by update to AQ GGN-055 response when information is available |
| 3.2.4.10.A   | Confirm the acceptability of RCIC operation without the gland seal compressor (de-energized 30 minutes after loss of all ac  | In Progress<br>This item will be addressed  |

| Interim Staff Evaluation Confirmatory Items |   | Status  |
|---|---|---|
|   | power).   | by update to AQ GGN-072 response when information is available  |
| 3.2.4.10.B                                  | Confirm that the calculations regarding battery sizing which show that Vital Batteries can provide required loads for at least 11 hours (considering load shedding) are acceptable. | In Progress<br>This item will be addressed by update to AQ GGN-031 response when information is available |

| Audit Questions | Status  | Completion or Target Date |
|-----------------|---|---------------------------|
| GGN-001         | In Progress - This AQ response will be updated when information is available  | Feb 2015                  |
| GGN-002         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Item 3.1.1.1.A) <sup>†</sup> | Feb 2015                  |
| GGN-003         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Item 3.1.3.1.A)              | Feb 2015                  |
| GGN-005         | Closed*   |                           |
| GGN-007         | Closed*   |                           |
| GGN-008         | Closed*   |                           |
| GGN-010         | In Progress - This AQ response will be updated when information is available  | Feb 2015                  |
| GGN-011         | Closed*   |                           |
| GGN-012         | Closed*   |                           |
| GGN-013         | Closed*   |                           |
| GGN-014         | Closed*   |                           |
| GGN-015         | In Progress - This AQ response will be updated when information is available  | Feb 2015                  |
| GGN-016         | In Progress - This AQ response will be updated when information is available  | Feb 2015                  |
| GGN-017         | In Progress- This AQ response will be updated when information is available   | Feb 2015                  |
| GGN-019         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Item 3.2.1.1.A)              | Feb 2015                  |
| GGN-021         | Closed*   |                           |

| Audit Questions | Status  | Completion or Target Date |
|-----------------|---|---------------------------|
| GGN-022         | Closed*   |                           |
| GGN-023         | Closed*   |                           |
| GGN-024         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Item 3.2.1.4.A)                | Feb 2015                  |
| GGN-025         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Item 3.2.1.2.A)                | Feb 2015                  |
| GGN-026         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Items 3.2.1.3.A and 3.2.3.A)†  | Feb 2015                  |
| GGN-028         | In Progress - This AQ response will be updated when information is available  | Feb 2015                  |
| GGN-029         | Closed*   |                           |
| GGN-030         | Closed*   |                           |
| GGN-031         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Item 3.2.4.10.B)               | Feb 2015                  |
| GGN-034         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Items 3.2.1.8.A and 3.2.4.8.A) | Feb 2015                  |
| GGN-036         | Closed*   |                           |
| GGN-038         | Closed*   |                           |
| GGN-039         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Item 3.2.2.A)                  | Feb 2015                  |
| GGN-040         | Closed*   |                           |
| GGN-041         | Closed*   |                           |
| GGN-042         | Closed*   |                           |
| GGN-043         | In Progress - This AQ response will be updated when information is available  | Feb 2015                  |
| GGN-044         | Closed*   |                           |
| GGN-045         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Item 3.2.4.2.A)                | Feb 2015                  |
| GGN-046         | In Progress - This AQ response will be updated when information is available  | Feb 2015                  |

| Audit Questions | Status   | Completion or Target Date |
|-----------------|--|---------------------------|
| GGN-047         | Closed*  |                           |
| GGN-048         | Closed*  |                           |
| GGN-050         | Closed*  |                           |
| GGN-052         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Item 3.1.3.2.A) <sup>†</sup>  | Feb 2015                  |
| GGN-053         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Item 3.2.4.8.B)               | Feb 2015                  |
| GGN-055         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Item 3.2.4.9.A)               | Feb 2015                  |
| GGN-057         | Closed*  |                           |
| GGN-058         | In Progress - This AQ response will be updated when information is available   | Feb 2015                  |
| GGN-061         | Closed*  |                           |
| GGN-062         | In Progress - This AQ response will be updated when information is available   | Feb 2015                  |
| GGN-063         | Closed*  |                           |
| GGN-064         | In Progress - This AQ response will be updated when information is available   | Feb 2015                  |
| GGN-065         | Closed*  |                           |
| GGN-066         | Closed*  |                           |
| GGN-067         | Closed*  |                           |
| GGN-071         | In Progress - This AQ response will be updated when information is available   | Feb 2015                  |
| GGN-072         | In Progress - This AQ response will be updated when information is available (ISE Confirmatory Item 3.2.4.10.A) <sup>†</sup> | Feb 2015                  |

\*Closed indicates that Entergy's response is complete.

<sup>†</sup>Question status changed to "in progress" due to potential impact of the associated ISE confirmatory item.

## 7 Potential Interim Staff Evaluation Impacts

There are no potential impacts to the Interim Staff Evaluation identified at this time except those identified in Section 4.

## 8 References

The following references support the updates to the Overall Integrated Plan described in this Attachment.

1. "Overall Integrated Plan in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated February 27, 2013 (GNRO-2013/00015, ML13059A316).
2. NRC Order Number EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012 (ML12054A735).
3. Entergy Letter to NRC, *Entergy's first Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)*, dated August 28, 2013 (GNRO-2013/0060, ML13240A264).
4. NRC Letter, "Grand Gulf Nuclear Station - Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC No. MF0954)," dated February 19, 2014 (ML14007A718).
5. Entergy Letter to NRC, *Entergy's Second Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)*, dated February 28, 2014 (GNRO-2014/00011, ML14059A080).