Entergy

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GNRO-2016/00007

May 24, 2016

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

SUBJECT: Notification of Full Compliance with NRC Order EA-12-051 Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order EA-12-051)
Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

REFERENCES:

1. NRC Order Number EA-12-051, *Order to Modify Licenses with Regard to Reliable Spent Fuel Pool (SFP) Instrumentation*, dated March 12, 2012 (ML12054A682)

2. Entergy Letter to NRC, *Overall Integrated Plan in Response to March 12, 2012, Commission Order Modifying License with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)*, dated February 26, 2013 (GNRO-2013/00016, ML13064A417)

3. NRC Letter to Entergy, Grand Gulf Nuclear Station, Unit 1 – Interim Staff Evaluation and Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation, dated November 25, 2013 (Order Number EA-12-051) (TAC NO. MF0955)

4. NRC Letter to Entergy, Grand Gulf Nuclear Station, Unit 1 – *Report for the Onsite Audit Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Pool Instrumentation Related to Orders EA-12-049 and EA-12-051 (TAC Nos. MF0954 and MF0955)*, dated November 24, 2015 (ML15308A298)

Dear Sir or Madam:

On March 12, 2012, the NRC issued Order EA-12-051, *Order Modifying Licenses with Regard to Reliable Spent Fuel Pool (SFP) Instrumentation* (Reference 1), to all power reactor licensees, which is applicable to Entergy Operations, Inc. (Entergy).The Order was effective immediately and

directed the installation of reliable SFP instrumentation. Reference 2 provided the response to Section C.1.a which requires that the Licensee submit an Overall Integrated Plan (OIP). This letter, along with its enclosures, provides the notification required by Section C.3 of the Order that full compliance with the Order has been achieved. This letter also provides information updates, as necessary, with respect to References 3 and 4.

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

I declare under penalty of perjury that the foregoing is true and correct; executed on May 24, 2016.

Sincerely,

for KJM

KJM/sas

Attachments: 1. Compliance with Order EA-12-051
2. NRC Requests for Information
3. Audit Open Item Response

cc: next page

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Attachment 1 to GNRO-2016/00007

Compliance with Order EA-12-051

Compliance with Order EA-12-051

1. Background

On March 12, 2012, the NRC issued Order EA-12-051, *Order Modifying Licenses with Regard to Reliable Spent Fuel Pool (SFP) Instrumentation* (Reference 1), to all power reactor licensees, which is applicable to Entergy Operations, Inc. (Entergy). The Order was effective immediately and directed the installation of reliable SFP instrumentation.

Grand Gulf Nuclear Station (GGNS) developed an Overall Integrated Plan (Reference 2) documenting the requirements to install reliable spent fuel pool level instrumentation (SFPI). The information provided herein documents full compliance with the Order for Grand Gulf Nuclear Station, Unit 1.

2. Compliance

Grand Gulf has installed two independent full-scale level monitors on the Spent Fuel Pool (SFP) in response to Reference 1.

Entergy submitted the Grand Gulf Overall Integrated Plan (OIP) by letter dated February 26, 2013 (Reference 2). By letter dated November 25, 2013 (Reference 3), the NRC provided the interim staff evaluation and requested additional information necessary for completion of the review. The information requested by the NRC is captured in Attachment 2.

Compliance with NRC Order EA-12-051 was achieved using the guidance in Nuclear Energy Institute (NEI) document NEI 12-02 (Reference 4) which has been endorsed by the NRC (Reference 5).

3. References

1. NRC Order Number EA-12-051, Order to Modify Licenses with Regard to Reliable Spent Fuel Pool (SFP) Instrumentation, dated March 12, 2012 (ML12054A682)

2. Entergy Letter to NRC, *Overall Integrated Plan in Response to March 12, 2012, Commission Order Modifying License with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)*, dated February 26, 2013 (GNRO-2013/00016, ML13064A417)

3. NRC Letter to Entergy, Grand Gulf Nuclear Station, Unit 1 – Interim Staff Evaluation and Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation, dated November 25, 2013 (Order Number EA-12-051) (TAC NO. MF0955)

4. NEI 12-02, Rev. 1, Industry Guidance for compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" August, 2012 (ADAMS Accession No. ML12240A307)

5. NRC Interim Staff Guidance, JLD-ISG-2012-03, Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, August 29, 2012 (ADAMS Accession No. ML12054A682)

6. Grand Gulf Nuclear Station, Unit 1 – Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (Order EA-12-051) (TAC No. MF0955), dated July 30, 2013 (GNRI-2013/00129)

7. Response to Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (Order EA-12-051), dated August 29, 2013 (GNRO-2013/00057)

8. Grand Gulf Nuclear Station, Unit 1 – Interim Staff Evaluation and Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051) (TAC NO. MF0955), dated November 25, 2013 (GNRI-2013/00178)

9. Entergy Letter to NRC, Entergy's Third Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying License with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated August 27, 2014 (GNRO-2014/00055)

10. Entergy Letter to NRC, Entergy's Fourth Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying License with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated February 18, 2015 (GNRO-2015/00005)

11. Grand Gulf Nuclear Station, Unit 1 – Report for the Onsite Audit Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Pool Instrumentation Related to Orders EA-12-049 AND EA-12-051 (TAC NOS, MF0954 AND MF0955), dated November 24, 2015 (ML15308A298).

Attachment 2 to GNRO-2016/00007

NRC Requests for Information

NRC Requests for Information

As stated in Attachment 1, Entergy submitted the Overall Integrated Plan (OIP) for Grand Gulf Nuclear Station (GGNS) by Reference 2 of this attachment.

By Reference 6 of Attachment 1, the NRC provided requests for additional information (RAIs) for the OIP. Entergy provided responses to the RAIs by Reference 7.

By Reference 8 of Attachment 1, the NRC provided its interim staff evaluation (ISE) and requested additional information necessary for completion of the review. Entergy provided responses to the nineteen (19) ISE RAIs by References 9 and 10 of Attachment 1, with Reference 10 containing the design bridging document.

New RAIs #20-23 were received prior the onsite audit. RAIs #20, 21 and 22 were closed during the audit (Reference 11) and responses to these are provided below. RAI #23 was listed as an open item in the audit report and the response is presented in Attachment 3.

RAI #20

EMC compliance: Please make available for staff review an assessment of potential susceptibilities of EMI/RFI in the areas where the SFP instruments are located and how to mitigate those susceptibilities

MOHR reports 1-0410-4 and 1-0410-4-S1 demonstrate the new SFPI satisfies the EMI/RFI compliance guidelines of Revision 3 of EPRI TR-102323 in accordance with Entergy Engineering Standard EN-IC-S-004-MULTI. As demonstrated in the SFPI Vendor's (MOHR) System EMC Test Report and Supplemental Information, the SFPI system passed the High Frequency Radiated and Conducted Emissions testing.

The Lower Cable Room where the displays are located is already a radio exclusion zone. New 3.5 foot exclusion zones around the probes have been painted to prevent radio usage near the pool. Furthermore, FSG-11 governs the use of the SFPI and include a cautionary statement to preclude radio usage within close proximity to the displays.

RAI #21

Please provide further information describing the maintenance and testing program the licensee will establish and implement to ensure that regular testing and calibration is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. Include a description of plans to ensure necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment.

The following is a list of Preventative Maintenance (PM) tasks documenting the Entergy Fleet PM Strategy for the MOHR instrumentation system:

Task Name	Objective	Frequency of Occurrence
Channel Calibration Check (Operator Rounds)	To validate that the MOHR instruments (both channels) are displaying the correct spent fuel pool level within the accuracy of the instruments and that the date stamp on the display is indicating correctly.	1D
Channel Check / Panel Functional Check	To check each channel against each other for comparison and to perform functional assessments of each panel.	1Y
Signal Processor Clock Battery Replacement	To prevent failure of the onboard clock battery and adverse impact to the signal processor operating system.	10Y

By checking each channel to be within the accuracy requirement of 3 inches from actual pool level on a daily frequency, validating all panel indications to be proper and functional on this same frequency including battery power status, and validating functional transfer of AC to DC power yearly, these checks meet or exceed the 6 month and 2 year recommendations of the vendor and will prevent level calibration from falling out of the accuracy requirements of the instrumentation.

RAI #22

Please describe the impact of recent MOHR's SFPI equipment failures (failure of the filter coil (or choke) in particular) on the Grand Gulf's SFP level instrument. Also, any actions/measures to address this equipment failure. The equipment qualifications need to be reevaluated as resulted of changes made to the equipment configurations.

The vendor MOHR has determined the source of the failures is a miniature surface mount common-mode choke component used on the Video and Digicomp printed circuit boards (PCB's) within the EFP-IL Signal Processor. The new boards have equivalent substitute components that are less susceptible to transient electrical events. The substitute components have equivalent size, mass, and solder attachment technique as the original component such that there is no impact to the system mechanical characteristics. The components demonstrate equivalent electrical performance such that EMC characteristics are not significantly changed. The vendor recommended repair has been implemented on the GGNS system per CR-HQN-2015-0345. Proprietary Mohr Report 1-1010-2: EFP-IL MOD 1 Modification Package addresses continued equipment qualification following the repair.

Attachment 3 to GNRO-2016/00007

Audit Open Item Response

Audit Open Item Response (RAI #23)

RAI #23

During the onsite audit, the NRC staff noted that the metal conduits for the two SFP level channels were routed within 3 feet of each other (and sometimes less than that) on the north and west walls of the SFP operating floor in the auxiliary building. This does not appear to meet the requirements of Order EA-12-051 that:
"The spent fuel pool level instrument channels shall be arranged in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the spent fuel pool. This protection may be provided by locating the primary instrument channel and fixed portions of the backup instrument channel, if applicable, to maintain instrument channel separation within the spent fuel pool area, and to utilize inherent shielding from missiles provided by existing recesses and corners in the spent fuel pool structure."

In the GGNS NRC audit report the NRC documented the need to provide additional protection or separation of some SFPI conduit on the 208 elevation of the auxiliary building refuel floor. Based on further discussion with the NRC changes to the audited configuration of the SFPI conduit were determined to be unnecessary. This documents the acceptability of the as audited conduit configuration at GGNS.

Unlike a typical BWR Mark I or II refuel floor, a Mark III (GGNS) has a concrete enclosed, seismic qualified structure surrounding the SFP. Given the location inside a robust structure and the evaluated absence of credible internal missiles, GGNS used a minimum of 3'-0" separation between Channel-A and Channel-B Spent Fuel Pool Instrumentation (SFPI) conduits with one exception. The exception is a short run in the elevator area where intervening structures are credited. A minimum 3'-0" distance is considered to maintain reasonable separation to meet the requirements of NRC Order EA-12-051. This is based on the conduit separation meeting the plant design basis for missile hazards for safety related circuits because there are no credible missile hazards in the area that could affect these conduits. The specific reasons a minimum of 3'-0" separation is acceptable is because:

- The conduits are installed on the inside walls of a Seismic Category I concrete structure providing protection from all external hazards.
- Permanently installed equipment located on the refuel floor has been evaluated for internal missile hazards.

  ☐ No credible internal hazards exist due to the location of installed equipment on the refuel floor.
  ☐ Overhead cranes in the area of interest are seismically qualified.

- Procedural guidance provides reasonable assurance that there will be no transient missile hazards in the area.

Additionally, in the area of concern where minimum separation is used, i.e. 3'-0", intervening structures provide additional assurance that randomly postulated missiles will not simultaneously damage both redundant channels of instrumentation. Also, this area is a narrow pathway next to the SFP that is not conducive to its use as an equipment storage/work area.