



Entergy Operations, Inc.
P. O. Box 756
Port Gibson, MS 39150

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

GNRO-2014/00055

August 27, 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 Reliable Spent Fuel Pool Instrumentation (Order Number 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. Entergy Letter to NRC, *Entergy's First 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 28, 2013 (GNRO-2013/00061)
 4. Entergy Letter to NRC, *Entergy's Second 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 28, 2014 (GNRO-2014/00013)

Dear Sir or Madam:

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued an order (Reference 1) to Entergy Operations, Inc. (Entergy). Reference 1 was immediately effective and directs Entergy to install reliable spent fuel pool level instrumentation.

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan (Reference 2). 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 27, 2014.

Sincerely,



KJM/ras

Attachment: Grand Gulf Nuclear Station's Third Six Month Status Report for the Implementation of Order EA-12-051, Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation

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
Mail Stop OWFN/8 B1
Washington, DC 20555-0001

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

Attachment to GNRO-2014/00055

**Grand Gulf Nuclear Station's Third Six Month Status Report for the
Implementation of Order EA-12-051, Order Modifying Licenses with Regard to
Requirements for Reliable Spent Fuel Pool Instrumentation**

**Grand Gulf Nuclear Station's
Third Six Month Status Report for the Implementation of Order EA-12-051, Order
Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool
Instrumentation**

1 Introduction

Grand Gulf Nuclear Station (GGNS) developed an Overall Integrated Plan (Reference 1 in Section 8), documenting the requirements to install reliable spent fuel pool level instrumentation (SFPI), in response to Reference 2. This attachment provides an update of milestone accomplishments since the last status report, 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 January 31, 2014 and are current as of July 31, 2014.

None

3 Milestone Schedule Status

The following provides an update to the schedule identified in Section 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.

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Install reliable SFPI	Spring 2016 Refueling Outage	Planned	N/A
Respond to NRC RAIs (received July 30, 2013)	August 29, 2013	Submitted August 29, 2013	N/A
Respond to ISE RAIs (received November 25, 2013)	September 30, 2015	See Section 6	N/A

4 Changes to Compliance Method

Section 6 of the Overall Integrated Plan (OIP) states that cables in the SFP area are routed in seismically mounted rigid metal conduit. However, the cable between the spent fuel pool and the west wall of the Auxiliary Building is routed through the existing service cable trench that surrounds the SFP and then through a new protective steel channel along the ground before transitioning to rigid metal conduit along the wall. Small sections of flexible conduit protect the cable from the back of the probe and into the cable trench. Although cabling for each channel travels similar routes through the Auxiliary Building, each channel makes use of completely separate conduit supports and penetrations.

Section 7 of the OIP refers to Attachment 1 for the approximate locations of the level instruments. Attachment 1 of the original OIP shall be superseded by Figure 1 in RAI #2 in Section 9 of this update. Refer to the response in RAI #2 of Section 9 for additional details regarding the SFPI probe arrangement and the separation between the two instrument channels.

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

GGNS has received an Interim Staff Evaluation that includes 19 RAIs. Responses to the RAIs are due by September 30, 2015 and some responses are provided in Section 9 of this six-month status report. The following table provides a status of any RAIs documented in the Interim Staff Evaluation.

RAI #	Response Status
1	See Section 9
2	See Section 9
3	In Progress
4	In Progress
5	In Progress
6	In Progress
7	In Progress
8	In Progress
9	See Section 9
10	See Section 9
11	In Progress
12	In Progress
13	See Section 9
14	See Section 9
15	See Section 9
16	See Section 9
17	See Section 9

18	See Section 9
19	See Section 9

7 Potential Interim Evaluation Impacts

There are no potential impacts to the Interim Staff Evaluation identified at this time except for those identified in Section 6.

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 License with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)," dated February 26, 2013 (GNRO-2013/00016, ML13059A316).
2. NRC Order Number EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012 (ML12054A679).
3. "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 (ML13316B986).
4. "Summary of the November 26, 2013, Public Meeting to Discuss Industry Responses to Staff Interim Evaluations for Spent Fuel Pool Instrumentation," dated December 26, 2013 (ML13347B030).
5. "Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (Order EA-12-051)," dated July 30, 2013 (GNRI-2013/00129).
6. Entergy Letter to NRC, Entergy's First 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 28, 2013 (GNRO-2013/00061).
7. Entergy Letter to NRC, Entergy's Second 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 28, 2014 (GNRO-2014/00013).

9 Responses to the Interim Staff Evaluation Requests for Additional Information

RAI #1

Please provide information on specific procedures controlling irradiated hardware stored in the SFP. Include details of any analysis performed to determine the projected dose rate impact and the appropriate Level 2 elevation as a result of dose from irradiated material stored in the SFP.

Specific procedures controlling irradiated hardware stored in the SFP are as follows:

Special Nuclear Material - 17-S-02-3

Non-Nuclear Material - 07-S-02-301

Fuel Movement – 08-S-02-75

Control of Highly Irradiated Objects - EN-RP-123

Interim Staff Guidance JLD-ISG-2012-03 'Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation' states "The NRC staff considers that the methodologies and guidance in conformance with the guidelines provided in NEI 12-02, Revision 1, subject to the clarifications and exceptions in Attachment 1 to this ISG, are an acceptable means of meeting the requirements of Order EA-12-051."

NEI 12-02 R1 section 2.3.2, 'Level 2- level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck' defines Level 2.

Level 2 represents the range of water level where any necessary operations in the vicinity of the spent fuel pool can be completed without significant dose consequences from direct gamma radiation from the stored spent fuel. Level 2 is based on either of the following:

- 10 feet (+/- 1 foot) above the highest point of any fuel rack seated in the spent fuel pools, or
- a designated level that provides adequate radiation shielding to maintain personnel radiological dose levels within acceptable limits while performing local operations in the vicinity of the pool. This level shall be based on either plant-specific or appropriate generic shielding calculations, considering the emergency conditions that may apply at the time and the scope of necessary local operations, including installation of portable SFP instrument channel components. Additional guidance can be found in EPA-400 (Reference 4), USNRC Regulatory Guide 1.13 (Reference 5) and ANSI/ANS-57.2-1983 (Reference 6).

Entergy has selected the 10 foot option which has been determined by the NRC to meet the requirements of the order with no further evaluation or review required.

RAI #2

Please provide a clearly labeled sketch or marked-up plant drawing depicting the proposed routing of the cables that will extend from the SFP sensors toward the location of the read-out/display device in the computer and control panel room.

The read-out/display device will be located in the lower cable spreading room. Figure 1 shows the approximate locations of the SFPI probes (in the northwest and southwest corners), the inside dimensions of the SFP, and the proposed cable routing. Along the walls where the conduits from each channel appear to run together, the conduits are separated vertically, using completely separate supports.

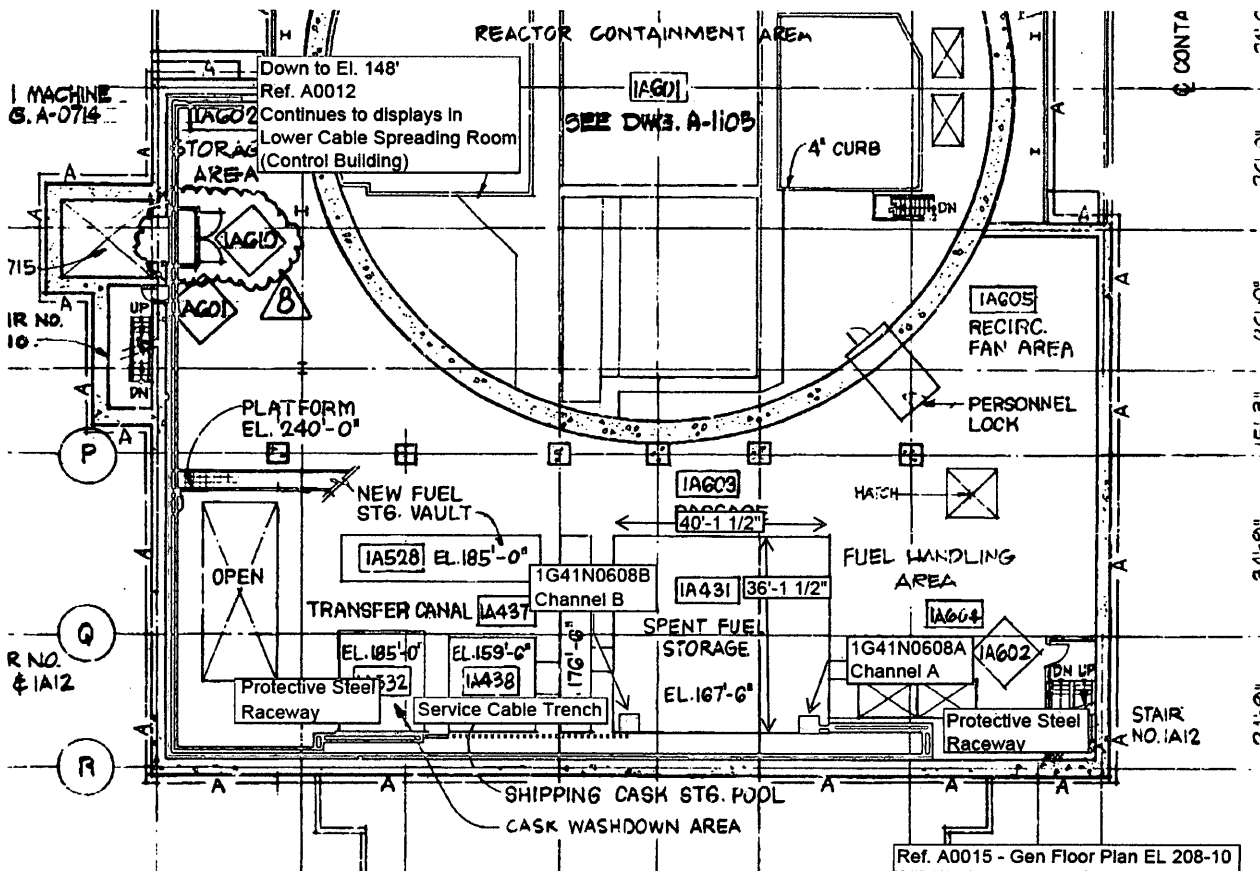


Figure 1: SFP Plan View

RAI #3

Please provide the results of the analyses used to verify the design criteria and methodology for seismic testing of the SFP instrumentation and the electronics units, including design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.

This response will be provided in a future update.

RAI #4

For each of the mounting attachments required to fasten SFP level equipment to plant structures, please describe the design inputs, and the methodology that was used to qualify the structural integrity of the affected structures/equipment.

This response will be provided in a future update.

RAI #5

Please provide further information describing how other material stored in the SFP will not create adverse interaction with the SFP level instruments.

This response will be provided in a future update.

RAI #6

Please provide analysis of the maximum expected radiological conditions (dose rate and total integrated dose) to which the sensor electronics (including power boxes, signal processors, and display panels) will be exposed. Provide documentation indicating the maximum total integrated dose the sensor electronics can withstand and how it was determined. Discuss the time period over which the analyzed total integrated dose was applied.

This response will be provided in a future update.

RAI #7

Please provide information indicating (a) the temperature ratings and whether the temperature ratings for the system electronics are continuous duty ratings; and (b) the maximum expected ambient temperature in the rooms in which the system electronics will be located under BDB conditions, which include no AC power available to run Heating, Ventilation, and Air Conditioning (HVAC) systems.

This response will be provided in a future update.

RAI #8

Please provide information indicating the maximum expected relative humidity in the room in which the sensor electronics will be located under BDB conditions, in which there is no ac power available to run HVAC systems, and whether the sensor electronics is capable of continuously performing required functions under this expected humidity condition.

This response will be provided in a future update.

RAI #9

Please provide a description of the specific method or combination of methods to be applied to demonstrate the reliability of the permanently installed equipment under BDB shock and vibration conditions.

See bridging document Topic #14. [Note: Preliminary responses are provided in the DRAFT Bridging Document (in e-portal). Awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #10

For RAI #9 above, please provide the results for the selected methods, tests, and analyses used to demonstrate the qualification and reliability of the installed equipment in accordance with the Order requirements.

See bridging document Topic #14. [Note: Preliminary responses are provided in the DRAFT Bridging Document. Awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #11

Please provide analysis of the vendor analysis and seismic testing results to show that instrument performance reliability, following exposure to simulated seismic conditions representative of the environment anticipated for the SFP structures at GGNS, has been adequately demonstrated.

This response will be provided in a future update.

RAI #12

Please provide the NRC staff with the final configuration of the power supply source for each channel so the staff may conclude the two channels are independent from a power supply assignment perspective.

This response will be provided in a future update.

RAI #13

Please provide the results of the calculation depicting battery backup duty cycle requirements, demonstrating that battery capacity is sufficient to maintain the level indication function until offsite resource availability is reasonably assured.

See bridging document Topic #18. [Note: Preliminary responses are provided in the DRAFT Bridging Document. Awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #14

Please provide analysis verifying the proposed instrument performance is consistent with these estimated accuracy normal and BDB values. Demonstrate that the channels will retain these accuracy performance values following a loss of power and subsequent restoration of power.

See bridging document Topics #16, 17 and 18. [Note: Preliminary responses are provided in the DRAFT Bridging Document. Awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #15

Please provide a description of the methodology that will be used for determining the maximum allowed deviation from the instrument channel design accuracy under normal operating conditions. The NRC staff understands this allowed deviation will serve as an acceptance criterion for a calibration procedure to alert operators and technicians that the channel requires adjustment to within normal design accuracy.

In general, relative to normal operating conditions, any applicable calibration procedure tolerances (or acceptance criterion) will be established based on the vendor manual's stated/recommended reference accuracy (or design accuracy). The methodology used will be based on the vendor manuals and captured in plant procedures and/or programs. See bridging document Topic #20. [Note: Preliminary responses are provided in the DRAFT Bridging Document. Awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #16

Please provide a description of the in-situ calibration process at the SFP location that will result in the channel calibration being maintained at its design accuracy.

The process will be captured in Entergy procedures established based on manufacturer's recommendations and Entergy processes and procedures. The instrument automatically monitors the integrity of its level measurement system using in-situ capability. Deviation of measured test parameters from manufactured or as-installed configuration values beyond a configurable threshold-tolerable limit prompts operator intervention. See bridging document Topic #20. [Note: Preliminary responses are provided in the DRAFT Bridging Document. Awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #17

Please describe the evaluation used to validate that the display location can be accessed without unreasonable delay following a BDB event. Include the time available for personnel to access the display as credited in the evaluation, as well as the actual time (e.g., based on walk-throughs) that it will take for personnel to access the display. Additionally, include a description of the radiological and environmental conditions on the paths personnel might take. Describe whether the display location remains habitable for radiological, heat and humidity, and other environmental conditions following a BDB event. Describe whether personnel are continuously stationed at the display or monitor the display periodically.

The displays will be located in the Lower Cable Spreading Room which is in the Control Building, one floor below the Control Room. This room is accessible from the Control Room via two stairwells in a Category One structure (one each on the east and west walls) and therefore can be accessed without unreasonable delay following a BDB event. Therefore, an evaluation of the time it takes to access the display is not required.

The stairwells to the display location and the Lower Cable Spreading Room are mild radiation environments. An evaluation of whether the room remains habitable for temperature, humidity and radiological conditions following a BDB event is still in progress. Personnel are not typically continuously stationed at the display.

RAI #18

Please provide a list of the procedures addressing operation (both normal and abnormal response), calibration, test, maintenance, and inspection that will be developed for use of the SFPI instrumentation. The licensee is requested to include a brief description of the specific technical objectives to be achieved within each procedure.

The calibration and test procedures developed by MOHR are provided in the technical manuals developed by MOHR. See bridging document Topics #10, 19, and 20 [Note: Preliminary responses are provided in the DRAFT Bridging Document. Awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]. The objectives are to measure system performance, determine if there is a deviation from normal tolerances, and return the system to normal tolerances.

Diagnostic procedures developed by MOHR are provided as automated and semi-automated routines in the system software alerting the operator to abnormal deviation in selected system parameters such as battery voltage, loop continuity, and TDR waveform of the transmission cable. The technical objective of the diagnostic procedures is to identify system conditions that require operator attention to ensure continued reliable liquid level measurement. Manual diagnostic procedures are also provided in the event that further workup is determined to be necessary.

Maintenance procedures developed by MOHR are provided in the technical manual. These allow a technician trained in EFP-IL system maintenance to ensure that system functionality is maintained.

An operation procedure will provide sufficient instructions for operation and use of the system.

Entergy procedures will be developed in accordance with the vendor manuals provided by MOHR and Entergy procedures and processes.

FLEX Support Guidelines will provide sufficient instructions for use of the SFPI during a Beyond Design Basis external event.

RAI #19

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.

SFPI channel/equipment maintenance/preventative maintenance and testing program requirements to ensure design and system readiness will be established in accordance with Entergy's processes and procedures and in consideration of vendor recommendations to ensure that appropriate regular testing, channel checks, functional tests, periodic calibration, and maintenance are performed (and available for inspection and audit). See bridging document Topics #10 and 20. [Note: Preliminary responses are provided in the DRAFT Bridging Document. Awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]