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Michael R. Chisum
Sit Vice President
Waterford 3

W3F1-2014-0049

August 28, 2014

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

SUBJECT: Third Six Month Status Report for Implementation of Order EA-12-051, Commission Order Modifying License With Regard To Reliable Spent Fuel Pool Instrumentation
Waterford Steam Electric Station, Unit 3 (Waterford 3)
Docket No. 50-382
License No. NPF-38

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 (ADAMS Accession No. ML12054A682)

2. NRC Interim Staff Guidance JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable SFP Instrumentation," Revision 0, dated August 29, 2012 (ADAMS Accession No. ML12221A339)

3. Nuclear Energy Institute (NEI) 12-02, "Industry Guidance for Compliance with NRC Order EA-12-051, To Modify Licenses with Regard to Reliable SFP Instrumentation," Revision 1, dated August 2012 (ADAMS Accession No. ML12240A307)

4. Entergy letter to NRC, "Initial Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Reliable SFP Instrumentation (Order Number EA-12-051)," dated October 26, 2012 (ADAMS Accession No. ML12300A446)

5. Waterford Steam Electric Station, Unit 3, letter to NRC, "Overall Integrated Plan in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)," dated February 28, 2013 (ADAMS Accession No. ML13063A263).

6. Waterford Steam Electric Station, Unit 3 letter to NRC, "First Six Month Status Report for Implementation of Order EA-12-051, Commission Order Modifying License With Regard To Reliable Spent Fuel Pool Instrumentation" dated August 28, 2013 (ADAMS Accession No. ML13241A280)

7. Waterford Steam Electric Station, Unit 3 letter to NRC, "Second Six Month Status Report for Implementation of Order EA-12-051, Commission Order Modifying License With Regard To Reliable Spent Fuel Pool Instrumentation" dated February 28, 2014 (ADAMS Accession No. ML14059A087)

Dear Sir or Madam:

On March 12, 2012, the NRC issued NRC Order EA-12-051 (Reference 1) to Entergy Operations, Inc. (Entergy). The Order (Reference 1) was immediately effective and directs Waterford Steam Electric Station, Unit 3 (Waterford 3), to have a reliable indication of the water level in associated spent fuel storage pools.

Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (Reference 2) and an Overall Integrated Plan (OIP). Reference 2 endorses industry guidance document NEI 12-02, Revision 1 (Reference 3). Reference 4 provided the initial status report regarding SFP instrumentation, and Reference 5 provided the OIP.

NRC Order EA-12-051 requires submission of a status report at six-month intervals following submittal of the Overall Integrated Plan with regard to the requirements for reliable spent fuel pool instrumentation for Waterford 3. Reference 6 provided the first six-month status report for Waterford 3. The purpose of this letter is to provide, as an attachment, the third six month status report for the implementation of Order EA-12-051.

There are no new commitments identified in this submittal. Should you have any questions concerning the content of this letter, please contact John Jarrell, Regulatory Assurance Manager, at (504) 739-6685.

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

Sincerely,

MRC/LEM

Attachment: Waterford Steam Electric Station, Unit 3, Third Six Month Status Report for the Implementation of Order EA-12-051, Order Modifying Licenses with Regard to the Requirements for Reliable Spent Fuel Pool Instrumentation

cc: Attn: Director, Office of Nuclear Reactor Regulation
U. S. NRC
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Attachment

W3F1-2014-0049

Waterford Steam Electric Station, Unit 3,
Third Six Month Status Report for the Implementation of Order EA-12-051,
Order Modifying Licenses with Regard to the Requirements for
Reliable Spent Fuel Pool Instrumentation

Waterford Steam Electric Station, Unit 3, Third Six Month Status Report for the Implementation of Order EA-12-051, Order Modifying Licenses with Regard to the Requirements for Reliable Spent Fuel Pool Instrumentation

1 Introduction

Waterford Steam Electric Station, Unit 3 (Waterford 3), developed an Overall Integrated Plan (Reference 1 in Section 8) documenting the requirements to install reliable spent fuel pool level instrumentation (SFP LI) in response to NRC Order EA-12-051 (Reference 2). This attachment provides a planned 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.

- Second Six-Month Status Report — February 2014
- Third Six-Month Status Report — Complete with submission of this document in August 2014

3 Milestone Schedule Status

The following provides an update to the milestone schedule to support the Overall Integrated Plan (Reference 1). This section provides the activity status of each item, and the expected completion date noting any change. 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
Submit 60 Day Status Report	Oct 2012	Complete	N/A
Submit Overall Integrated Plan	Feb 2013	Complete	N/A
Submit 6 Month Updates:			
Update 1	Aug 2013	Complete	N/A
Update 2	Feb 2014	Complete	N/A
Update 3	Aug 2014	Complete	N/A
Update 4	Feb 2015	Not Started	No Change
Update 5	Aug 2015	Not Started	No Change
Milestone	**Target Completion Date**	**Activity Status**	**Revised Target Completion Date**
Modifications:			
Engineering and Implementation			
Design Engineering	Oct 2014	In Progress	No Change
Implementation Outage	Nov 2015	Not Started	No Change
Procedures:			
Create Procedures	Nov 2015	Not Started	No Change
Training:			
Develop Training Plan	May 2015	Not Started	No Change
Implement Training	Nov 2015	Not Started	No Change
Submit Completion Report:	Feb 2016	Not Started	No Change
Respond to NRC ISE RAIs	March 2015	See Section 6	No Change

4 Changes to Compliance Method

There are no changes to the compliance method as documented in the Overall Integrated Plan (Reference 1).

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

Waterford 3 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

Waterford 3 has received an Interim Staff Evaluation that includes 18 RAIs. Responses to the RAIs are due March 31, 2015 and are provided in Section 9 of this six-month update 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	See Section 9
4	See Section 9
5	See Section 9
6	See Section 9
7	See Section 9
8	See Section 9
9	See Section 9
10	See Section 9
11	See Section 9
12	See Section 9
13	See Section 9
14	See Section 9
15	See Section 9
16	See Section 9
17	See Section 9
18a	See Section 9
18b	See Section 9

7 Potential Interim Staff 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. Waterford Steam Electric Station, Unit 3 letter to NRC, "Overall Integrated Plan in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)," dated February 28, 2013 (ADAMS Accession No. ML13063A263).

2. NRC Order Number EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012 (ADAMS Accession No. ML12054A682).

3. "Waterford Steam Electric Station, Unit 3 – 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. MF0946)," dated November 25, 2013 (ADAMS Accession No. ML13312A787).

4. "November 26, 2013, Public Meeting Summary for the Discussion Between the NRC Staff and Industry Concerning Responses to Staff Interim Evaluations for Spent Fuel Pool Instrumentation," dated December 26, 2013 (ADAMS Accession No. ML13347B030).

5. "Waterford, Unit 3 – Request for Additional Information E-mail, Overall Integrated Plan in Response to 3/12/12 Commission Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051) (TAC No. MF0946)," dated August 28, 2013 (ADAMS Accession No. ML13246A318).

9 Responses to the Interim Staff Evaluation Requests for Additional Information

RAI #1

Please provide information regarding 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 SPF.

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, USNRC Regulatory Guide 1.13 and ANSI/ANS-57.2-1983.

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 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.

See bridging document Topics #8, 9, & 12 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #3

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.

See bridging document Topics #8, 9, 12, & 13 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #4

Please provide further information to describe how other material stored in the SFP will not create adverse interaction with the fixed instrument location(s).

The SFP and Auxiliary Building are Seismic Category 1 Structures. As a part of the Engineering Change (EC) process for WF3, it was verified that material stored in the SFP will not create any adverse interaction with the fixed instrument locations in the northeast and southwest corners. Future hardware additions to the SFP are controlled by procedure.

RAI #5

Please provide analysis of the maximum expected radiological conditions (dose rate and total integrated dose) to which the transmitter electronics located within the Reactor Auxiliary Building will be exposed. Also, provide documentation indicating the maximum total integrated dose the electronics for this equipment is capable of withstanding. Discuss the time period over which the analyzed total integrated dose was applied.

See bridging document Topic #3 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #6

Please provide information indicating (a) the maximum expected ambient temperature in the room in which the sensor electronics will be located under BDB conditions, with no ac power available to run heating, ventilation, and air conditioning (HVAC) systems, and (b) whether the sensor electronics are capable of continuously performing required functions under this expected temperature condition.

See bridging document Topic #3 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #7

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

See bridging document Topic #3 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #8

Please provide information describing the evaluation of the local electronics cabinet and display panel ratings against postulated plant conditions. Also provide results of the manufacturer's shock and vibration test methods, test results, and the forces and their frequency ranges and directions applied to the display panel associated with its successful tests. Provide a description of the specific method or combination of methods to be applied to demonstrate the reliability of the permanently installed local and electronics cabinet equipment under BDB shock and vibration conditions. Identify the specific commercial or military standards that will be used to define the parameters of the shock and vibration testing as well as the g-forces and frequency response spectra to be applied.

See bridging document Topics #8 & 14 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #9

For RAI #8 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 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #10

Please provide analysis of the vendor analysis and seismic testing results and show that SFP level instrument performance reliability, following exposure to simulated seismic conditions representative of the environment anticipated for the SFP structures at Waterford 3, has been adequately demonstrated. Include information describing the design inputs and methodology used in any analyses of the mounting of electronic equipment onto plant structures, as requested in RAI #2 above.

See bridging document Topics #8, 9, 12, & 13 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #11

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

Channel 1 is powered by LP 312PA, and Channel 2 is powered by LP 313PB. LP 312PA is fed power from MCC 3A311S (part of the “A” bus), and LP 313PB is fed power from MCC 3B311-S (part of the “B” bus). This is consistent with Section 3.6 of NEI’s guidance, which states: “The normal electrical power supply for each channel shall be provided by different sources such that the loss of one of the channels primary power supply will not result in a loss of power supply function to both channels of SFP level instrumentation.” The loss of power supplied to the “A” bus will not result in a loss of power supplied to the “B” bus and vice versa.

RAI #12

Please provide the results of the calculation depicting the 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 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #13

Please provide an analysis verifying the proposed instrument performance is consistent with estimated accuracy normal and BDB values. Also, 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 & 18 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #14

Please provide a description of the methodology to 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 manuals 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 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #15

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 beyond a configurable threshold prompts operator intervention. See bridging document Topic #20 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

RAI #16

For any SFP level instrumentation displays located outside the main control room, please describe the evaluation used to validate 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) it will take for personnel to access the display. Additionally, PLEASE 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. Identify whether personnel are to be continuously stationed at the display or will monitor the display periodically.

The processor/display for each channel will be located on the Reactor Auxiliary Building (RAB) +21.00 elevation in the (wing area). The wing area can be approached from the Main Control Room (+46.00 elevation of RAB) by descending one of two stairwells adjacent to the Main Control Room. Once on the +21.00 elevation of the Reactor Auxiliary Building, the wing area is accessed from the south through door D-21. The displays in the wing area can also be accessed by entering the RAB from the north entrance. The permanently mounted primary and back-up channel displays can be considered promptly accessible, because they can be reached within the 30 minute deployment requirement that exists for portable instrumentation (Section 3.1 of NEI 12-02).

The impact to habitability would be primarily from elevated temperatures, as the EL. +21' of the RAB (wing area) is considered a mild radiation environment. Habitability will be assured by heat stress countermeasures and rotation of personnel to the extent feasible. Personnel will not be continuously stationed at the backup display, it will be monitored periodically. The site FLEX Support Guidelines will provide guidance for personnel to evaluate the room temperature and take actions as necessary. In addition, site procedures already use passive cooling technologies for response personnel.

The FLEX staffing plan has not been finalized at this time. The results of the staffing plan will be included in a future six month status report.

If necessary, portable radios will be used to communicate with decision makers.

RAI #17

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 SFP instrumentation. 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 MOHR technical manuals (see bridging document Topics # 10, 19, & 20 located on the ePortal). [Note: Preliminary responses are available in the draft bridging document which is 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 system software alerting the operator to abnormal deviation in selected system parameters such as battery voltage, 4-20 mA 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 and 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 #18

Please provide the following:

a) **Further information describing the maintenance and testing program to be established and implemented 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.**

b) **A description of the compensatory actions that will be taken in the event that one or both channels are non-functioning, as described in the guidance in NEI 12-02 Section 4.3.**

SFPI channel/equipment maintenance/preventative maintenance and testing program requirements to ensure design and system readiness are 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 is performed (and available for inspection and audit). See bridging document Topics #10 & 20 (Document located on ePortal). [Note: Preliminary responses are available in the draft bridging document which is awaiting issuance of NRC Audit Report for the SFPI vendor (MOHR).]

a) The description of compensatory actions that will be taken in the event that one or both channels are non-functioning is available in the response to RAI 11.b in Reference 5.