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PNP 2014-084

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August 28, 2014

U.S. Nuclear Regulatory Commission
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SUBJECT: Palisades Nuclear Plant 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)

Palisades Nuclear Plant
Docket No. 50-255
License No. DPR-20

- REFERENCES:
1. NRC Order Number EA-12-051, *Order To Modify Licenses With Regard To Reliable Spent Fuel Pool 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 Spent Fuel Pool Instrumentation*, Revision 0, dated August 29, 2012 (ADAMS Accession No. ML12221A339)
 3. NEI 12-02, *Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,"* Revision 1, dated August 2012 (ADAMS Accession No. ML12240A307)
 4. Entergy Nuclear Operations, Inc. letter to NRC, PNP 2012-092, *Initial 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)*, dated October 25, 2012 (ADAMS Accession No. ML12300A067)
 5. Entergy Nuclear Operations, Inc. letter to NRC, PNP 2013-009, *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 28, 2013 (ADAMS Accession No. ML13060A360)
 6. Entergy Nuclear Operations, Inc. letter to NRC, PNP 2013-065, *Palisades Nuclear Plant First 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)*, dated August 28, 2013 (ADAMS Accession No. ML13241A235)

7. NRC Interim Staff Evaluation, Palisades-Interim Staff Evaluation and Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation (TAC No. MF0769), dated November 26, 2013 (ADAMS Accession No. ML13312A423)
8. Entergy Nuclear Operations, Inc. letter to NRC, PNP 2014-010, *Palisades Nuclear Plant Second 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)*, dated February 28, 2014 (ADAMS Accession No. ML14059A078)

Dear Sir or Madam:

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued an order (Reference 1) to Entergy Nuclear Operations, Inc. (ENO). This order was immediately effective and directed ENO to install reliable spent fuel pool level instrumentation at the Palisades Nuclear Plant (PNP).

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 pursuant to Section IV, Condition C. Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the content of the status reports. Reference 2 endorses industry guidance document NEI 12-02, Revision 1 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the PNP initial status report regarding mitigation strategies. Reference 5 provided the PNP overall integrated plan. Reference 6 provided the first six-month status report. Reference 7 contains a request for additional information regarding the overall integrated plan for implementation of Order EA-12-051. Reference 8 provided the second six-month status report.

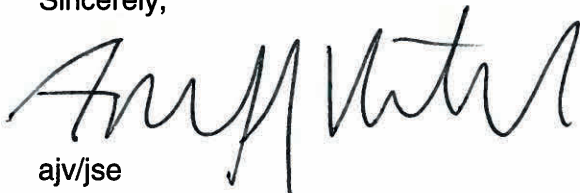
The purpose of this letter is to provide the third six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The attached report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

This letter also provides information in response to the request for additional information in Reference 7.

This letter contains no new commitments and no revised commitments.

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

Sincerely,



ajv/jse

Attachment: Palisades Nuclear Plant 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)

cc: Office Director, NRR, USNRC
Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

Attachment

Palisades Nuclear Plant 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)

1 Introduction

Entergy Nuclear Operations, Inc. (ENO) developed for Palisades Nuclear Plant (PNP) 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 in Section 8. 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.

- 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 a line item update to milestone schedule to support 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
Reliable SFPI Installed	Fall 2015 Refueling Outage	In Progress	N/A
Response to NRC Request for Additional Information (received July 18, 2013) (Reference 3 in Section 8)	August 19, 2013	Submitted August 19, 2013	N/A
Response to NRC ISE Request for Additional Information (received November 26, 2013)	March 31, 2015	In Progress	N/A

†Target Completion Date is the last submitted date from either the overall integrated plan or previous six-month update.

4 Changes to Compliance Method

Attachment 1 of the Overall Integrated Plan (Reference 1 in Section 8) shows Channel A mounted against the north wall near the northwest corner of the Spent Fuel Pool (SFP). The location of Channel A has been moved to the west wall near the northwest corner of the SFP. See Section 7 for additional discussion. Section 7 also contains a figure with the new cable routing for the SFP area.

The Overall Integrated Plan states in Section 6 that SFPI cables in the SFP area shall be routed in seismically mounted rigid metal conduit. This is true for the coaxial cable, but does not apply to the SiO₂ stainless steel armored cable. See Section 7 for additional discussion.

Attachment 2 of the Overall Integrated Plan shows SFPI Channel A being powered by MCC-7 via Lighting Panel EL-25. SFPI Channel A will now be powered by MCC-1 via Lighting Panel EL-25B.

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

ENO 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

ENO has received an Interim Staff Evaluation for PNP that includes 18 Requests for Additional Information (RAIs). Responses to the RAIs are due by March 31, 2015 and are discussed 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	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
18	See Section 9

7 Potential Interim Staff Evaluation Impacts

Section 3.4 of the Interim Staff Evaluation discusses the arrangement of the SFPI channels and references the sketch in Attachment 1 of the Overall Integrated Plan. As discussed in Section 4, the location of the Channel A level instrument has been moved to the west SFP wall, within 12” of the northwest SFP corner.

Section 3.4 of the Interim Staff Evaluation also refers to a statement that declares cables in the SFP area will be routed in seismically mounted rigid metal conduit. It should be noted that this statement does not apply to the first 20 feet of cable run, which is comprised of SiO₂ stainless steel armored cable, routed in seismically mounted 12 gauge unistrut channel with a closure strip. The SiO₂ stainless steel armored cable then transitions to coaxial cable, at which point the coaxial cable will be installed in seismically mounted rigid metal conduit for the remainder of the run in the SFP area. This cable installation is applicable to both Channel A and Channel B.

An updated sketch of the SFPI arrangement showing the current Channel A and Channel B cable routings is provided below in Figure 1.

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

8 References

The following references support the updates to the overall integrated plan described in this attachment.

1. ENO letter to NRC, PNP 2013-009, *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 28, 2013 (ADAMS Accession No. ML13060A360)
2. NRC Order Number EA-12-051, *Order To Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation*, dated March 12, 2012 (ADAMS Accession No. ML12054A682)
3. NRC email to ENO, *Palisades Nuclear Plant – Requests for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (TAC MF0769)*, dated July 18, 2013 (ADAMS Accession No. ML13200A328)
4. NRC letter to ENO, *Palisades – Interim Staff Evaluation and Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation (TAC NO. MF0769)*, dated November 26, 2013 (ADAMS Accession No. ML13312A423)
5. *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)

9 Responses to the Interim Staff Evaluation Requests for Additional Information (RAIs)

RAI #1

Given the potential for varied dose rates from other materials stored in the SFP, please describe how level 2 will be adjusted to other than the elevation provided in section 2 above.

ENO Response:

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, Revision 1, Section 2.3.2, states "Level 2 - level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck."

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).

ENO 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 analyses verifying the seismic capability of the level probes, the mounting brackets, and the electronics units, and provide the results of the analysis of the combined maximum seismic and hydrodynamic forces on the cantilevered portion of the assembly exposed to the potential sloshing effects. Show that the SFP instrument design configuration will be maintained during and following the maximum seismic ground motion considered in the design of the SFP structure.

ENO Response:

See draft bridging document Topics #8, 9, & 12 located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the NRC audit report for the SFPI vendor (MOHR).]

RAI #3

For each of the mounting attachments required to attach SFP Level equipment to plant structures, please describe the design inputs, and the methodology that will be used to qualify the structural integrity of the affected structures/equipment.

ENO Response:

See draft bridging document Topics #8, 9, 12, & 13 located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the NRC audit report for the SFPI vendor (MOHR).]

RAI #4

Please address how other hardware stored in the SFP will not create adverse interaction with the fixed instrument location(s).

ENO Response:

The SFP and Auxiliary Building are Seismic Category 1 Structures. As a part of the Engineering Change (EC) process for PNP, SFPI probe locations were verified to be free of stored SFP hardware. 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 sensor electronics will be exposed. Also, please provide documentation indicating the radiological dosage the electronics for this equipment are capable of withstanding. Please discuss the time period over which the analyzed total integrated dose is evaluated to be applied.

ENO Response:

The Channel A display containing the system electronics will be mounted in the Main Control Room, a mild radiation environment. The Channel B display is located in the C-40 Panel Room, which is a mild radiation area. Both the Main Control Room and C-40 Panel Room are not affected by increased radiation levels due to receding SFP water level. No analysis is necessary to evaluate the system electronics for exposure to radiation.

RAI #6

Please provide information indicating 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 whether the sensor electronics are capable of continuously performing required functions under this expected temperature condition.

ENO Response:

See draft bridging document Topic #3 located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the NRC audit report for the SFPI vendor (MOHR).]

RAI #7

Please provide information indicating 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 whether the sensor electronics are capable of continuously performing required functions under this expected humidity condition.

ENO Response:

See draft bridging document Topic #3 in located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the NRC audit report for the SFPI vendor (MOHR).]

RAI #8

Please provide a description of the specific method or combination of methods that will be used to demonstrate the reliability of the permanently installed equipment under BDB shock and vibration conditions. Identify the specific commercial and/or military standards that will be used to establish the testing requirements, and the specific acceleration levels and frequencies that will be simulated.

ENO Response:

See draft bridging document Topic #14 located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the 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.

ENO Response:

See draft bridging document Topic #14 located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the NRC audit report for the SFPI vendor (MOHR).]

RAI #10

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

ENO Response:

See draft bridging document Topic #8 located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the NRC audit report for the SFPI vendor (MOHR).]

RAI #11

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.

ENO Response:

Instrument Channel A is being powered from Lighting Panel (L-25B) through existing 20A breaker #5, which is supplied from MCC #1. Instrument Channel B is being powered from Lighting Panel (L-76) through existing 20A breaker #12, which is supplied from MCC #82. These two buses represent independent 480 V power sources.

RAI #12

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

ENO Response:

See draft bridging document Topic #18 located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the NRC audit report for the SFPI vendor (MOHR).]

RAI #13

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

ENO Response:

See draft bridging document Topics #16, 17 & 18 located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the NRC audit report for the SFPI vendor (MOHR).]

RAI #14

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

ENO Response:

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 draft bridging document Topics #20 located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the 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.

ENO Response:

The process will be captured in ENO procedures established based on manufacturer's recommendations and ENO process 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 draft bridging document Topic #20 located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the NRC audit report for the SFPI vendor (MOHR).]

RAI #16

For the SFP level instrumentation backup display located in the radwaste control panel 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) that it will take for personnel to access the backup 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. Describe whether personnel are continuously stationed at the backup display or monitor the display periodically.

ENO Response:

The backup display will be mounted in the Radwaste Control Panel Room Cabinet C104 at the 590' elevation of the Aux. Building. This cabinet is located in Room 121, and can be accessed via Stairwell No. 16 and Door 75, or via Corridor 106A through Door 190. Both Stairwell 16 and Corridor 106A can be approached from the north, east, and west via Corridor 106. The back-up channel display can be considered promptly accessible, because it 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 C-40 panel room 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. The licensee is requested to include a brief description of the specific technical objectives to be achieved within each procedure.

ENO Response:

The calibration and test procedures developed by MOHR are provided in the technical manuals developed by MOHR. See bridging document Topics #10, 19, & 20 located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the 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 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.

ENO procedures will be developed in accordance with the vendor manuals provided by MOHR and ENO 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 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 your plans for ensuring that necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment.

ENO Response:

SFPI channel/equipment maintenance/preventative maintenance and testing program requirements to ensure design and system readiness will be established in accordance with ENO 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 draft bridging document Topics #10 and #20 located on ePortal. [Note: Preliminary responses are available in the draft bridging document, which will be finalized upon issuance of the NRC audit report for the SFPI vendor (MOHR).]