



**Entergy Nuclear Northeast**  
Indian Point Energy Center  
450 Broadway, GSB  
P.O. Box 249  
Buchanan, NY 10511-0249  
Tel 914 254 6700

**John A Ventosa**  
Site Vice President  
Administration

NL-14-109

August 27, 2014

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
11555 Rockville Pike  
Rockville, MD 20852-2738

**SUBJECT:** Indian Point Energy Center's Third Six-Month Status Report for the Implementation of Order EA-12-051 Modifying Licenses with Regard to Requirements for to Reliable Spent Fuel Pool Instrumentation (TAC Nos. MF0737 and MF0738)  
Indian Point Unit Numbers 2 and 3  
Docket Nos. 50-247 and 50-286  
License Nos. DPR-26 and DPR-64

- References:**
1. NRC Order Number EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, dated March 12, 2012 (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
  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
  4. Entergy letter to NRC (NL-12-145), Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated October 29, 2012
  5. Entergy letter to NRC (NL-13-043), Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, dated February 27, 2013

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NRR

6. Entergy letter to NRC (NL-13-109), Indian Point Energy Center's First Six-Month Status Report for the Implementation of Order EA-12-051 Modifying Licenses with Regard to Requirements for to Reliable Spent Fuel Pool Instrumentation (TAC Nos. MF0737 and MF0738), dated August 27, 2013
7. Entergy letter to NRC (NL-14-029), Indian Point Energy Center's Second Six-Month Status Report for the Implementation of Order EA-12-051 Modifying Licenses with Regard to Requirements for to Reliable Spent Fuel Pool Instrumentation (TAC Nos. MF0737 and MF0738), dated February 27, 2014.

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 install reliable spent fuel pool level instrumentation. Specific requirements are outlined in Attachment 2 of Reference 1.

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 2 endorses industry guidance document NEI 12-02, Revision 1 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the Entergy initial status report regarding spent fuel pool instrumentation. Reference 5 provided the Entergy overall integrated plan.

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. 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 (Reference 7), including any changes to the compliance method, schedule, or need for relief and the basis, if any.

There are no new commitments identified in this submittal. If you have any questions concerning the content of this letter, please contact Mr. Robert Walpole, Manager, Regulatory Affairs at (914) 254-6710.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 27, 2014.

Respectfully,



JAV/sp

Attachment: Indian Point Energy Center's Third Six-Month Status Report for the  
Implementation of Order EA-12-051 Modifying Licenses with Regard to  
Requirements for to Reliable Spent Fuel Pool Instrumentation

cc: Mr. Douglas V. Pickett, Senior Project Manager, NRC NRR DORL  
Mr. William M. Dean, Regional Administrator, NRC Region 1  
NRC Resident Inspectors Office  
Mr. John B. Rhodes, President and CEO, NYSERDA  
Ms. Bridget Frymire, New York State Dept. of Public Service  
Ms. Jessica A. Kratchman NRC NSIR DPR DDEP IRIB

ATTACHMENT TO NL-14-109

ENTERGY'S THIRD SIX-MONTH  
STATUS REPORT FOR THE  
IMPLEMENTATION OF ORDER EA-12-051 MODIFYING LICENSES  
WITH REGARD TO REQUIREMENTS FOR RELIABLE SPENT  
FUEL POOL INSTRUMENTATION

ENTERGY NUCLEAR OPERATIONS, INC.  
INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 and 3  
DOCKET NOS. 50-247 and 50-286

## **Indian Point Energy Center's (IPEC) Third Six Month Status Report for the Implementation of Order EA-12-051 Modifying Licenses with Regard to Requirements for to Reliable Spent Fuel Pool Instrumentation**

### **1. Introduction**

Entergy Nuclear Operations, Inc. (Entergy) developed an Overall Integrated Plan (Reference 1) for Indian Point Energy Center (IPEC), 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 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.

<b>Milestone</b>	<b>Target Completion Date</b>	<b>Activity Status</b>	<b>Revised Target Completion Date</b>
Unit 3 Reliable SFPI Installed	Spring 2015 Refueling Outage	In Progress	N/A
Unit 2 Reliable SFPI Installed	Spring 2016 Refueling Outage	In Progress	N/A
Respond to NRC RAIs (Received June 25, 2013) (Reference 3)	August 23, 2013	Complete	N/A
Respond to ISE RAIs dated November 8, 2013 (Reference 4)	September 30, 2014	In Progress	N/A

#### **4. Changes to Compliance Method**

The probe locations shown in Attachments 1 and 3 of the OIP have changed. The Channel A probe is shown where the Channel B probe is located, and the Channel B probe is shown where the Channel A probe is located. Refer to Section 7 for a discussion on the impacts to the ISE.

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

IPEC 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**

IPEC has received an Interim Staff Evaluation (Reference 4) that includes 15 RAIs. Responses to the RAIs are due by September 30, 2014 and 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 #	IP2 Response Status	IP3 Response Status
1	See Section 9	See Section 9
2	In Progress	See Section 9
3	In Progress	See Section 9
4	In Progress	See Section 9
5	In Progress	See Section 9
6a	In Progress	See Section 9
6b	In Progress	See Section 9
6c	In Progress	See Section 9
7	In Progress	See Section 9
8	In Progress	See Section 9
9	In Progress	See Section 9
10	In Progress	See Section 9
11	See Section 9	See Section 9
12	See Section 9	See Section 9
13	In Progress	See Section 9
14	See Section 9	See Section 9
15a	See Section 9	See Section 9
15b	See Section 9	See Section 9

## 7. Potential Interim Staff Evaluation Impacts

As discussed in Section 4, the channel probe locations shown in Attachments 1 and 3 of the OIP have changed. The Channel A probe is shown where the Channel B probe is located, and the Channel B probe is shown where the Channel A probe is located.

In Section 3.4 (Page 9 of 30), the ISE references the August 20, 2013 letter from IPEC that describes the arrangement of the primary and backup instruments. The referenced paragraph in the ISE is revised as follows:

The backup instrument (Channel B) will be in the southeast corner of the SFP and the primary instrument (Channel A) will be in the northwest corner of the SFP. Locating the new instruments in the corners of the SFP takes advantage of missile and debris protection inherent in the corners. Channel B cable will be routed along the east Fuel Storage Building (FSB) wall and then along the south FSB wall to enter the Fan House, while Channel A is routed along the west FSB wall until it enters the Fan House, maintaining physical separation in FSB. Channel A and B displays will both be located in each unit's Fan House.

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

## 8. Reference

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

1. Entergy letter to NRC (NL-13-043), "Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated February 27, 2013 (ADAMS Accession No. ML13072A082).
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. "Request for Additional Information Overall Integrated Plan in Response to Order EA-12-051, 'Reliable Spent Fuel Pool Instrumentation' Entergy Operations, Order No. EA-12-051 (TAC Nos. MF0737 and MF0738)," dated June 25, 2013 (ADAMS Accession No. ML13169A127).
4. "Indian Point Nuclear Generating Unit Nos. 2 and 3 – 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 Nos. MF0737 and MF0738)," dated November 8, 2013 (ADAMS Accession No. ML13298A805).
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 (ADAMS Accession No. ML13347B030).



## 9. Responses to the Interim Staff Evaluation Requests for Additional Information

### RAI #1

**Please provide information regarding the specific requirements in the procedures controlling irradiated equipment or materials stored in the SFP, including details of any analysis performed to determine the projected dose rate impact and the appropriate Level 2 value as a result of other hardware 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 (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.

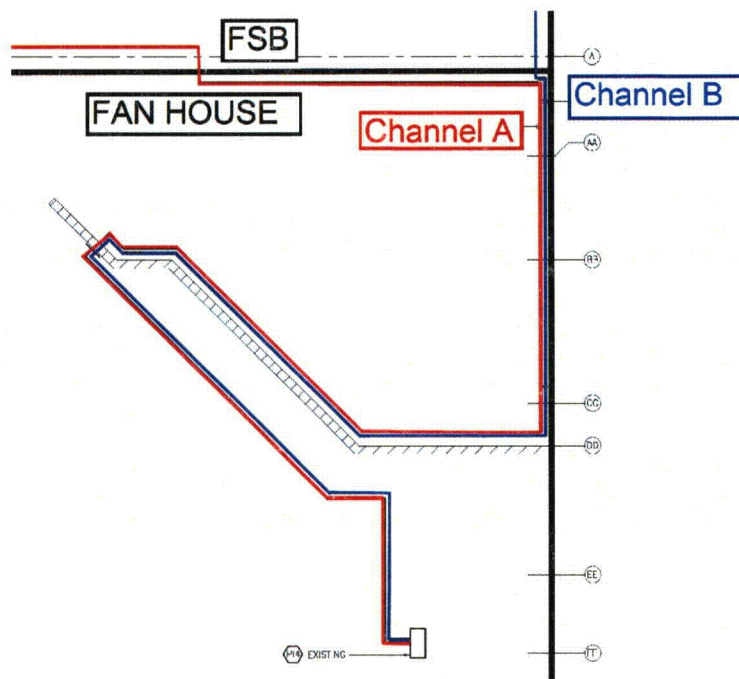
**RAI #2**

**Please provide a description of the protection provided for the cabling routed along the exterior of the fuel building for Channel B of IP2 and IP3. Also, please provide a sketch to illustrate the remaining cable routing from the fuel building wall penetrations to the processor units for Channel A and Channel B for IP2 and IP3.**

As noted in Sections 4 and 7, the probe locations shown in Attachments 1 and 3 of the OIP have been changed. The Channel A probe is shown where the Channel B probe is located, and the Channel B probe is shown where the Channel A probe is located.

For IP3, Channel A will penetrate through the west wall into the Fan House approximately 30 ft north of the doorway into the Fan House. The Fan House is a Seismic Class 1 structure that is protected against adverse weather conditions. The Channel B route will follow the east wall to the south wall, follow along the south wall and penetrate on the south side of the doorway between the Fan House and the Fuel Storage Building (FSB). Once outside the FSB, the two conduit runs will converge near the door between the FSB and the Fan House. Each channel will maintain plant design channelization requirements by remaining in their dedicated conduits. The two channels will be run down to the 67'-6" Elevation of the PAB Fan House. Both conduits are to be routed through the existing penetration south of the door between the Fan House and the upper mezzanine of the pipe penetration area. Once through the penetration they will be routed down the hall to the Gas Analyzer Rack, which is part of the retired in place Hydrogen Recombiner Panel. The two indicators will be mounted on the panel by removing the retired in place equipment and installing the level indicators. The IP3 SFPI cable routing within the Fan House is shown graphically in Figure 1.

For IP2, the response to this RAI will be provided in a future six-month update.



**Figure 1: IP3 SFPI Fan House Cable Routing**

**RAI #3**

**Please provide the analyses verifying that the seismic testing of the sensor/probe assemblies and the electronics units, and 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.**

See IPEC bridging document Topics #8, 9 and 12 (Section 10). [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).]

IP2 analysis is being developed and will be provided in a future six-month update.

**RAI #4**

**For each of the mounting attachments required to attach 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, and 13 (Section 10). [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).]

IP2 analysis is being developed and will be provided in a future six-month update.

**RAI #5**

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

As a part of the Engineering Change (EC) process for IP3, SFPI probe locations in the northwest and southeast corners were verified to be free of stored SFP hardware. Future hardware additions to the SFP are controlled by procedure.

The RAI response for IP2 will be provided in a future six-month update.

**RAI #6**

**Please provide the following:**

- a) Information indicating a) the temperature ratings for all system electronics (including sensor electronics, system electronics, transmitter, receiver and display) and whether the ratings are continuous duty ratings; and, b) what will be the maximum expected temperature in the room(s) in which the sensor electronics will be located under BDB conditions in which there will be no ac power available to run Heating Ventilation and Air Conditioning (HVAC) systems.**
  - b) 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 its required functions under this expected humidity condition.**
  - c) Documentation or analysis of the maximum expected radiological conditions (dose rate and total integrated dose) to which the equipment located within the fan house will be exposed.**
- 
- a) See bridging document Topic #3 (Section 10). [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).]  
IP2 analysis is being developed and will be provided in a future six-month update.
  - b) See bridging document Topic #3 (Section 10). [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).]  
IP2 analysis is being developed and will be provided in a future six-month update.
  - c) See bridging document Topic #4 (Section 10). [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).]

For IP3, the indicator/display processor is located in a low dose area on the 67'-6" elevation in Fan House. This elevation is below the level of the top of the fuel racks in the Fuel Storage Building, Elevation 69-7 1/2". Section 3.4 of NEI 12-02 states that level instrument channels should be qualified for radiation levels for a normal refueling quantity of freshly discharged fuel with the SFP water level at Level 3. Since Level 3 (70-7 1/2") is a foot above the top of the fuel racks, lowering water levels to this level would not result in a reduction in shielding between the spent fuel assemblies and the location of the SFPI display in the Fan House at Elevation 67'-6". Dose rates in the area of the indicator/display processor will remain unchanged and thus remain acceptable for both electronics and operators.

The expected radiological conditions for the IP2 SFPI display will be provided in a future six-month update.

**RAI #7**

**Please provide information describing the anticipated environment for shock, shock test method, and test results regarding the processor. Also, please provide information on the anticipated environment for shock, a description of any analysis, and description of modeling related to the probe assembly.**

See bridging document Topic #14 (Section 10). [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).]

IP2 analysis is being developed and will be provided in a future six-month update.

**RAI #8**

**Please provide information describing the anticipated environment for vibration, vibration test method, and test results regarding the processor. Also, please provide information on the anticipated environment for vibration, a description of any analysis, and description of vibration modeling related to the probe assembly.**

See bridging document Topic #14 (Section 10). [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).]

IP2 analysis is being developed and will be provided in a future six-month update.

**RAI #9**

**Please provide analysis 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 Indian Point Energy Center Units 2 and 3, has been adequately demonstrated.**

See bridging document Topics #8, 9, 12, and 13 (Section 10). [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).]

IP2 analysis is being developed and will be provided in a future six-month update.

**RAI #10**

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

For IP3, Instrument Channel A is being powered from Instrument Bus 31, Circuit 28, and Instrument Channel B is being powered from Instrument Bus 32, Circuit 28.

The IP2 final power configuration will be provided in a future update.

**RAI #11**

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

See bridging document Topic #18 (Section 10). [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 #12**

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

See bridging document Topic # 16, 17 and 18 (Section 10). [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 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, 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 display or monitor the display periodically.**

The FLEX Strategy and Staffing plans account for personnel available following a BDB event. The display location can be reached without unreasonable delay utilizing the "normal" path to access the 67'-6" elevation of the Fanhouse which is through the RCA Access point into the PAB and then into the Fanhouse. The PAB is a Seismic Cat I building and the path consists of hallways which can be accessed following a BDB event. A walkdown was performed from the CCR to the display location on the 67'-6" elevation of the Fanhouse and it was timed at less than or equal to 20 minutes. There are also multiple other pathways (dependent upon the path obstruction) to access the display if this primary route was not available following the BDB event. Sections 3.1.9 and 3.1.13 of EC-45666 explains that the radiological conditions of the display location, pre and post BDB event, remain unchanged (a low dose area) based on the location of the displays being located at an elevation (67'-6") lower than the top of the fuel racks and thus maintaining the same amount of shielding as during normal operation. IP-CALC-00068, Rev.0 analyzes the temperature conditions of the display location and concludes that although the area will have a peak high temperature of approximately 125 deg F, in an extreme heat condition, it will remain habitable for an Operator to access the display and obtain the level information. Entergy does not plan to have an Operator continuously stationed at the display but to monitor the display on an as needed basis.

IP2 analysis is being developed and will be provided in a future six month update.

**RAI #14**

**Please provide a list of the procedures addressing operation (both normal and abnormal response), calibration, test, maintenance, and inspection procedures that will be developed for use of the spent SFP 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 procedure developed by MOHR is provided in the technical manual (See bridging document Topics #10, 19, and 20) [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 to 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.

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 #15**

**Please provide the following:**

- a) 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.**
  - b) 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.**
- 
- a) 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 (Section 10). [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).]
  - b) 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 (Section 10). [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).]