August 11, 2016

L-2016-161

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

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Florida Power & Light Company's, Turkey Point Units 3 and 4, Documentation of Response to Request for Additional Information Regarding the Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)

References:

1. FPL Letter, L-2016-002, Florida Power and Light Company's, Turkey Point Units 3 and 4, Final Compliance in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated January 6, 2016.

2. NRC Email, Spent Fuel Pool Instrumentation RAI Responses, Email from Mr. Jason Paige, NRC Project Manager, to Stavroula Mihalakea and Sergio Chaviano, dated July 11, 2016.

3. NRC Letter, Turkey Point Nuclear Generating Unit Nos. 3 and 4 - Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent fuel Pool Instrumentation (Order No. EA-12-051) (TAC Nos. MF0988 and MF0989), dated July 11, 2013, ADAMS Accession No. ML13191A134.

4. NRC Letter to Florida Power and Light Turkey Point Nuclear Generating Unit Nos. 3 and 4 - 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. MF0988 and MF0989) dated November 19, 2013, ADAMS Accession No. ML13280A177.

5. U.S. Nuclear Regulatory Commission, "Nuclear Regulatory Commission Audits of Licensee Responses to Reliable Spent Fuel Pool Instrumentation Order EA-12-051," dated March 26, 2014.

In Reference 1, Florida Power & Light Company (FPL) submitted to Nuclear Regulatory Commission (NRC) Staff, the final compliance letter in response to the March 12, 2012 Commission Order, Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order EA-12-051).

In Reference 2, as part of the review to complete the Safety Evaluation Report of this Commission Order, the NRC Staff requested FPL to docket the responses to the request for additional information (RAIs) questions listed in both References 3 and 4. Previously, in accordance with Reference 5, FPL had placed the RAI responses on the e-portal in accordance with the audit review streamlined process.

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The purpose of this letter is to docket the Turkey Point Units 3 and 4 responses to the NRC RAI questions listed in References 3 and 4.

As such, FPL provides in the attached enclosures, the response to the RAIs regarding the Overall Integrated Plan for the Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation. Enclosure 1 contains FPL's responses to RAIs listed in References 3 and 4. The list of the RAI questions was re-sequenced to be inclusive of all RAIs listed in both references. A clarification note is added to that effect, where applicable. Additionally, the responses to RAI questions 5, 6, and 7 include the discussion of the responses to the audit questions 5D-1, 9E-1, and 7D-1, respectively.

Enclosure 2, lists the RAI questions and the references of Supporting Documents for each RAI response provided by FPL. The references were previously made available for NRC Staff reviews on the e-Portal as part of the audit review streamlined process. The e-Portal has been updated with the final revisions of these reference documents.

This letter contains no new regulatory commitments and no revisions to existing regulatory commitments.

Should you have any questions regarding this submittal, please contact Mr. Mitch Guth, Turkey Point Licensing Manager, at 305-246-6698.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 11, 2016.

Sincerely,

B Berryman for T. Summers acting site VP

Thomas Summers
Site Vice President
Turkey Point Nuclear Plant

Enclosures

cc: USNRC Regional Administrator, Region II
USNRC Project Manager, Turkey Point Nuclear Plant
USNRC Senior Resident Inspector, Turkey Point Nuclear Plant

NRC RAI #1

Please provide a clearly labeled sketch or marked-up plant drawing of the plan view of the SFP area, depicting the SFP inside dimensions, the planned locations/ placement of the primary and back-up SFP level sensor, and the proposed routing of the cables that will extend from these sensors toward the location of the read-out/display device.

(Note: This information was previously requested as RAI-2 in the NRC letter dated July 11, 2013.)

FPL Response to RAI #1:

The modification details and instructions to install the primary and back up level sensors are discussed in the Engineering Change Package (EC) 280521 and 280522 for Turkey Point Units 3 and 4, respectively. The drawings show the distance between the redundant channels, bracket design, and conduit routing. The following drawings provide the requested information:

Turkey Point Unit 3

Drawing	Description
EC280521-E-002	Locations of the primary (LE-3-651A) and back-up (LE-3-651B) level sensors
EC280521-C-009	Dimensions of bracket mounting plates and location on side of SFP.
EC280521-C-004	Spent Fuel Pool Plan view at elevation 58'-0" with conduit routing
EC280521-E-003	Conduit Routing Overview (cable routing)
EC280521-C-001	Aux Bldg Room (Fire Zone 046) Plan View (readout location)
5610-C-206	Spent Fuel Pool General Details (pool dimensions)

Turkey Point Unit 4

Drawing	Description
EC280522-E-002	Locations of the primary (LE-4-651A) and back-up (LE-4-651B) level sensors
EC280522-C-009	Dimensions of bracket mounting plates and location on side of SFP.
EC280522-C-004	Spent Fuel Pool Plan view at elevation 58'-0" with conduit routing
EC280522-E-004	Conduit Routing Overview (cable routing)
EC280522-C-001	Aux Bldg Room (Fire Zone 046) Plan View (readout location)
5610-C-206	Spent Fuel Pool General Details (pool dimensions)

NRC RAI #2

Please provide the following:

a) The design criteria that will be used to estimate the total loading on the mounting device(s), including static weight loads and dynamic weight loads. Describe the methodology that will be used to estimate the total loading, inclusive of design basis maximum seismic loads and

the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.

b) A description of the manner in which level sensor (and stilling well, if appropriate) will be attached to the refueling floor and/or other support structures for each planned point of attachment of the probe assembly. Indicate in a schematic the portions of the level sensor that will serve as points of attachment for mechanical/mounting or electrical connectors.

c) A description of the manner by which the mechanical connections will attach the level instrument to permanent SFP structures so as to support the level sensor assembly.

(Note: This information was previously requested as RAI-3 in NRC letter dated July 11, 2013)

FPL Response to RAI #2:

a) The design criteria used for the Spent Fuel Pool Instrumentation System (SFPIS) are contained in the Westinghouse Specification WNA-DS-02957-GEN. This specification established the requirements for the SFPIS and includes the following requirements: Functional, Performance, Design, Manufacturing, Testing and Acceptance. It also lists the design constraints – including normal and abnormal plant conditions – under which the SFPIS must operate. The requirements and design constraints meet NRC Order 12-051 requirements and NEI 12-02 guidance.

Seismic requirements are contained in section 4.9 of this Westinghouse Specification.

The SFP bracket was seismically analyzed by Westinghouse in the referenced document Calculation CN-PEUS-14-14, Seismic Analysis of the SFP Mounting Bracket at Turkey Point Plant Nuclear Generating Units 3 & 4, using the seismic response spectra that are used for rigid buildings of low aspect ratios such as the Auxiliary Building and adjacent Fuel Handling Buildings.

The Westinghouse calculation in section 4.6.2.3 analyzes the hydrodynamic load due to seismic effects. Additionally, Section 4.6.2.4 analyzes the seismic loading on the bracket. Section 4.6.3 analyzes the combined load effects on the mounting plate. Calculation PTN-0LHC-14-2003 was completed to capture the Seismic Evaluation of Spent Fuel Pool Level Instrumentation Bracket Anchorage, Instrument Panel Support and Unique Conduit Support.

The equipment used at Turkey Point to monitor the Spend Fuel Pool level is seismically qualified in accordance with IEEE 344-2004 and Regulatory Guide 1.100 as documented in Westinghouse Evaluation WNA-TR-03149-GEN and EQ-QR-269.

The governing steel design code for Turkey Point Units 3 and 4 is the 6th edition of the AISC Manual of Steel Construction. The analysis of the bracket is performed in GTSTRUDL.

b) Each water level measurement device consists of a flexible stainless steel sensor cable probe (LE-3-651A/B) suspended in the Spent Fuel Pool from a seismically qualified bracket attached to

the operating deck at the side of the pool. The seismically qualified bracket is attached to the Spent Fuel Pool floor with 4 stainless steel Hilti anchor bolts.

The Turkey Point installation does not include a stilling well in its design.

The following drawings show the connection of the mechanical and electrical components:

Drawing	Description
Westinghouse 10067E35 sh1	Mounting bracket plan, section, details
Westinghouse 10067E35 sh2	Electrical connection conduit details
Westinghouse 10116D43 sh 1, 2	One line schematic of sensor and wire

c) The level sensor probe is physically attached to a bracket which is bolted to a mounting plate. The mounting plate is secured to the Spent Fuel Pool refueling floor by 4 stainless steel Hilti anchor bolts. Both primary and back-up level sensor probes are configured in the same manner.

See the drawings listed in the above 2b response for the specific details.

NRC RAI #3

For RAI #2 (a) above, please provide the results of the analysis 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.

FPL Response to RAI # 3:

The testing of the SFP level probe instrumentation was performed and documented by Westinghouse' Automation and Field Services group and is contained in the reference document EQ-QR-269 rev 5, Design Verification Testing Summary Report for the Spent Fuel Pool Instrumentation System.

One of the requirements for SFPIS probe performance was that the probe has an anchor with sufficient weight to provide stability and that it remains in the SFP during and after a seismic event. (Reference Westinghouse Specification WNA-DS-02957-GEN). The Westinghouse Final Summary Design Verification Report, WNA-TR-03149-GEN) references the letter LTR-SEE-II-13-47 that documents performance of a sloshing calculation. This calculation concluded that the level probe would remain in the spent fuel pool. The SFPIS pool-side bracket is Seismic category 1 and its seismic analysis is site specific. Westinghouse calculation CN-PEUS-14-14 includes the analysis for the effects of sloshing in section 4.6.2.3. This site specific bracket seismic analysis also considers sloshing of the pool. The Westinghouse design verification report also indicated that heat shrink covering of the connector at the edge of the SFP that connects the sensor to the coaxial cable is necessary to protect the connection point from a

sloshing event. The installation of the heat shrink connector covering is part of the implementation instructions at Turkey Point.

NRC RAI #4

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

FPL Response to RAI #4:

Calculation PTN-0LHC-14-2003 was performed for Turkey Point Specific mounting attachments. Section 3 of this document defines the design inputs for the mounting attachment to the SFP structure. Section 4 of this document provides the methodology and acceptance criteria for this mounting attachment.

NRC RAI #5

Please provide the following:

a) A description of the specific method or combination of methods that will be applied to demonstrate the reliability of the permanently installed equipment under beyond-design-basis ambient temperature, humidity, shock, vibration, and radiation conditions.

b) A description of the testing and/or analyses that will be conducted to provide assurance that the equipment will perform reliably under the worst-case credible design basis loading at the location where the equipment will be mounted. Include a discussion of this seismic reliability demonstration as it applies to a) the level sensor mounted in the SFP area, and b) any control boxes, electronics, or read-out and retransmitting devices that will be employed to convey the level information from the level sensor to the plant operators or emergency responders.

c) A description of the specific method or combination of methods that will be used to confirm the reliability of the permanently installed equipment such that following a seismic event the instrument will maintain its required accuracy.

(Note: This information was previously requested as RAI-4 in the NRC letter dated July 11, 2013.)

FPL Response to RAI # 5:

a) The instruments used at Turkey Point for the post FLEX SFP level monitoring system have been analyzed by Westinghouse to demonstrate their reliability. This testing and analysis is summarized in Westinghouse Design Verification Testing Summary Report for the Spent Fuel Pool Instrumentation System, Westinghouse document EQ-QR-269.

This testing included mechanical preconditioning, thermal aging, radiation aging, Electromagnetic compatibility (EMC), Electrostatic discharge (ESD), seismic and static pull testing for the sensor. The seismic test program objective was satisfied by performing seismic testing to the Safe Shutdown Earthquake (SSE) and Hard Rock High Frequency (HRHF) spectra. The spectra are taken from Westinghouse Document WNA-DS-02957-GEN Mild Environment testing was performed on the SFPIS electronics enclosure and level sensor electronics housing in accordance with IEEE Std 323-2003.

A Failure Modes and Effects analysis was completed on the SFPIS system and is contained in Westinghouse document WNA-AR-00377-GEN.

As noted in section 8.2.3 of the Westinghouse SFPIS Design Spec WNA-DS-02957-GEN, the components of both the primary and backup Westinghouse SFP measurement channels are permanently installed and fixed to rigid structural walls or floors of Seismic Category I structures, and will not be subjected to any significant shock or vibration inputs beyond the seismic accelerations and sloshing effects evaluated. The systems are subjected to seismic testing, which is consistent with anticipated shock and vibration expected to be seen by mounted equipment.

The level sensor electronics are enclosed in NEMA-4X rated enclosures and are rugged and robust designs. They provide protection to the enclosed electronics. These housings are mounted to a seismically qualified structure and will contain the active electronics and aid in protecting the internal components from vibration inducted damage. The Westinghouse Design Specification in section 4.2.17.1 has a requirement to mount the level sensor at least 6 inches away from other structures/equipment, if the stilling well is not used. At Turkey Point, the stilling well is not used and the probe support bracket is designed to locate the probe at least 7 inches from the spent fuel pool side wall. Expected vibration and shock levels are enveloped by the applied seismic testing.

b) The Spent Fuel Pool Instrumentation System (SFPIS) was subjected to an Integrated Functional Test by Westinghouse using their procedure WNA-TP-04752-GEN.
A Final Summary Design Verification Report was prepared by Westinghouse (WNA-TR-03149-GEN). This report provides the summary results of all of the SFPIS device testing that was performed.

A site-specific calculation was completed to establish the integrated dose at the probe locations. The calculation determined that the integrated dose is bounded by the capability of the instruments (Ref. NAI -1913-001, Turkey Point Units 3 & 4 SFP Area Doses to Level Instrumentation).

c) The specific methods that were used to confirm the reliability of the permanently installed equipment of the SFPIS to assure the equipment will maintain its required accuracy include:

- Westinghouse has provided a SFPIS Standard Product Test Strategy, Westinghouse document WNA-PT-00188-GEN that is the basis of equipment type testing and qualification as well as startup testing and commissioning of the SFPIS at Turkey Point.

- A Report was compiled by Westinghouse that documents the configuration of the SFPIS components for the specific Turkey Point application and is contained in the Westinghouse Integrated Functional Test Report WNA-TR-03555-FPL.

- A site walkdown by Westinghouse and Sargent and Lundy Engineers along with FPL project manager and maintenance supervision was conducted to verify as built conditions prior to engineering package development. They also determined an adequate cable routing path to maintain the required 25' of separation of circuits exposed to potential external missiles. Mounting of the electronics enclosures was determined to be sufficiently distanced from the SFP to eliminate potential harsh environmental effects on the equipment. (Reference West letter FPL-14-83).

- Modification package (EC 280521 for Unit 3, 280522 for Unit 4) implementation instructions have specific steps for installation of supports, brackets, conduit supports and enclosure mounting.

NRC RAI #6

For RAI #5 above, please provide the results from the selected methods, tests and analyses used to demonstrate the qualification and reliability of the installed equipment in accordance with Order EA-12-051 requirements.

FPL Response to RAI # 6:

The Westinghouse Final Summary Design Verification Report (WNA-TR-03149-GEN) provides the results of the SFPIS equipment qualification and reliability analysis.

Execution of the test specified per WNA-TP-00189, "Spent Fuel Pool Instrumentation System Standard Product Integrated Functional Test Plan" and the Integrated Function Test procedure WNA-TP-04752-GEN, "Spent Fuel Pool Instrumentation System Standard Product Integrated Functional Test Procedure" validate that the manufacturing and functionality of the SFPIS equipment which is supplied by Westinghouse meets the design requirements.

To assure the performance of the SFPIS at all times with respect to EMI/RFI, in situ testing was performed in addition to the Westinghouse type testing. The testing, which included radio transmissions and running equipment in the 3 areas where the equipment is located, demonstrated that the system is not adversely affected by EMI/RFI that could be experienced in the area.

NRC RAI #7

Please provide the following:

a) A description of how the two channels of the proposed level measurement system in each pool meet this requirement so that the potential for a common cause event to adversely affect both channels is minimized to the extent practicable.

b) Further information describing the design and installation of each level measurement system, consisting of level sensor electronics, cabling, and read-out devices. Address how independence of these components of the primary and back-up channels is achieved through the application of independent power sources, physical and spatial separation, independence of signals sent to the location(s) of the read-out devices, and the independence of the displays.

(Note: This information was previously requested as RAI-5 in NRC letter dated July 11, 2013.)

FPL Response to RAI # 7:

a) The two SFP level sensors are located in the Unit 3 SFP on the North end. For Unit 4 the two sensors are located on the South End. The two level sensors on each unit are separated to the extent practicable and completely independent with respect to signals, transmitter circuits, and display circuits. The sensors are located on the side of the SFP opposite the transfer canal. Manipulator crane rails are on the East and West sides of the SFP and transfer canal and the conduits for the SFPIS do not cross the manipulator crane rails. The SFP buildings are designed to seismic class 1 standards.

b) The Unit 3 instruments are physically located in the Northeast and Northwest corners of the SFP building and the Unit 4 instruments are located in the Southeast and Southwest corners. These locations provide inherent shielding from missiles and do not impair the SFP function. See drawing EC280521-C-004 for Unit 3 layout information and EC280522-C-004 for Unit 4 layout information. Inspections of the overhead areas within the SFP buildings determined that there are no structures or equipment that is not seismically designed or restrained that could affect both channels on either Turkey Point SFP.

The SFPIS probe to transmitter cable is a rugged coaxial cable mounted in a 1-1/2" conduit. The 2 channels are run in conduits from the probes inside the building and penetrate the exterior wall. They then take paths around the SFP buildings to the east and west with at least 25 ft of separation maintained throughout the runs outside the building. A review of the applicable NEI guidance and station tornado missile criteria determined that this routing meets the current licensing basis and therefore the NEI guidance with respect to tornado missile protection. In addition, the conduits that are routed along the west walls of the

pools are substantially shielded from any windborne missiles by the containment structures and spend fuel pools.

Once inside the CCW Heat Exchanger and Pump rooms and the Auxiliary Building, the conduits are protected by the surrounding structures. The transmitters are mounted at a height of 24'-4" MLW to the bottom of their NEMA 4X enclosures which is above all flooding levels for the current licensing basis and reevaluated levels for local intense precipitation and hurricane storm surge events.

The SFPIS level indicators are located in a Room (Fire Zone 046) of the Class I auxiliary building in a mild indoor environment and above the flood level. The displays are physically separate and isolated from the SFPIS level transmitters. The two SFPIS channels are powered from separate 120Vac feeds from non-safety sources on different unit step up transformers and each has a battery backup which has been tested to operate for greater than 72 hours.

The response to RAI#8 provides the details regarding the independence of power sources and backup power.

NRC RAI #8

Please provide the following:

a) A description of the electrical AC power sources and capacities for the primary and back-up channels.

b) 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.

(Note: This information was previously requested as RAI-6, in NRC letter dated July 11.2013; however, based on feedback received by licensees, it has been revised as above.)

FPL Response to NRC RAI #8:

a) The AC power sources for the primary channel of SFP level indication is a lighting panel from a nearby distribution panel mounted in an MCC which is powered from the Unit 3 non-vital

AC system. This Unit 3 power system is connected through its load center and switchgear through a step-down transformer fed from the Turkey Point Generating Station Switchyard.

The backup channel of SFP level indication is powered from a similar power distribution system, but through a Unit 4 non-vital system. The Unit 4 system is connected through a separate step-down transformer which is fed from a separate bay in the Turkey Point Generating Station Switchyard. These two SFP level channels are powered from different sources. Other than an ELAP event, there is no credible event that will de-energize both SFP channels simultaneously.

The total ac power demand for the individual SFP level channels was tested by Westinghouse in their calculation WNA-CN-00300-GEN. Their test which included charging a run-down battery and having a level transmitter simulator on full current draw with an RTD accessory at full power draw was run for an 8 hour period and total load was observed to be less than 0.72 amps at 120Vac. The test system included an RTD temperature monitoring function in addition to the level transmitter, which is not included in the Turkey Point application. Without the need for battery charging the total ac load was determined to be 0.43 amps. The power consumption for just the level transmitter only was determined to be 0.244 amps. One fully charged 26 Amp-hr battery would power level transmitter for 106.56 hours (4.44 days). The power feed to each channel is from a cable rated for 20 amps and a similarly sized distribution panel breaker.

b) The battery backup duty cycle was calculated by Westinghouse and is documented in Westinghouse calculation WNA-CN-00300-GEN. For the level transmitter only configuration which is the Turkey Point SFP level transmitter configuration, a single 26 Amp-Hr battery will last from full charge for 101.21 hours or 4.22 days. This capability is of sufficient duration to allow the SFPIS to operate until offsite resources can be onsite to replace batteries or connect a small AC generator to restore AC power to each of the channels. There is a portable AC generator and spare batteries available in the FLEX equipment building to permit offsite resources to connect a replacement power source.

NRC RAI #9

Please provide the following:

a) An estimate of the expected instrument channel accuracy performance (e.g., in percentage of span) under both a) normal spent fuel pool level conditions (approximately Level 1 or higher) and b) at the BDB conditions (i.e., radiation, temperature, humidity, post seismic and post-shock conditions) that would be present if the SFP level were at the level 2 and 3 datum points.

b) A description of the methodology that was used for determining the maximum allowed deviation from the instrument channel design accuracy that was employed under normal operating conditions as an acceptance criterion for a calibration procedure to flag the operators and to technicians that the channel requires adjustment to within the normal condition design accuracy.

(Note: This information was previously requested as RAI-6 in NRC letter dated July 11, 2013.)

FPL Response to RAI #9:

a) The system accuracy was defined to be +/- 3" per section 4.2.17 of Westinghouse SFPIS Design Specification WNA-DS-02957-GEN. This performance also recognizes the potential for Boron deposits on the SFP level sensor cable of up to 4" long by ½ " diameter as long as the system is maintained in accordance with the calibration and maintenance instructions contained in West document WNA-TP-04709-GEN .

This accuracy is to be maintained upon loss and restoration of power and was maintained in all potential levels of SFP conditions. When the probe anchor is between 1 – 5 inches above the fuel rack, the SFPIS shall be capable of measuring +/- one foot above the fuel assembly during normal and harsh conditions.

Westinghouse completed an uncertainty analysis, WNA-CN-00301 rev2, and determined that based on the performance of the system that the accuracy of the integrated system is +/-1.60" as noted in table 4-1 of this analysis.

Results of the testing are contained in Westinghouse SFPIS Integrated Functional Check Report WNA-TR-03555-FPL. The testing determined that the specified probe measurement accuracy of +/- 3 inches was successful. The maximum actual deviation of the Turkey Point probes ranged from a low of -0.70" to a high of -1.47". All 4 probes tested within the required +/- 3" specified value.

The components of both the primary and backup Westinghouse SFP measurement channels are permanently installed and fixed to rigid structural walls or floors of Seismic Category I structures, and will not be subjected to any significant shock or vibration inputs beyond the seismic accelerations and sloshing effects evaluated. The systems are subjected to seismic testing, which is consistent with anticipated shock and vibration expected to be seen by mounted equipment.

The level sensor electronics are enclosed in NEMA-4X rated enclosures and are rugged and robust designs. They provide protection to the enclosed electronics. These housings are mounted to a seismically qualified structure and will contain the active electronics and aid in

protecting the internal components from vibration inducted damage. Expected vibration and shock levels are enveloped by the applied seismic testing.

Based on the environmental testing performed by Westinghouse, these probes will maintain accuracy over their entire measurement range and all environmental conditions.

b) As noted in the Westinghouse Uncertainty Analysis WNA-CN-00301, in section 4, the uncertainty value (=/- 1.60") is used as a maximum deviation between channels to alert operators and technicians that recalibration may be necessary. At a minimum, NEI 12-02 requires that surveillances or testing be performed within 60 days of a planned refueling outage considering normal testing schedule allowances (e.g. 25%).

Instrument performance is monitored through the daily operator surveillances. Every day, operator logs direct observation of the SFPIS level transmitter readings to be taken and compared to the other channel of SFPIS to determine that the two channels are reading within 1.6" of each other. Also, the SFPIS system readings are compared to the normal SFP level indicator to verity that the Normal level indication and the SFPIS indication are within +/- 3" of each other. If either observation exceeds the identified limits, a work request is initiated to maintenance to investigate and repair/recalibrate as appropriate. If the difference exceeds 3", an action item is initiated to determine if the instrument should be declared out of service and/or if compensatory measure are needed.

Maintenance of the SFPIS is done under procedures ¾-PMI-033.03A and ¾-PMI-033.03B.

NRC RAI #10

Please provide the following:

a) A description of the capability and provisions the proposed level sensing equipment will have to enable periodic testing and calibration, including how this capability enables the equipment to be tested in-situ.

b) A description of how such testing and calibration will enable the conduct of regular channel checks of each independent channel against the other, and against any other permanently installed spent fuel pool level instrumentation.

c) A description of what preventative maintenance tasks are required to be performed and the frequency at which they was conducted. Discuss how these surveillances were incorporated into the plant surveillance program.

d) A description of what preventative maintenance tasks are required to be performed during normal operation, and the planned maximum surveillance interval that is necessary to ensure that the channels are fully conditioned to accurately and reliably perform their functions when needed.

(This information was previously requested as RAI-8 in NRC letter dated July 11, 2013.)

FPL Response to RAI # 10:

a) Westinghouse has provided a calibration procedure that utilizes two separate processes to meet the Order (reference WNA-TP-04709-GEN). The functionality check (calibration verification) of the equipment requires the probe/bracket assembly to be unbolted and lifted approximately 1 foot above the SFP water line. Prior to lifting the probe/bracket, the level indicator reading is to be recorded. After lifting the probe bracket, record the physical change of the bracket from its original mounting elevation; also record the level indicator value. Subtract the raised level indicator value from the original level value and compare to the physical height the bracket was lifted. If within +/- 3" the calibration verification is acceptable. If not then calibration of the probe is required.

Visual inspection of the probe cable with a camera along its length for fraying of the cable, corrosion, inspection of the weight at the end of the cable for damage, clearance to the SFP wall is within spec are all performed as a part of this calibration verification activity. Cleaning of any boric acid buildup on the cable at the water line is to be performed prior to performing this calibration verification activity.

In addition visual inspection of the probe waveform characteristics is required in accordance with the Westinghouse procedure guidance. If these steps are not successful, then a full range calibration proof test is required.

All of these steps were incorporated into plant maintenance procedures. Each SFP level probe is checked individually.

b) Operators perform a daily check of the SFP level instrumentation to verify that the deviation between channels is within the specified limits and also that the indicated level is within +/- 3 inches of the normal SFP level indication. This was incorporated into the operator daily log form 419 to track this surveillance. Compensatory actions are tracked under plant procedure 3/4-NOP-033.

c) Calibration verification is done on an 18 month interval as noted above in item a. The probe lifespan is estimated to be 7.1 years, the replacement of the electronics were based on the failure likelihood code in the Westinghouse FMEA analysis (ref. West WNA-AR-00377-GEN). Battery replacement is scheduled on a 3 year interval.

All of these preventative maintenance (PM) tasks are included in the plant PM program and based on the vendor recommendations (ref. West WNA-TP-04709-GEN).

d) During normal operation there are no preventative maintenance tasks that are planned other than those noted above in item a, b and c. The planned maximum surveillance interval is daily and the preventative maintenance activities are performed at 18 month intervals, unless the daily surveillance identifies a deficiency at which time the identified indicator are entered into the corrective maintenance program. If a channel of SFP level indication is determined to be out of service it will be restored within 90 days. If both channels of SFP level indication become nonfunctional, then actions will be initiated within 24 hours to restore one of the channels of instrumentation and implement compensatory actions within 72 hours.

NRC RAI #11

Please provide the following:

a) The specific location for the primary and backup instrument channel display.

b) For any SFP level instrumentation displays located outside the main control room, 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-through) 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.

FPL Response to RAI # 11:

a) For both Units 3 and 4 at the Turkey Point Nuclear Station, the primary and backup channel displays are located in a Room (Fire Zone 046) (Elev 18') in the Class I auxiliary building . This location is promptly accessible as the area is a normally assigned watch station, outside of the SFP floor and inside a structure providing protection against adverse weather and outside of any very high radiation areas or locked high radiation areas during normal operation.

b) During a BDB event, this location will not experience any significant change in radiation levels. As per the engineering design package, this area is not expected to exceed 125°F, will remain between 0 to 95% humidity and radiation levels will not exceed 2.5 mrem/hr as noted in radiation survey calculation PTN-BSHM-09-004 for fire zones around the Aux Bldg Room (Fire Zone 046) (see dwg 5610-A-61 sh2) as noted on pages 31-34 of this calculation.

In a BDB event, this location will not be continuously manned due to personnel assigned more time sensitive tasks. With the design basis heat load, the spent fuel pools would begin to boil 2.7 hours after the event. As noted in the Overall Integrated Plan (OIP), uncovery of the fuel has been calculated to occur after 33 hours. Monitoring of the level indicators is directed by the Off Normal Procedure in effect during the event.

NRC RAI #12

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 the 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.

FPL Response to RAI #12:

The modification review process was used to assure all necessary procedures are developed for maintaining and operating the spent fuel level instruments upon installation. These procedures were developed in accordance with the FPL procedural control process.

The objectives of each procedural area are described below:

- *Inspection, Calibration and Testing – Guidance on the performance of periodic visual inspections, as well as calibration and testing, to ensure that each SFP instrument channel is operating and indicating level within its design accuracy.*

  - Form F419, Inside SNPO Logs
  - 3-PMI-033.03A/B, Spent Fuel Pool Level Instrumentation LE/LIT-3-651A/B System Calibration Verification and Maintenance
  - 4 - PMI-033.03A/B, Spent Fuel Pool Level Instrumentation LE/LIT-4-651A/B System Calibration Verification and Maintenance

- *Preventative Maintenance – Guidance on scheduling of, and performing, appropriate preventative maintenance activities necessary to maintain the instruments in a reliable condition.*

  - 3 - PMI-033.03A/B, Spent Fuel Pool Level Instrumentation LE/LIT-3-651A/B System Calibration Verification and Maintenance
  - 4 - PMI-033.03A/B, Spent Fuel Pool Level Instrumentation LE/LIT-4-651A/B System Calibration Verification and Maintenance

- *Maintenance – To specify troubleshooting and repair activities necessary to address system malfunctions.*
    - Form F419, Inside SNPO Logs
    - 0-ADM-213, Tech. Spec, Related Equipment and Risk Significant SSC OOS Logbook
    - 3 - PMI-033.03A/B, Spent Fuel Pool Level Instrumentation LE/LIT-3-651A/B System Calibration Verification and Maintenance
    - 4 - PMI-033.03A/B, Spent Fuel Pool Level Instrumentation LE/LIT-4-651A/B System Calibration Verification and Maintenance

- *Programmatic Controls – Guidance on actions to be taken if one or more channels is out of service.*
    - 0-ADM-213, Tech. Spec, Related Equipment and Risk Significant SSC OOS Logbook

- *System Operations – To provide instructions for operation and use of the system by plant staff.*
    - 3/4 – ONOP-033.1, SFP Cooling System Malfunctions

- *Response to Inadequate Levels – Action to be taken on observations of levels below normal level are addressed in site Off Normal procedures and / or FLEX Support Guidelines.*
    - 3/4 – ONOP-033.1, SFP Cooling System Malfunctions

NRC RAI #13

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 how the guidance in NEI 12-02, Section 4.3 regarding compensatory actions for one or both non-functioning channels will be addressed.

c) A description of the compensatory actions to be taken in the event that one of the instrument channels cannot be restored to functional status within 90 days.

(Note: This information was previously requested as RAI-11 in NRC letter dated July 11, 2013.)

FPL Response to NRC RAI #13:

FPL Response to RAI-13a

The procedures described for RAI # 12 provide for SFPI channel/equipment maintenance/preventative maintenance and testing program requirements to ensure design and system readiness are established in accordance with FPL's processes and procedures. The design modification process took into consideration the vendor recommendations to ensure that appropriate regular testing, channel checks, functional tests, periodic calibration, and maintenance are performed.

Performance checks, described in the Vendor's Operator's Manual, and the applicable information are contained in plant procedures. Operator performance tests are performed periodically as recommended by the vendor.

Channel functional tests with limits established in consideration of vendor equipment specifications are performed at appropriate frequencies.

Channel calibration tests per maintenance procedures, with limits established in consideration of vendor equipment specifications, are performed at frequencies established in consideration of vendor recommendations.

FPL Response to RAI-13.b and 13.c

Both primary and backup SFPI channels incorporate permanent installation (with no reliance on portable, post-event installation) of relatively simple and robust augmented quality equipment. Permanent installation coupled with stocking of adequate spare parts reasonably diminishes the likelihood that a single channel (and greatly diminishes the likelihood that both channels) is (are) out-of-service for an extended period of time. Planned compensatory actions for unlikely extended out-of-service events are summarized as follows:

Channel(s) Out-of service	*Required Restoration Action*	*Compensatory Action*
1	*Initiate actions to restore channel to functional status within 90 days.*	*Initiate actions in accordance with Note 1.*
2	*Initiate actions to restore at least one channel to functional status within 24 hours.*	*Initiate compensatory actions for monitoring Spent Fuel Pool level within 72 hours (Note 2)*

Note 1; If channel restoration is not expected to be completed within 90 days initiate compensatory action. Initiate an evaluation in accordance with the corrective action program. The evaluation shall determine compensatory actions required if the second channel becomes inoperable. The evaluation shall include a planned schedule for restoring the instrument channel(s) to functional status.

Note 2: Initiate an evaluation in accordance with the corrective action program. The evaluation shall document compensatory actions taken or planned to be taken to implement an alternate method of monitoring and schedule required actions for restoring the instrument channel(s) to functional status.

Implementation of Order EA-12-051
Reliable Spent Fuel Pool Instrumentation
Turkey Point Units 3 & 4
Response to Request for Additional Information

RAI#	UNIT 3 Supporting Documents	UNIT 4 Supporting Documents
1	*Drawings* • EC280521-E-002 rev 1 • EC280521-C-009 rev 0 • EC280521-C-004 rev 0 • EC280521-E-003 rev 1 • EC280521-C-001 rev 0 • 5610-C-206 rev 4	*Drawings* • EC280522-E-002 rev 0 • EC280522-C-009 rev 0 • EC280522-C-004 rev 0 • EC280522-E-004 rev 1 • EC280522-C-001 rev 0 • 5610-C-206 rev 4
2	• Westinghouse Spec WNA-DS-02957-GEN rev 4 • Westinghouse Calc CN-PEUS-14-14 Rev 1 • S&L Calculation PTN-0LHC-14-2003 Rev 2 • Westinghouse dwg 10067E35 rev 0 sh1, 2 • Westinghouse dwg 10116D43 rev 0 sh 1,2 • Westinghouse Final Summary Design Verification Report, WNA-TR-03149-GEN rev 1	• Westinghouse Spec WNA-DS-02957-GEN rev 4 • Westinghouse Calc CN-PEUS-14-14 Rev 1 • S&L Calculation PTN-0LHC-14-2003 Rev 2 • Westinghouse dwg 10067E35 rev 0 sh1, 2 • Westinghouse dwg 10116D43 rev 0 sh 1,2 • Westinghouse Final Summary Design Verification Report, WNA-TR-03149-GEN rev 1
3	• Westinghouse Calc CN-PEUS-14-14 Rev 1 • Westinghouse Final Summary Design Verification Report, WNA-TR-03149-GEN rev 2 • Westinghouse Design Verification Summary Report EQ-QR-269 rev 5	• Westinghouse Calc CN-PEUS-14-14 Rev 1 • Westinghouse Final Summary Design Verification Report, WNA-TR-03149-GEN rev 2 • Westinghouse Design Verif Summary Report EQ-QR-269 rev 5
4	• S&L Calculation PTN-0LHC-14-2003 Rev 1	• S&L Calculation PTN-0LHC-14-2003 Rev 1
5	• Westinghouse Final Summary Design Verification Report, WNA-TR-03149-GEN rev 1 • Westinghouse Design Verif Summary Report EQ-QR-269 rev 5 • Westinghouse SFPIS Design Spec WNA-DS-02957-GEN Rev. 4 • Westinghouse FMEA WNA-AR-00377-GEN rev 4.	• Westinghouse Final Summary Design Verification Report, WNA-TR-03149-GEN rev 1 • Westinghouse Design Verif Summary Report EQ-QR-269 rev 5 • Westinghouse SFPIS Design Spec WNA-DS-02957-GEN Rev. 4 • Westinghouse FMEA WNA-AR-00377-GEN rev 4.

Implementation of Order EA-12-051
Reliable Spent Fuel Pool Instrumentation
Turkey Point Units 3 & 4
Response to Request for Additional Information

RAI#	UNIT 3 Supporting Documents	UNIT 4 Supporting Documents
	• Westinghouse Integr Func Test WNA-TP-04752-GEN rev 2 • Westinghouse SFPIS Test Strategy WNA-PT-00188-GEN Rev 3 • Westinghouse Integrated Functional Test Report WNA-TR-03555-FPL rev 0 • Westinghouse Walkdown Summary letter FPL-14-83 rev 0 • NAI -1913-001, Rev. 0, Turkey Point Units 3 & 4 SFP Area Doses to Level Instrumentation	• Westinghouse Integr Func Test WNA-TP-04752-GEN rev 2 • Westinghouse SFPIS Test Strategy WNA-PT-00188-GEN Rev 3 • Westinghouse Integrated Functional Test Report WNA-TR-03555-FPL rev 0 • Westinghouse Walkdown Summary letter FPL-14-83 rev 0 • NAI -1913-001, Rev. 0, Turkey Point Units 3 & 4 SFP Area Doses to Level Instrumentation
6	• Westinghouse Final Summary Design Verification Report, WNA-TR-03149-GEN rev 1	• Westinghouse Final Summary Design Verification Report, WNA-TR-03149-GEN rev 1
7	• Drawing EC280521-C-004 rev 0	• Drawing EC280522-C-004 rev 0
8	• Westinghouse power consumption calculation WNA-CN-00300-GEN rev 0	• Westinghouse power consumption calculation WNA-CN-00300-GEN rev 0
9	• Westinghouse SFPIS Design Spec WNA-DS-02957-GEN rev 4 • Westinghouse Uncertainty Analysis, WNA-CN-00301 rev 2 • Westinghouse SFPIS Integrated Functional Check Report WNA-TR-03555-FPL rev 0	• Westinghouse SFPIS Design Spec WNA-DS-02957-GEN rev 4 • Westinghouse Uncertainty Analysis, WNA-CN-00301 rev 2 • Westinghouse SFPIS Integrated Functional Check Report WNA-TR-03555-FPL rev 0
10	• Westinghouse Calibration Procedure WNA-TP-04709-GEN rev 4 • Westinghouse FMEA WNA-AR-00377-GEN rev 4	• Westinghouse Calibration Procedure WNA-TP-04709-GEN rev 4 • Westinghouse FMEA WNA-AR-00377-GEN rev 4
11	• FPL Dwg 5610-A-61 rev 19 • FPL Calc PTN-BSHM-09-004 rev 0	• FPL Dwg 5610-A-61 rev 19 • FPL Calc PTN-BSHM-09-004 rev 0

Implementation of Order EA-12-051
Reliable Spent Fuel Pool Instrumentation
Turkey Point Units 3 & 4
Response to Request for Additional Information

RAI#	UNIT 3 Supporting Documents	UNIT 4 Supporting Documents
12	• Procedure 3 - PMI-033.03A/B, Spent Fuel Pool Level Instrumentation LE/LIT-3-651A/B System Calibration Verification and Maintenance • Procedure 0-ADM-213, Tech. Spec, Related Equipment and Risk Significant SSC OOS Logbook • Form F419, Inside SNPO Logs • Procedure 3 – ONOP-033.1, SFP Cooling System Malfunction	• Procedure 4 - PMI-033.03A/B, Spent Fuel Pool Level Instrumentation LE/LIT-4-651A/B System Calibration Verification and Maintenance • Procedure 0-ADM-213, Tech. Spec, Related Equipment and Risk Significant SSC OOS Logbook • Form F419, Inside SNPO Logs • Procedure 4 – ONOP-033.1, SFP Cooling System Malfunctions