UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 4, 2013

Mr. Kevin Walsh, Site Vice President
c/o Mr. Michael Ossing
NextEra Energy Seabrook, LLC
P.O. Box 300
Seabrook, NH 03874

SUBJECT: SEABROOK STATION, UNIT 1 - 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. MF0837)

Dear Mr. Walsh:

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12054A679), to all power reactor licensees and holders of construction permits in active or deferred status. This order requires the licensee to have a reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of the following pool water level conditions by trained personnel: (1) level that is adequate to support operation of the normal fuel pool cooling system, (2) level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred.

By letter dated February 26, 2013 (ADAMS Accession No. ML13063A439), NextEra Energy Seabrook, LLC (NextEra or the licensee) provided the Overall Integrated Plan (OIP) for Seabrook Station, Unit 1 (Seabrook) describing how it will achieve compliance with Attachment 2 of Order EA-12-051 by third quarter of 2015. By letter dated July 18, 2013 (ADAMS Accession No. ML13217A166), the NRC staff sent a request for additional information (RAI) to the licensee. The licensee provided supplemental information by letter dated August 28, 2013 (ADAMS Accession No. ML13247A177).

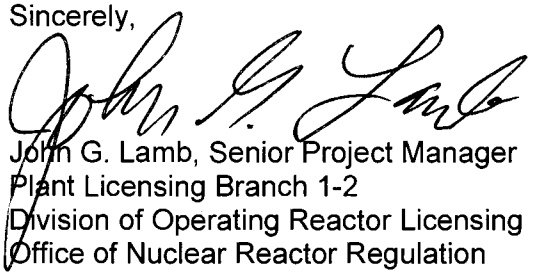
The NRC staff has reviewed these submittals with the understanding that the licensee will update its OIP as implementation of the Order progresses. With this in mind, the NRC staff has included an interim staff evaluation with this letter to provide feedback on the OIP. The NRC staff's findings in the interim staff evaluation are considered preliminary and will be revised as the OIP is updated. As such, none of the NRC staff's conclusions are to be considered final. A final NRC staff evaluation will be issued after the licensee has provided the information requested.

The interim staff evaluation also includes RAIs, response to which the NRC staff needs to complete its review. The licensee should provide the information requested in the 6-month status updates, as the information becomes available. However, the NRC staff requests that all

information be provided by October 31, 2014, to ensure that any issues are resolved prior to the date by which the licensee must complete full implementation of Order EA-12-051. The licensee should adjust its schedule for providing information to ensure that all this information is provided by the requested date.

If you have any questions regarding this letter, please contact me at 301-415-3100 or via e-mail at John.Lamb@nrc.gov.

Sincerely,



John G. Lamb, Senior Project Manager
Plant Licensing Branch 1-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure:
Interim Staff Evaluation and
Request for Additional Information

cc w/encl: Distribution via Listserv

INTERIM STAFF EVALUATION AND REQUEST FOR ADDITIONAL INFORMATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE OVERALL INTEGRATED PLAN IN RESPONSE TO

ORDER EA-12-051, RELIABLE SPENT FUEL POOL INSTRUMENTATION

NEXTERA ENERGY SEABROOK, LLC

SEABROOK STATION, UNIT 1

DOCKET NO. 50-443

1.0 INTRODUCTION

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12054A679), to all power reactor licensees and holders of construction permits in active or deferred status. This order requires, in part, that all operating reactor sites have a reliable means of remotely monitoring wide-range spent fuel pool (SFP) levels to support effective prioritization of event mitigation and recovery actions in the event of a beyond-design-basis (BDB) external event. The order required all holders of operating licenses issued under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," to submit to the NRC an Overall Integrated Plan (OIP) by February 28, 2013.

By letter dated February 26, 2013 (ADAMS Accession No. ML13063A439), NextEra Energy Seabrook, LLC (Seabrook or the licensee) provided the OIP for Seabrook Station, Unit 1 (Seabrook) describing how it will achieve compliance with Attachment 2 of Order EA-12-51 by the third quarter of 2015. By letter dated July 18, 2013 (ADAMS Accession No. ML13217A166), the NRC staff sent a request for additional information (RAI) to the licensee. The licensee provided supplemental information by letter dated August 28, 2013 (ADAMS Accession No. ML13247A177).

2.0 REGULATORY EVALUATION

Order EA-12-051 requires all holders of operating licenses issued under 10 CFR Part 50, notwithstanding the provisions of any Commission regulation or license to the contrary, to comply with the requirements described in Attachment 2 to the Order except to the extent that a more stringent requirement is set forth in the license. Licensees shall promptly start implementation of the requirements in Attachment 2 to the Order and shall complete full implementation no later than two refueling cycles after submittal of the OIP or December 31, 2016, whichever comes first.

Order EA-12-051 required the licensee, by February 28, 2013, to submit to the Commission an OIP, including a description of how compliance with the requirements described in Attachment 2 of the Order will be achieved.

Attachment 2 of Order EA-12-051 requires the licensee to have a reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of the following pool water level conditions by trained personnel: (1) level that is adequate to support operation of the normal fuel pool cooling system, (2) level that is adequate to provide substantial radiation shielding for a person standing on the SFP operating deck, and (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred.

Attachment 2 of Order EA-12-051, states that the SFP level instrumentation shall include the following design features:

1.1 Instruments: The instrumentation shall consist of a permanent, fixed primary instrument channel and a backup instrument channel. The backup instrument channel may be fixed or portable. Portable instruments shall have capabilities that enhance the ability of trained personnel to monitor spent fuel pool water level under conditions that restrict direct personnel access to the pool, such as partial structural damage, high radiation levels, or heat and humidity from a boiling pool.

1.2 Arrangement: The spent fuel pool level instrument channels shall be arranged in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the spent fuel pool. This protection may be provided by locating the primary instrument channel and fixed portions of the backup instrument channel, if applicable, to maintain instrument channel separation within the spent fuel pool area, and to utilize inherent shielding from missiles provided by existing recesses and corners in the spent fuel pool structure.

1.3 Mounting: Installed instrument channel equipment within the spent fuel pool shall be mounted to retain its design configuration during and following the maximum seismic ground motion considered in the design of the spent fuel pool structure.

1.4 Qualification: The primary and backup instrument channels shall be reliable at temperature, humidity, and radiation levels consistent with the spent fuel pool water at saturation conditions for an extended period. This reliability shall be established through use of an augmented quality assurance process (e.g., a process similar to that applied to the site fire protection program).

1.5 Independence: The primary instrument channel shall be independent of the backup instrument channel.

1.6 Power supplies: Permanently installed instrumentation channels shall each be powered by a separate power supply. Permanently installed and portable instrumentation channels shall provide for power connections from sources independent of the plant [alternating current (ac)] and [direct current (dc)] power distribution systems, such as portable generators or replaceable batteries. Onsite generators used as an alternate power source and replaceable batteries used for instrument channel power shall have sufficient capacity to maintain the level indication function until offsite resource availability is reasonably assured.

1.7 Accuracy: The instrument channels shall maintain their designed accuracy following a power interruption or change in power source without recalibration.

1.8 Testing: The instrument channel design shall provide for routine testing and calibration.

1.9 Display: Trained personnel shall be able to monitor the spent fuel pool water level from the control room, alternate shutdown panel, or other appropriate and accessible location. The display shall provide on-demand or continuous indication of spent fuel pool water level.

Attachment 2 of Order EA-12-051, states that the SFP instrumentation shall be maintained available and reliable through appropriate development and implementation of the following programs:

2.1 Training: Personnel shall be trained in the use and the provision of alternate power to the primary and backup instrument channels.

2.2 Procedures: Procedures shall be established and maintained for the testing, calibration, and use of the primary and backup spent fuel pool instrument channels.

2.3 Testing and Calibration: Processes shall be established and maintained for scheduling and implementing necessary testing and calibration of the primary and backup spent fuel pool level instrument channels to maintain the instrument channels at the design accuracy.

On August 29, 2012, the NRC issued an Interim Staff Guidance document (the ISG), JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation" (ADAMS Accession No. ML12221A339), to describe methods acceptable to the NRC staff for complying with Order EA-12-051. The ISG endorses, with exceptions and clarifications, the methods described in the Nuclear Energy Institute (NEI) guidance document NEI 12-02, Revision 1, "Industry Guidance for Compliance with NRC Order EA-12-051, 'To

Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,'" dated August 2012 (ADAMS Accession No. ML12240A307). Specifically, the ISG 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.

3.0 TECHNICAL EVALUATION

3.1 Background and Schedule

Seabrook Station is a single unit PWR with a single associated SFP.

The licensee submitted its OIP on February 26, 2013. The OIP states that installation of the SFP level instrumentation at Seabrook Station will be completed by the third quarter of 2015 based on the end of the second refueling outage following submittal of its OIP.

The NRC staff has reviewed the licensee's schedule for implementation of SFP level instrumentation provided in its OIP. If the licensee completes implementation in accordance with this schedule, it would appear to achieve compliance with Order EA-12-051 within two refueling cycles after submittal of the OIP and before December 31, 2016.

3.2 Spent Fuel Pool Water Levels

Attachment 2 of Order EA-12-051 states, in part, that:

> All licensees identified in Attachment 1 to this Order shall have a reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of the following pool water level conditions by trained personnel: (1) level that is adequate to support operation of the normal fuel pool cooling system [Level 1], (2) level that is adequate to provide substantial radiation shielding for a person standing on the SFP operating deck [Level 2], and (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred [Level 3].

NEI 12-02 states, in part, that:

> Level 1 represents the HIGHER of the following two points:
>
> - The level at which reliable suction loss occurs due to uncovering of the coolant inlet pipe, weir or vacuum breaker (depending on the design), or
>
> - The level at which the water height, assuming saturated conditions, above the centerline of the cooling pump suction provides the required net positive suction head specified by the pump manufacturer or engineering analysis.

In its OIP, the licensee stated, in part, that:

> Based on preliminary calculation, the low level limit for reliable SFP cooling system operation corresponds to an elevation of approximately 22 ft., 6 in. This level is based on a preliminary calculation that assumes mitigating effects by the installed suction strainer on vortexing. The actual effect of the strainer on this level will be determined during the engineering and design phase of the project. For the purposes of this submittal the minimum level that will be adequate to support normal fuel pool cooling system operation, as indicated on either the primary or backup instrument channel, is assumed to correspond to a plant elevation of 22 ft., 6 in.

In its letter dated August 28, 2013, the licensee stated, in part, that:

> To determine the higher of the two levels the following was taken into consideration:
>
> 1) The level at which reliable suction loss occurs due to uncovering the coolant inlet pipe or any weirs or vacuum breakers associated with suction loss. This level was established based on nominal suction strainer inlet elevation and conservative estimate for the onset of vortexing. The actual effect of the strainer on this level has been formally determined by calculation C-S-1-24606, "Spent Fuel Pool Level for Reliable Pump Suction," (Reference 7). The elevation for reliable pump suction is plant elevation 23 ft., 4 inches.
>
> 2) The level at which the normal spent fuel pool cooling pumps lose required NPSH [net positive suction head] assuming saturated conditions in the pool. Reference 7 demonstrates that the point of zero NPSH margin is 22 ft., 4 inches of plant elevation. With the spent fuel pool at 212 degrees F, saturated conditions, the NPSHA [NPSH available] is approximately 11.2 ft. The NPSHR [NPSH required] for the pump is 10 ft. at 212 degrees F. This results in a ratio of NPSHA/NPSHR value of approximately 1.12. Therefore, the NPSHA is greater than the NPSHR at saturated conditions.
>
> The higher of the above points is the level where the inlet strainer will lose suction (Item (1) above). Therefore, Level 1 has been revised to elevation 23 ft., 4 inches for both the primary and backup instrumentation.

In its letter dated August 28, 2013, the licensee provided a sketch depicting the elevations identified as Levels 1, 2 and 3 and the SFP level instrument sensitivity band. The NRC staff reviewed this sketch and notes that Level 1 is identified at the elevation of 23 feet (ft.) 4 inches (in.).

The NRC staff notes that the elevation identified as Level 1 is adequate for normal SFP cooling system operation and it is also adequate to ensure the required fuel pool cooling pump NPSH. This level represents the higher of the two points described in NEI 12-02 for Level 1.

NEI 12-02 states, in part, that:

> 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.

In its OIP, the licensee stated in part, that:

> Indicated level on either the primary or backup instrument channel of greater than an elevation of 10 ft., 9.5 in. which will provide substantial radiation shielding for a person standing on the SFP operating deck. This elevation is approximately 13 feet above the top of the spent fuel positioned in the pool (Nominal Elev. (-) 1 ft., 5-¾ in.). With 13 feet of water above the highest fuel element position, the calculated dose rate at the surface of the SFP is less than 2.5 mrem/hr (Reference 10, Section 12.3.2.1.c).

In its letter dated August 28, 2013, the licensee provided a sketch depicting the elevations identified as Levels 1, 2 and 3 and the SFP level instrument sensitivity band. The NRC staff reviewed this sketch and notes that Level 2 at an elevation of 10 ft. 9 ½ in., is more than 10 ft. above the top of the fuel rack. The NRC staff also notes that the licensee designated Level 2 using the first of the two options described in NEI 12-02 for Level 2.

NEI 12-02 states, in part, that:

> Level 3 corresponds nominally (i.e., +/- 1 foot) to the highest point of any fuel rack seated in the spent fuel pool. Level 3 is defined in this manner to provide the maximum range of information to operators, decision makers and emergency response personnel.

In its OIP, the licensee stated, in part, that:

> Indicated level on either the primary or backup instrument channel of greater than elevation (-)1 foot. This is the nominal water level approximately 6 in. above the top of the fuel racks.

In its letter dated August 28, 2013, the licensee stated, in part, that:

> Level 3 has also been revised to provide margin for instrument sensitivity band and uncertainty. For the purposes of this submittal an indicated level on either the primary or backup instrument channel of greater than plant elevation (-) 0 ft., 6 in will be assumed to assure that the fuel remains covered. The actual effect of the instrument sensitivity band and accuracy on this level will be determined during the engineering and design phase of the project.

The NRC staff notes that the actual effect of the instrument sensitivity band and accuracy on Level 3 has not been determined at this point in time and that the identified elevation for this level could change. The NRC staff has identified this request as:

RAI #1

Please provide the final elevation for Level 3 and an updated sketch of the SFP elevation view with the SFP levels, if applicable.

The licensee's proposed plan, with respect to identification of Levels 1 and 2, appears to be consistent with NEI 12-02, as endorsed by the ISG.

3.3 Design Features: Instruments

Attachment 2 of Order EA-12-051, states, in part, that:

> The instrumentation shall consist of a permanent, fixed primary instrument channel and a backup instrument channel. The backup instrument channel may be fixed or portable. Portable instruments shall have capabilities that enhance the ability of trained personnel to monitor spent fuel pool water level under conditions that restrict direct personnel access to the pool, such as partial structural damage, high radiation levels, or heat and humidity from a boiling pool.

NEI 12-02 states, in part, that:

> A spent fuel pool level instrument channel is considered reliable when the instrument channel satisfies the design elements listed in Section 3 [Instrumentation Design Features] of this guidance and the plant operator has fully implemented the programmatic features listed in Section 4 [Program Features].

In its OIP, the licensee stated that the instrumentation will consist of permanent, fixed primary and backup SFP level monitoring instrument channels and that the minimum measured span of each channel will be continuous from a high pool level elevation of 24 ft. to approximately 6 in. above the top of the spent fuel racks (total span 25 ft.).

In its letter dated August 28, 2013, the licensee stated, in part, that:

> The SFP level instrument upper range will be at least 12 inches above Level 1 to account for upper instrument sensitivity band and instrument loop uncertainty. From a practical perspective, the upper range capability will extend even higher (e.g. above normal operating level).
>
> Level 3 has also been revised to provide margin for instrument sensitivity band and uncertainty. For the purposes of this submittal an indicated level on either the primary or backup instrument channel of greater than plant elevation (-) 0 ft., 6 in will be assumed to assure that the fuel remains covered. The actual effect of the instrument sensitivity band and accuracy on this level will be determined during the engineering and design phase of the project.

The NRC staff notes that the range specified for the licensee's instrumentation will cover the currently proposed Levels 1, 2, and 3 as described in Section 3.2 above. The licensee's proposed plan, with respect to the number of channels and the range of the SFP level instrumentation appears to be consistent with NEI 12-02, as endorsed by the ISG.

3.4 Design Features: Arrangement

Attachment 2 of Order EA-12-051, states, in part, that:

> The spent fuel pool level instrument channels shall be arranged in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the spent fuel pool. This protection may be provided by locating the primary instrument channel and the fixed portions of the backup instrument channel, if applicable, to maintain instrument channel separation within the spent fuel pool area, and to utilize inherent shielding from missiles provided by existing recesses and corners in the spent fuel pool structure.

NEI 12-02 states, in part, that:

> The intent of the arrangement requirement is to specify reasonable separation and missile protection requirements for permanently installed instrumentation used to meet this order. Although additional missile barriers are not required to be installed, separation and shielding can help minimize the probability that damage due to an explosion or extreme natural phenomena (e.g., falling or wind-driven missiles) will render fixed channels of SFP instrumentation unavailable. Installation of the SFP instrument channels shall be consistent with the plant-specific SFP design requirements and should not impair normal SFP function.
>
> Channel separation should be maintained by locating the installed sensors in different places in the SFP area.

In its OIP, the licensee stated, in part, that:

> The Spent Fuel Pool Level Instrumentation for each channel will consist of a level sensing probe suspended in the SFP, a signal conditioning processor module, level indicator and a backup battery system. Redundant Train A and Train B cables will be routed from the FSB [Fuel Storage Building] through the CEB [Containment Enclosure Building] and into the PAB [Primary Auxiliary Building] to connect each probe to a signal conditioning processor module. The signal processor module is a panel-mount instrument that has a display screen showing a numerical read out of SFP level as a continuous indication (i.e., remote Indication). The signal conditioning processor module for each channel will be mounted in a separate stainless steel enclosure located in the PAB so that the instruments will not be subject to the radiation, high temperature and high humidity conditions that could result from postulated loss of water inventory in the SFP. The primary operator indication and backup battery systems will be provided in the Train A and Train B Essential Switchgear Rooms (Elev. 21 ft., 6 in.) located in the Control Building.
>
> Channel separation (independence) will be provided as part of the design of the SFP level instrumentation. The Guided Wave Radar Sensors (GWS) will be physically located in different areas of the SFP. The GWS probes will be installed on the north and south sides of the pool. Sensor conditioning electronics, battery backup power supplies and level indicators will also be located in separate areas of the plant. Interconnecting cabling for channel power and indication will be routed in separate conduits and raceways from the cabling for the opposite channel.

In its letter dated August 28, 2013, the licensee stated, in part, that:

> Enclosure 3 contains a plan view of the proposed arrangement for the portions of the instrument channel consisting of permanent measurement channel equipment. As requested the enclosure depicts the inside dimensions of the SFP, planned placement of the primary and backup level sensors in the SFP and the proposed routing of cables that will connect the sensors to the level transmitters. The location of the signal conditioning processor module (level Transmitter) for each channel has been revised from the Primary Auxiliary Building to the Containment Enclosure Building. The planned location of the UPS/remote display in the Train A and Train B Essential switchgear Rooms is also provided.

The NRC staff notes that in Enclosure 3 of letter dated August 28, 2013, the licensee provided a sketch depicting the inside dimensions of the SFP, planned placement of the primary and backup level sensors in the SFP, and the proposed routing of cables.

The licensee's proposed plan, with respect to the location of the primary and backup level instruments, appears to be consistent with NEI 12 02, as endorsed by the ISG. However, the NRC staff notes that the sketches provided in its letter dated August 28, 2013, showed the train A and B conduits run side by side in parts of the FSB, then through the CEB and finally into the

PAB. The NRC staff has concerns regarding the routing of these two channels in accordance with the guidance on channel separation as described in NEI 12-02. Additional information is needed to enable the NRC staff to complete its evaluation. The NRC staff has identified this request as:

RAI #2

Please provide additional information describing how the proposed arrangement of the waveguides and routing of the cabling between the FSB through the CEB and into the PAB meets the Order requirement to arrange the SFP level instrument channels in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the SFP.

3.5 Design Features: Mounting

Attachment 2 of Order EA-12-051 states, in part, that:

> Installed instrument channel equipment within the spent fuel pool shall be mounted to retain its design configuration during and following the maximum seismic ground motion considered in the design of the spent fuel pool structure.

NEI 12-02 states, in part, that:

> The mounting shall be designed to be consistent with the highest seismic or safety classification of the SFP. An evaluation of other hardware stored in the SFP shall be conducted to ensure it will not create adverse interaction with the fixed instrument location(s).
>
> The basis for the seismic design for mountings in the SFP shall be the plant seismic design basis at the time of submittal of the Integrated Plan for implementing NRC Order EA-12-051.

In its OIP, the licensee stated that installed equipment will be seismically qualified to withstand the maximum seismic ground motion considered in the design of the plant area in which it will be installed. The licensee stated that where the collapse of components would adversely affect the performance of the SFP level instrumentation, the components will be supported to withstand seismic loading or isolated from the systems or components by Seismic Category I boundary restraints.

In its letter dated August 28, 2013, the licensee stated, in part, that:

> The answer to this request requires design information that is not available at this time. Information that is available will be provided in future 6-month update reports.

The NRC staff notes that further information regarding the mounting of the SFP level instrumentation is not currently available for review. In its letter dated August 28, 2013, the

licensee stated the information will be provided to the staff in a future 6-month OIP update report. The NRC staff has identified these requests as:

RAI #3

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 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 the 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 connections.**

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.**

(This information was previously requested as RAI-3 in NRC letter dated July 18, 2013)

In addition, the NRC staff plans to verify the results of the licensee's seismic testing and analysis when it is completed based on the licensee's response to the following RAI.

RAI #4

For RAI 3(a) above, please provide the analyses used to verify the design criteria and methodology for seismic testing of the SFP instrumentation and the electronics units, including, design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.

RAI #5

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

3.6 Design Features: Qualification

Attachment 2 of Order EA-12-051 states, in part, that:

> The primary and backup instrument channels shall be reliable at temperature, humidity, and radiation levels consistent with the spent fuel pool water at saturation conditions for an extended period. This reliability shall be established through use of an augmented quality assurance process (e.g. a process similar to that applied to the site fire protection program).

NEI 12-02 states, in part, that:

> The instrument channel reliability shall be demonstrated via an appropriate combination of design, analyses, operating experience, and/or testing of channel components for the following sets of parameters, as described in the paragraphs below:
>
> - conditions in the area of instrument channel component use for all instrument components,
> - effects of shock and vibration on instrument channel components used during any applicable event for only installed components, and
> - seismic effects on instrument channel components used during and following a potential seismic event for only installed components...

The NRC staff assessment of the instrument qualification is discussed in the following subsections below: 3.6.1, "Augmented Quality Process," 3.6.2, "Qualification and Reliability," and 3.6.3, "Qualification Evaluation Summary."

3.6.1 Augmented Quality Process

Appendix A-1 of the guidance in NEI 12-02 describes a quality assurance process for non-safety systems and equipment that is not already covered by existing quality assurance requirements. Within the ISG, the NRC staff found the use of this quality assurance process to be an acceptable means of meeting the augmented quality requirements of Order EA-12-051.

In its OIP, the licensee stated that augmented quality assurance requirements, similar to those applied to Appendix R fire protection equipment in the NextEra Energy Seabrook Quality Assurance Topical Report, would be applied to this project.

The licensee's proposed augmented quality assurance process appears to be consistent with NEI 12-02, as endorsed by the ISG.

3.6.2 Qualification and Reliability

NEI 12-02 states, in part, that:

> The temperature, humidity and radiation levels consistent with conditions in the vicinity of the [SFP] and the area of use considering normal operational, event and post-event conditions for no fewer than seven days post-event or until off-site resources can be deployed by the mitigating strategies resulting from Order EA-12-049 should be considered. Examples of post-event (beyond-design-basis) conditions to be considered are:
>
> - radiological conditions for a normal refueling quantity of freshly discharged (100 hours) fuel with the SFP water level 3 as described in this order,
> - temperatures of 212 degrees F and 100% relative humidity environment,
> - boiling water and/or steam environment
> - a concentrated borated water environment, and...

In its OIP, the licensee stated, consistent with NEI 12-02, in part, that:

> Temperature, humidity and radiation levels consistent with the conditions in the vicinity of the SFP and the area of use considering normal operational, event and post-event conditions for no fewer than seven days post-event or until off-site resources can be deployed by the mitigating strategies resulting from Order EA-12-049 (Reference 2) will be addressed in the engineering and design phase.
>
> Examples of post-event (beyond-design-basis) conditions that will be considered are:
>
> - Radiological conditions for a normal refueling quantity of freshly discharged (100 hours) fuel with the SFP water at level 3 as described in this order,
> - Temperatures of 212 degrees F and 100% relative humidity environment,
> - Boiling water and/or steam environment,
> - A concentrated borated water environment, and...

While addressing seismic qualification, in its OIP, the licensee stated, in part, that:

> The effects of postulated seismic events on installed instrument channel components (with the exception of battery chargers and replaceable batteries), will be verified to ensure that the equipment design and installation is robust. Applicable components of the instrument channels will be qualified by the manufacturer (or otherwise tested) for seismic effects at response levels commensurate with the equipment mounting location. Instrument channel

> qualification will be based on the guidance provided in Sections 7, 8, 9, and 10 of IEEE Standard 344-2004, IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations, (Reference 9) or a substantially similar industrial standard...

Related to qualification and reliability, in its letter dated August 28, 2013, the licensee stated, in part, that:

> The answer to this request requires design information that is not available at this time. Information that is available will be provided in future 6-month update reports.

The NRC staff notes the information regarding the qualification and reliability of the SFP level instrumentation is not currently available for review. In its letter dated August 28, 2013, the licensee stated that the information will be provided to the NRC staff in a future 6-month OIP update report. The NRC staff has identified these requests as:

RAI #6

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 BDB 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 re-transmitting 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.**

(This information was previously requested as RAI-4 in NRC letter dated July 18, 2013)

In addition, the NRC staff plans to verify the results of the licensee's testing and analysis used to demonstrate the qualification and reliability of the installed equipment when it is completed based on the licensee's response to the following RAI.

RAI #7

For RAI #6 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.

3.6.3 Qualification Evaluation Summary

Upon acceptable resolution of the RAIs in subsections 3.6.1 and 3.6.2, the NRC staff will be able to make a conclusion regarding the instrument qualification.

3.7 Design Features: Independence

Attachment 2 of Order EA-12-051 states, in part, that:

> The primary instrument channel shall be independent of the backup instrument channel.

NEI 12-02 states, in part, that:

> Independence of permanently installed instrumentation, and primary and backup channels, is obtained by physical and power separation commensurate with the hazard and electrical isolation needs. If plant AC or DC power sources are used then the power sources shall be from different buses and preferably different divisions/channels depending on available sources of power.

In its OIP, the licensee stated that the backup instrument channel would be redundant to, and independent of, the primary instrument channel. The licensee also stated that independence would be obtained through separation of the sensors, indication, backup battery power supplies, associated cabling and channel power feeds.

In its letter dated August 28, 2013, the licensee stated, in part, that:

> The permanently installed primary and backup instrument channels are redundant and will be installed independent of each other with respect to physical separation and electrical power sources. The physical and electrical separation will minimize the potential for a common cause event to adversely affect both channels. Each channel will consist of a level sensor, Level Transmitter and Uninterruptible Power Supply (UPS) with remote level display.
>
> The level sensors will be located on the North and South sides of the SFP physically separated to the extent practical by a distance greater than the shortest length of a pool side. The length of the shortest side of the SFP is approximately 27 ft. The horizontal separation will minimize the potential for a common cause event in the area of the SFP to adversely affect both channels.
>
> The level transmitters, one per channel, will also be mounted in separate locations within the Containment Enclosure Ventilation Area (CEVA) using

independent seismically qualified supports (see Enclosure 3). A vendor supplied cable will be independently run from each SFP sensor to the appropriate level transmitter. The vendor cables will be routed in dedicated rigid steel conduits that will be installed from each SFP sensor locations to the west wall of the SFP building, head south to the existing cable tray block outs, exit through the block outs to the transmitters located in CEVA. Each conduit will be installed on its own separate independent series of seismically qualified supports (i.e. "A" train and "B" train supports) maintaining physical separation between the primary and backup channel routings. The spatial separation of the transmitters and associated conduits will minimize the potential for a common cause event in the SFP area to adversely affect both channels.

The primary and backup channel UPS/Remote Indication Enclosures, which include the remote displays, will be located in the "A" and "B" train Essential Switchgear Rooms, one channel in each room. The Essential Switchgear Rooms are separated by physical barriers that assure train separation that preserves the independence of redundant Class 1E plant electrical systems to prevent the occurrence of a common failure mode. From the transmitter locations in CEVA, new plant cables will be installed in the existing seismically qualified "A" and "B" train tray systems to the remote indication enclosures (UPS/ Remote Indicator) located in the "A" and "B" train Essential Switchgear Rooms. Rigid steel conduit will also be installed in each switchgear room from the enclosure to the tray system. All conduit and trays for the routing of the cabling will be seismically qualified and capable of carrying safety related Class 1E circuits.

The primary level channel will be powered from the 120 VAC distribution panel for MCC 615 (Train "B"). MCC 615 is located in the train "B" Essential Switchgear Room. The backup level channel will be powered from the 120 VAC distribution panel for MCC 515 (Train "A"). MCC 515 is located in the train "A" Essential Switchgear Room. These panels are physically separated from each other and will be normally powered from independent emergency diesel backed power supplies which serve to minimize the potential for a common cause event to affect both channels. In the event that the primary or backup power source from these panels is unavailable the channel UPS will automatically swap from 120 VAC power to the battery backup power supply.

The NRC staff notes that the licensee's proposed independence and physical and power separation appears to be consistent with NEI 12-02, as endorsed by the ISG. This proposed arrangement would not affect the operation of the independent channel under BDB event conditions, and the electrical functional performance of each level measurement channel would be considered independent of the other channel. However, the NRC staff plans to review the final electrical power supply design information to complete its review. The NRC staff has identified this request as:

RAI #8

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

The physical separation of the instruments was previously discussed in Section 3.4, "Arrangement." As stated in Section 3.4, the licensee appears to have routed the waveguides for each of the independent SFP level sensors in close proximity to one another, thus jeopardizing the independence between primary and backup instrument channels that could have been gained from the application of physical separation.

3.8 Design Features: Power Supplies

Attachment 2 of Order EA-12-051, states in part, that:

> Permanently installed instrumentation channels shall each be powered by a separate power supply. Permanently installed and portable instrumentation channels shall provide for power connections from sources independent of the plant ac and dc power distribution systems, such as portable generators or replaceable batteries. Onsite generators used as an alternate power source and replaceable batteries used for instrument channel power shall have sufficient capacity to maintain the level indication function until offsite resource availability is reasonably assured.

NEI 12-02 states, in part, that:

> The normal electrical power supply for each channel shall be provided by different sources such that the loss of one of the channels primary power supply will not result in a loss of power supply function to both channels of SFP level instrumentation.
>
> All channels of SFP level instrumentation shall provide the capability of connecting the channel to a source of power (e.g., portable generators or replaceable batteries) independent of the normal plant AC and DC power systems. For fixed channels this alternate capability shall include the ability to isolate the installed channel from its normal power supply or supplies. The portable power sources for the portable and installed channels shall be stored at separate locations, consistent with the reasonable protection requirements associated with NEI 12-06 (Order EA-12-049). The portable generator or replaceable batteries should be accessible and have sufficient capacity to support reliable instrument channel operation until off-site resources can be deployed by the mitigating strategies resulting from Order EA-12-049.
>
> If adequate power supply for either an installed or portable level instrument credits intermittent operation, then the provisions shall be made for quickly and reliably taking the channel out of service and restoring it to service. For example, a switch on the power supply to the channel is adequate provided the power can

be periodically interrupted without significantly affecting the accuracy and reliability of the instrument reading. Continuous indication of SFP level is acceptable only if the power for such indication is demonstrably adequate for the time duration specified in section 3.1[.]

In its OIP, the licensee stated, in part, that:

> The primary and backup instrument channels will be powered from redundant dedicated batteries and local battery chargers. The battery chargers will normally be supplied 120 VAC power from redundant Class 1E distribution panels (Train A and Train B) that are sequenced and powered by the Emergency Diesel Generators or the Supplemental Emergency Power System (SEPS) on loss of off site power (LOOP) events. If the normal Class 1E power supply to a channel is not available, the dedicated battery supply will automatically power the instrument channel. A minimum battery life of 72 hours will be provided for each channel.
>
> The design will include the capability to isolate the normal Class 1E power supply to each channel by opening the feeder breaker within the Class 1E distribution panel. The Class 1E distribution panels that will be used for this application are located in the Essential Train A and Train B Switchgear Rooms.
>
> The minimum battery life of 72 hours will be sufficient to assure that the SFP level instrumentation will provide reliable level indication until off-site resources can be deployed by the mitigating strategies resulting from Order EA-12-049. As part of the mitigating strategies for Order EA-12-049 (Reference 2), it is assumed that one channel of the SFP level instrumentation will be repowered by the SEPS approximately 10 minutes into the event if the emergency diesel generators are not available. Off-site resources (personnel, equipment, etc.) will begin to arriving at the station approximately hour 6 into the event and full staffing is expected within 24 hours. Requested portable equipment that will be connected to repower the redundant vital plant bus, including the power feed to the redundant SFP level monitoring instrument channel, is assumed to arrive at the site from the Regional Response Center (RRC) approximately 24 hours into the event.
>
> Long term coping strategies will include repowering of the redundant SFP level monitoring instrument channel and SFP cooling equipment approximately 36 hours into the event.

In its letter dated August 28, 2013, the licensee stated, in part, that:

> Each level measurement channel will be powered by an independent Emergency Diesel backed power source. The primary level channel will be powered from the 120 VAC distribution panel for MCC 615 (Train "B"). The backup level channel will be powered from 120 VAC distribution panel for MCC 515 (Train "A").

> On a loss of offsite power MCC 615 and MCC 515 are powered from separate independent Emergency Diesel Generators. In the event that the primary or backup power source from these panels is unavailable the respective channel UPS will automatically swap from 120 VAC to the battery backup power supply.
>
> Battery sizing will be in accordance with IEEE 485-2010. The design criteria for each channel will assume continuous level measurement system operation for at least 72 hours following a loss of the normal AC power source. Calculation of system power consumption will be based on the specified values listed in component manufacturer specifications. Margin will be added to the battery sizing calculations, following the guidelines of IEEE 485-2010, Section 6.2.2. The specified 72 hour battery mission time will provide ample margin to allow the implementation of Phase II FLEX actions as described in section IX of the Overall Integrated Plan. The 72 hour battery life will be tested and verified during the Factory Acceptance Test or Site Acceptance Test prior to final acceptance of the system.

The NRC staff notes that the proposed criteria for sizing of the battery backup appears to be consistent with NEI 12-02, as endorsed by the ISG. However, the NRC staff plans to verify the results of the licensee's calculation for required duty cycle given the final design load of the instrument channel for its installed configuration. The NRC staff has identified this request as:

RAI #9

Please provide the results of the calculation depicting the battery backup duty cycle requirements and compatibility with the duration required for the plant mitigating strategy for assuring SFP level filling/cooling.

3.9 Design Features: Accuracy

Attachment 2 of Order EA-12-051 states, in part, that:

> The instrument channels shall maintain their designed accuracy following a power interruption or change in power source without recalibration.

NEI 12-02 states, in part, that:

> Accuracy should consider operations while under SFP conditions, e.g., saturated water, steam environment, or concentrated borated water. Additionally, instrument accuracy should be sufficient to allow trained personnel to determine when the actual level exceeds the specified lower level of each indicating range (levels 1, 2 and 3) without conflicting or ambiguous indication.

In its OIP, the licensee stated, in part, that:

> The instrument channels will be designed such that they will maintain their design accuracy following a power interruption or change in power source

> without recalibration. Channel accuracy will consider SFP conditions, e.g., saturated water, steam environment, or concentrated borated water.
>
> Additionally, instrument channel accuracy will be sufficient to allow trained personnel to determine when the actual level exceeds the key spent fuel pool water levels (Levels 1, 2 and 3) without conflicting or ambiguous indication. The accuracy will be within the resolution requirements of Figure 1 of NEI 12-02.

In its letter dated August 28, 2013, the licensee stated, in part, that:

> The answer to this request requires design information that is not available at this time. Information that is available will be provided in future 6-month update reports.

The NRC staff notes that the information regarding the SFP level instrumentation channel accuracy is not currently available for review. In its letter dated August 28, 2013, the licensee stated the information will be provided to the NRC staff in a future 6-month OIP update report. The NRC staff has identified this request as:

RAI #10

Please provide the following:

a) **An estimate of the expected instrument channel accuracy performance under both (a) normal SFP 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 Level 3 datum points.**

b) **A description of the methodology to be used for determining the maximum allowed deviation from the instrument channel design accuracy under normal operating conditions.**

(This information was previously requested as RAI-7 in NRC letter dated July 18, 2013)

3.10 Design Features: Testing

Attachment 2 of Order EA-12-051 states, in part, that:

> The instrument channel design shall provide for routine testing and calibration.

NEI 12-02 states, in part, that:

> Static or non-active installed (fixed) sensors can be used and should be designed such that testing and/or calibration can be performed in-situ. For microprocessor based channels the instrument channel design shall be capable of testing while mounted in the pool.

In its OIP, the licensee stated that instrument channel design would provide for routine testing and calibration consistent with Order EA-12-051 and the guidance in NEI 12-02.

In its letter dated August 28, 2013, the licensee stated, in part, that:

> The answer to this request requires design information that is not available at this time. Information that is available will be provided in future 6-month update reports.

The NRC staff notes the information on the design of the SFP level instrumentation to provide for routine testing and calibration is not currently available for review. In its letter dated August 28, 2013, the licensee stated that the information will be provided to the NRC staff in a future 6-month OIP update report. The NRC staff has identified this request as:

RAI #11

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 regarding the way 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 SFP level instrumentation.**

c) **A description regarding the functional checks to be performed, and the frequency at which they will be conducted. Describe how calibration tests will be performed, and the frequency at which they will be conducted. Discuss how these surveillances will be incorporated into the plant surveillance program.**

d) **A description of the preventive maintenance tasks required to be performed during normal operation, and the planned maximum surveillance interval that is necessary to ensure 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 18, 2013)

3.11 Design Features: Display

Attachment 2 of Order EA-12-051 states, in part, that:

> Trained personnel shall be able to monitor the spent fuel pool water level from the control room, alternate shutdown panel, or other appropriate and accessible location. The display shall provide on-demand or continuous indication of spent fuel pool water level.

NEI 12-02 states, in part, that:

> The intent of this guidance is to ensure that information on SFP level is reasonably available to the plant staff and decision makers. Ideally there will be an indication from at least one channel of instrumentation in the control room. While it is generally recognized (as demonstrated by the events at Fukushima Daiichi) that SFP level will not change rapidly during a loss of spent fuel pool cooling scenario more rapid SFP drain down cannot be entirely discounted. Therefore, the fact that plant personnel are able to determine the SFP level will satisfy this requirement, provided the personnel are available and trained in the use of the SFP level instrumentation (see Section 4.1) and that they can accomplish the task when required without unreasonable delay.
>
> SFP level indication from the installed channel shall be displayed in the control room, at the alternate shutdown panel, or another appropriate and accessible location (reference NEI 12-06). An appropriate and accessible location shall have the following characteristics:
>
> - occupied or promptly accessible to the appropriate plant staff giving appropriate consideration to various drain down scenarios,
> - outside of the area surrounding the SFP floor, e.g., an appropriate distance from the radiological sources resulting from an event impacting the SFP,
> - inside a structure providing protection against adverse weather, and
> - outside of any very high radiation areas or LOCKED HIGH RAD AREA during normal operation.
>
> If multiple display locations beyond the required "appropriate and accessible location" are desired, then the instrument channel shall be designed with the capability to drive the multiple display locations without impacting the primary "appropriate and accessible" display.

In its OIP, the licensee stated, in part, that:

> The location for primary and backup SFP level indication will be accessible during and following an event. The Operator indication (Primary and Backup indication) will be provided in the Train A and Train B Essential Switchgear Rooms (Elev. 21 ft., 6 in.) which are located in the Seismic Category I Control Building. The Train A and Train B Essential Switchgear Rooms are in close proximity to the main Control Room and Emergency Planning Technical Support Center located on elevation 75 ft. of the Control Building.

In its letter dated August 28, 2013, the licensee stated, in part, that:

> Local and remote Spent Fuel Pool (SFP) wide range level instrument displays will be provided for each level measurement channel (Primary and backup). The displays will be located in areas outside of the area surrounding the SFP floor.
>
> A local display will be located on the front of the primary and backup level transmitters located in the CEVA (Ref. Enclosure 3). The CEVA is adjacent to the Spent Fuel Building (SFP) and has multiple access routes through the Seismic Category I Primary Auxiliary Building (PAB) which is normally accessed through the Radiation Protection Checkpoint. Alternate routes into the PAB and CEVA are provided through doors P418 and EM414 (~ Elev. 25 ft.). These doors provide access from the exterior of the PAB and are normally locked. Door EM 414 provides access into the Main Steam Feedwater Pipe Chase and/or RCA Tunnel. Door P418 provides access to the 25 ft. elevation of the PAB.
>
> Normal access into the CEVA is provided through door P415 which is located on the southeast corner of the 25 ft. elevation of the PAB. An alternate access route into CEVA is provided from the West Main Steam and Feedwater Pipe Chase stairwell through door EM409 (Elev. 21 ft., 6 in.). The level transmitters and associated displays will be physically protected from the environmental and radiological conditions that could result from a beyond design basis (BDB) event by a reinforced concrete wall that separate the CEVA from the SFB.
>
> Remote Spent Fuel Pool (SFP) wide range level instrument displays will also be located in the Train "A" and Train "B" Essential Switchgear Rooms (Elev. 21 ft., 6 in.) contained in the Seismic Category I Control Building (Ref. Enclosure 3, one remote indicator per Train). The Train A and Train B Essential Switchgear Rooms are in close proximity to the main Control Room and Emergency Planning Technical Support Center which are located on Elevation 75 ft. of the Control Building. The remote level displays will be physically protected from the environmental and radiological conditions that could result from a beyond design basis (BDB) event by a reinforced concrete wall that separate the Essential Switchgear Rooms from the PAB and SFB. This area will be accessible and continuously habitable following a beyond design basis event.
>
> Multiple routes are available to access the Essential Switchgear Rooms from the Control Building. The normal route from the Main Control Room is provided by door C300. This door provides access into the Turbine Building where stair cases TBST1, TBST2, TBST3 and TBST4 provide alternate routes to the 21 ft., 6 in. elevation and door C102. Door C102 provides access from the Turbine Building into the Train "A" Essential Switchgear Room. From the Train "A" Essential Switchgear Room, doors C106 or C109 provide access into the Train "B" Essential Switchgear Room.
>
> An alternate access path into the Train "B" Essential Switchgear Rooms is provided from the Main Control Room via an enclosed Seismic Category I stairwell (Stairwell CBST2). Door C312 provides access from the Main control

room into the 75 ft. elevation of the stairwell. Door C118 provides direct access from the 21 ft., 6 in elevation of the stairwell into the Train "B" Essential Switchgear room. From the Train "B" Essential Switchgear room, doors C106 or C109 provide direct access into the Train "A" Essential Switchgear room. Stairwell CBST2 can also be accessed from outside of the control building via door C119 (Elev. 21 ft., 6 in.).

The minimum shift complement following a beyond design basis event will initially consist of the staffing positions noted below:

- Shift Manager
- Unit Supervisor
- Work Control Supervisor
- Two Control Room Operators
- Five Nuclear Systems Operators
- Firefighter
- Chemistry Technician
- Health Physics Technician

Primary and secondary responders from the Offsite Emergency Response Organization would augment this staff within 60 minutes of a declared Alert level (or higher) emergency condition if it is safe to access the plant. If it is unsafe to access the plant, the primary and secondary responders from the offsite Emergency Response Organization will report to the Alternate Technical Support Center/Operation Support Center located at the Emergency Operations Facility in Portsmouth, New Hampshire. Staff from the Alternate Technical Support Center/ Operation Support Center will be dispatched to the plant when safe access routes are established.

Hand held radios, satellite phones, person to person contact or the plant PBX phone system are communication systems that will be available for transmitting information to and from the Control Room.

The NRC staff has concerns regarding the licensee's lack of information on the prompt accessibility, habitability and availability of NRC staff as it relates to the locations for the SFP level instrumentation displays. The NRC staff has identified this request as:

RAI #12

Please describe the evaluation used to validate that display locations can be accessed without unreasonable delay following a BDB event. Include the time available for personnel to access the display location 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 locations. Additionally, please include a description of the radiological and environmental conditions on the paths personnel might take. Describe whether the display locations remain habitable for radiological, heat and humidity, and other environmental conditions following a BDB event. Describe whether personnel are continuously stationed at the display locations or monitor the displays periodically.

3.12 Programmatic Controls: Training

Attachment 2 of Order EA-12-051 states, in part, that:

> Personnel shall be trained in the use and the provision of alternate power to the primary and backup instrument channels.

NEI 12-02 states, in part, that:

> The personnel performing functions associated with these SFP level instrumentation channels shall be trained to perform the job specific functions necessary for their assigned tasks (maintenance, calibration, surveillance, etc.). SFP instrumentation should be installed via the normal modification processes. In some cases, utilities may choose to utilize portable instrumentation as a portion of their SFP instrumentation response. In either case utilities should use the Systematic Approach to Training (SAT) to identify the population to be trained. The SAT process should also determine both the initial and continuing elements of the required training.

In its OIP, the licensee stated, in part, that:

> The Systematic Approach to Training (SAT) will be used to evaluate what training is required for station personnel based upon changes to plant equipment, implementation of FLEX portable equipment, and new or revised procedures that result from implementation of the strategies described in this report.

The licensee's proposed plan, with respect to the training personnel in the use and the provision of alternate power to the primary and backup instrument channels, including the approach to identifying the population to be trained, appears to be consistent with NEI 12-02, as endorsed by the ISG.

3.13 Programmatic Controls: Procedures

Attachment 2 of Order EA-12-051 states, in part, that:

> Procedures shall be established and maintained for the testing, calibration, and use of the primary and backup spent fuel pool instrument channels.

NEI 12-02 states, in part, that:

> Procedures will be developed using guidelines and vendor instructions to address the maintenance, operation and abnormal response issues associated with the new SFP instrumentation.

In its OIP, the licensee stated that procedures would be developed using guidelines and vendor instructions to address the maintenance, operation, and abnormal response issues associated with the new SFP instrumentation.

In its letter dated August 28, 2013, the licensee stated, in part, that:

> The answer to this request requires design information that is not available at this time. Information that is available will be provided in future 6-month update reports.

The NRC staff notes the information on the procedures for the testing, calibration, and use of the primary and backup SFP instrument channels is not currently available for review. In its letter dated August 28, 2013, the licensee stated the information will be provided to the NRC staff in a future 6-month OIP update report. The NRC staff has identified these requests as:

RAI #13

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.

(This information was previously requested as RAI-10 in NRC letter dated July 18, 2013. However, based on feedback from the licensees, it has been revised as above.)

3.14 Programmatic Controls: Testing and Calibration

Attachment 2 of Order EA-12-051 states, in part, that:

> Processes shall be established and maintained for scheduling and implementing necessary testing and calibration of the primary and backup spent fuel pool level instrument channels to maintain the instrument channels at the design accuracy.

NEI 12-02 states, in part, that:

> Processes shall be established and maintained for scheduling and implementing necessary testing and calibration of the primary and backup SFP level instrument channels to maintain the instrument channels at the design accuracy. The testing and calibration of the instrumentation shall be consistent with vendor recommendations or other documented basis.

In its OIP, the licensee stated, in part that:

> Processes will be established and maintained for scheduling and implementing necessary testing and calibration of the primary and backup spent fuel pool level instrument channels to maintain the instrument channels at the design accuracy. Testing and calibration of the instrumentation will be consistent with vendor recommendations and any other documented basis. Calibration will be specific to the mounted instruments and indicators.

In its letter dated August 28, 2013, the licensee stated, in part, that:

> The answer to this request requires design information that is not available at this time. Information that is available will be provided in future 6-month update reports.

The NRC staff notes the information on the testing and calibration of the SFP level instrumentation is not currently available for review. In its letter dated August 28, 2013, the licensee stated the information will be provided to the NRC staff in a future 6-month OIP update report. The NRC staff has identified these requests as:

RAI #14

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. Please include a description of plans to ensure necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment.**

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

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

(This information was previously requested as RAI-11 in NRC letter dated July 18, 2013.)

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.

3.15 Instrument Reliability

NEI 12-02 states, in part, that:

> A spent fuel pool level instrument channel is considered reliable when the instrument channel satisfies the design elements listed in Section 3 [Instrument Design Features] of this guidance and the plant operator has fully implemented the programmatic features listed in Section 4 [Program Features].

In its OIP, the licensee stated that the reliability of the primary and backup instrument channels will be assured by conformance with the requirements and guidelines of NRC JLD-ISG-2012-03 and NEI 12-02.

Upon acceptable resolution of the RAIs noted above, the NRC staff will be able to make a conclusion regarding the reliability of the SFP instrumentation.

4.0 CONCLUSION

The NRC staff is unable to complete its evaluation regarding the acceptability of the licensee's plans for implementing the requirements of Order EA-12-051 due to the need for additional information as described above. The NRC staff will issue an evaluation with its conclusion after the licensee has provided the requested information.

The interim staff evaluation also includes RAIs, response to which the NRC staff needs to complete its review. The licensee should provide the information requested in the 6-month status updates, as the information becomes available. However, the NRC staff requests that all information be provided by October 31, 2014, to ensure that any issues are resolved prior to the date by which the licensee must complete full implementation of Order EA-12-051. The licensee should adjust its schedule for providing information to ensure that all this information is provided by the requested date.

If you have any questions regarding this letter, please contact me at 301-415-3100 or via e-mail at John.Lamb@nrc.gov.

Sincerely,

/ra/

John G. Lamb, Senior Project Manager
Plant Licensing Branch 1-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure:
Interim Staff Evaluation and
Request for Additional Information

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DATE	10/28/2013	12/04/2013	

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