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

November 21, 2013

Mr. Joseph H. Plona
Senior Vice President and Chief Nuclear Officer
DTE Electric Company
Fermi 2 - 210 NOC
6400 North Dixie Highway
Newport, MI 48166

SUBJECT: FERMI 2 - 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. MF0771)

Dear Mr. Plona:

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 28, 2013 (ADAMS Accession No. ML13063A285), DTE Electric Company (the licensee) provided the Overall Integrated Plan (OIP) for Fermi 2 describing how it will achieve compliance with Attachment 2 of Order EA-12-051 by the fall of 2015. By letter dated July 29, 2013 (ADAMS Accession No.13210A220), the NRC staff sent a request for additional information (RAI) to the licensee. The licensee provided supplemental information by letters dated August 19, 2013 (ADAMS Accession No. ML13231A233), and August 26, 2013 (ADAMS Accession No. ML13239A118).

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 staff has included an interim staff evaluation with this letter to provide feedback on the OIP. The 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 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 staff requests that all information be provided by March 31, 2015, 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 of this information is provided by the requested date.

If you have any questions regarding this letter, please contact me at 301-415-4037 or via e-mail at thomas.wengert@nrc.gov.

Sincerely,

Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-341

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

DTE ELECTRIC COMPANY

FERMI 2 NUCLEAR POWER PLANT

DOCKET NO. 50-341

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 28, 2013 (ADAMS Accession No. ML13063A285), DTE Electric Company (the licensee) provided the OIP for Fermi 2 Nuclear Power Plant (Fermi 2), describing how it will achieve compliance with Attachment 2 of Order EA-12-51 by fall of 2015. By letter dated July 29, 2013 (ADAMS Accession No. ML13210A220), the NRC staff sent a request for additional information (RAI) to the licensee. The licensee provided supplemental information by letters dated August 19, 2013 (ADAMS Accession No. ML13231A233), and August 26, 2013 (ADAMS Accession No. ML13239A118).

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.

Enclosure

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 licensees 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

Fermi 2 Nuclear Power Plant has a single SFP.

The licensee submitted its OIP on February 28, 2013. The OIP states that installation of the SFP level instrumentation is scheduled for completion prior to startup from the refueling outage in the fall of 2015.

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 that Level 1 would be set at an elevation of 683 feet (ft.) 6 inches (in.) based on the surface of the water maintained by scuppers.

In its letter dated August 19, 2013, the licensee provided a simplified elevation sketch depicting the elevations identified as Levels 1, 2 and 3 and the proposed SFP level instrumentation sensor range. The NRC staff reviewed this sketch and notes that Level 1 at 683 ft. 6 in. is

adequate for normal SFP cooling system operation and it is also adequate to ensure the required fuel pool cooling pump net positive suction head (NPSH) as the skimmer surge tanks supply the SFP cooling pumps. 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 that Level 2 would be set at an elevation of 671 ft. 1/8 in. which is 10 ft. above the top of the fuel racks.

In its letter dated August 19, 2013, the licensee provided a simplified elevation sketch depicting the elevations identified as Levels 1, 2 and 3 and the proposed SFP level instrumentation sensor range. The NRC staff reviewed this sketch and notes that Level 2 is identified at elevation 671 ft. 1/8 in.

In its OIP, the licensee stated that in addition to the spent fuel racks in the SFP, Fermi 2 is also used to store materials that could affect radiation doses in the SFP area. The licensee also stated that plant procedures will be developed to address the stored radioactive material, the associated pool level monitoring, and the personnel access requirements.

In its letter dated August 19, 2013, the licensee stated, in part, that

> Level 2 (Elevation 671'-0 1/8") is established as being ten (10) feet above Level 3 (Elevation 661'-0 1/8") which is the highest point of any fuel rack seated in the SFP. This is consistent with the guidance of NEI 12-02 where ten feet of water would provide substantial radiation protection from the spent fuel stored in the fuel racks. The radiation from other materials stored in the SFP area may be less shielded if the SFP water level drops down to Level 2. The dose from both the spent fuel in the racks and that from other stored materials will be assessed in a calculation for habitability and equipment qualification as part of the design of the Spent Fuel Pool Level Instrumentation (SFPLI) system. An adjustment to the elevation designated as Level 2 may be necessary to meet the guidance of NEI 12-02.

> Order EA-12-051 requires status updates at six month intervals following submittal of the Overall Integrated Plan (OIP) to delineate progress made in implementing the requirements of the Order. Additional discussion regarding dose rates for stored spent fuel and other material in the SFP and the potential impact on the elevation for level 2 will be provided in the six month update scheduled for August 2014.

The NRC staff notes that further information regarding the potential dose rate impact of other material stored in the SFP is not currently available for review. In its letter dated August 19, 2013, the licensee indicated that additional information regarding dose rates for stored spent fuel and other material in the SFP and the potential impact on the elevation for Level 2 will be provided in the six-month update scheduled for August 2014. The staff has identified this request as:

RAI #1

Please provide the information regarding the projected dose rate impact and the appropriate Level 2 value as a result of other material stored in the SPF.

Please include the results of the calculation to be performed to assess the habitability and equipment qualification as part of the design of the SFP Level Instrumentation system.

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 that Level 3 would be set at an elevation of 661 ft. 1/8 in. based on the elevation of the top of the Fermi 2 tallest fuel rack.

In its letter dated August 19, 2013, the licensee provided a simplified elevation sketch depicting the elevations identified as Levels 1, 2 and 3 and the proposed SFP level instrumentation sensor range. The NRC staff reviewed this sketch and notes that Level 3 at 661 ft. 1/8 in. is aligned with the highest point of any spent fuel storage rack seated in the SFP.

The licensee's proposed plan, with respect to identification of Levels 1 and 3, appears to be consistent with the guidance.

3.3 <u>Design Features: Instruments</u>

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 both the primary and backup instrument channels would be fixed and that the instrument's range provides continuous indication from 0 ft. to 22 ft. and encompasses Level 3 up to Level 1.

In its letter dated August 19, 2013, the licensee provided a simplified elevation sketch depicting the elevations identified as Levels 1, 2 and 3 and the proposed SFP level instrumentation sensor range. The NRC staff reviewed this sketch and notes that proposed sensor range covers the elevations identified as Levels 1, 2 and 3

The NRC staff notes the range specified for the licensee's instrumentation will cover 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 instrumentation for its SFP, 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 the fixed primary level instrument would be located in the northeast corner of the SFP and its associated signal processor in the auxiliary building, and the fixed backup level instrument would be in the northwest corner of the SFP and its associated signal processor in the reactor building. The licensee also stated that sensors would be located as close to the corners as possible to maintain maximum separation and to provide best protection against a single missile damaging both channels. The licensee provided a sketch, in its OIP, depicting the sensor locations and cable routings for the two redundant channels. In addition, the licensee stated that cabling for the primary and backup channel instruments would be routed in raceways separately and seismically mounted, and that cables from the sensors in the SFP area would be in dedicated rigid steel conduits routed in covered recess in the floor to avoid interference with fuel handling activities.

In its letter dated August 19, 2013, the licensee provided additional sketches showing the planned locations/placement of the primary and backup SFP level sensors, and the proposed routing of the cables from the SFP to the local display panels and remote indication panels.

The NRC staff reviewed these sketches and notes the proposed arrangement has the instrument probes and cable routing for the SFP instrument channels, running separately from each other.

The staff notes the licensee's proposed plan, with respect to location and arrangement of the SFP level instrumentation, appears to be consistent with NEI 12-02, as endorsed by the ISG.

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 mounting of the primary and backup channel instruments will be seismic class I and 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 is installed.

In its letter dated August 19, 2013, the licensee stated, in part, that

> The level indicator system and sensors that will be mounted at the edge of the SFP are comprised of a level sensor probe assembly, and a mounting bracket. The level sensor probe assembly is placed in the SFP as shown in Figures 1, 2, and 3. The loading on the mounting bracket includes the static weight loads and dynamic loads of the level sensor probe assembly. The dynamic loads consist of design basis maximum seismic loads on the components, along with hydrodynamic loads produced by pool sloshing.
>
> The total loading on the mounting bracket will be derived by combining the maximum assembly static and seismic loads with the hydrodynamic loads on the submerged portion of the level sensor probe assembly. In addition, seismic qualification testing will be performed to levels that envelop the seismic response spectra at the installed location.

In its letter dated August 19, 2013, the licensee also stated that the mounting bracket provides the only mechanical and electrical attachment point for the level sensor probe and that the mounting bracket will be rigidly anchored to the permanent fuel pool structure using expansion anchor bolts. The licensee indicated that further details will be provided in the six-month update scheduled for August 2014.

Related to the potential adverse impact on the fixed SFP level instruments from other material stored in the SFP, in its letter dated August 19, 2013, the licensee stated the level sensor probes are positioned such that the spargers will not interfere with the function of the probes. The licensee also stated the level sensor probes are positioned such that the material stored on permanent supports on the SFP walls will not interfere with the operation of the level sensor probes. According to the licensee, the level sensor probe length is designed such that there is no mechanical interference between the probes and the fuel racks. The licensee also provided sketches showing the proposed mounting arrangement for the level sensor probes.

The NRC staff notes that the licensee's proposed installation and mounting of the instrument appear to meet the seismic design criteria described in the guidance and appears to be consistent with NEI 12-02, as endorsed by the ISG.

The staff notes that the final mounting design details are not currently available for review. In its letter dated August 19, 2013, the licensee indicated that further details will be provided to the staff in the six-month update scheduled for August 2014. The staff plans to verify the final design and the results of the licensee's seismic testing and analysis report. The staff has identified these requests as:

RAI #2

Please provide the results of the analyses used to verify the design criteria and methodology for seismic testing of the SFP instrumentation and the electronics units, including design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.

RAI #3

For each of the mounting attachments required to attach SFP Level equipment to plant structures, please describe the design inputs, and the methodology that was 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) Post Event Conditions, (3.6.3) Shock and Vibration, and (3.6.4) Seismic Reliability.

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 the augmented quality components, similar to those applied to fire protection, would be used for this project.

The licensee's proposed augmented quality assurance process appears to be consistent with this guidance.

3.6.2 Post Event Conditions

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.

In its OIP, the licensee stated, consistent with NEI 12-02, 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 NRC Order EA-12 049 (Reference 9.2) will be addressed in the engineering 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 level 3 as described in NRC Order EA-12-051 (Reference 9.1),
> - Temperatures of 212 degrees F and 100% relative humidity environment,
> - Boiling water and/or steam environment,
> - A concentrated borated water environment, and...

Related to radiological conditions, in its letter dated August 19, 2013, the licensee stated, in part, that

> The area above and around the pool will be subject to large amounts of radiation in the event that the fuel becomes uncovered. The only parts of the measurement channel in the pool radiation environment are the level sensor probes, which are not susceptible to the expected levels of radiation. The remote display electronics will be located in a location outside the spent fuel pool area that does not exceed the analyzed limit for the electronics.

The NRC staff has concerns with the licensee's lack of information regarding its analysis of the maximum expected radiological conditions for the location of the sensor electronics. The staff has identified this request as:

RAI #4

Please provide analysis of the maximum expected radiological conditions (dose rate and total integrated dose) to which the system electronics (including power boxes, signal processors, and display panels) will be exposed. Also, provide documentation indicating what is the maximum total integrated dose the electronics can withstand and how it was determined. Discuss the time period over which the analyzed total integrated dose was applied.

While addressing post-event temperature and humidity conditions, the licensee stated in its letter dated August 19, 2013, in part, that

> Ambient Temperature:
>
> The postulated temperature in the SFP area that results from a boiling pool is 100°C (212°F). The level sensor probe is rated for a maximum temperature of 210°C (410°F). The signal processor will be located in an area where the temperature will not exceed the rated temperature of the electronics.
>
> Humidity:
>
> The maximum humidity postulated for the SFP area is 100% relative humidity (essentially, a saturated steam environment). The electronics will be located outside of the spent fuel pool area in a location away from the steam atmosphere. The upper portion of the level sensor probe is designed to withstand 100% relative humidity. Because the level sensor probes are sealed, accumulation of condensation on the level sensor probes will not affect operation of the level indication system.

The NRC staff has concerns with the licensee's lack of information regarding whether the sensor electronics are capable of continuously performing required functions under these expected temperature and humidity conditions. The staff has identified these requests as:

RAI #5

Please provide information indicating (a) the temperature ratings and whether the temperature ratings for the system electronics are continuous duty ratings; and, (b) the maximum expected ambient temperature in the rooms in which the system electronics will be located under BDB conditions, where there is no AC power available to run Heating Ventilation and Air Conditioning (HVAC) systems?

RAI #6

Please provide information indicating the maximum expected relative humidity in the rooms in which the system electronics will be located under BDB conditions, where there

is no AC power available to run HVAC systems, and whether the sensor electronics are capable of continuously performing required functions under this expected humidity condition.

3.6.3 Shock and Vibration

NEI 12-02 states, in part, that

> Applicable components of the instrument channels are rated by the manufacturer (or otherwise tested) for shock and vibration at levels commensurate with those of postulated design basis event conditions in the area of instrument channel component use using one or more of the following methods:
>
> - instrument channel components use known operating principles, are supplied by manufacturers with commercial quality programs (such as ISO9001) with shock and vibration requirements included in the purchase specification and/or instrument design, and commercial design and testing for operation in environments where significant shock and vibration loadings are common, such as for portable hand-held devices or transportation applications;
> - substantial history of operational reliability in environments with significant shock and vibration loading, such as transportation applications, or
> - use of component inherently resistant to shock and vibration loadings or are seismically reliable such as cables.

In its letter dated August 19, 2013, the licensee stated, in part, that

> A shock and vibration test report was provided by the vendor for the selected MOHR EFP-IL Guided Ultra-Wideband (UWB) Radar Tank Level Indicator (TLI) System with MOHR EFP Series Guided UWB Radar sensors. Testing was performed by the U.S. Naval Research Laboratory (NRL) to the requirements of MIL-PRF-28800F.

The NRC staff notes that the use of MIL-PRF-28800F appears to be an acceptable method for shock testing. However, the NRC staff has concerns with the licensee's lack of information regarding the description of the tests, applied forces, and the operability condition of the sensor after the tests were completed. The staff has identified the request as:

RAI #7

Please provide information describing the evaluation of the comparative sensor design, the shock and vibration test results, and forces and their frequency ranges and directions applied to the sensor applicable to its successful tests, demonstrating that the referenced previous testing provides an appropriate means to demonstrate reliability of the sensor under the effects of shock and vibration.

3.6.4 Seismic Reliability

The ISG recommends the use of Sections 7, 8, 9, and 10 of IEEE 344-2004 for seismic qualification of the SFP level instrumentation.

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

> Applicable components of the instrument channels are rated by the manufacturer (or otherwise tested) for seismic effects at levels commensurate with those of postulated design basis event conditions in the areas of component usage (with the exception of battery chargers and replaceable batteries). The following measures will be used to verify that the design and installation is adequate:
>
> - Demonstration of seismic motion consistent with that of existing design basis loads at the installed location.
> - Substantial history of operational reliability in environments with significant vibration, such as for transportation applications. Such a vibration design will be inclusive of the effects of seismic motion imparted to the components at the proposed locations of the plant.
> - Adequacy of seismic design and installation will be demonstrated based on the guidance in Sections 7, 8, 9, and 10 of IEEE Standard 344-2004, "IEEE Recommended Practice for Seismic Qualification of Class IE Equipment for Nuclear Power Generating Stations," ...or a substantially similar industrial standard.
> - Demonstration that proposed devices are substantially similar in design to models that have been previously tested for seismic effects in excess of the plant design basis at the location where the instrument is to be installed (g-levels and frequency ranges); or
> - Seismic qualification using seismic motion consistent with that of existing design basis loading at the installation location.

In its letter dated August 19, 2013, the licensee stated, in part, that

> Seismic testing and/or analysis will be performed to the requirements of IEEE 344-2004. The equipment to be evaluated includes the level sensor probe, readout, power control panel, signal processor, and mounting brackets.
>
> The method to confirm the reliability of the permanently installed equipment during and following seismic conditions to maintain the required accuracy is being developed. Further details will be provided in a six-month update scheduled for August 2014.

The licensee's planned approach with respect to the seismic reliability of the instrumentation 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 seismic test when it is completed. The staff has identified this request as:

RAI #8

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

3.6.5 Qualification Evaluation Summary

Upon acceptable resolution of the RAIs in Section 3.6, 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, in part, that

> The primary instrument channel will be independent of the backup instrument channel. The primary instrument channel sensor will be located in the north east corner of the SFP, and the associated signal processor and remote display units will be located in the Auxiliary Building. The backup instrument channel sensor will be located in the north west corner of the SFP, and the associated signal processor and remote display units will be located in the Reactor Building. Cabling for the primary channel will be routed separately from cabling for the backup channel. The power sources for the primary channel and the backup channel will be from a different local 120V AC power source.

In its letter dated August 19, 2013, the licensee stated, in part, that

> The primary and backup level sensors are physically separated by the width of the spent fuel pool as shown in Figure 2 of this enclosure. Cabling to the respective signal processors and the associated remote indicators will also be separate due to the separate locations of the backup and primary level indicators as shown in Figures 4 and 5. The primary channel signal processor and the

> associated remote indicator are located in the Auxiliary Building; whereas the backup channel signal processor and the associated remote indicator are located in the Reactor Building.
>
> For separation of power to the primary and backup indicators see Figures 4 and 5 of this attachment. The proposed plans call for power to the primary and backup channels using Balance of Plant (BOP) 120 volt AC normal power. The separation of the two channel power sources is discussed in the response to RAI-5b; both power sources are independent such that no one single failure will interrupt power to both channels.

In addition, in its letter dated August 19, 2013, the licensee stated that that an electronic signal is sent from the sensor electronic panels located on the Auxiliary Building (AB) 4th floor and RB 3rd floor via separate independent wiring for each channel to the readout display panels located at different locations in the RB 2nd floor and in the Main Control Room (MCR).

The NRC staff notes that with this arrangement, the loss of one backup power supply will not affect the operation of the independent channel under BDB event conditions. The implementation of such design provisions appears to be consistent with NEI 12-02, as endorsed by the ISG, and the electrical functional performance of each level measurement channel would be considered independent of the other channel. However, the NRC staff plans to verify the final electrical power supply design information when it is provided. The NRC staff has identified this request as:

RAI #9

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.

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

> Fermi 2 instrumentation channels will each be powered by a separate Fermi 2 local 120V AC power source. Each channel will be provided with external backup power using replaceable batteries with a minimum duration/capacity of 72 hours. Each channel will automatically switch over to backup power on loss of normal power. For extended battery operation, each channel will have an "On Demand" operation feature. Backup power will be provided by Phase 2 and/or Phase 3 generators within 72 hours. FLEX power will have sufficient capacity to sustain the level indication function indefinitely consistent with FLEX implementation guide NEI 12-06 (Reference 9.5).
>
> In addition, a manual transfer switch and an auxiliary power disconnect switch will also be installed for each instrument channel so that a portable FLEX generator can be connected, providing robustness within 72 hours on loss of normal channel power.

In its letter dated August 19, 2013, the licensee stated, in part, that

> The Spent Fuel Pool (SFP) primary and backup channel instruments will be powered by 120 VAC separate Balance of Plant (BOP) power distribution panels. The Distribution Panels are classified as Seismic Category II/I. The Distribution Panels have adequate spare capacity to power the SFP instruments.
>
> Each channel will be provided with backup power from replaceable batteries for a minimum duration of 72 hours. Backup power for each channel will be automatically switched on loss of the respective normal channel power sources.

> In addition, a manual transfer switch will also be installed for each instrument channel so that a portable FLEX generator can be connected within 72 hours of a loss of normal channel power, as an additional alternative power source.
>
> The battery sizing design criteria will be developed by the vendor and will be provided in the six month update scheduled for August 2014.

In accordance with vendor specification, on loss of normal 120 volt AC power, internal battery power will be available to the SFP instrumentation for 7 days. This will be verified by calculations or testing prior to installation. However, FLEX power will take over the function of the battery power within 72 hours and will continue until normal power is restored.

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 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 staff has identified this request as:

RAI #10

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

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 that the primary and backup instrument channels will be designed to maintain their design accuracy following a power interruption or change in power source without recalibration.

In its letter dated August 19, 2013, the licensee stated, in part, that

> The vendor identified absolute system accuracy for the level indication system selected for use with the spent fuel pool instrumentation is approximately +/- 0.13% of span. The accuracy of the instrument channel is not expected to be significantly affected under BDB conditions (i.e., radiation, temperature, and humidity, post-seismic and post-shock conditions).

> The overall instrument channel accuracy at both normal and BDB conditions will be determined during the engineering and design phase. Updated information will be provided in the six-month status update scheduled for August 2014.

The licensee also stated that the calibration procedure acceptance criteria for deviation from instrument channel design accuracy will be established during the engineering and design phase following plant procedure development processes and based on the plant instrument setpoint methodology.

The NRC staff notes that the estimated instrument channel design accuracies and methodology appear to be sufficient to maintain the instrument channels to within their designed accuracies before significant drift can occur. The NRC staff plans to verify that the licensee's proposed instrument performance is consistent with these estimated accuracy values. Further, the NRC staff plans to verify that the channels will retain these accuracy performance values following a loss of power and subsequent restoration of power. The staff has identified this request as:

RAI #11

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

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 the primary and backup instrument channels design will provide for routine testing and calibration consistent with the guidelines of NRC JLD-ISG-2012-03 & NEI 12-02 and permit in-situ testing.

In its letter dated August 19, 2013, the licensee stated, in part, that

> The Primary and Backup instrument channels will have indicators that can be compared against each other. This comparison can be performed at suitable times and frequencies. The results of the comparison between the SFP LI channels can be compared with the criteria described in response to RAI-7b to determine if recalibration or troubleshooting is needed. As the specifics

regarding testing, calibrating and channel checks are developed, the information will be provided in the six month update scheduled for February 2015.

Functional checks will be performed periodically and will include visual inspection, verification of the instrument display reading, and testing of the battery backup on simulated loss of normal power. The frequency of calibration tests and the way these tests will be incorporated into current processes have not yet been determined. This information will be provided in the six month update scheduled for February 2015.

Details of preventative maintenance and surveillance of the instrument channels have not been developed. Additional information will be provided in the six month update scheduled for February 2015.

The NRC staff notes that the results of the comparison between the SFP level instruments channels can be compared with the acceptance criteria described in Section 3.9 above to determine if recalibration or troubleshooting is needed. The staff also notes that further information regarding 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 19, 2013, the licensee indicated that this information will be provided to the staff in its February 2015, six-month OIP update. The staff has identified this request as:

RAI #12

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 calibration tests and functional checks to be performed and the frequency at which they will be conducted. Discuss how these surveillances will be incorporated into the plant surveillance program.**

c) **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 that the channels are fully conditioned to accurately and reliably perform their functions when needed.**

(This information was previously requested as RAI-8 in the NRC letter dated July 29, 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 that the primary instrument channel remote display will be located in the control room and the backup instrument channel remote display will be located on the Reactor Building 2nd floor near the FLEX SFP refill station. The licensee also stated that the SFP level instrumentation signal processors located in the AB and the RB will have display screens showing SFP level numerical read out with continuous indication.

In its letter dated August 19, 2013, the licensee stated, in part, that

> The backup display will be located near the FLEX Spent Fuel Pool fill station on the second floor of the reactor building (RB). This arrangement conforms to the

guidance in NEI 12-02 and allows for the operator controlling emergency pool filling operation to directly monitor pool level. The arrangement also increases the physical separation of indication cabling between the two channels.

Adequate operations resources are available on shift to periodically monitor the backup indication. The FLEX Fuel Pool fill station is located in an area that is accessible to plant operators both from the Auxiliary Building (AB) and an outside RB entrance. Both the AB and the RB are seismic Class 1, safety related structures and the FLEX Fuel Pool fill station, inside the RB, is a considerable distance from the SFP. Communications between the control room and the plant operators is provided by a variety of means including radios and the plant phone system.

The planning for FLEX is on-going and the resource needs to monitor the back-up channels during a beyond design bases event is being considered in this planning.

As stated in the response to RAI-9a, the backup indication is located in a seismic class 1, safety related structure and is accessible from multiple paths. The area environment is expected to be mild and habitable following beyond design bases external events addressed by NRC Order-EA-12-049.

The NRC staff notes that the NEI guidance for "Display" specifically mentions the control room as an acceptable location for SFP instrumentation displays, as it is occupied or promptly accessible, outside the area surrounding 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. The licensee's proposed location for the primary SFP instrumentation display appears to be consistent with NEI 12-02, as endorsed by the ISG. However, the NRC staff has concerns with the licensee's lack of information regarding the accessibility, habitability, availability of personnel and communications related to the location for the SFP instrumentation backup display. The staff had identified this request as:

RAI #13

For the backup display location, please describe the evaluation used to validate that the backup display location can be accessed without unreasonable delay following a BDB event. Include the time available for personnel to access the display as credited in the evaluation, as well as the actual time (e.g., based on walk-throughs) it will take for personnel to access the display. Additionally, please include a description of the radiological and environmental conditions on the paths personnel might take. Describe whether the backup display location remains habitable for radiological, heat and humidity, and other environmental conditions following a BDB event. Describe whether personnel are continuously stationed at the backup display or monitor the display periodically.

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

> Systematic Approach to Training (SAT) will be used to identify the population to be trained and to determine both the initial and continuing elements of the required training. The program criteria will be consistent with the guidelines of NRC JLD-ISG-2012-03 & NEI 12-02 (References 9.3 and 9.4). Personnel will complete training prior to placing the instrumentation in service.

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, 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 SFPLI. Procedures will also address the following situations consistent with the applicable NEI 12-02 guidelines (Reference 9.4):

- If, at the time of an event or thereafter until the unit is returned to normal service, an instrument channel ceases to function, its function will be recovered within a period of time consistent with the emergency conditions that may apply at the time.
- If, at the time of an event or thereafter until the unit is returned to normal service, an instrument channel component needs to be replaced, a commercially available component may be used even if it does not meet all of the qualifications (section 6.3 above [of OIP]) in order to maintain the instrument channel functionality.
- Fermi 2 will have a strategy to ensure SFP water level addition is initiated at an appropriate time consistent with the implementation of NEI 12-06...

In its letter dated August 19, 2013, the licensee stated, in part, that

> The standards, guidelines and/or criteria that will be utilized to develop procedures for activities associated with the SFP level instrumentation, as well as storage and installation of portable instruments, have not yet been determined. However, information from the following documents is being considered:
>
> - INPO AP-913 and Maintenance Rule,
> - RG 1.33, Quality Assurance Program Requirements (Operation), Revision 2, and
> - ANSI 18.7-1976, Administrative Controls and Quality Assurance for Operational Phase of Nuclear Power Plants.
>
> Information regarding the utilization of standards, guidelines and/or criteria to develop these procedures will be provided in the six month update scheduled for February 2015.

The NRC staff has concerns with the licensee's lack of information about its plans to establish and maintain procedures for the testing, calibration, and use of the primary and backup SFP instrument channels. The staff previously requested this information as RAI-10 in NRC letter dated July 29, 2013. However, based on feedback from licensees, the staff revised this RAI as follows:

RAI #14

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.

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 that processes will 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 licensee also stated that the testing and calibration of the instrumentation will be consistent with vendor recommendations or other documented bases and that calibration will be specific to the mounted instrument and the monitor.

In its letter dated August 19, 2013, the licensee stated, in part, that

> The maintenance and testing program as well as compensatory actions for non-functioning channels have not yet been developed. The information will be provided in the six month update scheduled for February 2015.

The NRC staff notes the information on processes for testing and calibration of the SFP level instrumentation is not currently available for review. In its letter dated August 19, 2013, the licensee indicated that this information will be provided to the staff in its February 2015, six-month OIP update. The staff has identified this request as:

RAI #15

Please provide the following:

a) **Further information describing the maintenance and testing program the licensee will establish and implement to ensure that regular testing and calibration is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. Include a description of plans to ensure that necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment.**

b) **A description of the compensatory actions to 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 planned compensatory actions in the event the non-functioning instrument channel cannot be restored to functional status within 90 days.**

(This information was previously requested as RAI-11 in the NRC letter dated July 29, 2013.)

RAI #16

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 reliability of the primary and backup instrument channels will be in conformance with the 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 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 staff requests that all information be provided by March 31, 2015, 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 of this information is provided by the requested date.

If you have any questions regarding this letter, please contact me at 301-415-4037 or via e-mail at thomas.wengert@nrc.gov.

Sincerely,

/RA/

Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-341

Enclosure:
Interim Staff Evaluation and
Request for Additional Information

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