

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

June 21, 2013

Mr. Scott T. Batson Site Vice President Oconee Nuclear Station Duke Energy Carolinas, LLC 7800 Rochester Highway Seneca, SC 29672-0752

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3, REQUEST FOR ADDITIONAL INFORMATION REGARDING OVERALL INTEGRATED PLAN FOR RELIABLE SPENT FUEL POOL INSTRUMENTATION (ORDER NUMBER EA-12-051) (TAC NOS. MF0785, MF0786, AND MF0787)

Dear Mr. Batson:

By letter dated February 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13086A095), Duke Energy Carolinas, LLC submitted an Overall Integrated Plan (OIP) in response to the March 12, 2012, U. S. Nuclear Regulatory Commission (NRC) Order modifying licenses with regard to requirements for Reliable Spent Fuel Pool (SFP) Instrumentation (Order Number EA-12-051; ADAMS Accession No. ML12054A679) for Oconee Nuclear Station, Units 1, 2, and 3.

The NRC staff is reviewing the submittal and has determined that additional information is needed to complete its review. The specific questions are found in the enclosed request for additional information (RAI). The NRC is requesting responses to these RAIs by July 19, 2013. If any part of this information is not available by the July 19, 2013, response date for this RAI, please provide the date this information will be submitted.

If you have any questions, please call me at 301-415-2901.

Sincerely,

P. Boska

John P. Boska, Senior Project Manager Plant Licensing Branch II-1 Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270, and 50-287

Enclosure: RAI

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION OVERALL INTEGRATED PLAN IN RESPONSE TO ORDER EA-12-051, "REALIBLE SPENT FUEL POOL INSTRUMENTATION" DUKE ENERGY CAROLINAS, LLC OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3 DOCKET NOS. 50-269, 50-270 AND 50-287

1.0 INTRODUCTION

By letter dated February 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13086A095), Duke Energy Carolinas, LLC submitted an Overall Integrated Plan (OIP) in response to the March 12, 2012, U. S. Nuclear Regulatory Commission (NRC) Order modifying licenses with regard to requirements for Reliable Spent Fuel Pool (SFP) Instrumentation (Order Number EA-12-051; ADAMS Accession No. ML12054A679) for Oconee Nuclear Station, Units 1, 2, and 3. The NRC staff endorsed Nuclear Energy Institute (NEI) 12-02, "Industry Guidance for Compliance with NRC Order EA-12-051, to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," Revision 1, dated August 2012, (ADAMS Accession No. ML12240A307), with exceptions, as documented in Interim Staff Guidance (ISG) 2012-03 "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation," Revision 0, dated August 29, 2012 (ADAMS Accession No. ML12221A339).

The NRC staff has reviewed the February 28, 2013, response by the licensee and determined that the following Request for Additional Information (RAI) is needed to complete its Technical Review. The NRC is requesting responses to these RAIs by July 19, 2013. If any part of this information is not available by the July 19, 2013, response date for this RAI, please provide the date this information will be submitted.

2.0 LEVELS OF REQUIRED MONITORING

The OIP states, in part, that

Indication of SFP level will be provided from one foot above normal pool water level (EI. 841 '-0") down to approximately the top of the fuel storage racks (EI. 816'-6" for Unit 1 & 2 and EI. 816'-4" for Unit 3).

In accordance with the guidance in NEI 12-02, the system will be capable of monitoring SFP level at three distinct water levels:

- Level 1 Level that is adequate to support operation of the normal fuel pool cooling system indicated level greater than the point at which pump suction is presumed to be lost (El. 837'-6").
- Level 2 Level adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck - indicated level greater than 10' above the highest point of any fuel storage racks (approximately El. 826'-6" for Units 1 & 2 and El. 826'-4" for Unit 3).

 Level 3 - Level where fuel remains covered but actions to implement make-up water addition should no longer be deferred - indicated level at the highest point of any fuel storage racks (approximately El. 816'-6" for Units 1 & 2 and El. 816'-4" for Unit 3).

RAI-1

Please provide the following:

- a) For level 1, specify how the identified location represents the HIGHER of the two points described in the NEI 12-02 guidance for this level.
- b) A clearly labeled sketch depicting the elevation view of the proposed typical mounting arrangement for the portions of instrument channel consisting of permanent measurement channel equipment (e.g., fixed level sensors and/or stilling wells, and mounting brackets). Indicate on this sketch the datum values representing Level 1, Level 2, and Level 3 as well as the top of the fuel. Indicate on this sketch the portion of the level sensor measurement range that is sensitive to measurement of the fuel pool level, with respect to the Level 1, Level 2, and Level 3 datum points.

3. 0 INSTRUMENTATION DESIGN FEATURES

3.2 Arrangement

The OIP states, in part, that

The two SFP level instrument channels will be installed in diverse locations, 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 SFP.

The associated cabling, power supplies and indication for each level instrument/channel will be routed separately from each other. Cable routings will be specified to provide reasonable protection from missiles that may result from damage to the structure over the SFP and refuel floor, as applicable. The conduit and cable routing will be determined by the detailed design.

RAI-2

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

3.3 Mounting

The OIP states, in part, that

Permanently installed instruments will be mounted to retain their design configuration during and following the maximum seismic ground motion considered in the design of the SFP structure or other building structure in which they are located.

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.

3.4 Qualification

The OIP states, in part, that

All instrument channels will be specified to be reliable at the maximum temperature, humidity, and radiation levels predicted during an extended loss of AC power (ELAP) event at their installed locations. The level instrumentation will be designed to remain functional following a Safe Shutdown Earthquake.

RAI-4

Please provide the following:

 a) A description of the specific method or combination of methods you intend to apply to demonstrate the reliability of the permanently installed equipment under Beyond-Design-Basis (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.

3.5 Independence

The OIP states, in part, that

The two level instruments and associated cabling for each SFP will be physically separated and electrically independent of one another.

RAI-5

Please provide the following:

- a) A description of how the two channels of the proposed level measurement system meet this requirement so that the potential for a common cause event to adversely affect both channels is minimized to the extent practicable.
- b) Further information describing the design and installation of each level measurement system, consisting of level sensor electronics, cabling, and readout devices. Please address how independence of these components of the primary and back-up channels is achieved through the application of independent power sources, physical and spatial separation, independence of signals sent to the location(s) of the readout devices, and the independence of the displays.

3.6 Power Supplies

The OIP states, in part, that

The two instrument channels for each SFP will be powered normally by separate power supplies backed up by rechargeable or replaceable batteries. The backup power sources will have sufficient capacity to maintain the level indication function until offsite power or other emergency resource availability is reasonably assured consistent with NEI 12-02 guidance.

RAI-6

Please provide the following:

- a) A description of the electrical AC power sources and capacities for the primary and backup channels.
- b) If the level measurement channels are to be powered through a battery system (either directly or through an Uninterruptible Power Supply (UPS)), provide the design criteria that will be applied to size the battery in a manner that ensures, with margin, that the channel will be available to run reliably and continuously following the onset of the BDB event for the minimum duration needed, consistent with the plant mitigation strategies for BDB external events (Order EA-12-049).

3.7 Accuracy

The OIP states, in part, that

The accuracy will be consistent with the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02. The new SFP instrument channels will be capable of maintaining their designed accuracy without recalibration following a power interruption or change in power source.

Accuracy will consider SFP post-event conditions, e.g., saturated water, steam environment, or concentrated borated water.

Instrument accuracy will 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 as identified by NEI 12-02 guidance) without conflicting or ambiguous indication.

RAI-7

Please provide the following:

- a) An estimate of the expected instrument channel accuracy performance (e.g., in % of span) 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 that will be used for determining the maximum allowed deviation from the instrument channel design accuracy that will be employed under normal operating conditions as an acceptance criterion for a calibration procedure to flag to operators and to technicians that the channel requires adjustment to within the normal condition design accuracy.

3.8 Testing

The OIP states, in part, that

The instrument channel design shall provide for routine testing and calibration. Testing will be consistent with the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02.

RAI-8

Please provide the following:

- a) A description of the capability and provisions the proposed level sensing equipment will have to enable periodic testing and calibration, including how this capability enables the equipment to be tested in-situ.
- b) A description of how such testing and calibration will enable the conduct of regular channel checks of each independent channel against the other, and against any other permanently-installed SFP level instrumentation.
- c) A description of how calibration tests and functional checks 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 what preventative maintenance tasks are required to be performed during normal operation, and the planned maximum surveillance interval that is necessary to ensure that the channels are fully conditioned to accurately and reliably perform their functions when needed.

3.9 Display

The OIP states, in part, that

The instrument displays for each SFP level instrument will be provided in the main control room or other accessible location. The displays will be consistent with the guidelines of NRC JLDISG- 2012-03 and NEI 12-02.

RAI-9

Please provide the following:

- a) The specific location for each of the primary and backup instrument channel displays.
- b) The reasons justifying why the locations selected will enable the information from these instruments to be considered "promptly accessible". Include consideration of various drain-down scenarios.

- c) If the primary and backup display location is other than the main control room, then provide justification for prompt accessibility to displays including primary and alternate route evaluation, habitability at display location(s), continual resource availability for personnel responsible to promptly read displays, and provisions for communications with decision makers for the various SFP drain down scenarios and external events.
- d) The reasons justifying why the locations selected will enable the information from these instruments to be considered "promptly accessible". Include consideration of various drain-down scenarios.

4.0 PROGRAM FEATURES

4.2 Procedures

The OIP 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 SFP level instrumentation.

RAI-10

Please provide the following:

- a) A list of the operating (both normal and abnormal response) procedures, calibration/test procedures, maintenance procedures, and inspection procedures that will be developed for use of the spent fuel pool instrumentation in a manner that addresses the order requirements.
- b) A brief description of the specific technical objectives to be achieved within each procedure. If your plan incorporates the use of portable spent fuel level monitoring components, please include a description of the objectives to be achieved with regard to the storage location and provisions for installation of the portable components when needed.

4.3 Testing and Calibration

The OIP states, in part, that

Testing and calibration of the instrumentation will be consistent with vendor recommendations or other documented basis. Calibration will be specific to the mounted instrument(s) and the display(s).

Existing station work control processes will be utilized to control maintenance and testing.

RAI-11

Please provide the following:

- a) Further information describing the maintenance and testing program the licensee will establish and implement to ensure that regular testing and calibration is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. Include a description of your plans for ensuring that necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment.
- b) A description of how the guidance in NEI 12-02 Section 4.3 regarding compensatory actions for one or both non-functioning channels will be addressed.
- c) A description of the compensatory actions to be taken in the event that one of the instrument channels cannot be restored to functional status within 90 days.

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*See memo dated 6/14/13

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