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

August 1, 2013

Mr. C. R. Pierce
Regulatory Affairs Director
Southern Nuclear Operating Company, Inc.
Post Office Box 1295, Bin 038
Birmingham, AL 35201-1295

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2 – REQUEST FOR ADDITIONAL INFORMATION REGARDING OVERALL INTEGRATED PLAN FOR RELIABLE SPENT FUEL POOL INSTRUMENTATION (ORDER NUMBER EA-12-051) (TAC NOS. MF0721 AND MF0722)

Dear Mr. Pierce:

By letter dated February 27, 2013, Southern Nuclear Operating Company submitted an Overall Integrated Plan (OIP) in response to the March 12, 2012, Commission Order to modify licenses with regard to requirements for Reliable Spent Fuel Pool (SFP) Instrumentation (Order EA-12-051) for the Edwin I. Hatch Nuclear Plant, Units 1 and 2.

The Nuclear Regulatory Commission staff finds that additional information, as requested in the enclosure, is needed to complete its review. Please provide a response to the questions within 30 days of the date of this letter. If any part of this information is not available within 30 days of this request, please provide the date that this information will be provided.

Sincerely,

Robert Martin

Robert E. Martin, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

Enclosure:
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

OVERALL INTEGRATED PLAN IN RESPONSE TO

ORDER NUMBER EA-12-051 "RELIABLE SPENT FUEL POOL INSTRUMENTATION"

SOUTHERN NUCLEAR OPERATING COMPANY

EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NUMBERS 50-321 AND 50-366

1.0 INTRODUCTION

By letter dated February 27, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13059A389), Southern Nuclear Operating Company submitted an Overall Integrated Plan (OIP) in response to the March 12, 2012, Commission Order modifying licenses with regard to requirements for Reliable Spent Fuel Pool (SFP) Instrumentation (Order Number EA-12-051; ADAMS Accession No. ML12054A679) for Edwin I. Hatch Nuclear Plant, Units 1 and 2. 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 27, 2013, response by the licensee and determined that the following Request for Additional Information (RAI) is needed to complete its Technical Review. If any part of this information is not available within the 30-day response period for this RAI, please provide the date this information will be submitted.

2.0 LEVELS OF REQUIRED MONITORING

The OIP states, in part, that

> Level 1 – Level adequate to support operation of the normal fuel pool cooling system. The low level alarm setpoint is Elevation 225'-9" [225 feet, 9 inches] for Unit 1, Elevation 226'-2.5" for Unit 2, which is above the elevation where the pumps lose suction from a low level in the skimmer surge tank (Engineering Central File (ECF) application of the Plant Data Management System (PDMS) for instruments IG41N372 and 2G41N372).
>
> Level 2 – Level adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck. For Unit 1 and 2, it is elevation 214'-0" approximately 10'-0" above (elevation 204'-0" is the norninal level of the highest fuel rack) the highest point of the fuel racks (plus or minus 1 foot) (Unit 2*

FSAR Sections 9.1.2.2.2b and 9.1.3.2.5, Reference 10; Drawing H26105, Reference 11).

Level 3 – Level where fuel remains covered. For Unit 1 and 2, it is Elevation 204'-0", which is the nominal level of the highest fuel rack (Unit 2 FSAR Section 9.1.2.2.2b, Reference 10; Drawing H26105, Reference 11).

RAI-1

Please provide the following:

a) For level 1, specify how the identified elevation 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 racks. 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

> Design of the instruments will be consistent with the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02 with the exceptions and clarifications as detailed below.
>
> - Primary and backup instrument channels will consist of fixed components.
>
> - The plan is for both channels to utilize Guided Wave Radar, which functions according to the principle of Time Domain Reflectometry (TDR). A generated pulse of electromagnetic energy travels down the probe. Upon reaching the liquid surface the pulse is reflected and based upon reflection times, level is inferred.
>
> - The measured range will be continuous from the high pool level elevation (227' -5") to the top of the spent fuel racks at elevation (204') (Reference 10).
>
> - Instrument channel level sensing components (probe) will be located in the SFP directly adjacent to the spent fuel. The electronics processing module will be capable of being located in a non-harsh environment area outside the SFP area.

- The display shall provide a continuous indication of spent fuel pool water level at the Display location. In the event the link to the Display is lost, a field accessible signal/indication (remote to the Display location) will be available for determination of pool level.

- The electronic processing module and the Display will be installed in a location that will meet the criteria established in NEI 12-02 and endorsed by NRC JLD-ISG-2012-03. The specific location of the electronic processing module and the Display has not been determined yet.

RAI-2

Please modify the sketch in Attachment 1 or 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 sensors, and the proposed routing of the cables that will extend from the sensors toward the location of the local electronics cabinets and read-out/display devices in the main control room or alternate accessible location.

3.3 Mounting

The OIP states, in part, that

> Per NEI 12-02 Section 3.3, Mounting, the new equipment will be mounted to maintain the current Seismic Class of the Spent Fuel Pool which is Seismic Class I (Unit 2 FSAR Section 9.1.2.2.1, Reference 10). Thus, the new equipment will be seismically qualified to Class I. In addition, the mounting of the primary and backup channel components throughout the plant will meet the criteria of the structure it will be routed through or attached to (refer to Qualification details below relating to cable and raceway installation criteria).

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 connection. 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

> Conduit design in the SFP area will be installed to Seismic Category 1 criteria. Both existing and new barriers will be used to provide a level of protection for the cable located on the refueling floor from missiles. The existing and new raceway used to route the cable to the Display will be installed to Seismic Class 1 criteria. Augmented quality requirements, similar to those applied to fire protection, will be applied to the components installed in response to this Order.
>
> The specific values to use for the shock and vibration qualification will be determined in the design phase of the implementation using FSAR and Design Basis information. Components of the instrument channels installed in the SFP area will be qualified for shock and vibration.
>
> For seismic impact on instrument channel components required after a potential seismic event for installed components, the following measures will be used to verify that the design and installation is adequate. Applicable components of the instrument channels are rated by manufacturer (or otherwise tested) for seismic impact at levels commensurate with those of postulated design basis event conditions in the area of instrument channel component use...

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 primary and backup instrument channels are of the same technology, are permanently installed, separated by distance or barriers, and utilize independent power supplies from different buses/switchgear.

RAI-5

Please provide the following:

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

b) Further information describing the design and installation of each level measurement system, consisting of level sensor electronics, cabling, and 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

> Each channel will normally be powered from independent (different buses/switchgear) 120V AC power sources and will have a dedicated battery backup. The battery backup will be dedicated to each channel, should have the capability of automatically switching and operating on backup batteries and will have manual switching as a minimum. A minimum battery life of 24 hours will be provided to allow for power restoration from portable equipment (refer to attachment 2 for a typical sketch). Refer to Safety Function Support section of the SNC Integrated Plan February 28, 2013, submittal for NRC Order EA-12-049 for details on the power strategy from portable FLEX Diesel Generators (DGs).

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)), please 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

> Instrument channels will be designed such that they will maintain their design accuracy without recalibration following a power interruption or change in power source. SNC plans for the instrument design accuracy to be within ± 1 inch, or as close as reasonably achievable, over the entire range for the expected environmental and process conditions. Accuracy will consider SFP post event conditions, e.g., saturated water, steam environment, or concentrated borated water. Additionally, the instrument accuracy of the GWR technology will be sufficient to allow trained personnel to determine when the actual level exceeds the specified level of each indicating range (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.

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

> Instrument channel design will provide for routine testing and calibration consistent with Order EA-12-051 and the guidance in NEI 12-02.
>
> - SNC plans for the design to facilitate in-situ testing and or calibration of the Static or non-active installed (fixed) sensor SNC plans for the design to facilitate the microprocessor based channel features to be capable of testing the instrument channel while mounted in the pool

- Existing work control processes will be used to control maintenance and testing. (e.g., Preventive Maintenance (PM) Program, Surveillance Program, Vendor Contracts, or work orders)

- Other testing and calibration requirements are located in Program Controls testing sub section below.

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

> Primary and backup indication will be provided in the Main Control Room, at the alternate shutdown panel, or another appropriate and accessible location (reference NEI 12-06) that complies with the NEI 12-02 characteristics. If multiple display locations are powered from the instrument loop, then the guidance in NEI 12-02 regarding multiple displays will be followed (refer to attachment 2 for a typical sketch).

RAI-9

Please provide the following:

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

b) If both the primary and backup display locations are not in the main control room, provide a description of the display location that addresses primary and alternate access route evaluation, continuous habitability at display location(s), continual resource availability for personnel responsible to promptly read displays, and provisions for verbal communications with decision makers for the various SFP drain down scenarios and external events.

c) 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 new SFP instrumentation consistent with NEI 12-02.
>
> Procedures will address a strategy to ensure SFP water level addition is initiated at an appropriate time consistent with implementation of NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide (References 5 and 7).

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 SFP 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

> 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 instrument and the monitor. Out of service time as identified in NEI 12-02 will be incorporated consistent with the programmatic process used for compliance with NRC Order EA-12-049 (Order to Modify Licenses With Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events).

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. Include discussion on compensatory action that will be taken in the event that the data link between the local electronics station and the control room display is lost during or following a BDB.

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.

Mr. C. R. Pierce
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Dear Mr. Pierce:

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Sincerely,

Robert E. Martin, Senior Project Manager
Plant Licensing Branch II-1
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