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: JOSEPH M. FARLEY 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. MF1429 AND MF1430)

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 Joseph M. Farley 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 21 days of the date of this letter. If any part of this information is not available within 21 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. 50-348 and 50-364

Enclosure:
Request for Additional Information

cc w/encl: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
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REQUEST FOR ADDITIONAL INFORMATION

OVERALL INTEGRATED PLAN IN RESPONSE TO

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

SOUTHERN NUCLEAR OPERATING COMPANY

JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NUMBERS 50-348 AND 50-364

INTRODUCTION

By letter dated February 27, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13059A388), Southern Nuclear Operating Company, Inc., submitted an Overall Integrated Plan (OIP) in response to the March 12, 2012, U.S. Nuclear Regulatory Commission (NRC), Commission Order modifying licenses with regard to requirements for Reliable Spent Fuel Pool (SFP) Instrumentation (ADAMS Accession No. ML12054A679) for Joseph M. Farley 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 SFP 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 SFP Instrumentation," Revision 0, dated August 29, 2012 (ADAMS Accession No. ML12221A339).

From NEI 12-02 Section 2.0 "LEVELS OF REQUIRED MONITORING"

The OIP states, in part, that

1. Level adequate to support operation of the normal fuel pool cooling system – Fuel pool level to support spent fuel pump Net Positive Suction Head (NPSH) requirements is 153'-4".

2. Level adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck – Elevation 139'-3/8" is approximately 10'-0" above the highest point of the fuel racks (plus or minus 1 foot).

3. Level where fuel remains covered – Elevation 129'-3/8" is the nominal level of the highest spent fuel rack.

RAI-1

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 probes and/or stilling wells, and mounting brackets). 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.

From NEI 12-02 Section 3.2 "Arrangement"

The OIP states, in part, that

> Specific channel level sensing components physical properties and installation details will be provided later after the engineering and design phase is completed. The probe support (including stilling well) will be designed to shield the probe from event generated missiles (falling debris). The design of the probe and probe support will allow the fuel handling machine to pass over it without interference. Cabling for power supplies and indications for each channel will be separated for missile protection (falling debris) and routed in separate conduits from cabling for the other channel.

RAI-2

Provide a clearly labeled sketch or marked-up plant drawing of the plan view of the SFP area depicting, in addition to the planned locations/placement of the primary and back-up SFP level sensors provided in Attachment 1, the SFP inside dimensions and the proposed routing of the cables that will extend from the sensors toward the location of the read-out/display device. Further, confirm the proposed area(s) will be accessible when the SFP area is not accessible.

From NEI 12-02 Section 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 (Reference 10 – Section 3.8.4). 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

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.

From NEI 12-02 Section 3.4 "Qualification"

The OIP states, in part, that

> 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 using one or more of the following methods (note different methods may be used for the various sub components of the primary and back-up instrument channels):...
>
> 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 the 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 using one or more of the following methods (note different methods may be used for the various sub components of the primary and back-up instrument channels):...

RAI-4

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 during and following seismic conditions to maintain its required accuracy.

From NEI 12-02 Section 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

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 on how each level measurement system, consisting of level sensor electronics, cabling, and readout devices will be designed and installed to address independence through the application and selection of independent power sources, the use of physical and spatial separation, independence of signals sent to the location(s) of the readout devices, and the independence of the displays.

From NEI 12-02 Section 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

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 FLEX Program plans.

From NEI 12-02 Section 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

Provide the following:

a) An estimate of the expected instrument channel accuracy performance (e.g., in % of span) under both i) normal SFP level conditions (approximately Level 1 or higher), and ii) at the BDB conditions (i.e., radiation, temperature, humidity, and 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.

From NEI 12-02 Section 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.

RAI-8

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 functional checks will be performed, and the frequency at which they will be conducted. Describe how calibration tests will be performed, and the frequency at which they will be conducted. Provide a discussion as to 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.

From NEI 12-02 Section 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

Provide the following:

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

b) If the primary or 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.

c) The reasons justifying why the locations selected enable the information from these instruments to be considered "promptly accessible" to various drain-down scenarios and external events.

NEI 12-02 Section 4.0 "PROGRAM FEATURES"

From NEI 12-02 Section 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.

RAI-10

Please provide a description of the standards, guidelines and/or criteria will be utilized to develop procedures for inspection, maintenance, repair, operation, abnormal response and administrative controls associated with the SFP level instrumentation, as well as storage and installation of portable instruments.

From NEI 12-02 Section 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

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 what compensatory actions are planned in the event that one of the instrument channels cannot be restored to functional status within 90 days.

Principal Contributors: Carla P. Roque-Cruz
Milton Concepcion

Date:

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