



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

September 16, 2013

Mr. Richard L. Anderson
Vice President
NextEra Energy
Duane Arnold Energy Center
3277 DAEC Road
Palo, IA 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER – REQUEST FOR ADDITIONAL
INFORMATION REGARDING OVERALL INTEGRATED PLAN FOR RELIABLE
SPENT FUEL POOL INSTRUMENTATION (ORDER NUMBER EA-12-051)
(TAC NO. MF1001)

Dear Mr. Anderson:

By letter dated February 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13063A014), NextEra Energy Duane Arnold, LLC, 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 Duane Arnold Energy Center. The Balance of Plant Branch (SBPB) and the Instrumentation and Controls Branch (EICB) staff have identified additional information that is needed to complete the technical review (TR). The staff's Request for Additional Information (RAI) is enclosed.

Please provide a response to this information request by October 16, 2013. If some information is unavailable by October 16, 2013, then provide the date when any additional information will be submitted.

Should you have any questions, please feel free to contact Carolyn Faría at 301-415-4050.

Sincerely,

A handwritten signature in black ink that reads "Karl D. Feintuch".

Karl D. Feintuch, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure:
RAI for Duane Arnold Energy Center

REQUEST FOR ADDITIONAL INFORMATION
OVERALL INTEGRATED PLAN IN RESPONSE TO
ORDER EA-12-051 "RELIABLE SPENT FUEL POOL INSTRUMENTATION"
NEXTERA ENERGY DUANE ARNOLD, LLC
DUANE ARNOLD ENERGY CENTER
DOCKET NO. 50-331

1.0 INTRODUCTION

By letter dated February 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13063A014), NextEra Energy Duane Arnold, LLC, 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 Duane Arnold Energy Center. The U.S. Nuclear Regulatory Commission (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 24, 2012 (ADAMS Accession No. ML12240A307), with exceptions, as documented in Interim Staff Guidance 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. 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 - Elevation (853'-8") based on the normal water level in the Spent Fuel Pool. This water level is above the SFP weir wall elevation that is needed to ensure adequate SFP cooling flow.

Level 2: Level adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck - (Elevation 841'-5"). This elevation is approximately 10' above the top of the fuel racks. This monitoring level ensures there is adequate water level to provide substantial radiation shielding for personnel to respond to Beyond-Design-Basis External Events and to initiate SFP makeup strategies.

Enclosure

Level 3: Level where fuel remains covered - (Elevation 831'-5"). This level is the nominal level of the highest fuel rack.

RAI-1

Please provide 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:

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.

Primary and Backup instrument channel level sensing components will be located in the north side of the SFP. The distance between the Primary and Backup instrument level sensing components will be approximately 20 feet. See Plan View of SFP Showing New SFP Level Instrumentation in Section XVIII, Drawings.

SFP level sensors will be installed in the north side of the SFP. Sensor conditioning electronics and battery backup will be located in the Control Building, which is a Class 1 structure that provides protection from all external natural events.

Cabling for power supplies and indications for each channel will be routed in separate conduits from the cabling for the adjacent channel. New components and the associated raceway will be installed per Duane Arnold Energy Center (DAEC) specifications and procedures.

RAI-2

Please modify the marked-up plant drawing of the plan view (in Section XVIII, Page 10 of 10) of the SFP area, to depict 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:

Mounting will be Seismic Class I. 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.

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:

Instrument channel reliability will be demonstrated via an appropriate combination design, analyses, operating experience, and/or testing of channel components for the following sets of parameters:

- conditions in the area of instrument channel components use for all instrument components,
- effects of shock and vibration on all instrument channel components, and
- seismic effects on instrument channel components during and following a potential seismic event for all installed components

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 instrument channel will be redundant to and independent of the backup instrument channel. Independence will be obtained through separation of the sensors, indication, backup battery power supplies, associated cabling and channel feeds.

Cabling for power supplies and indications for each channel will be routed in separate conduits from the cabling for the adjacent channel. New components and associated raceway will be installed per DAEC specifications and procedures.

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:

Both channels will be powered from dedicated batteries and local battery chargers. The battery chargers for both channels will normally be powered from separate sources of 120V AC power. Minimum battery life of 72 hours will be provided. The battery systems will include provision for battery replacement should the battery charger be unavailable following the event. Spare batteries will be readily available. In the event of a loss of normal power, the battery chargers will be connected to a backup power source.

RAI-6

Please provide the following:

- a) A description of the electrical AC power sources and capacities for the primary and backup channels, demonstrating that these sources are independent and that the restoration of power to them may be performed independently.
- b) 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 following a power interruption or change in power source without recalibration. Accuracy will consider Spent Fuel Pool water conditions. Additionally, 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) 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. Details will be determined during the engineering and design phase. Instrument channel testing and calibration will be performed using existing plant work control processes.

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 design will include remote indication that will be accessible during and after post event conditions. The location will ensure that it meets the following criteria:

- 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.

RAI-9

Please provide the following:

- a) The specific location for the primary and backup instrument channel displays.
- b) For display locations that are not within 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.

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.

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.

Mr. Richard L. Anderson
Vice President
NextEra Energy
Duane Arnold Energy Center
3277 DAEC Road
Palo, IA 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER – REQUEST FOR ADDITIONAL INFORMATION REGARDING OVERALL INTEGRATED PLAN FOR RELIABLE SPENT FUEL POOL INSTRUMENTATION (ORDER NUMBER EA-12-051) (TAC NO. MF1001)

Dear Mr. Anderson:

By letter dated February 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13063A014), NextEra Energy Duane Arnold, LLC, 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 Duane Arnold Energy Center. The Balance of Plant Branch (SBPB) and the Instrumentation and Controls Branch (EICB) staff have identified additional information that is needed to complete the technical review (TR). The staff's Request for Additional Information (RAI) is enclosed.

Please provide a response to this information request by October 11, 2013. If some information is unavailable by October 11, 2013, then provide the date when any additional information will be submitted.

Should you have any questions, please feel free to contact Carolyn Faria at 301-415-4050.

Sincerely,

/ **RA** /

Karl D. Feintuch, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure:
RAI for Duane Arnold Energy Center

DISTRIBUTION:

PUBLIC	LPL3-1 R/F	RidsNrrPMDuaneArnoldResource	RidsNrrDorl Resource
RidsNrrDorlLp3-1 Resource		RidsNrrOd Resource	KFeintuch, NRR
RidsOeMailCenter Resource		RidsNrrDraAplaResource	RidsNrrLAMHenderson

ADAMS Accession No.: ML13255A198

*via memo

OFFICE	LPL3-1/PM	LPL3-1/PM	LPL3-1/LA	NRR/SBPB/BC	LPL3-1/BC	LPL3-1/PM
NAME	CFaria	KFeintuch	MHenderson	GCasto*	RCarlson(TWengert)	KFeintuch
DATE	09/10/13	09/10/13	09/13/13	08/15/13	09/ 16 /13	09/ 16 /13

OFFICIAL RECORD COPY