

NRR-PMDAPEm Resource

From: Beltz, Terry
Sent: Friday, June 07, 2013 7:24 AM
To: Loeffler, Richard A.
Cc: jennie.eckholt@xenuclear.com; Kissinger, Peter W.; OConnor, Sandra; Roque-Cruz, Carla; Zhao, Jack
Subject: Monticello Nuclear Generating Plant - Requests for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (TAC No. MF0924)
Attachments: Monticello - Requests for Additional Information - Order EA-12-051.docx

Mr. Loeffler,

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated February 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13060A447), Xcel Energy 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 Monticello Nuclear Generating Plant. The NRC staff in the Balance of Plant Branch (SBPB) and the Instrumentation and the Controls Branch (EICB) have identified areas in which additional information is needed to complete the Technical Review. The staff's Request for Additional Information (RAI) is provided as an attachment to this e-mail.

You may accept this as a formal request for additional information and respond to the questions by July 8, 2013. Alternatively, you may request to discuss the content of the RAIs with the NRC staff in a conference call, including any change to the proposed response date.

Please let me know if you have any questions or concerns.

Sincerely,

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REQUEST FOR ADDITIONAL INFORMATION
OVERALL INTEGRATED PLAN IN RESPONSE
ORDER NUMBER EA-12-051, "RELIABLE SPENT FUEL POOL INSTRUMENTATION"

XCEL ENERGY, INC.

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263

(TAC NO. MF0924)

1.0 INTRODUCTION

By letter dated February 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13060A447), Xcel Energy, Inc. (the licensee) 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 (Order Number EA-12-051; ADAMS Accession No. ML12054A679) for the Monticello Nuclear Generating Station. 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).

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 by the July 9, 2013, response date for the RAIs, please provide the date this information will be submitted.

2.0 LEVELS OF REQUIRED MONITORING

RAI-1

The OIP states, in part, that

Level 1 is the level that is adequate to support operation of the normal fuel pool cooling system. Currently, the level in the fuel pool is maintained at a constant level due to overflow weirs that spill into skimmer surge tanks. This configuration permits the total water volume to change within the skimmer surge tanks but it does not impact the spent fuel pool water level. The minimum level, without weirs, where the skimmer surge tank and the spent fuel pool become decoupled is 37 feet and 3 inches from the bottom of the spent fuel pool. This level will be used for Level 1. Allowance for instrumentation accuracy will be applied to this setpoint.

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. Based on the guidance in Section 2.3 of NEI 12-02, Level 2 is 10 feet above the top of the spent fuel rack, which corresponds to 24 feet and 9 inches from the bottom of the MNGP spent fuel storage pool. Therefore, Level 2 will be 24 feet and 9 inches from the bottom of the spent fuel storage pool. Allowance for instrumentation accuracy will be applied to this setpoint.

Level 3 is the level where the fuel remains covered and actions to implement make-up water addition should no longer be deferred. Level 3 corresponds nominally to the highest point of the fuel rack in the spent fuel pool. Level 3 will be 14 feet and 9 inches from the bottom of the spent fuel storage pool. Allowance for instrumentation accuracy will be applied to this setpoint.

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.
- c) The OIP states, "An evaluation of other hardware stored in the spent fuel pool will be conducted as part of the design process to ensure other hardware will not adversely interact with the fixed instrument locations." Given the potential for varied dose rates from hardware stored in the SFP, describe how level 2 will be adjusted to other than the elevation provided in section 2 above.

3.0 INSTRUMENTATION DESIGN FEATURES

RAI-2

3.2 Arrangement

The OIP states, in part, that

The probe for the primary channel level transmitter will be located near or in a corner of the spent fuel pool to utilize the inherent shielding from missiles. The final length, location, and mounting of the probe will be determined during the design process. The probe for the backup channel level transmitter will be located across the spent fuel pool from the probe of the primary level transmitter. The backup channel probe will be located in or near a different corner of the pool.

The final length, location and mounting of the backup channel probe will be determined during the design process. The primary and backup level transmitter probes will be located in separate corners, which will allow separation between the probes and will also provide protection against a single missile damaging both the primary and the backup spent fuel pool probes.

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.

RAI-3

3.3 Mounting

The OIP states, in part, that

Both the primary and backup system mounting will be installed as Seismic Category I to meet the NRC JLD-ISG-2012-03 and NEI 12-02 guidance requirements. An evaluation of other hardware stored in the spent fuel pool will be conducted as part of the design process to ensure other hardware will not adversely interact with the fixed instrument locations.

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.
- d) Address how other hardware stored in the SFP will not create adverse interaction with the fixed instrument location(s).

RAI-4

3.4 Qualification

The OIP states, in part, that

The primary and backup instrument channels will be qualified through the use of an augmented quality assurance process that meets the NRC JLD-ISG-2012-03 and NEI 12-02 guidance requirements. The following sections describe the conditions and details of the qualification.

The applicable primary and backup instrument channel components will be qualified for reliable operation following a seismic event. The methods used to qualify components will be consistent with the guidance of NEI 12-02 and the exceptions and clarifications to NEI 12-02 provided by the NRC Staff in NRC JLD-ISG-2012-03.

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) Please provide a description of the specific method or combination of methods that will be used to confirm the reliability of the permanently installed equipment following seismic conditions to maintain its required accuracy.

RAI-5

3.5 Independence

The OIP states, in part, that

The primary channel will be independent of the backup channel. Both channels will have their own probes located in separate corners of the spent fuel pool with separate cable routes and separate electronics. Where routed in conduit and cable trays, the primary and backup channel cabling will be routed in separate conduit or cable trays to achieve independence. Power supply independence is addressed in Section 3.6.

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 precluded.
- 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.

RAI-6

3.6 Power supplies

The OIP states, in part, that

The instrument channels will each have an independent backup battery power supply that will be capable of supporting the instrument until repowered as specified by the mitigating strategies of NRC Order EA-12-049 and NEI 12-06. Any onsite generators used as an alternate power source and replaceable batteries used for instrument channel function will have sufficient capacity to maintain level indication function until offsite resource availability is reasonably assured. Any portable power supplies used will be stored consistent with the requirements of NRC Order EA-12-049 and NEI 12-06. The design process will determine the normal power source, battery power supply, and any additional power sources required for the instrument channels. Both the primary and the backup instrument channels will maintain their design accuracy without recalibration following a power interruption or change in the power source as required by NRC Order EA-12-051.

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 FLEX Program plans.

RAI-7

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 primary and backup instrument channels will maintain their design accuracy without requiring recalibration following a power interruption or change in the power source as required by NRC Order EA-12-051. The total loop accuracy of the primary system and the backup system will be determined for the entire span (Level 1 through 3) during the design process.

Please provide the following:

- a) An estimate of the expected instrument channel accuracy performance (e.g., in % 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.

RAI-8

3.8 Testing

The OIP states, in part, that

Instrument channel design will provide for routine testing and calibration. The primary and backup instrumentation channels will be capable of in-situ testing and calibration. Testing will be consistent with the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02 and will be performed in accordance with station procedures.

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 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 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.

RAI-9

3.9 Display

The OIP states, in part, that

The primary and backup instrumentation displays will be installed per the requirements of NRC JLD-ISG-2012-03 and NEI 12-02, Section 3.9. The primary display will be located in the control room and will provide the operators an on-demand or continuous display of the spent fuel pool level. The backup display will be located in an area which meets the four characteristics defined in NEI 12-02, Section 3.9. The location for both of the electronics control cabinets will be determined during the design process.

Please provide the following:

- a) The specific location for the backup instrument channel display.
- b) If the 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.

4.0 PROGRAM FEATURES

RAI-10

4.2 Procedures

The OIP states, in part, that

Procedures will be developed for both the primary and backup instrument channels consistent with the requirements of NRC JLD-ISG-2012-03 and NEI 12-

02, Section 4.2. This will include procedures for the maintenance, operation, testing, calibration and normal/abnormal response of the primary and backup instrument channels. As described in Section 3.1.4, the duration of time required for both the primary and backup spent fuel pool instrumentation channels to be functional will be coordinated with the mitigating strategies being developed for NRC Order EA-12-049 and NEI 12-06.

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

RAI-11

4.2 Testing and Calibration

The OIP states, in part, that

Testing and calibration of the primary and backup instrument channels will be established and implemented by existing MNGP processes, and will be scheduled in intervals such that the design accuracy of the instrument channels is maintained. Surveillance or testing intervals will be established per the recommendations of NEI 12-02, Section 4.3. Allowed 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-12-49.

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