



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

August 29, 2013

Ms. Mary G. Korsnick,
Chief Nuclear Officer Chief-Operations Officer
Constellation Energy Nuclear Group, LLC
100 Constellation Way, Suite 200C
Baltimore, MD 21202

SUBJECT: R.E. GINNA NUCLEAR POWER PLANT- REQUEST FOR ADDITIONAL
INFORMATION RE: OVERALL INTEGRATED PLAN FOR RELIABLE
SPENT FUEL POOL INSTRUMENTATION (ORDER EA-12-051)
(TAC NO. MF1174)

Dear Ms. Korsnick:

By letter dated February 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13066A172), Constellation Energy Nuclear Group, LLC submitted an Overall Integrated Plan 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 Instrumentation (Order Number EA-12-051; ADAMS Accession No. ML12054A679) for the R.E. Ginna Nuclear Power Plant. The NRC staff endorsed Nuclear Energy Institute (NEI) 12-02, "Industry Guidance for Compliance with U.S. Nuclear Regulatory Commission (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 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 licensee's submittal and identified additional information that is needed to complete the NRC staff's technical review. Please provide a response to the enclosed Request for Additional Information (RAI) by September 23, 2013. If any part of this information is not available by the September 23, 2013, response date for this RAI, please provide the date this information will be submitted.

M. Korsnick

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If you have any questions regarding this RAI, please contact me at (301) 415-1476, or email mohan.thadani@nrc.gov.

Sincerely,



Mohan C. Thadani, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-244

Enclosure:
RAI

cc: Mr. Joseph E. Pacher, Vice President
R.E. Ginna Nuclear Power Plant
R.E. Ginna Nuclear Power Plant, LLC
1503 Lake Road
Ontario, NY 14519

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REQUEST FOR ADDITIONAL INFORMATION
OVERALL INTEGRATED PLAN IN RESPONSE TO
ORDER EA-12-051, "RELIABLE SPENT FUEL POOL INSTRUMENTATION"
CONSTELLATION ENERGY NUCLEAR GROUP, LLC
R.E. GINNA NUCLEAR POWER PLANT
DOCKET NO. 50-244

1.0 INTRODUCTION

By letter dated February 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13066A172), Constellation Energy Nuclear Group, LLC 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 R.E. Ginna Nuclear Power Plant. 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 within the 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

- 1) Level adequate to support operation of the normal SFP cooling system - Indicated water level on either the primary or backup instrument channel of greater than elevation 275'- 11.5" (based on the low water level trip of SFP Pump B (Ginna Updated Final Safety Analysis Report (UFSAR) Section 9.1.3.2.2, plus the accuracy of the SFP water level instrument channel, which will be determined during the engineering and design phase. (Ginna UFSAR Section 9.1.3.2.2,).
- 2) Level adequate to provide substantial radiation shielding for a person standing on the SFP operating deck - Indicated water level on either the primary or backup instrument channel of greater than elevation 257'-0" plus the accuracy of the SFP water level instrument channel, which will be determined during the engineering and design phase.

Enclosure

This elevation is approximately 5'-7" above the top of the fuel racks and ensures a minimum water level of 5'-9" above the top of the fuel. With 5'-7" of water above the top of the fuel racks; the calculated dose rate near the edge of the pool is less than 100 mrem/hr. 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. Calculations to determine dose rates near the edge of the SFP with 5'-7" of water above the top of the fuel racks were performed using SAS2H/ORIGEN-S or ORIGEN-ARP for source term calculations and MCNP5 code was used to calculate gamma (primary and capture) and neutron dose rates at the locations of interest. MCNP5 is a general-purpose Monte-Carlo N-Particle code that can be used for neutron, photon, electron, or coupled neutron/photon/electron transport.

- 3) Level where fuel remains covered - Indicated water level on either the primary or backup instrument channel of greater than elevation 251'-5" plus the accuracy of the SFP water level instrument channel, which will be determined during the engineering and design phase. This monitoring level assures that there is adequate water level above the stored fuel seated in the rack.

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.
- c) Detailed information regarding the analysis used to determine Level 2 including assumptions for amount and location of source material, assumptions regarding future changes to amount of source material and locations that are valid for the stated 100 mrem/hr dose rate appropriately marked on the floor plan. Include a discussion regarding dose rates for stored spent fuel versus that of other material that may be stored in the pool.

3.0 INSTRUMENTATION DESIGN FEATURES

3.2 Arrangement

The OIP states, in part, that

SFP water level sensors will be installed in the southwest and southeast corners of the SFP. Transmitters will be located in the decontamination pit. The decontamination pit is located approximately six feet south of the SFP. The SFP and decontamination pit are separated by a reinforced concrete wall which will provide suitable radiation shielding for the electronics. The decontamination pit walls and cover will also provide protection from event generated missiles. These locations provide reasonable protection against missiles and will not interfere with SFP activities.

RAI-2

Please provide a clearly labeled sketch or marked-up plant drawing of the plan view of the spent fuel pool area, depicting the spent fuel pool inside dimensions, the planned locations/ placement of the primary and back-up spent fuel pool level sensor, 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

Mounting will be Seismic Class I. Installed equipment will be seismically qualified to withstand the maximum seismic motion considered in the design of the plant area in which it is installed. An evaluation of other hardware stored in the SFP will be conducted to ensure it will not create an adverse interaction with the fixed SFP instrument locations.

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.
- d) A description of how other material stored in the SFP will not create adverse interaction with the fixed instrument location(s).

3.4 Qualification

The OIP states, in part, that

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

- conditions in the area of instrument channel components,
- effects of shock and vibration on the instrument channel components, and
- seismic effects on instrument channel components used during and following a potential seismic event.

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 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 spent fuel pool 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.

3.5 Independence

The OIP states, in part, that

The primary instrument channel will be redundant to and independent of the backup instrument channel, including power supplies.

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 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.

3.6 Power Supplies

The OIP states, in part, that

The primary and backup channels will be powered from dedicated batteries and local battery chargers. The battery chargers for both channels will normally be powered from independent, non-safety related, 120V AC power supplies. 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.

During the loss of normal power the battery chargers will be connectable to another 120V AC Power source. This will be from portable generators stored onsite, consistent with the reasonable protection requirements associated with NEI 12-06, or from generators deployed from off-site by the mitigating strategies resulting from Order EA- 12-049, at approximately 24 hours after the event.

RAI-6

Please provide the following:

- a) A description of the normal and alternate 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 Beyond-Design-Basis (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. 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 SFP conditions, e.g., saturated water, steam environment, or concentrated borated water. Additionally, instrument accuracy will be sufficient to allow trained personnel to determine when the actual water level exceeds the specified lower level of each indicating range (levels 1, 2 and 3) without conflicting or ambiguous indication. The accuracy will consider the resolution requirements of Figure 1 of NEI 12-02. Actual accuracy for the indication under all required conditions will be determined during the engineering and design phase.

RAI-7

Please provide the following:

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

Testing will be consistent with the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02. Instrument channel design will provide for routine testing and calibration that can be performed in-situ consistent with Order EA-12-051 and the guidance in NEI 12-02. Details will be determined during the engineering and design phase.

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

Remote indication will be provided in the new Standby Auxiliary Feedwater Diesel Generator Building. The display will be consistent with the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02.

The new Standby Auxiliary Feedwater Diesel Generator Building will be:

- promptly, accessible to the appropriate plant staff, including during the occurrence of a SFP drain down event,
- located outside of the area surrounding the SFP floor at an appropriate distance from the radiological sources resulting from an event impacting the SFP,
- a structure that provides protection against adverse weather, and
- located outside of any high radiation areas or LOCKED HIGH RAD AREA during normal operation.

RAI-9

Please provide the following:

- a) 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.
- b) The reasons justifying why the locations selected enable the information from these instruments to be considered "promptly accessible" from a response time perspective. Discuss 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.

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*.

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

Processes will be established and maintained for scheduling and implementing necessary testing and calibration of the primary and backup SFP water 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, Issuance of Order to Modify Licenses - with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events. Functionality testing will be performed at the frequency specified in NEI 12-02.

Instrument channel out of service times as identified in NEI 12-02 will be implemented and controlled consistent with the programmatic process used for compliance with NRC Order EA- 12-051.

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.
- 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.

M. Korsnick

- 2 -

If you have any questions regarding this RAI, please contact me at (301) 415-1476, or email mohan.thadani@nrc.gov.

Sincerely,

/ra/

Mohan C. Thadani, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-244

Enclosure:
RAI

cc: Mr. Joseph E. Pacher, Vice President
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1503 Lake Road
Ontario, NY 14519

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