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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Response to Request for Additional Information

Attached are the Nuclear Innovation North America, LLC (NINA) responses to the NRC staff questions in Request for Additional Information (RAI) letter number 423, related to SRP Section 1.05. The attachments to this letter contain the responses to the following RAI questions:

01.05-6

01.05-7

When a change to the COLA is required, it will be incorporated into the next routine revision of the COLA following NRC acceptance of the RAI response.

There are no commitments in this submittal.

If you have any questions, please contact me at (979) 316-3011 or Bill Mookhoek at (979) 316-3014.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 3/14/13

Scott Head
Manager, Regulatory Affairs
NINA STP Units 3 & 4

rhs

Attachments:

- 1) RAI 01.05-6
- 2) RAI 01.05-7

STI 33662781

DOG
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RAI 01.05-6**Questions**

In response to RAI 01.05-2, the applicant stated that the certified ABWR design provides for reliable level and temperature indication. However, the applicant proposed to enhance the SFP level instrument to ensure that it provides reliable SFP level indication. The applicant proposed to include this information in Appendix (1E) of the FSAR.

The staff reviewed the applicant's response and determined that the response is insufficient to address the staff's concerns described in RAI 01.05-02. The applicant's response proposes to provide detailed design information at a time after the license has been issued. The NRC staff needs sufficient design information in order to reach a safety conclusion within the COLA review. The applicant should address the specific provisions in Interim Staff Guidance (ISG) JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Instrumentation," (ML12221A339) dated August 29, 2012 that endorses the 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". The ISG provides an acceptable method for satisfying Order EA-12-051. As stated in the ISG, other methods may be used to satisfy Order EA-12-051, but these methods will be reviewed by the NRC staff on a case-by-case basis to determine their acceptability. If the applicant proposes to use methods that differ from those in the ISG and endorsed guidance, the applicant should explain why these alternative methods are acceptable. Examples where additional information is needed include the following:

- a. In proposed Section 1.2 "Arrangement", of Appendix 1E.2.6 the applicant stated that the instrument channel will be arranged in a manner that provides reasonable protection against missiles, but does not provide examples of possible installation locations or location selection criteria, as described in the ISG.
- b. In proposed Section 1.3 "Mounting", of Appendix 1E.2.6 the applicant stated that the instrument will be mounted to retain its design configuration during and following the maximum seismic ground motion considered in the design, but does not specify that the seismic design of the mounting needs to be consistent with the SFP seismic design or that an evaluation of other hardware stored in the SFP shall be conducted to ensure that this hardware will not cause an adverse interaction with the instrument.
- c. In proposed Section 1.4 "Qualification", of Appendix 1E.2.6 the applicant stated that the instrument will be reliable at temperature, humidity, and radiation levels consistent with the spent fuel pool water at saturation conditions for an extended period, however, this is not consistent with the criteria described in Section 3.4 of the NEI guidance which specifies that the instrument shall be reliable at conditions expected during normal operation, events and post-event conditions. The NEI guidance provide example of said conditions. Additionally, the applicant's response does not address the seismic classification of the instrument channel [from alternate power connection to the instrument, and from the instrument to the display] or the instrument itself.

d. In proposed Section 1.6 "Power Supplies", of Appendix 1E.2.6 the applicant stated that the instrumentation channels will also provide for quick and accessible power connections from alternate sources independent of the plant ac and dc power distribution systems. The applicant's response does not specify that the channel shall have the capability to isolate the installed channel from the normal power supply.

e. In proposed Section 1.7 "Accuracy", of Appendix 1E.2.6 the applicant stated that the instrument channels will maintain their designed accuracy following a power interruption or change in power source without recalibration. The applicant's response does not address the minimum accuracy described in the ISG and the NEI guidance. Additionally, the applicant's response does not address that special considerations should be given to the SFP conditions (saturated water, steam environment, concentrated boric water, etc) and how this can affect the instrument accuracy.

f. In proposed Section 1.8 "Testing", of Appendix 1E.2.6 the applicant's response does not state that the instrument shall be designed with the capability of in-situ testing and calibration.

The staff requests the applicant to update FSAR Appendix 1E in order to provide additional design information on the SFP level instrument in order to allow the NRC staff to reach a safety conclusion, to remove reference to a future submittal of design details, and to create an ITAAC to confirm that the installed instrument is properly installed, in the right location, and that it meets all the design features credited in FSAR Appendix 1E.

Response

FSAR Appendix 1E, Section 1E.2.6 will be revised as shown below in shaded text in response to this Request for Additional Information. These changes will be incorporated into the STP 3 & 4 FSAR in the next routine revision.

1E.2.6 Spent Fuel Pool (SFP) Instrumentation (7.1)

The certified ABWR design includes reliable level and temperature monitors in the SFP that provide indication and annunciation via the process computer and annunciation in the Main Control Room (MCR). Additionally, STP 3 & 4 SFP level indication independent of the process computer will be provided at the remote shutdown system panel or other appropriate and accessible location. The instruments are will be powered by battery-backed non-Class 1E batteries. 120 VAC, normally powered by the Plant Investment Protection (PIP) buses, which are backed up by the Combustion Turbine Generator (CTG) as described in DCD Subsection 7.7.1.10. Although not Post Accident Monitoring (PAM) instruments, the SFP level instrumentation channels will be designed and qualified to PAM Category 1 requirements (see DCD, Section 7.5).

STP 3 & 4 will also enhance the spent fuel pool instrumentation to ensure that it provides a reliable indication of the water level in the spent fuel storage pools capable of

supporting identification of the following pool water level conditions by trained personnel: (1) level that is adequate to support operation of the normal fuel pool cooling

system, (2) level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred. These enhancements will be consistent with the guidance provided in NEI 12-02, Revision 1 (Reference 1E-11), and JLD-ISG-2012-03 (Reference 1E-12).

1. The spent fuel pool level instrumentation will include the following design features:

1.1 Instruments: The instrumentation will consist of two permanent, fixed instrument channels with level indication from the top of the fuel racks to ~~the top~~ above the normal operating level of the spent fuel pool. Level instrumentation will include high and low water level alarms that annunciate in the Control Room and level indication independent of the process computer at the remote shutdown system panel or other appropriate and accessible location. The level channels will be functional in all plant operating modes.

1.2 Arrangement: The spent fuel pool level instrument channels will be 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 spent fuel pool. This protection will be provided by maintaining instrument channel separation within the spent fuel pool area, and will utilize inherent shielding from missiles provided by existing corners in the spent fuel pool structure. The channel separation guidance contained in NEI 12-02, Revision 1 Section 3.2 will be considered in determining sensor locations.

1.3 Mounting: Installed instrument channel equipment within the spent fuel pool will be mounted to retain its design configuration during and following the maximum seismic ground motion considered in the design of the spent fuel pool structure. The seismic design of the mounting will be consistent with the SFP seismic design. In addition, an evaluation of other hardware stored in the SFP will be conducted to ensure it will not create adverse interaction with the fixed instrument locations.

1.4 Qualification: The instrument channels will be reliable at temperature, humidity, and radiation levels consistent with ~~the spent fuel pool water at saturation conditions for an extended period~~ normal operation, event, and post-event conditions ~~for at least 7 days post-event.~~ ~~the spent fuel pool water at saturation conditions for an extended period.~~ This reliability will be established through use of an augmented quality assurance process (e.g., a process similar to that applied to the site fire protection program). Verification that the instrument channel design and installation is adequate from shock and vibration and seismic perspectives will be demonstrated as discussed in NEI 12-02, Revision 1 and

JLD-ISG-12-03. In addition, these instrument channels will be included in the Design Reliability Assurance Program (DRAP)

1.5 Independence: The instrument channels will be physically and electrically independent of each other.

1.6 Power supplies: The permanently installed level instrumentation channels will be powered by separate Non-Class 1E Vital power supplies. The instrumentation channels will also provide for quick and accessible power connections from alternate sources independent of the plant ac and dc power distribution systems. The independent alternate sources used for instrument channel power will have sufficient capacity to maintain the level indication function for at least 72 hours batteries. The STP 3 & 4 Class 1E batteries are capable of providing 125 VDC power for over 76 hours post-event utilizing deep load shedding and division cross-connection strategies.

FLEX equipment is expected to arrive on site approximately 36 hours after event initiation. At this time, 480 VAC FLEX diesel generators will be installed and used to power the battery chargers and other select ESF loads, thereby assuring battery functionality indefinitely.

Since the SFP level instrument channels will be continuously powered by the Class 1E batteries, there is no need for backup power supplies.

1.7 Accuracy: The instrument channels will maintain their designed accuracy following a power interruption or change in power source without recalibration. Considerations in determining required instrument accuracy should include SFP conditions, e.g., saturated water or steam conditions. Instrument accuracy will also be sufficient to allow trained personnel to determine when the actual level reaches the specified lower level of each indicating range (Levels 1, 2 and 3) without conflicting or ambiguous indication.

1.8 Testing: The instrument channel design will provide for routine testing and calibration which can be accomplished in-situ.

1.9 Display: Trained personnel will be able to monitor the spent fuel pool water level from the control room and the alternate remote shutdown system panel or other appropriate and accessible location. The display will provide on-demand or continuous indication of spent fuel pool water level.

Additionally, FSAR Appendix 1E, Section 1E.4 (References), will be revised as shown below to include NEI 12-02 and JLD-ISG-2012-03.

1E.4 References

1E-11 NEI 12-02 [Revision 1] "Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" August 2012.

1E-12 JLD-ISG-2012-03 "Compliance with Order EA-12-051, "Reliable Spent Fuel Pool Instrumentation" August 29, 2012.

Also, an ITAAC will be added to COLA Part 9 (Inspections, Tests, Analyses, Acceptance Criteria) Section 3.0 (Site-Specific ITAAC) as shown below to ensure that the SFP level instrumentation will be designed and installed as described in FSAR Appendix 1E.

Table 3.0-28 Spent Fuel Pool Level Instrumentation

Design Requirement	Inspections, Tests, Analyses	Acceptance Criteria
The Spent Fuel pool level instrumentation channels are properly installed, in the correct locations, and meet all design features in FSAR Appendix 1E	Inspections will be performed to verify that the Spent Fuel Pool level instrument channels are properly installed, in the correct locations, and meet all design features in FSAR Appendix 1E	A report exists that concludes that the Spent Fuel Pool level instrument channels are properly installed, in the correct locations, and meet all design features in FSAR Appendix 1E

RAI 01.05-7**Questions**

In the proposed changes to FSAR Appendix 1E.2.6.2, the applicant described that the spent fuel pool instrumentation will be maintained, available, and reliable through appropriate development and implementation of programs for training, procedures, and testing and calibration. The staff reviewed the proposed program descriptions and determined that additional information was needed. For example:

- a. In proposed Section 2.2 “Procedures”, of Appendix 1E.2.6 the applicant’s response stated that procedures shall be established and maintained for the testing, calibration, and use of the spent fuel pool level instrument channels. The staff determined that this program description is not consistent with the program description provided in ISG JLD-ISG-2012-03 and in NEI 12-02(as endorsed by the ISG). The guidance states that procedures shall be developed to address the maintenance, operation and abnormal response issues associated with the instrumentation. Procedures shall also address the installation and use of backup power.
- b. In proposed Section 2.3 “Testing and Calibration”, of Appendix 1E.2.6 the applicant’s response stated that processes will be established and maintained for scheduling and implementing necessary testing and calibration of spent fuel pool level instrument channels to maintain the instrument channels at the design accuracy. The staff determined that this response does not address the backup power source, as described in the guidance. The guidance also provides for surveillances or testing to validate functionality within 60 of a planned outage, and includes provisions for outage time.

The staff requests the applicant to update FSAR Appendix 1E in order to provide additional program description in FSAR Appendix 1E, and address the guidance provided in ISG JLD-ISG-2012-03, and NEI 12-02, as endorsed by the ISG. If the applicant proposes to use methods that differ from those in the ISG and endorsed guidance, the applicant should explain why these alternative methods are acceptable. The staff considers that the completion of these programs shall be confirmed through a License Condition.

Response

FSAR Appendix 1E, Section 1E.2.6 will be revised as shown below in shaded text in response to this Request for Additional Information. These changes will be incorporated into the STP 3 & 4 FSAR in the next routine revision.

2.0 The spent fuel pool instrumentation will be maintained available and reliable through appropriate development and implementation of the following programs:

2.1 Training: Personnel will be trained ~~in the use and the provision of alternate power to the instrument channels.~~ to perform the job specific functions necessary for their assigned tasks (maintenance, calibration, surveillance, etc.) The Systematic Approach to Training will be used to determine the initial and continuing elements of required training as well as the population to be trained.

2.2 Procedures: Procedures shall be established and maintained for the testing, calibration, and use of the spent fuel pool level instrument channels. ~~These procedures will also address any known potential abnormal response issues associated with the instrumentation.~~

2.3 Testing and Calibration: Processes will be established and maintained for scheduling and implementing necessary testing and calibration of ~~the~~ spent fuel pool level instrument channels to maintain the instrument channels at the design accuracy. ~~Additionally, the out of service provisions contained in NEI 12-02, Revision 1, Section 4.3 will be implemented for the SFP level channels. The spent fuel pool level instrument channels will be included in the Design Reliability Assurance Program (DRAP).~~

Proposed License Condition

Issuance of a license condition to complete procedure development for the Spent Fuel Pool Instrumentation is inconsistent with the approach to providing for future procedure development in the STP 3&4 COLA. Currently, the Procedure Development Plan, which includes the existing Spent Fuel Pool Instrumentation, is covered by a commitment in FSAR Section 13.5. FSAR Section 13.5 (Plant Procedures) describes the types of procedures to be developed for STP 3 & 4, including administrative procedures, system operating procedures, abnormal operating procedures, emergency operating procedures, maintenance procedures (including instrument calibration and testing procedures), etc. Many of these procedures control safety related activities. This approach is consistent with the approach taken in Regulatory Guide 1.206, Section C.IV.4, even for operational programs required by NRC regulation. Singling out the Spent Fuel Pool instrument procedures for a License Condition, when much more safety-significant procedures are not covered by such conditions is inappropriate. STP 3 & 4 considers the activities to support the development of procedures and training for the enhanced Spent Fuel Pool instrumentation to be already covered by the existing commitment in Section 13.5 of the FSAR.