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April 23, 2013
U7-C-NINA-NRC-130027

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 424, related to SRP Section 1.05. The attachments to this letter contain the responses to the following RAI questions:

01.05-8 01.05-9 01.05-10

There are no COLA changes in this submittal.

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 4/23/13

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

rhs

Attachments:

1) RAI 01.05-8
2) RAI 01.05-9
3) RAI 01.05-10

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NRO

STI 33680767

(paper copy)

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01.05-8

The staff has reviewed the applicant's response to RAI 01.05-2 regarding SFP instruments and has questions regarding Section 1.6 power supplies. The applicant stated that the permanently installed instrumentation channels will be powered by separate Non-Class 1E Vital power supplies powered by the CTG. The independent alternate sources used for instrument channel power will have sufficient capacity to maintain the level indication function until offsite resource capability is reasonably assured. These power supplies will be stored in a Seismic Category I building and will be easily accessible for timely installation. This information is consistent with the NRC Order EA-12-051 and Interim Staff Guidance (ISG) JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Instrumentation," (ML12221A339) dated August 29, 2012, which 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.

In regards to the applicant's response to RAI 01.05-2, the CTG is only designed for the 100 yr wind speed of 134 mph based on ASCE/SEI 7-05. Given the two hundred year wind speed of 142 mph, the CTG cannot be assumed to be operable, and the independent alternate sources will be needed to provide SFP instrumentation.

a. Please document in the FSAR if these independent alternate power supplies are the same portable DC power supplies that will be procured under FLEX as discussed in RAI response 01.05-4.

b. The Order EA-12-051 states that, "Based upon the considerations set forth above, the Commission has determined that all power reactor licensees and CP holders must have a reliable means of remotely monitoring wide-range spent fuel pool levels to support effective prioritization of event mitigation and recovery actions in the event of a beyond-design-basis external event." Please include the SFP instruments and the independent alternate DC power sources in the Reliability Assurance Program or justify why it is not necessary even though the Order EA-12-051 states that the SFP level indication should be reliable.

c. Please document in the FSAR whether these alternate power supplies will be able to provide sufficient power for 24 hours following a high wind exceeding 134 mph. On-site and off-site debris may prevent offsite resources from reaching the site. If these alternate power supplies cannot provide sufficient power for 24 hours following a high wind event, please justify why this instrumentation can be considered "reliable" as stated in the Order EA-12-051.

Response

a) The FSAR requires that each unit have 2 portable DC power supplies stored in a protected location. These power supplies will be used as required based on the conditions present and

would be used to power the Spent Fuel Pool (SFP) level instruments, if necessary. However, NINA believes that documenting this fact is below the level of detail required to be included in the FSAR.

b) FSAR Part 2 Tier 2, Appendix 1E was revised in COLA Revision 9 as shown below to document that the SFP level instruments will be included in the Design Reliability Assurance Program (DRAP).

NINA does not believe that the SFP level instrument power supplies should be included in the DRAP For the following reasons.

- The SFP level instrument channels are normally powered by separate Class 1E batteries which are capable of providing 125 VDC power for over 76 hours post-event.
- There will be two commercially procured supplies per unit, only one of which would potentially be required during an event.
- The power supplies will be stored in diverse robust structures.

c) FSAR Part 2 Tier 2, Appendix 1E was revised in COLA Revision 9 as shown below documenting that the SFP level instruments will be powered by the 1E batteries, which are capable of providing 125 VDC power for over 76 hours post-event utilizing deep load shedding and division cross-connection strategies. Appendix 1E was also revised to document that the alternate power sources will have sufficient capacity to maintain the level indication function until offsite resource capability is reasonably assured.

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

NRC Recommendation

NRC issued an order to power reactor licensees and holders of construction permits requiring them to have a reliable indication of the water level in associated 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.

Response

The certified ABWR design includes reliable level and temperature monitors in the SFP that provide indication and annunciation via the process computer ~~and annunciate~~ 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.~~vital 120 VAC, normally powered by the Plant Investment Protection (PIP) buses,~~

~~which are backed-up by the Combustion Turbine Generator (CTG) as described in 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:

   1.6 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 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 32 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.

   In addition, the instrument channel design will provide for quick and accessible power connections from alternate sources independent of the plant AC and DC power distribution systems. This design will also allow for isolating the instrument channels from their normal power supplies. The independent alternate sources used for instrument channel power will have sufficient capacity to maintain the level indication function until offsite resource capability is reasonably assured. These power supplies will be stored in diverse robust structures.

01.05-9

Based on the public telephone call with STP on January 16, 2013, the staff was informed that STP plans to place one diesel driven fire water pump in each unit with respect to NTTF Recommendation 4.2 External Events, in the context of high winds at beyond design basis wind speeds. Each diesel driven fire water pump will be housed in the Reactor Building (a Cat 1 structure). The staff is requesting STP to document in the FSAR:

(1) that one diesel driven fire water pump will be housed in each unit, in the Reactor Building; And

(2) clarify whether both diesel driven fire water pumps will be included in the Reliability Assurance Program (RAP). One diesel driven fire water pump is already included in the RAP as described in Chapter 19. If the applicant does not propose to include both diesel driven fire water pumps in the RAP, please justify why this is appropriate.

Response

FSAR Part 2 Tier 2, Appendix 1E, Section 1E.2.4 "Mitigating Strategies for Beyond Design Basis Events (4.2)" was revised in COLA Revision 9 as shown below to reflect that one pump will be stored in a safety related structure in each unit and that both pumps will be included in the DRAP.

1E.2.4 Mitigating Strategies for Beyond Design Basis Events (4.2)

STP 3 & 4 incorporates three staged AC independent portable pumping systems:

- Two pumps (a fire truck and a trailer mounted portable pump) shared between STP 3 & 4 provide core, SFP, and containment cooling water to the RHR system via the ACIWA system. ~~(~~Operation of the ACIWA system is discussed in DCD Subsection 5.4.7.1.1.10~~)~~.
  – The fire truck is stored in the Turbine Building Truck Bay and is protected from site hazards with the exception of floods.

  – The trailer mounted portable diesel-driven pump is stored in a Seismic Category I structure as required for protection from severe weather events (FSAR Subsection 19.4.6). In addition, one of the two diesel driven pumps to be procured in accordance with FLEX guidance will be stored in a seismic Category I structure. These pumps will be included in the DRAP.

- One trailer mounted pump shared between STP 1, 2, 3, & 4 provides water in the event of the loss of large areas of the plant (Part 11, Subsection 5.1.2).

  – This trailer mounted pump is protected primarily by distance.

- In addition to the above pumps, two additional portable high capacity pumps will be procured as described in the paragraph below. This will result in one high capacity portable trailer mounted diesel driven pump stored in a safety related structure in each unit, two fire trucks stored in a turbine building, and one trailer mounted diesel driven pump shared between the four units.

STP 3 & 4 is monitoring the development of the industry FLEX program (Reference 1E-3) and will implement applicable portions of the program. This industry program is developing diverse and flexible mitigation strategies to address extended loss of power and loss of ultimate heat sink that will increase the defense-in-depth for beyond design basis scenarios. This includes procurement of additional onsite portable equipment that will be stored in robust structures (as defined in NEI 12-06) at diverse locations and be capable of being used to assist in mitigating beyond design basis events. Equipment to be procured includes:

- Two diesel driven high capacity pumps (one/unit) one of which will be required to be kept in a Seismic Category I structure
- Six portable diesel generators (three/unit)
- Four portable DC power supplies (two/unit)
- ~~Four~~ Eight handheld satellite phones (~~two~~ four/unit)
- Various hoses, fittings, cables, and jumpers necessary to connect the above equipment

01.05-10

Based on the public telephone call with STP on January 16, 2013, the staff was informed that STP agreed to remove the following statements regarding NTTF 2.1 on External Flooding from the response to RAI 01.05-1 and the associated FSAR content, since there was no engineering analysis to support the statements.

"Additionally, an MCR breach is highly improbable because:

· Overtopping of the embankment is not possible due to very large freeboard:

· An MCR embankment failure at any point except a very small portion of the 12.4 mile embankment perimeter has no impact on site structures "

The staff requests the applicant to confirm that these statements are removed from STP's response to NTTF 2.1 on External Flooding that is contained in the response to RAI 01.05-1 and the FSAR.

Response

FSAR Part 2 Tier 2, Appendix 1E, Section 1E.2.1.2 "Flooding" was revised in COLA, Revision 9 as shown below to remove the requested statements.

1E.2.1.2 Flooding

Conservatisms in the STP 3 & 4 analyses of possible flooding resulting from these events and the plant design minimize the likelihood of even a small increase in flooding level. The postulated MCR embankment breach has been determined to be the design basis flood (DBF) for STP 3 & 4. Very conservative assumptions regarding both the maximum breach size and the speed at which the breech occurs make it highly improbable that the predicted flood level could be exceeded during an actual MCR breach. MCR embankment breach analysis is described in FSAR Subsection 2.4S.4.2.2.~~Additionally, an MCR breach is highly improbable because:~~

- ~~Overtoppping of the embankment is not possible due to very large freeboard:~~
  ~~—MCR minimum embankment height is 65.8 feet MSL;~~

  ~~—MCR operating level is less than 49 feet MSL;~~

  ~~—Maximum MCR level during a concurrent Probable Maximum Precipitation (PMP) event is 52.6 feet MSL.~~

- ~~The potential for a seismic induced MCR embankment failure is negligible because of both the embankment design and the low potential for significant seismic activity in the site vicinity.~~

- ~~An MCR embankment failure at any point except a very small portion of the 12.4 mile embankment perimeter has no impact on site structures.~~

Although the above discussion demonstrates the improbability of a flood exceeding the design basis flood levels, STP 3 & 4 also performed an analysis to determine at what flood level (Cliff Edge) the ability to cool the core would be lost. Although unachievable in any realistic scenario, this level demonstrates the margin beyond design that is built into STP 3 & 4. The flood level that the EDGs would be lost, and therefore, the ability to cool the core would be lost, was determined to be 51 feet.

~~MCR embankment breach analysis is described in Subsection 2.4S.4.2.2.~~