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July 31, 2013
U7-C-NINA-NRC-130043

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 NRC staff questions in Request for Additional Information (RAI) letter numbers 430, 431, 432, 433, and 434 related to SRP Section 1.05. The attachments to this letter contain the responses to the following RAI questions:

01.05-16	01.05-17	01.05-18	01.05-19	01.05-20

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 7/31/13

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

Attachments:

1) RAI 01.05-16
2) RAI 01.05-17
3) RAI 01.05-18
4) RAI 01.05-19
5) RAI 01.05-20

D091
NRO

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(paper copy)

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01.05-16

Question

In regards to the response to RAI 01.05-5, the staff reviewed the applicant's response and determined that the response is insufficient to completely address the staff's concerns. The NRC staff needs sufficient 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-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (ML12229A174), dated August 29, 2012 that endorses the Nuclear Energy Institute (NEI) 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide". The ISG provides an acceptable method for satisfying Order EA-12-049. As stated in the ISG, other methods may be used to satisfy Order EA-12-049, 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.

- Provide references to calculations that provide bases for events and decisions stated throughout the document for the staff to be able to audit them, if needed. For example, provide references to supporting calculations for that the steam driven RCIC will operate for 36 hours" (p. 21) and that the COPS rupture disk opens at 20 hours into the event" (p.22).

Response

Calculation NSO-2013-000311/PSNN-2013-0513 provides the bases for the events and decisions documented in the STP 3 & 4 ABWR FLEX Integrated Plan. This calculation will be made available for NRC staff review at the audit scheduled for August 1 through September 13, 2013 (ML13189A249).

01.05-17

Question:

In regards to the response to RAI 01.05-5, the staff reviewed the applicant's response and determined that the response is insufficient to completely address the staff's concerns. The NRC staff needs sufficient 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-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (ML12229A174), dated August 29, 2012 that endorses the Nuclear Energy Institute (NEI) 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide". The ISG provides an acceptable method for satisfying Order EA-12-049. As stated in the ISG, other methods may be used to satisfy Order EA-12-049, 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.

Should the accident progress or conditions worsen, confirm that containment can be isolated to control release of radioactivity to the environment.

a. State whether the solenoids for the vent line isolation values operate on DC or AC power. If they operate on AC power, state how they are going to be operated under extended loss of AC power, if needed.

b. ABWR FSAR Tier 2 Section 6.2.4.3.2.2.2.3 states that containment vent isolation valves "close on the following signals: high drywell pressure, RPV low water level 3, and high radioactivity in the purge and vent exhaust line." However, the essential containment instrumentation listed (e.g., pp. 31 and 34) does not include instrumentation for measuring radioactivity. Without such a measurement, justify how containment is to be isolated on high radioactivity in the purge and vent exhaust line, if needed.

Response

Item 1: Confirm that containment can be isolated to control release of radioactivity to the environment should the accident progress or conditions worsen.

The STP 3&4 ABWR FLEX Integrated Plan (FLEX Plan) describes mitigation strategies that increase defense-in-depth for a beyond-design basis external event (BDBEE) including an Extended Loss of AC power (ELAP) and loss of normal access to the ultimate heat sink (LUHS). The FLEX Plan does not require that the containment be isolated to control release of radioactivity during the ELAP and LUHS and specifically requires that the Containment Overpressure Protection System (COPS) remain in service until core and containment cooling have been restored.

During Phase I of the response to an ELAP and LUHS, normal methods of core and containment cooling are not available and suppression pool temperature and pressure will increase until the

COPS rupture disks open at a nominal pressure of approximately 90 psig (FSAR 6.2.5.2.6.3). There is no other mechanism to remove heat from the containment other than venting steam through the COPS. Use of the COPS to cool the containment will continue throughout Phase I and Phase III until other methods of core and containment cooling are established.

As explained in ABWR DCD 6.2.5.2.6.2, venting steam using the COPS does allow the release of radioactivity to the environment; however, the use of the COPS during an ELAP and LUHS significantly reduces the potential for containment structural failure, which would result in a much larger release of radioactivity. Therefore, the COPS would not be isolated to control release of radioactivity to the environment in order to prevent containment structural failure, especially if the accident progresses or conditions worsen. In order to minimize the release of radioactivity through the COPS, the COPS release point is from the wetwell airspace. This ensures that fission products are directed to the suppression pool via the SRVs, scrubbing any potential release. As explained in DCD 6.2.5.2.6.9, offsite dose during a severe accident is reduced because of the COPS.

The COPS does include provisions to isolate the venting path if required after the plant is stable (FSAR Subsection 6.2.5.2.1) following restoration of core and containment cooling. COPS isolation valves, T31-F007 and T31-F010, are shown in DCD Figure 6.2-39, Atmospheric Control System P&ID (Sheet 1 of 3), and the COPS isolation function is described in ABWR DCD Section 6.2.5.2.6.1.

Item 2: State whether the solenoids for the vent line isolation values operate on DC or AC power. If they operate on AC power, state how they are going to be operated under extended loss of AC power, if needed.

COPS isolation valves, T31-F007 and T31-F010, are shown on DCD Figure 6.2-39 as normally open, fail open, air operated butterfly valves that are controlled by electric solenoids. ABWR DCD 6.2.5.2.6.1, Item (6), states that the solenoids for COPS isolation valves, T31-F007 and T31-F010, are DC powered; however, STD DEP 6.2-3 changed the power source of these solenoids to "vital AC (VAC)." The vital AC (VAC) system provides a source of 120 Volt uninterruptible power that is normally supplied from the Class 1E 125V DC system. The Class 1E 125V DC system would be powered from the Class 1E batteries during Phase I of the FLEX Plan and by the Class 1E battery chargers during Phase III of the FLEX Plan.

COPS isolation valves, F007 and F010, must remain open throughout both Phase I and Phase III of the FLEX Plan response to an ELAP and LUHS. DCD Figure 6.2-39, Note 10, also specifies that the COPS isolation valves "are not provided with an isolation signal" and that "Control switches should be locked open." These design requirements are consistent with the design objective of the COPS isolation valves which, as described in the response to Item 1, is that the COPS isolation valves, T31-F007 and T31-F010, will not be operated (i.e., closed) at any time during an extended loss of AC power until core and containment cooling are restored.

Item 3: ABWR FSAR Tier 2 Section 6.2.4.3.2.2.2.3 states that containment vent isolation valves "close on the following signals: high drywell pressure, RPV low water level 3, and high radioactivity in the purge and vent exhaust line." However, the essential containment

instrumentation listed (e.g., pp. 31 and 34) does not include instrumentation for measuring radioactivity. Without such a measurement, justify how containment is to be isolated on high radioactivity in the purge and vent exhaust line, if needed.

The STP 3&4 ABWR FLEX Integrated Plan (FLEX Plan) "list instrumentation credited for this coping evaluation phase" (page 31) and "list instrumentation credited or recovered for this coping evaluation" (page 34) do not include instrumentation for measuring radioactivity because the FLEX Plan does not assume or require that the containment is isolated on high radioactivity in the purge and vent exhaust line. As stated in the response to Items 1 and 2, the COPS remains in service throughout Phase I and Phase III to provide containment cooling and minimize the potential for containment structural failure during an ELAP and LUHS.

ABWR FSAR Tier 2 Section 6.2.4.3.2.2.2.3 describes ACS isolation valves other than the COPS. These ACS containment isolation valves do "close on the high drywell pressure, RPV low water level 3, and high radioactivity in the purge and vent exhaust line." These ACS containment isolation valves would receive an isolation signal from one or more isolation signals early in Phase I of the FLEX Plan. ABWR FSAR Tier 2 Section 6.2.4.3.2.2.2.3 does not include any discussion of the COPS. DCD Figure 6.2-39, Atmospheric Control System P&ID (Sheet 1 of 3), also indicates that ACS valves, other than COPS, close on isolation signals described in DCD 6.2.4.3.2.2.2.3. However, DCD Figure 6.2-39, Note 10, specifies that the COPS isolation valves "are not provided with an isolation signal," which is consistent with the design function of the COPS.

01.05-18

Question

In regards to the response to RAI 01.05-5, the staff reviewed the applicant's response and determined that the response is insufficient to completely address the staff's concerns. The NRC staff needs sufficient 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-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (ML12229A174), dated August 29, 2012 that endorses the Nuclear Energy Institute (NEI) 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide". The ISG provides an acceptable method for satisfying Order EA-12-049. As stated in the ISG, other methods may be used to satisfy Order EA-12-049, 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.

- In Mode 5, the reactor vessel will be open to the Secondary Containment Building. Confirm that a means is provided to isolate the containment if the need arises and describe the approach to achieve the function.

Response

STP 3 & 4 Technical Specifications Limiting Condition for Operation 3.6.4.1 requires that the secondary containment will be OPERABLE in Mode 5 during movement of irradiated fuel in the secondary containment, during core alterations, and during operations with the potential for draining the reactor vessel. As such, during these periods the secondary containment will be isolated. At all other times in Mode 5 the secondary containment is not required to be OPERABLE.

As described in FSAR section 13.5.3.1 "Plant Operating Procedure Development Plan", Emergency Operating Procedures and Abnormal Operating procedures will be developed prior to fuel load and will be inspected as part of the operational programs inspection. Procedures to respond to acts of nature (e.g., Tornado, flood, dam failure, earthquake) [FSAR 13.5.3.4.7(22)] are required as part of the Abnormal Operating Procedures. Response to a loss of all AC power is a required part of the Emergency Operating Procedures (FSAR 13.5.3.2). The operating procedures to respond to an Extended Loss of AC Power (ELAP) will provide a method to close the secondary containment. This closure process will close all doors, hatches, and openings able to be closed and cover or otherwise limit flow through any other openings not in working condition depending on the state of the opening.

01.05-19

Question

In regards to the response to RAI 01.05-5, the staff reviewed the applicant's response and determined that the response is insufficient to completely address the staff's concerns. The NRC staff needs sufficient 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-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (ML12229A174), dated August 29, 2012 that endorses the Nuclear Energy Institute (NEI) 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide". The ISG provides an acceptable method for satisfying Order EA-12-049. As stated in the ISG, other methods may be used to satisfy Order EA-12-049, 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.

The essential containment instrumentation listed (e.g., pp. 31 and 34) does not include instrumentation for measuring drywell temperature. Provide the basis for concluding that monitoring drywell temperature is not required for purposes such as validating the qualification range of measurement instruments located in the drywell or establishing the survivability of penetration seals or other equipment.

Response

DCD Section 3I (Equipment Qualification Environmental Design Criteria) specifies the minimum set of plant environmental conditions, which envelope the actual environments expected over the plant life, for which safety-related systems and equipment are to be designed and qualified. Equipment in the drywell is to be designed and qualified for 171 degrees Celsius (339.8 degrees F).

FSAR Section 3.11.6.1 "Environmental Qualification Document (EQD)" specifies that the EQD will summarize the qualification results of all safety-related electrical and mechanical equipment located in harsh environments and that it will be made available for NRC review as part of the ITAAC for basic configuration of components as provided in DCD Tier 1, Section 1.2.

Calculation NSO-2013-000311/PSNN-2013-0513, which will be made available for NRC staff review at the audit scheduled for August 1 through September 13, 2013, documents that the maximum drywell temperature expected during an ELAP condition is approximately 332 degrees F. Since this temperature is less than the containment equipment design temperature, the penetration seals, instrumentation, and other equipment in the drywell will remain functional during ELAP conditions and monitoring of drywell temperature to validate equipment survivability is unnecessary.

01.05-20

Question

In regards to the response to RAI 01.05-5, the staff reviewed the applicant's response and determined that the response is insufficient to completely address the staff's concerns. The NRC staff needs sufficient 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-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (ML12229A174), dated August 29, 2012 that endorses the Nuclear Energy Institute (NEI) 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide". The ISG provides an acceptable method for satisfying Order EA-12-049. As stated in the ISG, other methods may be used to satisfy Order EA-12-049, 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.

• Define "SAFER team" as stated on p. 19 and state how it is established and document in the FSAR the relevant regulatory commitments associated with this team.

Response

The Strategic Alliance for FLEX Emergency Response (SAFER) team is an alliance between Pooled Equipment Inventory Company (PEICo) and AREVA which has been selected by the Nuclear Strategic Issues Advisory Committee (NSIAC) to provide two offsite regional response centers for the nuclear industry in the United States.

A "SAFER Fukushima Workshop," which was attended by NRC staff, was conducted in Baltimore, Maryland on June 11, 2013, to review the development of the FLEX Regional Response Center Playbook.

The STP 3 & 4 ABWR FLEX Integrated Plan, which is included by reference in the FSAR, documents that an agreement between STP 3 & 4 and the Regional Response Center will be developed (FLEX Playbook) to define specific equipment required for the site, the priority of delivery of the equipment, and the delivery logistics for the equipment (see Page 17 of the FLEX Plan).