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March 19, 2014
U7-C-NINA-NRC-140002

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 is the Nuclear Innovation North America, LLC (NINA) response to the NRC staff questions in Request for Additional Information (RAI) letter number 443 related to SRP Section 1.05. The attachment to this letter contains the responses to the following RAI questions:

01.05-24 01.05-25 01.05-26 01.05-27 01.05-28


Where there are COLA markups, they will be made at the first routine COLA update 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 3/19/14


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

Attachment:
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DO91
NRO

cc: w/o attachment except*
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RAI 01.05-24**QUESTION:**

The NRC staff requests that the STP COL applicant describe the performance requirements as part of the mitigation strategies for a BDBEE at STP Units 3 & 4 as follows:

- a) Existing and future safety-related pumps, valves, and dynamic restraints that will be utilized in STP Units 3 & 4 as part of the mitigation strategies for an extended loss of AC power event;
- b) Existing and future non safety-related pumps, valves, and dynamic restraints that will be utilized in STP Units 3 & 4 as part of the mitigation strategies for an extended loss of AC power event; and
- c) Any portable equipment such as pumps and valves that will be utilized in STP Units 3 & 4 as part of the mitigation strategies for an extended loss of AC power event.

RESPONSE:

- a. As documented in the STP 3 & 4 ABWR FLEX Integrated Plan, all safety related pumps, valves, and dynamic restraints utilized as part of the mitigation strategies for an ELAP are permanently installed plant equipment. The performance requirements for these components are discussed in DCD/FSAR Chapters 3, 5.4.6, 6 and Appendix 1E. These requirements will not be exceeded during implementation of the strategies discussed in FSAR Appendix 1E, Subsection 1E.2.4 and the STP 3 & 4 ABWR FLEX Integrated Plan, except as noted below. Some items that were specifically considered were:
 - 1) Battery room ventilation and the battery chargers will be lost at the beginning of the event. A deep load shed will be performed within the first hour of the event. Battery room temperature will remain acceptable since the battery discharge rate will be low and no charging causing hydrogen generation will be occurring.
 - 2) RCIC will operate within the design and performance requirements listed; however, the suction temperature while connected to the suppression pool will be allowed to increase to 250°F, which is the qualification temperature for the limiting component (bearings). RCIC NPSH for FLEX operation has been evaluated to meet existing requirements based on suppression pool pressure, temperature and level generated during the event. ASME maximum stress values are unchanged throughout this range of operating temperatures.

Since RCIC suction temperature will exceed the suction and discharge design temperature for approximately 6 hours; piping expansion calculations will be performed at 250°F instead of 77°C (170.6°F), consistent with item (7) of DCD Table 5.4-2. Therefore, FSAR Appendix 1E, Subsection 2.4, "Mitigating Strategies for Beyond Design Basis Events (4.2)" will be revised to include this design requirement in the next routine revision of the COLA as shown below in shaded text.

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

To support the implementation of the FLEX Plan, the following system design requirements will be incorporated into the STP Units 3&4 final design:

- RCIC piping expansion calculations will be performed at 250°F.

- 3) Valves, piping, and instrumentation will operate within the performance requirements.
- b. All non-safety-related pumps, valves, and dynamic restraints utilized as part of the mitigation strategies for an ELAP are permanently installed plant equipment. The performance requirements for these components are discussed in DCD/FSAR Chapters 3, 5, 6, 9.5.1 and Appendix 1E. These requirements will not be exceeded during implementation of strategies discussed in FSAR Appendix 1E, Subsection 1E.2.4 and the STP 3 & 4 ABWR FLEX Integrated Plan. Some items that were specifically considered were:
- 1) The fire protection system pumps, valves, and piping will operate within the listed performance requirements.
 - 2) DCD Section 5.4.7.1.1.10.3, ACIWA Flow Rate, states that the flow rate supplied by the ACIWA mode of the RHR System is between 0.04 m³/sec (634 gpm) at a back pressure equal to the COPS set point and 0.06 m³/sec (951 gpm) for no containment back pressure. The required ACIWA flow rate for a single unit is 230 gpm at 11 hours and 165 gpm at 36 hours. Therefore, the single ACIWA diesel driven pump is capable of supplying the required flow rate to maintain vessel level for both units throughout ACIWA portion of the makeup. Note that ACIWA is not required until much later in the event timeline. Operation of the ACIWA system is discussed in DCD Subsection 5.4.7.1.1.10.
- c. The only portable pumps that will be utilized in STP Units 3 & 4 as part of the mitigation strategies for an extended loss of AC power event are two portable pumps used to transfer fuel oil to the ACIWA fuel oil storage tank from the Emergency Diesel Generator (EDG) fuel oil storage tanks. These will be a commercial grade component and will be procured to provide sufficient head and flow for the application based on the as-built condition. It is expected that the pump application requirements would require a vane type positive displacement pump with at least a 100 foot head and 5 GPM flow rate which is readily available commercially. As stated in the FLEX Integrated Plan, they will be stored inside an EDG fuel oil storage tank vault. The additional pumps discussed in FSAR Appendix 1E, Subsection 2.4 are "defense in depth" equipment and are not credited in the FLEX Integrated Plan.

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RAI 01.06-25**QUESTION:**

The NRC staff requests that the STP COL applicant describe the provisions for design, manufacture, testing, installation, and surveillance to provide assurance of the seismic, environmental, and functional capability of existing and future safety-related pumps, valves, and dynamic restraints to perform their intended functions as part of the mitigation strategies for an extended loss of AC power event at STP Units 3 & 4. As part of this request, the STP COL applicant should indicate whether any safety-related pumps, valves, and dynamic restraints used as part of the mitigation strategies for an extended loss of AC power event will have performance requirements that differ from their original design and performance specification (such as differences in pump net positive suction head available).

RESPONSE

All safety related pumps, valves, and dynamic restraints utilized as part of the mitigation strategies for an ELAP are permanently installed plant equipment. The design, manufacture, testing, installation, and surveillance to provide assurance of the seismic, environmental, and functional capability requirements for these components are discussed in DCD/FSAR Chapters 3, 5, 6 and Appendix 1E. There are no additional components in this category to be installed in the future. The operation of these components during normal and emergency conditions is described in the DCD/FSAR. RCIC will be operated manually during this event. Manual operation will not change the performance requirements for the system. No performance requirements that differ from their original design and performance specification will be necessary since these requirements will not be exceeded during implementation of strategies discussed in FSAR Appendix 1E, Subsection 1E.2.4 and the STP 3 & 4 ABWR FLEX Integrated Plan. Some items that were specifically considered were:

- 1) Battery room ventilation and the battery chargers will be lost at the beginning of the event. A deep load shed of DC loads will be performed within the first hour of the event. Battery performance will remain acceptable since the battery discharge rate will be low and no charging causing hydrogen generation will be occurring.
- 2) RCIC will operate within the design and performance requirements listed, however while connected to the suppression pool, the suction temperature will be allowed to increase to 250°F, which is the qualification temperature for the limiting component (bearings). NINA has evaluated the NPSH for this condition and found it acceptable based on using containment overpressure generated during the event. With the elevated suction temperature RCIC will perform within the requirements. Once suction is shifted to the Condensate Storage Tank, NPSH ceases to be a concern.
- 3) Valves, piping, and instrumentation will operate with the design and performance requirements.

Testing of the safety related equipment is performed in accordance with the requirements of the Technical Specifications and the Maintenance Rule Program.

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01.05-26**QUESTION:**

The NRC staff requests that the STP COL applicant describe the provisions for design, manufacture, testing, installation, and surveillance to provide assurance of the seismic, environmental, and functional capability of existing and future non safety-related pumps, valves, and dynamic restraints to perform their intended functions as part of the mitigation strategies for an extended loss of AC power event at STP Units 3 & 4.

RESPONSE:

All non-safety related pumps, valves, and dynamic restraints utilized as part of the mitigation strategies for an ELAP are permanently installed plant equipment and part of the AC Independent Water Addition System that is part of the Fire Protection System. The design, manufacture, testing, installation, and surveillance requirements for these components are discussed in DCD/FSAR Chapter 3, Subsection 9.5.1 and FSAR Appendix 1E. There are no additional components to be installed in the future. The operation of these components during normal and emergency conditions is described in DCD Subsection 5.4.7.1.1.10.

Testing of this non-safety related equipment is performed in accordance with the requirements of the AC Independent Water Addition System, the Fire Protection Program, and the Maintenance Rule Program. The important-to-safety AC Independent Water Addition System and Fire Protection System are included in the Design Reliability Assurance Program (DRAP) and within scope for the Maintenance Rule.

RAI 01.05-27**QUESTION:**

The NRC staff requests that the STP COL applicant describe the provisions for design, manufacture, testing, installation, and surveillance to provide assurance of the seismic, environmental, and functional capability of portable pumps, valves, and dynamic restraints that are part of the mitigation strategies for an extended loss of AC power event at STP Units 3 & 4

RESPONSE:

The only portable equipment utilized in STP Units 3 & 4 as part of the mitigation strategies for an extended loss of AC power event are two 120 volt pumps used to transfer fuel oil to the ACIWA fuel tank from the EDG fuel oil storage tanks. This will be a commercial grade component procured to meet the as-built design requirements for transferring fuel from an EDG Fuel Oil Storage Tank to the Fire Protection System Fuel Oil Storage Tank during Phase 3. As stated in the FLEX Integrated Plan, they will be mounted and stored inside an EDG fuel oil storage tank vault.

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These pumps will be procured in accordance with the requirements of the STP 3 & 4 Quality Assurance Program Description, specifically in Sections 4 and 7. The detailed procedures regarding determining the critical characteristics that ensure a commercial grade item is suitable for its intended use, technical evaluation of the item, receipt requirements, and quality evaluation of the item will be developed during implementation of Operational Programs as discussed in FSAR Section 13.4S and as stipulated in STP 3 & 4 Quality Assurance Program Description, Subsection 7.2.

RAI 01.05-28

QUESTION:

Consistent with the provisions for the specific operational programs listed in STP Units 3 & 4 FSAR Tier 2, Section 13.4S, "Operational Program Implementation," the NRC staff requests that the STP COL applicant provide a description of the operational program referenced in Appendix 1E to the STP Units 3 & 4 FSAR, Tier 2, and the STP Units 3 & 4 FLEX Integrated Plan, that will provide assurance of the functional capability of the pumps, valves, and dynamic restraints used in the mitigation strategies for an extended loss of AC power event at STP Units 3 & 4. In that Appendix 1E, Section 1E2.4 references the operational programs in FSAR Section 13.4S, the staff requests the STP COL applicant to indicate whether the planned operational program to mitigate BDBEEs will be specified in STP Units 3 & 4, FSAR Tier 2, Table 13.4S-1, "Operational Programs Required by NRC Regulation and Program Implementation," with a milestone for implementation.

RESPONSE:

NRC Order 12-049 requires licensees to develop, implement, and maintain guidance and strategies to mitigate BDBEEs. It does not require licensees to develop an Operational Program.

The information in FSAR table 13.4S references Operational Programs required by regulation as defined in SECY 05-0197. As the guidance and strategies for mitigating a BDBEE are not an Operational Program, it is inappropriate to include them in Table 13.4S. The reference to Table 13.4S in FSAR Appendix 1E and the integrated plan is primarily relative to the licensed and non-licensed operator training programs and maintenance rule program. The procedures, guidance and strategies to mitigate a BDBEE, which will be developed in accordance with FSAR Section 13.5, will be utilized during the licensed and non-licensed operator training programs. The Operational Programs listed below (Reference FSAR Section 13.4S) will provide assurance of the functional capability of the pumps, valves, and dynamic restraints used in the mitigation strategies for an extended loss of AC power event at STP Units 3 & 4. Therefore, an additional Operational Program is not needed.

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Item	Program Title	Program Source (Required By)	FSAR (SRP) Section
8	Fire Protection Program	10 CFR 50.48	9.5.1
11	Non-Licensed Plant Staff Training Program	10 CFR 50.120 10 CFR 52.78	13.2.2
12	Reactor Operator Training Program	10 CFR 55.13 10 CFR 55.31 10 CFR 55.41 10 CFR 55.43 10 CFR 55.45	13.2.1
13	Reactor Operator Requalification Program	10 CFR 50.34(b) 10 CFR 50.54(i) 10 CFR 55.59	13.2.1
16	Quality Assurance Program - Operation	10 CFR 50.54(a) 10 CFR 50, App A (GDC 1) 10 CFR 50, App B	17.5S
17	Maintenance Rule	10 CFR 50.65	17.6S
18	Motor-Operated Valve Testing	10 CFR 50.55a(b)(3)(ii)	3.9.6
19	Initial Test Program	10 CFR 50.34 10 CFR 52.79(a)(28)	14.2S

In addition, NINA proposed a License Condition (U7-C-NINA-NRC 130060 dated November 19, 2013) regarding the development and implementation of the guidance, strategies, and programs necessary to comply with the requirements of NRC Order 12-049 which has subsequently been modified (U7-C-NINA-NRC-140003) to include items e, f, g, and h. below based on Staff feedback. The complete proposed license condition is repeated here for ease of review.

PROPOSED LICENSE CONDITION:

Prior to initial fuel load, the following requirements will be addressed using the guidance contained in 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, Revision 0 (August 29, 2012):

- a. An administrative program will be developed for configuration control, maintenance and testing of the equipment used in the strategies to mitigate beyond-design-basis external events, as described in Final Safety Analysis Report (FSAR) Appendix 1E.2.4. This program will establish requirements for Preventative Maintenance (PM) activities and inventories and will include testing procedures and frequencies.
- b. Guidance and strategies to maintain or restore core cooling, containment and spent fuel pool cooling capabilities following a beyond-design-basis external event will be developed, implemented, and maintained. The guidance will include appropriate interfaces between the

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various accident mitigation procedures and guidelines so that the overall strategies are coherent and comprehensive.

- c. A Training Program will be developed using the Systematic Approach to Training (SAT) to evaluate required training for station personnel based upon plant equipment and procedures that result from implementation of the strategies.
- d. The basic configuration of the system design requirements to support FLEX implementation as stated in FSAR, Appendix 1E.2.4 are installed, and the documented results of inspections confirm that the system design requirements have been implemented as discussed in FSAR, Appendix 1E.2.4.
- e. Analyses will be performed to verify that the RCIC Room habitability and equipment functionality are acceptable under extended loss of AC power conditions for completion of mitigating strategy functions during Phase 1 as discussed in FSAR Appendix 1E.

The habitability analysis of the heat-up of the RCIC room during an ELAP will confirm that the temperature will not prevent completion of the intermittent required operator actions. The acceptance criteria used for this analysis will utilize the guidance contained in NUREG/CR-6146 "Local Control Stations: Human Engineering Issues and Insights" Table D-2.

The equipment functionality analysis will also confirm that the RCIC room temperature will not exceed the maximum temperature at which the equipment can meet the FLEX Integrated Plan requirements using the environmental qualification of the equipment as the acceptance criteria (Reference DCD Chapter 3, Appendix 3I)

- f. Analyses will be performed to verify that the Remote Shutdown System (RSS) room habitability and equipment functionality are acceptable under extended loss of AC power conditions for completion of mitigating strategy functions during Phase 1 and that the Control Room (CR) habitability and equipment functionality are acceptable during Phase 3 as discussed in FSAR Appendix 1E.

The habitability analysis of the heat-up of the RSS room in Phase 1 and the CR in Phase 3 during an ELAP will confirm that the temperature will not prevent completion of the required operator actions. The acceptance criteria used for this analysis will utilize the guidance contained in NUREG/CR-6146 "Local Control Stations: Human Engineering Issues and Insights" Table D-2.

The equipment functionality analysis will also confirm that the RSS room temperature and CR room temperature will not exceed the maximum temperature at which the equipment can meet the FLEX Integrated Plan requirements using the environmental qualification of the equipment as the acceptance criteria (Reference DCD Chapter 3, Appendix 1I).

- g. The administrative program, guidance and strategies, training program, and procedures developed for the implementation of the mitigating strategies will include provisions to respond to multi-unit events.

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- h. The procedures developed to implement the mitigating strategies will address implementation in all plant operating modes.

An overall integrated plan will be developed 180 days prior to initial fuel load, including a description of how compliance with the requirements described in this license condition will be achieved.