UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
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April 19, 2022

Ms. Patricia L. Skibbee
Board President
C-10 Research and Education Foundation
11 Chestnut Street
Amesbury, MA 01913

Dear Ms. Skibbee:

On behalf of the U.S. Nuclear Regulatory Commission (NRC), I am responding to your email to the Seabrook Senior Resident Inspector on March 9, 2022, in which you requested responses to several questions and concerns regarding the fourth quarter 2021 integrated inspection report (ADAMS Accession Number ML22040A204). Responses to the specific questions are enclosed.

Sincerely,

Matthew R. Young

Digitally signed by Matthew R. Young
Date: 2022.04.19 09:35:22 -04'00'

Matt R. Young, Chief
Projects Branch 2
Division of Operating Reactor Safety

Enclosure:
As stated

Letter to P. Skibbee from M. Young dated April 19, 2022

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**U.S. Nuclear Regulatory Commission**
**Response to Questions in the March 9, 2022, memorandum and email**

As you requested, we are responding in writing to eight of the 17 questions you submitted to us. We discussed the others during a telephone conversation on April 7.

*Q1a. Was the cause of the initial failure ever determined? Was it an electrical issue due to faulty wiring? Was faulty wiring due to moisture penetration due to ASR? Was the cause an equipment failure? Are vendor(s) on call for repairing/replacing this system?*

The cause of the initial failure was a failing voltage regulating module for the specific fire zone (RHR pump room, Zone #3) which consists of two smoke detectors. The RHR vaults contain one control panel with 10 zones (5 zones per vault). Each zone has a voltage regulating module that supplies 240 Volts of direct current (Vdc) to the associated detectors. Upon troubleshooting, the output voltage for the regulating module was found to be less than 45 Vdc. The fire detection system is a supervised system meaning that when the voltage module failed a trouble alarm was generated which provided trouble indication to the control room. The cause of the failed voltage regulating module was most likely due to normal component aging. The failure was not due to faulty wiring or water penetration into wiring.

The station does have vendor contacts and routinely works with various vendors for fire detector and system upgrades. Plant maintenance technicians are also trained and qualified to perform preventive and corrective maintenance and testing on the fire detection systems at Seabrook.

*Q1d. How advanced is ASR in the RHR system and how has the fire protection program been modified for this factor?*

The licensee has previously analyzed the impacts of ASR and ASR-related building deformation on the RHR vaults in a formal structural evaluation. In accordance with the structures monitoring program, Seabrook personnel conduct routine formal walkdowns of the RHR vaults inspecting for equipment impacts. Additionally, the NRC resident inspectors routinely conduct plant status walkdowns of both vaults. To date, there have not been any ASR-related impacts identified in any component of the fire protection systems in the RHR vaults. No modifications to the fire protection systems in the RHR vaults have been needed.

*Q2a. Although the most likely source of the water was the "refueling cavity" and "based upon the high pH, the observed surface corrosion did not have unacceptable effect on the structural integrity of the containment", in fact, no genuine assessment has yet taken place. This issue from the Spring refueling outage 2020 was pushed to Fall 2021 and now is further deferred to Spring 2023 (OR22). At what point in time will the NRC require a valid assessment?*

The characterization of a deferral of assessments is not borne out by our inspection results. The licensee performed technical assessments in both the spring 2020 and fall 2021 refueling outages, which we then inspected and documented in NRC inspection reports. The assessment in the fall 2021 refueling outage was updated with new information collected as a result of corrective actions planned and completed by the licensee from the spring 2020 outage. The licensee has further plans to remove the caps of the containment leak chase liner system during the performance of the planned 15-year containment integrated leak rate test planned for

the next refueling outage in spring 2023. NRC inspectors continue to verify that the licensee follows the requirements described in the NRC regulations and ASME Code.

*Q2b. If, as noted, the surface corrosion of the containment liner is deemed to NOT be due to water most likely leaking from the refueling cavity, then what IS causing the "observed surface corrosion" of the liner and on what basis did the NRC determine that corrosion did not affect the integrity of the liner?*

NRC inspectors reviewed a sample of the licensee's visual inspections via borescope through the leak chase channel test connections as well as the licensee's documented corrosion analysis. The inspectors confirmed by inspection activities that there is water in the containment leak chase cavity system. The identified corrosion was limited to the surface of the metal and did not show any significant loss of material. The corrosion analysis supported this visual evidence and provided a reasonable basis for integrity of the metal liner. In reaching conclusions related to the adequacy of the licensee's assessment of integrity of the leak chases, the inspectors considered the results of their interviews with plant staff, their independent review of plant records showing visual examination results of portions of the leak chases, and water chemistry sample results. As stated in our inspection report, the inspectors considered, in particular, the chemistry results showing high water pH which would preclude significant corrosion of the liner metal. Additionally, the inspectors noted that continued augmented monitoring by NextEra staff was an appropriate corrective action to verify their conclusions that the source of the water was from the refueling cavity.

*Q3b. After the myriad of measuring and reporting failures by NextEra noted above, did the NRC staff complete their own 2021 data measurements on the CIS and compare them directly to NextEra's 2021 data results?*

NRC inspection activities documented in our fourth quarter 2021 NRC inspection report identified an instance where structural monitoring measurements of the Seabrook containment internal structure were not properly evaluated in accordance with the licensee's structural monitoring program. During the spring 2021 refueling outage, NRC inspectors conducted independent walkdowns of the containment internal structure area of containment. As part of this walkdown the inspectors independently took photographs and measurements of multiple areas of the structure. The inspectors' measurements were consistent with the licensee's documented data measurements.

*Q3e. Please define/quantify both "a reasonable" ASR expansion and the "indications observed" as noted above? Please provide the results of the "more detailed finite element analysis" conducted?*

"A reasonable ASR expansion" refers to the NRC's assessment that NextEra assumed an appropriate amount of expansion for the listed structures based on the identified indications of ASR to conclude the structures remained capable of performing as intended. "Indications observed" refers to two horizontal cracks (~1/8" at their widest points) in the reactor cavity pit East keyway cavity opening, a series of small horizontal cracks (~0.01") on the East wall of the North extension area, and bowing of a floor deck grating with spalling of adjacent cover concrete of the floor slab perpendicular to the East wall of the North extension area.

A more detailed finite element analysis (Stage 2 building deformation analysis) is currently being completed by the licensee and its engineering contractor. The NRC will perform a detailed review of this analysis and any associated corrective actions when completed. The results of our review will be documented in a future inspection report.

*Q4a. Why were NextEra's October 4, 2021 general area dose rates up to 150 mrem/hr (usually 6-8 mrem/hr) two days after the plant shutdown on October 2, 2021?*

A large portion of the components of both trains of the RHR system are housed within the RHR vaults. In addition to use as an emergency core cooling system during a large break loss of coolant accident to inject water into the core, the RHR system is used during outages in the shutdown cooling mode to circulate water through the reactor coolant system and remove decay heat from the fuel. During this mode of operation, activated wear products found within the reactor coolant system circulate through the piping and valves within the RHR vaults and increase the dose rates in the general vicinity.

*Q4b. What are the details for NextEra's Radiation Work permit 0101 for the 'A' and 'B' RHR vaults that were to be performed by the individual exposed to high radiation levels on October 5, 2021?*

Radiation Work Permit (RWP) 0101 is used for general management and inspector walkdowns during outages. Task 20 of the RWP, used by the individual on October 5, 2021, allows access to radiation and high radiation areas for inspector walkdowns, but cannot be used to perform physical work. The alarm setpoints associated with Task 20 were 10 mrem dose and 50 mrem/hr dose rate. The individual that is mentioned in the report was an NRC inspector performing walkdowns of the RHR system and upon exiting the area noted that they had received 4.2 mrem of dose with a maximum dose rate of 47 mrem/hr.