UNITED STATES
NUCLEAR REGULATORY COMMISSION
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July 29, 2019

MEMORANDUM TO: Kerri. A. Kavanagh, Chief
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Division of Inspection and Regional Support
Office of Nuclear Reactor Regulation

FROM: Dong Park, Reactor Operations Engineer **/RA/**
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SUBJECT: CLOSURE OF INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA RELATED FINDINGS FOR WESTINGHOUSE ELECTRIC COMPANY INSPECTION REPORT NO. 99900404/2011-201

The purpose of this memorandum is to document the U.S. Nuclear Regulatory Commission (NRC) staff's closure of the Open Item documented in Westinghouse Electric Company (hereafter referred to as WEC) Inspection Report No. 99900404/2011-201, dated September 27, 2011 (Agencywide Document Access and Management System (ADAMS) Accession No. 112440588).

During the weeks of June 20, June 27, and July 10, 2011, the NRC staff conducted an Engineering Design Verification Inspection of the Westinghouse AP1000 reactor design in Cranberry Township, PA.

In Inspection Report No. 99900404/2011-201, the NRC staff issued an Open Item 99900404/2011-201-05, which the NRC staff determined was material to the acceptance criteria of inspections, tests, analyses, and acceptance criteria (ITAAC) No. 2.2.03.08c.i.03 (179) from Revision 19 of the certified AP1000 Design Control Document.

Section 14.2.9.1.3 of the Design Control Document (DCD), states in part: "…The proper flow resistance of each of the in-containment refueling water storage tank injection lines is verified by gravity draining water from the tank through the direct vessel injection flow path, while measuring the water level (driving head) and discharge flow rate using temporary instrumentation. A test fixture with prototypical resistance may be used to simulate the squib valves in the flow paths tested."

The same requirements are also provided in ITAAC Table 2.2.3-4, item 8.c. Verifying the proper flow resistance in the in-containment refueling water storage tank (IRWST) injection line is important as it is an input to the overall accident analysis.

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The inspection team identified that the resistance of the IRWST injection lines was calculated with the assumption that the check valves would be fully open. The inspection team questioned the validity of this assumption since as the IRWST level decreases the available pressure may decrease and may be insufficient to maintain these valves in the full open position. WEC concurred with this concern and stated that a recent internal review had also identified a similar concern and that CAP IR 11-076-C001 was tracking its resolution. WEC further indicated that their evaluation had determined that these check valves will not be fully open even with a full IRWST. This issue was identified by the team as NRC Open Item 99900404/2011-201-05.

On May 19 and 20, 2016, the NRC conducted an inspection at WEC to review the corrective actions taken by WEC in response to the Open Item 99900404/2011-201-05. During this inspection, IR No. 99900404/2016-203, dated June 30, 2016 (ADAMS Accession No. ML16173A282), the NRC inspection team determined that WEC took corrective actions, but these corrective actions involved modifications to the design that were departures from the approved AP1000 Final Safety Analysis Report. In response to Open Item 99900404/2011-201-05, WEC updated the Passive Core Cooling System (PXS) check valve qualification requirements to address the partial open operating position of the PXS check valves following a design-basis event. The inspectors concluded that WEC had addressed the long-term performance of the PXS check valves in an acceptable manner. Based on this inspection, the portion of Open Item 99900404/2011-201-05 related to the PXS check valve qualification requirements was closed. The portion of Open Item 99900404/2011-201-05 related to the planned License Amendment Request (LAR) to correct ITAAC 2.2.3-4, Item 8.c, remained open until the LAR was submitted to the NRC staff.

As noted in Open Item 99900404/2011-201-05, WEC planned to support the AP1000 licensees in preparing an LAR to correct ITAAC 2.2.3-4, Item 8.c, to reflect the partially open position of the PXS check valves during the IRWST Injection phase following a design-basis event. The adequacy of the modified ITAAC was reviewed by the NRC staff upon submittal of the LAR, including the adequacy of the ITAAC to verify adequate IRWST Injection based on gravity-driven flow, as necessary to provide sufficient core cooling in response to a design-basis event.

On February 28, 2018, the NRC issued Amendments Nos. 111 and 110 to Combined License (COL) Nos. NPF-91 and NPF-92 for the Vogtle Electric Generating Plant (VEGP) Units 3 and 4 (ADAMS Accession No. ML18026A566).

Based on WEC's update of the check valve qualification requirements and submittal of the license amendment, the NRC staff has determined that WEC has adequately address the identified Open Item. Open Item 99900404/2011-201-05 is closed and no additional inspection follow-up is required to verify completion/adequacy of the corrective actions.

SUBJECT: CLOSURE OF INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA RELATED FINDINGS FOR WESTINGHOUSE ELECTRIC COMPANY INSPECTION REPORT NO. 99900404/2011-201 Dated July 29, 2019

Enclosure:
Summary of NRC Inspection of Westinghouse Electric Company Affecting ITAAC

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ADAMS Accession No.: ML19204A233 NRR-106

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Summary of NRC Inspection of Westinghouse Electric Company Affecting ITAAC

1. AFFECTED INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA

The U.S. Nuclear Regulatory Commission (NRC) inspectors identified the following inspections, tests, analyses, and acceptance criteria (ITAAC) related to components being tested by Westinghouse Electric Company (WEC) facility in Cranberry Township, PA. For the ITAAC listed below, the NRC staff reviewed WEC's update of check valve qualification requirements and LAR in response to NRC Open Item 99900404/2011-201-05. The ITAAC's design commitments referenced below are for future use by the NRC staff during the ITAAC closure process; the listing of these ITAAC design commitments does not constitute that they have been met and/or are closed. The NRC staff did identify one NRC open item associated with the ITAAC identified below.

Source Document	ITAAC Index No.	ITAAC	Acceptance Criteria
Appendix C from the Combined License for Vogtle Electric Generating Plant Units 3 and 4	No. 179	2.2.03.08c.i.03	i) The injection line flow resistance from each source is as follows: 3. IRWST Injection: The calculated flow resistance for each IRWST injection line between the IRWST and the reactor vessel is: Line A: ≥ 5.35×10^{-6} ft/gpm^2 and ≤ 9.09×10^{-6} ft/gpm^2 and Line B: ≥ 6.15×10^{-6} ft/gpm^2 and ≤ 1.05×10^{-5} ft/gpm^2.

2. FINDINGS AND OBSERVATIONS

Based on WEC's update of the check valve qualification requirements and submittal of the license amendment in response to Open Item 99900404/2011-201-05, the NRC staff has determined that WEC has adequately address the identified Open Item. Open Item 99900404/2011-201-05 are closed and no additional inspection follow-up is required to verify completion/adequacy of the corrective actions.

3. ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Status	Type	Description	Applicable ITAAC
99900404/2011-201-05	CLOSED	NON	Criterion XI	2.2.03.08c.i.03