September 26, 2013

Mr. B. L. Ivey, Vice President,
Regulatory Affairs
Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway, B022
Birmingham, AL 35242

Mr. Ronald A. Jones Vice President,
New Nuclear Operations
South Carolina Electric and Gas
14368 State Highway 213
Jenkinsville, SC 29065

SUBJECT: SUMMARY OF NUCLEAR REGULATORY COMMISSION VENDOR INSPECTIONS AFFECTING INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA

Dear Mr. Ivey and Mr. Jones:

As discussed at the February 7, 2013, public meeting, the U.S. Nuclear Regulatory Commission (NRC) staff is informing holders of a combined license that incorporates by reference Appendix D of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Design Certification Rule for the AP1000 Design," of recent vendor issues that, if left uncorrected, are material to inspections, tests, analyses, and acceptance criteria (ITAAC). The attachment summarizes the results of all vendor inspections performed to date as they relate to ITAAC for Vogtle Units 3 and 4 and Summer Units 2 and 3. Each of the inspection findings below apply to all four of the new Vogtle and Summer units. As discussed at the public meeting, the NRC will continue to issue individual letters at the completion of each future vendor inspection involving ITAAC-related issues.

The NRC's Vendor Inspection Program verifies effective licensee oversight of the supply chain through inspections of a sample of vendors. Licensees are ultimately responsible for vendor oversight and vendor performance. It is the agency's expectation that licensees consider NRC vendor inspection findings as potential weaknesses in their procurement programs.

Consistent with the guidance in the NRC-endorsed NEI 08-01, Industry Guideline for the ITAAC Closure Process under 10 CFR Part 52, licensees should discuss the resolution of ITAAC findings (including ITAAC findings from vendor inspections) in their ITAAC closure notifications in accordance with 10 CFR 52.99(c)(1), "ITAAC closure notification." Section 52.99(c)(1) states, "The licensee shall notify the NRC that prescribed inspections, tests, and analyses have been performed and that the prescribed acceptance criteria are met. The notification must contain sufficient information to demonstrate that the prescribed inspections, tests, and analyses have been performed and that the prescribed acceptance criteria are met."

Please contact the respective inspection team leader listed in the attachment, if you have any questions or need assistance regarding these matters.

Sincerely,

/RA/

Richard A. Rasmussen, Chief
Electrical Vendor Branch
Division of Construction Inspection
and Operational Programs
Office of New Reactors

Docket Nos.: 05200025, 05200026
05200027, 05200028

Enclosure:
Summary of NRC Vendor Inspections
Affecting ITAAC

Please contact the respective inspection team leader listed in the attachment, if you have any questions or need assistance regarding these matters.

Sincerely,

/RA/

Richard A. Rasmussen, Chief
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Enclosure:
Summary of NRC Vendor Inspections
Affecting ITAAC

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ADAMS Accession No.: ML13156A136 NRC-001

OFFICE	NRO/DCIP/CQAB	NRO/DNRL/LB4	NRO/DNRL/LB4	NRO/DNRL/LB4
NAME	GNewman	BAnderson	DMcGovern	LBurkhart
DATE	06/05/2013	06/05/2013	06/07/2013	06/11/2013
OFFICE	NRO/DCIP/CIPB	NRO/DCIP/CITB	RII/DCP/CPB2	OGC
NAME	JBeardsley	MKowal	DAyres	MSpencer
DATE	07/16/2013	07/18/2013	06/07/2013	09/23/2013
OFFICE	NRO/DCIP/CMVB	NRO/DCIP/CEVB		
NAME	ERoach	RRasmussen		
DATE	09/26/2013	09/26/2013		

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Summary of Nuclear Regulatory Commission Vendor Inspections Affecting Inspections, Tests, Analyses, and Acceptance Criteria

1. Westinghouse Engineering Design Verification Inspection

a. Inspection Scope

During the weeks of June 20, June 27, and July 10, 2011, vendor inspectors performed an Engineering Design Verification Inspection of the Westinghouse AP1000 reactor design at Westinghouse Electric Company's (Westinghouse) Cranberry, PA, facility. The vendor inspection activities were documented in Inspection Report (IR) 99900404/2011-201 (Agencywide Document Access and Management System (ADAMS) Accession No. ML112440588).

During the week of September 24, 2012, vendor inspectors performed an inspection of Westinghouse corrective actions taken by Westinghouse in response to several previous NRC identified inspection findings associated with the design and qualification testing of systems and components being supplied as part of the AP1000 reactor design. The vendor inspection activities were documented in IR 99900404/2012-202 (ADAMS Accession No. ML12313A461).

The lead for this inspection is Mr. Jeffrey Jacobson, who can be reached by phone at 301-415-2977 or via electronic mail at jeffrey.jacobson@nrc.gov.

b. Findings and Observations

b1. Affected ITAAC Numbers: 2.2.03.02a (159), 2.2.03.02b (160)

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
2.a) The components identified in Table 2.2.3-1 as the American Society of Mechanical Engineers (ASME) Code Section III are designed and constructed in accordance with ASME Code Section III requirements.	Inspection will be conducted of the as-built components as documented in the ASME design reports.	The ASME Code Section III design reports exist for the as-built components identified in Table 2.2.3-1 as ASME Code Section III.
2.b) The piping identified in Table 2.2.3-2 as ASME Code Section III is designed and constructed in accordance with ASME Code Section III requirements.	Inspection will be conducted of the as-built piping as documented in the ASME design reports.	The ASME Code Section III design reports exist for the as-built piping identified in Table 2.2.3-2 as ASME Code Section III.

IR 99900404/2011-201 and IR 99900404/2012-202 discuss one inspection finding associated with inspections, tests, analyses, and acceptance criteria (ITAAC) 2.2.03.02a and 2.2.03.02b. This finding is material to the ITAAC acceptance criteria and, thus, is an ITAAC finding. IR 99900404/2011-201 states:

> The team identified that the purchase specifications and technical design requirements for these components did not account for the potentially large hydrodynamic forces that could occur due to a spurious opening of the IRWST squib valves while the reactor is at operating pressure. While Westinghouse was able to show that an open item had been created to perform a transient analysis to quantify the subject hydrodynamic forces, the open item did not specify whether the analysis should be performed at the reduced reactor coolant system pressure that might be expected during a normal accident mitigation sequence, or at the much higher reactor coolant system pressure that might exist during an inadvertent operation of the valves at full reactor coolant system pressure. Also, the team identified that Westinghouse had not developed a formal process to ensure that once completed, the transient analysis results would be appropriately transferred back into the specifications and requirements for the related components. These issues were identified as Nonconformance 99900404/2011-201-02.

IR 99900404/2012-202 states:

> With regard to Nonconformance 99900404/2011-201-02, the team determined that the analyses and calculations performed by Fauske & Associates to estimate the potential hydrodynamic loads that would occur under various squib valve operational scenarios were performed consistent with industry practices. However, the team raised concerns regarding how WEC was utilizing the resulting hydrodynamic load data in evaluating the impact on effected systems and components. Specifically, the WEC established acceptance criteria for the hydrodynamic loads, were developed with the assumption that the Probabilistic Risk Assessment case (600 psi initial pressure) and the spurious opening case at normal operation (2250 psi) of squib valve operation are beyond design basis events without providing sufficient justification for these events being considered beyond the design basis. This distinction is important as the criteria for assessing the impact of this event on piping and components is significantly different for design basis and beyond design basis events.
>
> In addition, while WEC provided evidence that the analysis methodology used to calculate hydrodynamic loads was validated, none of the information provided was in the form of quality assurance documentation. The validation documentation was in the form of presentations, technical papers and informal reports that had not been included in the quality assurance documentation for the RELAP5 code. The team expressed similar concerns with the sensitivity studies that were performed to support the hydrodynamic loads analysis, with the input file for the APTPlot post processor, and with the equations developed to model the swing check valves in the RELAP5 analysis. Consequently, due to the above concerns the inspection team was unable to close out Nonconformance 99900404/2011-201-02.

The issues are material to the ITAAC acceptance criteria because information concerning the pressure that piping and components could be subjected to is necessary to develop the ASME Code Section III design reports referenced in the ITAAC acceptance criteria in the above table, to show that the identified piping and components are designed and constructed in accordance with ASME Code Section III requirements. Without the information the ASME Code Section III design reports are incomplete and thus the ASME Code requirements are not met.

b2. Affected ITAAC Number: 2.2.03.08c.i.03 (179)

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
8.c) The PXS provides RCS makeup, boration, and safety injection during design basis events.	i) A low-pressure injection test and analysis for each CMT, each accumulator, each IRWST injection line, and each containment recirculation line will be conducted. Each test is initiated by opening isolation valve(s) in the line being tested. Test fixtures may be used to simulate squib valves. 3. IRWST Injection: The IRWST will be partially filled with water. All valves in these lines will be open during the test. Sufficient flow will be provided to fully open the check valves.	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: $\geq 5.53 \times 10^{-6}$ ft/gpm^2 and $\leq 9.20 \times 10^{-6}$ ft/gpm^2 and Line B: $\geq 6.21 \times 10^{-6}$ ft/gpm^2 and $\leq 1.03 \times 10^{-5}$ ft/gpm^2.

IR 99900404/2011-201 and IR 99900404/2012-202 discuss one open item associated with ITAAC 2.2.03.08c.i.03. This finding is material to the ITAAC acceptance criteria and, thus, is an ITAAC finding. IR 99900404/2011-201 states:

> The team identified that Calculation APP-PXS-M3C-019, which calculates the resistance of the IRWST injection lines, was performed with the assumption that the check valves, PXS-V122A/B and PXS-V124A/B, would be fully full open. The 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. Westinghouse 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. Westinghouse 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.

IR 99900404/2012-202 states:

> The team also reviewed WEC corrective actions to Open Item 99900404/2011-201-05, which concerned the assumed position of the check valves in the In-Containment Refueling Water Storage Tank (IRWST) injection lines and their impact on the calculation of IRWST injection line flow resistance. The team determined that correct values for the resistance of partially open check valves are now being used in the WEC safety analyses; however, ITAAC Table 2.2.3-4, item 8.c requires verifying the proper flow resistance of each of the IRWST injection lines by measuring the water level

(driving head) and discharge flow rate with the check valves in the full open position. WEC stated that they intend to remove this requirement from the ITAAC since the valve will not be in the full open position even when the tank is filled to the normal level.

In addition, the team determined that past experience has shown that extended operation of swing check valves in the partially open position can lead to failure of the check valve. WEC did not provide any evidence that acceptance criteria for extended operation of the IRWST and other Passive Core Cooling System check valves at partially open positions have been included in the design requirements. Consequently, Open Item 99900404/2011-201-05 will remain open pending submittal of a license amendment to resolve the ITAAC discrepancy described above and pending an update of the check valve qualification requirements.

This issue is material to the ITAAC acceptance criteria because the ability of the check valve to remain fully open is required by the ITAAC listed in the table above.

2. <u>SPX, Copes Vulcan Vendor Inspection</u>

a. <u>Inspection Scope</u>

During the week of February 13, 2012, vendor inspectors performed an inspection of the implementation of SPX, Copes Vulcan's quality assurance (QA) program activities associated with the design and manufacturing of the squib valves for the AP1000 reactor design. The vendor inspection activities were documented in IR 99900080/2012-201 (ADAMS Accession No. ML12158A154).

The lead for this inspection is Mr. Yamir Diaz-Castillo, who can be reached by phone at 301-415-2228 or via electronic mail at yamir.diaz-castillo@nrc.gov.

b. <u>Findings and Observations</u>

b1. <u>Affected ITAAC Numbers: 2.1.02.12a.iv (56), 2.2.03.12a.i (214)</u>

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
12.a) The automatic depressurization valves identified in Table 2.1.2-1 perform an active safety-related function to change position as indicated in the table.	iv) Tests or type tests of squib valves will be performed that demonstrate the capability of the valve to operate under its design conditions.	iv) A test report exists and concludes that each squib valve changes position as indicated in Table 2.1.2-1 under design conditions.
12.a) The squib valves and check valves identified in Table 2.2.3-1 perform an active safety-related function to change position as indicated in the table.	i) Tests or type tests of squib valves will be performed that demonstrate the capability of the valve to operate under its design condition.	i) A test report exists and concludes that each squib valve changes position as indicated in Table 2.2.3-1 under design conditions.

IR 9900080/2012-201 contains one inspection finding associated with ITAAC 2.1.02.12a.iv and 2.2.03.12a.i. This finding is material to the ITAAC acceptance criteria and, thus, is an ITAAC finding. IR 9900080/2012-201 states:

> Nonconformance 99900080/2012-201-01 cites SPX for failing to verify the adequacy of the initiator assembly design as part of its commercial-grade dedication program. Specifically, the NRC inspection team identified that the initiator assembly was being procured as a commercial-grade item and dedicated by SPX for use as a basic component. The design of the initiator assembly was performed by a commercial vendor and was not validated by SPX as part of its commercial-grade dedication program.

The NRC reviewed SPX's responses to Nonconformance 99900080/2012-201-01 and found that they were responsive to the Notice of Nonconformance. The NRC will review the implementation of SPX's corrective actions during a future NRC staff inspection to determine that full compliance has been achieved and maintained.

This issue is material to the ITAAC acceptance criteria because critical parameters of the squib valve initiator will need to be validated to ensure that the valve will change position as required by the ITAAC acceptance criteria listed in the table above.

b2. <u>Affected ITAAC Number: 2.1.02.08d.iii (34)</u>

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
8.d) The RCS provides automatic depressurization during design basis events.	iii) Inspections of each fourth-stage ADS valve will be conducted to determine the flow area through each valve.	iii) The flow area through each fourth-stage ADS valve is > 67 in^2.

IR 9900080/2012-201 contains an observation regarding ITAAC 2.1.02.08d.iii.
IR 9900080/2012-201 states:

> The NRC inspection team questioned the final condition of the [14-inch squib valves'] flow opening after the valve opened, and how much material would protrude into the flow opening. The "as-measured" dimensions of the 14-inch squib valve flow area met the flow area requirements of ITAAC 2.01.02.08d.iii with the valve in its normally closed position. However, the flow area of the valve opening may change slightly after the valve has been opened. Further review by NRC staff is necessary to verify the adequacy of meeting ITAAC 2.01.02.08d.iii with the valve in the open position.

This issue is material to the ITAAC acceptance criteria because the critical parameters of the squib valve flow area will need to be validated to ensure that the flow area through the ADS valve is as required by the ITAAC acceptance criteria in the table above.

3. <u>Clark Vendor Inspection</u>

a. <u>Inspection Scope</u>

During the week of March 19, 2012, vendor inspectors performed an inspection of the implementation of Clark's QA program activities associated with vibration aging and seismic qualification testing of Limitorque HBC series worm gear actuators and the seismic qualification of the IST LV Power and I&C Electrical Penetration in support of the Westinghouse AP1000 pressurized-water reactor. Limitorque HBC series worm gear actuators will be used on multiple seismic Category I valves. Therefore, vibrational aging and seismic qualification of these actuators affect multiple ITAAC. The vendor inspection activities were documented in IR 99901377/2012-201 (ADAMS Accession No. ML12108A097).

The lead for this inspection is Ms. Samantha Crane, who can be reached by phone at 301-415-6380 or via electronic mail at samantha.crane@nrc.gov.

b. Findings and Observations

b1. Affected ITAAC Numbers: 2.2.01.05.ii (99), 2.2.02.05a.ii (127), 2.2.05.05a.ii (260), 2.3.02.05.ii (292), 2.3.07.05.ii (397) and 2.7.01.05.ii (685)

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
5. The seismic Category I equipment identified in Table 2.2.1-1 can withstand seismic design basis loads without loss of structural integrity and safety function.	ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.	ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis dynamic loads without loss of structural integrity and safety function.
5.a) The seismic Category I components identified in Table 2.2.2-1 can withstand seismic design basis loads without loss of safety function.	ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I components will be performed.	ii) A report exists and concludes that the seismic Category I components can withstand seismic design basis loads without loss of safety function.
5.a) The seismic Category I equipment identified in Table 2.2.5-1 can withstand seismic design basis loads without loss of safety function.	ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.	ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.
5. The seismic Category I equipment identified in Table 2.3.2-1 can withstand seismic design basis loads without loss of safety function.	ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.	ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis dynamic loads without loss of safety function.
5. The seismic Category I components identified in Table 2.3.7-1 can withstand seismic design basis loads without loss of safety functions.	ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.	ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.

5. The seismic Category I equipment identified in Table 2.7.1-1 can withstand seismic design basis loads without loss of safety function.	ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.	ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.

IR 99901377/2012-201 contains one inspection finding associated with ITAAC 2.2.01.05.ii, 2.2.02.05a.ii, 2.2.05.05a.ii, 2.3.02.05.ii, 2.3.07.05.ii, and 2.7.01.05.ii. This finding is material to the ITAAC acceptance criteria and, thus, is an ITAAC finding. IR 99901377/2012-201 states:

> The inspectors initiated a Notice of Nonconformance (NON) 99901412/2012-201-02 for failure to ensure that adequate test instrumentation was used during the vibrational aging of the Limitorque HBC series worm gear actuator. Specifically, Clark used accelerometers for the vibrational aging of the Limitorque HBC series worm gear actuator that were not calibrated over the entire range for which they were used. These three accelerometers were calibrated over the 25 to 500 Hz frequency range and used during the vibrational aging test for frequencies ranging from 5 Hz to 100 Hz.
>
> The purpose of the vibrational aging is to show that the lower levels of normal and transient vibration, associated with plant operation and the operating basis earthquake will neither adversely affect an equipment's performance of its safety function nor cause any condition to exist that, if undetected, would cause failure of such performance during a subsequent safe shutdown earthquake. By using the accelerometers outside of their calibrated range, Clark cannot assure that the vibrational aging produced the equivalent fatigue effects of specified in plant vibration resulting from normal and transient plant operating conditions.

This nonconformance is material to the above listed acceptance criteria because it calls into question the validity of the testing described in the reports that concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.

The NRC reviewed Clark's responses to Nonconformance 99901412/2012-201-02 and found that they were responsive to the NON. The NRC will review the implementation of Clark's corrective actions during a future NRC staff inspection to determine that full compliance has been achieved and maintained.

4. <u>Westinghouse Cranberry Vendor Inspection</u>

a. <u>Inspection Scope</u>

During the week of March 26, 2012, vendor inspectors performed a vendor inspection at Westinghouse's Cranberry, Pennsylvania facility. The inspection team focused its review on Westinghouse's development of qualification and functional testing for a sample of components important to the safety of AP1000 reactors, including squib valves, electrical containment penetration assemblies, motor operated valve actuators, operational and control center panels, and reactor coolant pump switchgear. The vendor inspection activities were documented in IR 99900404/2012-201 (ADAMS Accession No. ML12128A072). Westinghouse completed corrective actions related to this inspection and transmitted them to the NRC by letter dated June 18, 2012 (ADAMS Accession No. ML12171A369). The NRC conducted additional follow-up on these actions which are described below for consistency and record-keeping.

The lead for this inspection is Mr. Jeffrey Jacobson, who can be reached by phone at 301-415-2977 or via electronic mail at jeffrey.jacobson@nrc.gov.

b. Findings and Observations

b1. Affected ITAAC Numbers: 2.2.01.06a.i (101), 2.2.03.07a.i (170), 2.2.03.12a.i (214)

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
6.a) The Class 1E equipment identified in Table 2.2.1-1 as being qualified for a harsh environment can withstand the environmental conditions that would exist before, during, and following a design basis accident without loss of safety function for the time required to perform the safety function.	i) Type tests, analyses, or a combination of type tests and analyses will be performed on Class 1E equipment located in a harsh environment.	i) A report exists and concludes that the Class 1E equipment identified in Table 2.2.1-1 as being qualified for a harsh environment can withstand the environmental conditions that would exist before, during, and following a design basis accident without loss of safety function for the time required to perform the safety function.
7.a) The Class 1E equipment identified in Table 2.2.3-1 as being qualified for a harsh environment can withstand the environmental conditions that would exist before, during, and following a design basis accident without loss of safety function for the time required to perform the safety function.	i) Type tests, analyses, or a combination of type tests and analyses will be performed on Class 1E equipment located in a harsh environment.	i) A report exists and concludes that the Class 1E equipment identified in Table 2.2.3-1 as being qualified for a harsh environment can withstand the environmental conditions that would exist before, during, and following a design basis accident without loss of safety function for the time required to perform the safety function.
12.a) The squib valves and check valves identified in Table 2.2.3-1 perform an active safety-related function to change position as indicated in the table.	i) Tests or type tests of squib valves will be performed that demonstrate the capability of the valve to operate under its design condition.	i) A test report exists and concludes that each squib valve changes position as indicated in Table 2.2.3-1 under design conditions.

IR 99900404/2012-201 discusses one inspection finding associated with ITAAC 2.2.01.06a.i, 2.2.03.07a.i, and 2.2.03.12a.i. This finding is material to the ITAAC acceptance criteria and thus, is an ITAAC finding. IR 99900404/2012-201 states:

> Nonconformance 99900404/2012-201-01 concerns the failure to include certain design features and the most adverse design conditions in the environmental qualification and functional test program. This example concerns the failure to include a test of the "no

fire" feature of the squib valve actuators in the qualification testing program. Verification of the "no fire" feature is important to ensure the design of the squib valve is sufficient to prevent spurious actuations of the valves.

This example is material to the ITAAC acceptance criteria because critical parameters of the squib valve initiator will need to be validated to ensure that the valve will change position as required by the ITAAC acceptance criteria in the table above.

Based on Westinghouse's response to the Notice of Nonconformance (NON) and NRC follow-up inspection activities at Wyle Laboratories documented in IR 99900905/2012-201 (ADAMS Accession No. ML12242A459), the NRC determined that these issues are resolved and Nonconformance 99900404/2012-201-01 is closed.

5. <u>Westinghouse New Stanton Vendor Inspection</u>

a. <u>Inspection Scope</u>

During the week of April 9, 2012, vendor inspectors performed an inspection of Westinghouse's implementation of its QA program implementation relating to quality activities associated with electromagnetic interference/radio frequency interference (EMI/RFI) qualification testing of Westinghouse AP1000 diverse actuation system (DAS) and the procurement of associated testing services from subcontractor Washington Laboratories, Ltd. (WLL). The vendor inspection activities were documented in Inspection Report (IR) 99901043/2012-201 (ML12131A263).

The lead for this inspection is Mr. George Lipscomb, who can be reached by phone at 301-415-6838 or via electronic mail at george.lipscomb@nrc.gov.

b. <u>Findings and Observations</u>

b1. <u>Affected ITAAC Number: 2.5.01.03d (514)</u>

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
3.d) The DAS has electrical surge withstand capability (SWC), and can withstand the electromagnetic interference (EMI), radio frequency (RFI), and electrostatic discharge (ESD) conditions that exist where the DAS equipment is located in the plant.	Type tests, analyses, or a combination of type tests and analyses will be performed on the equipment.	A report exists and concludes that the DAS equipment can withstand the SWC, EMI, RFI and ESD conditions that exist where the DAS equipment is located in the plant.

IR 99901043/2012-201 contains two inspection findings and one unresolved item associated with ITAAC 2.5.01.03d. These findings are material to the ITAAC acceptance criteria and, thus, are ITAAC findings. IR 99901043/2012-201 states:

> The NRC inspection team identified Nonconformance 99901043/2012-201-03 for Westinghouse's failure to document and evaluate a modification to the test configuration resulting from a test anomaly to ensure that the original design requirements have been

satisfied in accordance with Criterion XI, “Test Control,” of Appendix B to 10 CFR Part 50.

The NRC inspection team also identified Nonconformance 99901043/2012-201-04 for Westinghouse’s failure to ensure that the EMI/RFI testing of the DAS met various technical requirements of RG 1.180, in accordance with Criterion XI, “Test Control,” of Appendix B to 10 CFR Part 50.

WEC self-identified an ITAAC-related issue to verify and validate the simulation input and output software and the advanced logic system test and calibration tool software to ensure that the data recorded for all applicable EUT is properly calibrated and meets the predetermined acceptance values. Resolution of this issue is being tracked by Unresolved Item 99901043/2012-201-05.

The NRC reviewed Westinghouse’s responses to Nonconformance 99901043/2012-201-03 and 99901043/2012-201-04 and found that they were generally responsive to the NON. The NRC will review the implementation of Westinghouse’s corrective actions during a future NRC staff inspection to determine that full compliance has been achieved and maintained.

These issues are material to the ITAAC acceptance criteria because Westinghouse test procedures employ RG 1.180 to meet the technical requirements for testing the DAS. Therefore, the original design requirements, assumptions, and software used to verify the results must meet or exceed the technical requirements of RG 1.180 to demonstrate that the DAS equipment can withstand the SWC, EMI, RFI, and ESD conditions that exist where the DAS equipment is located in the plant as required by the ITAAC acceptance criteria.

6. Wyle Laboratories Vendor Inspection

a. Inspection Scope

During the week of July 23, 2012, vendor inspectors performed an inspection of Westinghouse’s implementation of its QA program implementation relating to quality activities associated with testing services to support environmental qualification of components being supplied as part of the Westinghouse AP1000 reactor design. The vendor inspection activities were documented in IR 99900905/2012-201 (ADAMS Accession No. ML12242A459).

The lead for this inspection is Mr. Jeffrey Jacobson, who can be reached by phone at 301-415-2977 or via electronic mail at jeffrey.jacobson@nrc.gov.

b. Findings and Observations

b1. Affected ITAAC Numbers: 2.1.02.12a.i (53), 2.2.02.11a.i (154), 2.3.02.11a.i (309), 2.3.06.12a.i (384)

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
12.a) The automatic depressurization valves identified in Table 2.1.2-1 perform an active safety-related function to change position as indicated in the table.	i) Tests or type tests of motor-operated valves will be performed that demonstrate the capability of the valve to operate under its design conditions.	i) A test report exists and concludes that each motor-operated valve changes position as indicated in Table 2.1.2-1 under design conditions.
11.a) The motor-operated valves identified in Table 2.2.2-1 perform an active safety-related function to change position as indicated in the table	i) Tests or type tests of motor-operated valves will be performed to demonstrate the capability of the valve to operate under its design conditions.	i) A test report exists and concludes that each motor-operated valve changes position as indicated in Table 2.2.2-1 under design conditions.
11.a) The motor-operated and check valves identified in Table 2.3.2-1 perform an active safety-related function to change position as indicated in the table.	i) Tests or type tests of motor-operated valves will be performed that demonstrate the capability of the valve to operate under its design conditions.	i) A test report exists and concludes that each motor-operated valve changes position as indicated in Table 2.3.2-1 under design conditions.
12.a) The motor-operated and check valves identified in Table 2.3.6-1 perform an active safety-related function to change position as indicated in the table	i) Tests or type tests of motor-operated valves will be performed that demonstrate the capability of the valve to operate under its design conditions.	i) A test report exists and concludes that each motor-operated valve changes position as indicated in Table 2.3.6-1 under design conditions.

IR 99901043/2012-201 contains two inspection findings associated with ITAAC 2.1.02.12a.i, 2.2.02.11a.i, 2.3.02.11a.i, and 2.3.06.12a.i. These findings are material to the ITAAC acceptance criteria and, thus, are ITAAC findings. IR 99901043/2012-201 states:

> The team identified that Wyle Qualification Plan WLQP57873-6, dated 8/12, Revision A, for 8-inch globe valves, specifies partial stroke segments to be used during steam or water flow tests. The partial strokes are necessary as the Wyle test facility does not have sufficient capacity to stroke the valve continuously at rated temperature, flow, and pressure. Consequently, the testing needs to be performed in intervals in order to allow operators to re-charge the fluid supply at the test facility. The team found that the qualification plan did not provide written justification that this test method demonstrates valve performance consistent with a continuous valve stroke as intermittent partial stroking of the valve could cloak problems with the valve that might exist during a continuous stroking cycle.
>
> The team identified that the absence of a documented justification for the performance of partial valve strokes during valve flow testing is a nonconformance with respect to the

test control provisions in 10 CFR Part 50 Appendix B and the Wyle QA Manual. This issue was identified as one example of Nonconformance 99900905/2012-201-01.

* * * * * * *

The team identified that the Wyle Qualification Plans for MOVs (for example, Test Procedure WLQP57873-4, dated 8/12/2011, Revision A), did not clearly specify whether or not the calculated values for valve factor and stem friction coefficients include or exclude instrument uncertainties. Consequently, it was not apparent whether these instrument inaccuracies would need to be considered later on by the valve vendor or licensees when they are performing analysis and testing to properly match motor actuators to specific valves, or alternatively, whether the instrument uncertainties were already accounted for in the Wyle calculated valve factors. The team found that Wyle's failure to clearly account for instrument uncertainties in the calculation of valve factors and stem friction coefficients is a nonconformance with respect to the design control provisions of Appendix B to 10 CFR Part 50 and the Wyle QA Manual. This issue was identified as Nonconformance 99900905/2012-201-04.

These issues are material to the ITAAC acceptance criteria because if left uncorrected, these issues could call into question the validity of the qualification testing performed to ensure that the motor operated valves will change position under design conditions as required by the acceptance criteria in the table above.

The NRC reviewed Wyle's response to Nonconformance 99900905/2012-201-01 and 99900905/2012-201-04 and found that it appeared responsive to the NON. The NRC will review the implementation of Wyle's corrective actions during a future NRC staff inspection to determine that full compliance has been achieved and maintained.

7. <u>Enertech Vendor Inspection</u>

a. <u>Inspection Scope</u>

From August 27-28, 2012, and from September 17-20, 2012, vendor inspectors performed an inspection of the implementation of Enertech's QA program activities associated with the design, fabrication, and testing of the ERV-Z 8-inch nozzle check valve for the passive core cooling system of the Westinghouse AP1000 reactor design. The vendor inspection activities were documented in IR 99901377/2012-201 (ADAMS Accession No. ML12306A385).

The lead for this inspection is Mr. Richard McIntyre, who can be reached by phone at 301-415-3215 or via electronic mail at richard.mcintyre@nrc.gov.

b. <u>Findings and Observations</u>

b1. <u>Affected ITAAC Numbers: 2.2.03.05a.ii(166), 2.2.03.02a(156)</u>

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
2.a) The components identified in Table 2.2.3-1 as ASME Code Section III are designed and constructed in accordance with ASME Code Section III requirements.	Inspection will be conducted of the as-built components as documented in the ASME design reports.	The ASME Code Section III design reports exist for the as-built components identified in Table 2.2.3-1 as ASME Code Section III.
5.a) The seismic Category I equipment identified in Table 2.2.3-1 can withstand seismic design basis loads without loss of safety function.	ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.	ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis dynamic loads without loss of safety function. For the PXS containment recirculation and IRWST screens, a report exists and concludes that the screens can withstand seismic dynamic loads and also post-accident operating loads, including head loss and debris weights.

IR 99901377/2012-201 contains two ITAAC findings associated with ITAAC 2.2.03.05a.ii and 2.2.03.02a. These findings are material to the ITAAC acceptance criteria and, thus, are ITAAC findings.

> The NRC inspection team issued Nonconformance 99901377/2012-201-02 in association with Enertech's failure to implement the regulatory requirements in Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. Specifically, Enertech was cited for not effectively implementing a commercial grade dedication (CGD) program to review the suitability of the application of commercially procured calibration services at Utah State University and the verification of ERV-Z 8-inch nozzle check valve non-pressure boundary items and materials that are essential to the safety-related functions of structures, systems, and components. In addition, the technical evaluations of commercial grade items performed as part of the dedication did not include a documented basis for the sample testing population for items from commercial suppliers where lot/batch homogeneity had not been verified. …
>
> The NRC inspection team issued Nonconformance 99901377/2012-201-03 in association with Enertech's failure to implement the regulatory requirements in Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. Specifically, the NRC inspection team determined that check valve testing was performed in accordance with written test procedures that incorporated the requirements and acceptance limits contained in applicable design documents. However, Criterion XI specifically requires that testing

demonstrate that components will perform satisfactorily in service. Enertech was cited for failing to have a test program for the ERV-Z 8-inch nozzle check valve that included adequate testing in accordance with ASME QME-1-2007 to demonstrate that the valve will perform satisfactorily in service.

These issues are material to the ITAAC acceptance criteria because if left uncorrected, these issues could call into question the validity of the qualification testing of the as-built check valves to ensure they perform their safety-related function and change position under design basis conditions in accordance with ASME Code Section III and ITAAC 2.2.03.05a.ii and 2.2.03.02a.

The NRC reviewed Enertech's responses to Nonconformance 99901377/2012-201-02 and 99901377/2012-201-03 and found them responsive to the NON. The NRC will review the implementation of Enertech's corrective actions during a future NRC staff inspection to determine that full compliance has been achieved and maintained.

8. List of Items Opened, Closed, and Applicable ITAAC

<table>
<tr><th>Item Number</th><th>Status</th><th>Type</th><th>Applicable Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) from License Nos. NFP-91, NFP-92, NFP-93, and NFP-94</th></tr>
<tr><td>99900404/2012-202-02</td><td>Open</td><td>NON</td><td>2.2.03.02a (159), 2.2.03.02b (160)</td></tr>
<tr><td>99900404/2011-201-05</td><td>Open</td><td>Open Item</td><td>2.2.03.08c.i.03 (179)</td></tr>
<tr><td>99900080/2012-201-01</td><td>Open</td><td>NON</td><td>2.1.02.12a.iv (56), 2.2.03.12a.i (214)</td></tr>
<tr><td>N/A</td><td>Open</td><td>Observation</td><td>2.1.02.08d.iii (34)</td></tr>
<tr><td>99901412/2012-201-02
Example 1</td><td>Open</td><td>NON</td><td>2.2.01.05.ii (99), 2.2.02.05a.ii (127), 2.2.05.05a.ii (260), 2.3.02.05.ii (292), 2.3.07.05.ii (397), 2.7.01.05.ii (685)</td></tr>
<tr><td>99900404/2012-201-01</td><td>Closed</td><td>NON</td><td>2.2.01.06a.i (101), 2.2.03.07a.i (170), 2.2.03.12a.i (214)</td></tr>
<tr><td>99901043/2012-201-03</td><td>Open</td><td>NON</td><td rowspan="3">2.5.01.03d (514)</td></tr>
<tr><td>99901043/2012-201-04</td><td>Open</td><td>NON</td></tr>
<tr><td>99901043/2012-201-05</td><td>Open</td><td>URI</td></tr>
<tr><td>99900905/2012-201-01
Example 2</td><td>Open</td><td>NON</td><td rowspan="2">2.1.02.12a.i (53), 2.2.02.11a.i (154), 2.3.02.11a.i (309), 2.3.06.12a.i (384)</td></tr>
<tr><td>99900905/2012-201-04</td><td>Open</td><td>NON</td></tr>
<tr><td>99901377/2012-201-02</td><td>Open</td><td>NON</td><td rowspan="2">2.2.03.05a.ii (166), 2.2.03.02a (156)</td></tr>
<tr><td>99901377/2012-201-03</td><td>Open</td><td>NON</td></tr>
</table>