UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200
ATLANTA, GEORGIA 30303-1200

May 9, 2023

Jamie Coleman
Regulatory Affairs Director
Southern Nuclear Operating Company
7825 River Road, BIN 63031
Waynesboro, GA 30830

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT (VEGP), UNIT 4 – INITIAL TEST PROGRAM AND OPERATIONAL PROGRAMS INTEGRATED INSPECTION REPORT 05200026/2023006

Dear Jamie Coleman:

On March 31, 2023, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Vogtle Electric Generating Plant, Unit 4. The enclosed inspection report documents the inspection results, which the inspectors discussed on April 25, 2023, with Mr. Glen Chick, VEGP Units 3 & 4 Executive Vice President, and other members of your staff.

The inspection examined a sample of construction and testing activities conducted under your Combined License (COL) as it relates to safety and compliance with the Commission's rules and regulations and with the conditions of these documents. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

The inspectors documented one finding of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or the significance or severity of the violation documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement; and the NRC Resident Inspector at Vogtle Electric Generating Plant (VEGP), Unit 3.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; and the NRC Resident Inspector at Vogtle Electric Generating Plant (VEGP), Unit 3.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any), will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component

of NRC's document system ADAMS. ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this letter, please contact us.

Sincerely,

Signed by Davis, Bradley on 05/09/23

Bradley J. Davis, Chief
Construction Inspection Branch 2
Division of Construction Oversight

Docket Nos.: 5200026
License Nos: NPF-92

Enclosure:
NRC Inspection Report (IR) 05200026/2023006
w/attachment: Supplemental Information

cc w/ encl: Distribution via LISTSERV

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT, UNIT 4 – NRC INITIAL TEST PROGRAM AND OPERATIONAL PROGRAMS INTEGRATED INSPECTION REPORTS 05200026/2023006 Dated May 09, 2023

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DATE	05/09/2023	05/09/2023	05/09/2023		

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U.S. NUCLEAR REGULATORY COMMISSION
Region II

Docket Numbers:	5200026
License Numbers:	NPF-92
Report Numbers:	05200026/2023006
Enterprise Identifier:	I-2023-006-0031
Licensee:	Southern Nuclear Operating Company, Inc
Facility:	Vogtle Unit 4 Combined License
Location:	Waynesboro, GA
Inspection Dates:	January 1, 2023, through March 31, 2023
Inspectors:	J. Eargle, Senior Resident Inspector - Testing, Division of Constriction Oversight (DCO) S. Egli, Senior Construction Inspector, DCO J. England, Senior Construction Inspector, DCO C. Even, Senior Construction Inspector, DCO J. Parent, Resident Inspector, DCO R. Patel, Senior Construction Inspector, DCIP M. Riley, Senior Construction Inspector, DCO S. Sanchez, Senior Emergency Preparedness Inspector, Division of Reactor Safety
Approved by:	Bradley J. Davis, Chief Construction Inspection Branch 2 Division of Construction Oversight

Enclosure

SUMMARY OF FINDINGS

Inspection Report (IR) 05200026/2023006; January 1 – March 31, 2023; Vogtle Unit 4 COL, initial test program and operational programs integrated inspection report.

This report covers a three-month period of announced inspections of Inspections, Tests, Analysis, and Inspection Criteria (ITAAC), preoperational test program, startup test program, and operational program inspections by resident and regional inspectors. Two findings were determined to be of very low safety significance (Green) by the inspectors. The significance of most findings is indicated by their color (Green, White, Yellow, or Red), using Inspection Manual Chapter (IMC) 2519, "Construction Significance Determination Process." Cross-cutting aspects are determined using IMC 0613, Appendix F, "Construction Cross-Cutting Areas and Aspects." All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy and the temporary enforcement guidance outlined in enforcement guidance memorandum 11-006. The NRC's program for overseeing the safe construction of commercial nuclear power reactors is described in IMC 2506, "Construction Reactor Oversight Process General Guidance and Basis Document."

A. NRC-Identified and Self Revealed Findings

(Green) An NRC-identified construction finding of very low safety significance (Green) with an associated non-cited violation (NCV) of Title 10 Code of Federal Regulations (10 CFR), Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified for the licensee's failure to ensure that all measuring and test equipment (M&TE) used to perform baseline thermal expansion measurements at the beginning of hot functional testing (HFT) were verified to be within their calibrated frequencies prior to use and documented on the M&TE usage log in accordance with procedure B-GEN-ITPA-004, "Conduct of Test." The licensee entered this issue into the corrective action program (CAP) as CR 50171546 and reperformed the test using calibrated M&TE that was accurately recorded in the M&TE usage log.

The performance deficiency was determined to be more than minor because it represented a substantive failure to implement an adequate program, process, procedure, or quality oversight function. The inspectors determined the finding to be of very low safety significance (Green) due to the licensee demonstrating with reasonable assurance that the design function of the applicable systems was not impaired by the deficiency. The inspectors determined the finding had a cross-cutting aspect of Challenge the Unknown in the area of Human Performance. Specifically, the licensee should have questioned the calibration status of the M&TE to be used during the test prior to certifying the test prerequisites were satisfied. [H.11] (Section 1P01)

B. Licensee-Identified Violations

None

REPORT DETAILS

Summary of Plant Construction Status

During this report period for Unit 4, the licensee completed various activities to satisfy aspects of the Vogtle Unit 4 initial test program. The licensee performed portions of hot functional testing activities which included testing the reactor coolant system (RCS), residual heat removal system, passive core cooling system (PXS), etc. at elevated temperatures and pressures. While heating the plant and operating equipment, Thermal Expansion Dynamic Effects and Vibration measurements were taken to ensure piping and components are properly installed and supported such that the expected movement does not result in excessive stress or fatigue.

The licensee performed preoperational and component tests of various structures, systems, and components and their control systems, e.g., protection and safety monitoring system (PMS) and PLS. Class 1E direct current and uninterruptible power supply system, electrical distribution system testing was performed to verify the functional capability of those systems to support electrical loads during normal and off-normal conditions. Preoperational testing of safety-related valves was performed for the RCS and PXS squib valves, and containment system check valves.

1. CONSTRUCTION REACTOR SAFETY

Cornerstones: Design/Engineering, Procurement/Fabrication, Construction/Installation, Inspection/Testing

IMC 2503, Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) - Related Work Inspections

1A01 (Unit 4) ITAAC Number 2.1.02.11a.i (46) / Family 10C

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.11a.i (46). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.C-02.02 - Construction Test Observation

The inspectors used the appropriate portions of the IP to witness the licensee's test performance to verify if controls in the main control room operated to cause a signal at the squib valve electrical leads which was capable of actuating the fourth-stage ADS squib valve. The inspectors observed the tests to verify if the test performance satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- B-GEN-ITPCI-039-F374, RCS-PL-V004A-I2-F Component Test 2, Ver. 1
- B-GEN-ITPCI-039-F378, RCS-PL-V004B-I1-F Component Test 2, Ver. 1
- B-GEN-ITPCI-039-F370, RCS-PL-V004A-I1-A Component Test 2, Ver. 0

b. Findings

No findings were identified.

1A02 (Unit 4) ITAAC Number 2.1.02.11a.ii (47) / Family 10C

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.11a.ii (47). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.C-02.02 - Construction Test Observation

The inspectors used the appropriate portions of the IP to observe the licensee's performance of the following procedure to verify if the first stage automatic depressurization system isolation motor operated valve performed its active function within 30 seconds after receiving a signal from the PMS. The test was observed to verify if it satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- B-GEN-ITPCI-039-F399, RCS-PL-V011A Component Test, Ver. 2

b. Findings

No findings were identified.

1A03 (Unit 4) ITAAC Number 2.1.02.11b.i (48) / Family 10C

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.11b.i (48). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.C-A4.10 - Instrumentation & Control Components & Systems

The inspectors used the appropriate portions of the IP to witness the licensee's test performance to verify if controls in the main control room operated to cause a signal at the squib valve electrical leads which was capable of actuating the fourth-stage ADS squib valve. The inspectors observed the tests to verify if the test performance satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- B-GEN-ITPCI-039-F374, RCS-PL-V004A-I2-F Component Test 2, Ver. 1
- B-GEN-ITPCI-039-F378, RCS-PL-V004B-I1-F Component Test 2, Ver. 1
- B-GEN-ITPCI-039-F370, RCS-PL-V004A-I1-A Component Test 2, Ver. 0

b. Findings

No findings were identified.

1A04 (Unit 4) ITAAC Number 2.2.01.09 (110) / Family 10A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.09 (110). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.C-02.02 - Construction Test Observation

The inspectors used the appropriate portions of the IP to observe the licensee's performance of the following procedures to verify if the valves performed their active function after receiving a signal from PMS. The test was observed to verify if the tests satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- B-GEN-ITPCI-039-F480, VFS-PL-V009-S1 Component Test, Ver. 1
- B-GEN-ITPCI-039-F479, VFS-PL-V004-S1 Component Test, Ver. 1

b. Findings

No findings were identified.

1A05 (Unit 4) ITAAC Number 2.2.02.07b.i (138) / Family 06D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.02.07b.i (138). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.C-02.02 - Construction Test Observation

The inspectors used the appropriate portions of the IP to observe the licensee's performance of the following procedure to verify if the passive containment cooling water storage tank isolation valve, SV4-PCS-PL-V001A, performed its active function of transferring open after receiving a signal from the PMS. The test was observed to verify if it satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- B-GEN-ITPCI-039-F297, PCS-PL-V001A-S1 Component Test, Ver. 1

b. Findings

No findings were identified.

1A06 (Unit 4) ITAAC Number 2.2.03.10 (206) / Family 10A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.10 (206). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.C-02.02- Construction Test Observation

The inspectors used the appropriate portions of the IP to observe the licensee's performance of the following procedures to verify if the valves performed their active function after receiving a signal from the PMS. The test was observed to verify if the tests satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- B-GEN-ITPCI-039-F322, PXS-PL-V101 Component Test, Ver. 1
- B-GEN-ITPCI-039-F359, PXS-PL-V130A S1 Component Test, Ver. 1
- B-GEN-ITPCI-039-F314, PXS-PL-V002A-2 Component Test, Ver. 2
- B-GEN-ITPCI-039-F317, PXS-PL-V014A-S1 Component Test, Ver. 1
- B-GEN-ITPCI-039-F323, PXS-PL-V108A-S1 Component Test, Ver. 1.0

b. Findings

No findings were identified.

1A07 (Unit 4) ITAAC Number 2.2.03.11b.i (209) / Family 10D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.11b.i (209). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.C-A4.10 - Instrumentation & Control Components & Systems

The inspectors used the appropriate portions of the IP to witness the licensee's test performance to verify if the squib valves received an electrical signal at the valve electrical leads that is capable of actuating the valve after a signal is input to the PMS. The inspectors observed the test and reviewed the results to verify if the test performance satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- B-GEN-ITPCI-039-F346, PXS-PL-V123A-I1-F Component Test 2, Ver. 1
- B-GEN-ITPCI-039-F344, PXS-PL-V123A-I1-A Component Test 2, Ver. 1
- B-GEN-ITPCI-039-F348, PXS-PL-V118B-I1-A Component Test 2, Ver. 1
- B-GEN-ITPCI-039-F348, PXS-PL-V118B-I1-F Component Test 2, Ver. 1

b. Findings

No findings were identified.

IMC 2504, Construction Inspection Program – Inspection of Construction and Operational Programs

1P01 Pre-operational Testing

- 70702-02.04 - Test Witnessing

a. Inspection Scope

The inspectors used the appropriate portions of the IP to observe the licensee's performance of the following procedure to verify if adequate thermal expansion measurements were taken to evaluate interferences caused by thermal effects of plant components during hot functional testing. The test was observed to verify if it satisfied the applicable quality and technical requirements of the UFSAR.

- 4-GEN-ITPP-507, Thermal Expansion, Version 1.0

The inspectors used the appropriate portions of the IP to observe the licensee's performance of the following procedure to verify if adequate dynamic effects and vibration measurements were taken to evaluate movement of safety-related components during hot functional testing. The test was observed to verify if it satisfied the applicable quality and technical requirements of the UFSAR.

- 4-GEN-ITPP-509, Reactor Coolant System Dynamic Effects and Vibration Testing, Version 1.0

b. Findings

Introduction

An NRC-identified construction finding of very low safety significance (Green) with an associated non-cited violation (NCV) of Title 10 Code of Federal Regulations (10 CFR), Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” was identified for the licensee’s failure to ensure that all measuring and test equipment (M&TE) used to perform baseline thermal expansion measurements at the beginning of hot functional testing (HFT) were verified to be within their calibrated frequencies prior to use and documented on the M&TE usage log in accordance with procedure B-GEN-ITPA-004, “Conduct of Test.”

Description

The administrative procedure B-GEN-ITPA-004, “Conduct of Test,” describes how all preoperational and startup testing is to be conducted and performed at Vogtle Electric Generating Plant, Units 3 & 4. Procedure B-GEN-ITPA-004, Section 4.10, Step 2,

required the licensee to use M&TE that was verified to be within its calibration frequency prior to use, and document all M&TE used during the test performance on B-GEN-0ITPA-004-F03, “M&TE Usage Log.”

On March 20, 2023, the licensee was in the process of performing the ambient baseline thermal expansion measurements as part of hot functional testing in accordance with 4-GEN-ITPP-507, “Thermal Expansion,” when NRC observed the licensee was utilizing measuring devices that either had expired or had no calibration records. Additionally, the inspectors observed that the licensee had not recorded the non-calibrated M&TE on the M&TE Usage Log. This was not in accordance with B-GEN-ITPA-004, Section 4.10, Step 2. Subsequent to NRC questions, the licensee stopped the test and removed all non-calibrated equipment that was being used to perform this test and used calibrated Southern Nuclear Company, Inc. equipment to reperform the test.

The licensee entered this issue into the corrective action program (CAP) as CR 50171546 and reperformed the test using calibrated M&TE that was accurately recorded in the M&TE usage log.

Analysis

The inspectors determined that the failure to ensure that all M&TE used to perform baseline thermal expansion measurements at the beginning of HFT were verified to be within their calibrated frequencies prior to use and documented on the M&TE usage log in accordance with procedure B-GEN-ITPA-004 was a performance deficiency. The performance deficiency was determined to be more than minor because it represented a substantive failure to implement an adequate program, process, procedure, or quality oversight function. Specifically, the licensee failed to ensure calibrated M&TE was utilized during preoperational testing.

The inspectors concluded the finding was associated with the Inspection/Testing Cornerstone and assessed the finding in accordance with Inspection Manual Chapter (IMC) 2519, “Construction Significance Determination Process,” Appendix A, “AP 1000 Construction Significance Determination Process,” Section 4. The inspectors determined the finding to be of very low safety significance (Green) due to the licensee demonstrating with reasonable assurance that the design function of the applicable systems was not impaired by the deficiency. The licensee reperformed the test using calibrated M&TE that was accurately recorded in the M&TE usage log.

The performance deficiency did not impact an ITAAC, thus it was determined to be a construction finding.

In accordance with IMC 0613 Appendix F, Construction Cross-Cutting Areas and Aspects,” the inspectors determined the finding had a cross-cutting aspect of H.11, Challenge the Unknown, in the area of Human Performance. Specifically, the licensee should have questioned the calibration status of the M&TE to be used during the test prior to certifying the test prerequisites were satisfied.

Enforcement

10 CFR 50, Appendix B, Criterion V, states in part, “Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings.”

Contrary to the above, on March 20, 2023, the licensee failed to accomplish preoperational testing activities in accordance with procedure B-GEN-ITPA-004. Specifically, the licensee failed to utilize M&TE that was calibrated within the proper calibration frequency and document the equipment in the M&TE usage log to perform baseline thermal expansion measurements during HFT.

The licensee entered this issue into the CAP as CR 50171546, stopped the test and removed all non-calibrated M&TE from being utilized to perform the test. The licensee then reperformed the test using calibrated M&TE that was accurately recorded in the M&TE usage log. Because this violation was not repetitive or willful, was of very low safety significance (Green), and was entered into the licensee’s CAP, this violation is being treated as a NCV consistent with Section 2.3.2.a of the NRC Enforcement Policy (NCV 05200026/2023006-01, Failure to Use Appropriate M&TE).

1P02 Pre-operational Testing

- 70702-02.04 - Test Witnessing

a. Inspection Scope

The inspectors used appropriate portions of the IP to observe the licensee’s performance of the following procedures for performing the channel calibration for the passive residual heat removal heat exchanger and containment flood up level transmitters. The tests were observed to verify if they satisfied the applicable quality and technical requirements of the UFSAR.

- B-GEN-ITPCI-019-F326, PMS Channel Calibration Test for 4-PXS-FT049B, Ver. 1
- B-GEN-ITPCI-019-F338, PMS Channel Calibration Test for 4-PXS-LT050, Ver. 1
- B-GEN-ITPCI-019-F340, PMS Channel Calibration Test for 4-PXS-LT052, Ver. 1

b. Findings

No findings were identified.

1P03 Pre-operational Testing

- 70702-02.04 - Test Witnessing

a. Inspection Scope

The inspectors used appropriate portions of the IP to observe the licensee's performance of the following procedures for performing the channel calibration for reactor coolant system level and pressure transmitters. The tests were observed to verify if they satisfied the applicable quality and technical requirements of the UFSAR.

- B-GEN-ITPCI-019-362, PMS Channel Calibration Test for 4-RCS-LT195D, Ver. 1
- B-GEN-ITPCI-019-370, PMS Channel Calibration Test for 4-RCS-PT191D, Ver. 1

b. Findings

No findings were identified.

3. OPERATIONAL READINESS

Cornerstones: Inspection/Testing, Operational Programs

IMC 2503, Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) - Related Work Inspections

3T01 (Unit 4) ITAAC Number 2.1.02.08d.i (32) / Family 03D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.08d.i (32). The inspectors used the following NRC inspection procedures (IPs)/sections to perform this inspection:

- 65001.D-02.03-Test Results Review

The inspectors used the appropriate portions of the IP to review the licensee's test results to verify if the calculated automatic depressurization system (ADS) piping flow resistance from the pressurizer through the sparger with all valves of each ADS group open is less than or equal to 2.91E-6 ft/gpm^2. The test package was reviewed to verify if the test results satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- SV4-PXS-T2R-070, Vogtle Unit 4 4-PXS-ITPP-503 Section 4.6 ADS Stages 1, 2, and 3 Flow Line Resistance Test Engineering Report, Rev. 0

b. Findings

No findings were identified.

3T02 (Unit 4) ITAAC Number 2.1.02.13b (64) / Family 10D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.13b (64). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.D-02.03-Test Results Review

The inspectors used the appropriate portions of the IP to review the licensee's test results to verify if the reactor coolant pumps trip after receiving a signal from the PMS. The ITAAC technical report and references were reviewed to verify if the test results satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- SV4-RCS-ITR-800064, U4 Testing Results for Reactor Coolant Pump Trip from PMS, Rev. 0

b. Findings

No findings were identified.

3T03 (Unit 4) ITAAC Number 2.2.01.11b (118) / Family 07D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.11b (118). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.D-02.03-Test Results Review

The inspectors used the appropriate portions of the IP to review the licensee's test results to verify if, after a loss of motive power, each remotely operated valve assumes the indicated loss of motive power position. The test packages were reviewed to verify if the test results satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- 2.2.01.11b-U4-CP, ITAAC Completion Package, Rev.0

b. Findings

No findings were identified.

3T04 (Unit 4) ITAAC Number 2.2.03.08c.i.01 (177) / Family 06D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.08c.i.01 (177). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.D-02.03-Test Results Review

The inspectors used the appropriate portions of the IP to review the licensee's test results to verify if the injection line flow resistance from the core makeup tank to the reactor vessel was ≥ 1.81×10^{-5} ft/gpm^2 and ≤ 2.25×10^{-5} ft/gpm^2. The ITAAC technical report and references were reviewed to verify if the test results satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- SV4-PXS-ITR-800177, Unit 4 Recorded Results of PXS Core Makeup Tank Injection Line Flow Resistance: ITAAC 2.2.03.08c.i.01 - NRC Index Number: 177, Rev. 1

b. Findings

No findings were identified.

3T05 (Unit 4) ITAAC Number 2.2.03.08c.i.03 (179) / Family 06D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.08c.i.03 (179). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.D-02.03-Test Results Review

The inspectors used the appropriate portions of the IP to review the licensee's test results to verify if the flow resistance from the IRWST injection line and the reactor vessel is within the acceptable design values. The test package was reviewed to verify if the test results satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- SV4-PXS-T2R-001, Vogtle Unit 4 4-PXS-ITPP-507 Section 4.2 IRWST Injection to DVI Nozzle Flow Resistance Test Engineering Report, Rev. 0

b. Findings

No findings were identified.

3T06 (Unit 4) ITAAC Number 2.2.03.08c.i.04 (180) / Family 06D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.08c.i.04 (180). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.D-02.03-Test Results Review

The inspectors used the appropriate portions of the IP to review the licensee's test results to verify if the calculated flow resistance for each containment recirculation line between containment and the reactor vessel was within the analyzed values. The ITAAC technical report and references were reviewed to verify if the test results satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- 4-PXS-ITPP-507, IRWST Flow Tests, Ver. 1.0

b. Findings

No findings were identified.

3T07 (Unit 4) ITAAC Number 2.2.03.08c.ii (181) / Family 06D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.08c.ii (181). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.D-02.03-Test Results Review

The inspectors used the appropriate portions of the IP to review the licensee's test results to verify if the flow resistance from the cold leg to the core makeup tank was ≤ 7.21×10^{-6} ft/gpm². The test package was reviewed to verify if the test results satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- SV4-PXS-T2R-006, Vogtle Unit 4 4-PXS-ITPP-503 Sections 4.4 & 4.5 CMT Cold Leg Balance Line Test Engineering Report, Rev. 0

b. Findings

No findings were identified.

3T08 (Unit 4) ITAAC Number 2.2.03.09a.i (201) / Family 03D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.09a.i (201). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.D-02.03-Test Results Review

The inspectors used the appropriate portions of the IP to review the licensee's test results to verify if the calculated flow resistance for each IRWST drain line between the in-containment refueling water storage tank (IRWST) and the containment was ≤ 4.44 x 10^{-6} ft/gpm^2. The test package was reviewed to verify if the test results satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- SV4-PXS-T2R-003, Vogtle Unit 4 4-PXS-ITPP-507 Section 4.3.1 and 4.3.3 IRWST to Containment Recirc Sump Flow Resistance Test Engineering Report, Rev. 0

b. Findings

No findings were identified.

3T09 (Unit 4) ITAAC Number 2.2.03.12a.iv (216) / Family 07D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.12a.iv (216). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.D-02.03-Test Results Review

The inspectors used the appropriate portions of the IP to review the licensee's test results to verify if passive core cooling system check valves changed position to perform their active safety function under preoperational test conditions. The ITAAC technical report and references were reviewed to verify if the test results satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- SV4-PXS-ITR-800216, Unit 4 Recorded Results of PXS Check Valves Change Position as Indicated in Table 2.2.3-1: ITAAC 2.2.03.12a.iv - NRC Index Number: 216, Rev. 0

b. Findings

No findings were identified.

3T10 (Unit 4) ITAAC Number 2.5.02.06a.ii (530) / Family 10D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.5.02.06a.ii (530). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.D-02.02-Test Witnessing

The inspectors used the appropriate portions of the IP to observe the licensee's performance of the following component test procedures used to verify if the PMS cabinet and divisional diagnostics tests assessed the software was loaded on to the cabinets successfully, no software or hardware errors were present, intra cabinet communication links were operable, and the cabinets were communicating the cabinet health status to the interface test processor. The tests were observed to verify if the test satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- B-GEN-ITPCI-001, PMS Cabinets, Ver. 4.0
- B-GEN-ITPCI-001-011, PMS Cabinets - Cabinet Diagnostics, Ver. 2.1
- B-GEN-ITPCI-001-012, PMS Cabinets - Division Diagnostics, Ver. 1.0

The inspectors used the appropriate portions of the IP to observe the licensee's performance of the following preoperational test procedure used to verify if all bypassed channels will alarm in the MCR (Division Bypass Alarm verification). The test was observed to verify if the test satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- 4-PMS-ITPP-521, Protection and Safety Monitoring System Logic Test Preoperational Test Procedure, Ver. 1.0

b. Findings

No findings were identified.

3T11 (Unit 4) ITAAC Number 2.6.03.04c (603) / Family 08D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.6.03.04c (603). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.D-02.02-Test Witnessing

The inspectors used the appropriate portions of the IP to observe the Class 1E direct current and uninterruptable power supply system preoperational tests to verify if the:
1) divisions A battery banks, C 24-hour battery banks, and spare battery banks could supply power to the DC switchboards' loads at the required voltage for the required design duty cycle;

2) divisions A and B 24-hour battery chargers & spare battery charger supplied required output current and voltage to the DC switchboards' bus loads while maintaining the corresponding battery charged;
3) divisions A and B 24-hour inverters could supply their AC loads with the required voltage and frequency; and
4) division A regulating transformer could supply AC loads at the required voltage when powered from its 480V motor control centers.

The test packages were reviewed as part of the ITAAC Technical Report to verify if the test results satisfied the applicable quality and technical requirements of the UFSAR and ITAAC.

- 4-IDS-ITPP-505, IDSA Class 1E DC and UPS Preoperational Test, Ver. 1
- 4-IDS-ITPP-506, IDSB Class 1E DC and UPS Preoperational Test, Ver. 1
- 4-IDS-ITPP-507, IDSC Class 1E DC and UPS Preoperational Test, Ver. 1
- 4-IDS-ITPP-509, IDSS Class 1E Battery and Charger Preoperational Test, Ver. 1

b. Findings

No findings were identified.

3T12 (Unit 4) ITAAC Number 2.7.06.02.ii (725) / Family 07D

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.7.06.02.ii (725). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.D-02.03-Test Results Review

The inspectors used the appropriate portions of the IP to review the licensee's test results to verify if the containment vacuum relief isolation valves open within 30 seconds. The ITAAC technical report and selected references were reviewed to verify if the test results satisfied the applicable quality and technical requirements of the UFSAR and the ITAAC.

- SV4-VFS-ITR-800725, Unit 4 Recorded Results of Stroke Testing for Containment Vacuum Relief Isolation Valves: ITAAC 2.7.06.02.ii, Rev. 0

b. Findings

No findings were identified.

4. OTHER INSPECTION RESULTS

4OA6 Meetings, Including Exit

.1 Exit Meeting.

On April 25, 2023, the inspectors presented the inspection results to Mr. G. Chick, Vogtle 3&4 Executive Vice President, and other licensee and contractor staff members. Proprietary information was reviewed during the inspection period but was not included in the inspection report.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensees and Contractor Personnel

S. Briggs, Testing and Turnover Director
A. Nix, ITP Director
E. Loehlein, Operations Director
J. Coleman, Regulatory Affairs Director
R. Nicoletto, NI Manager
S. Leighty, Regulatory Affairs Manager
W. Garrett, Licensing Manager
T. Takats, Electrical Manager
K. Roberts, ITAAC Manager
J. Olsen, NI Supervisor
D. Johnson, Maintenance Supervisor
G. Bauer, Electrical Supervisor

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Type	Status	Description
05200026/2023006-01	NCV	Open/Closed	Failure to Use Appropriate M&TE

LIST OF DOCUMENTS REVIEWED

Section 1A01
Test Package V4-PXS-T0W-1244543, PXS-PL-V004A-I1-A Component Test 2 & 1-F Component Test 2 (ITAAC) PMS CIM Squib, Rev. 0
Work order (WO) 1244674
WO 1244663
WO 1192630

Section 1A02
WO 1292996

Section 1A03

Test Package V4-PXS-T0W-1244543, PXS-PL-V004A-I1-A Component Test 2 & 1-F Component Test 2 (ITAAC) PMS CIM Squib, Rev. 0
WO 1244674
WO 1244663
WO 1192630

Section 1A04

WO1291587
WO 1247641

Section 1A05

WO 1199867

Section 1A06

WO 1243370
WO 1243375
WO 1293076
WO 1191738
WO 1243371

Section 1A07

Test Package PXS-PL-V123B-I1-A Component test 2 & 1-F Component Test 2 (ITAAC) PMS CIM Squib
WO 1244558
WO 1244543

Section 1P01

4-GEN-ITPP-517, Pre-Core Hot Functional Testing (HFT) Sequence Procedure, Ver. 2.0
WO: 1290102

Section 1P02

WO 1283709
WO 1191437
WO 1243380

Section 1P03

WO 1261769
WO 1261760

Section 3T01

4-PXS-ITPP-503, TPC for Passive Core Cooling System Pre-Core Flow Testing with RV Head Installed Preoperational Test Procedure, Rev. 1.0
SV4-PXS-T0W-1191260, (ITAAC) Perform Preop Test IAW 4-PXS-ITPP-503, Rev. 0
SV4-RCS-ITR-800032, Unit 4 Inspections and Associated Analysis of the ADS Stages 1-3 Piping Flow Path: ITAAC 2.1.02.08d.i, Rev. 0

SV4-PXS-T2C-007, Vogtle Unit 4 4-PXS-ITPP-503 Section 4.6 ADS Stages 1, 2, and 3 Flow Line Resistance Test Calculation, Rev. 0
APP-PXS-T1-501, Passive Core Cooling System Preoperational Test Specification, Rev. 4
APP-PXS-M3C-019, IRWST / Containment Sump Injection Lines and ADS Line Resistances, Rev. 5
2.1.02.08d.i-U4-CP, ITAAC Completion Package, Rev. 0
34VP1522 Digital M&TE Record PZR P-1 Instrument
34VP1523 Digital M&TE Record PZR P-2 Instrument
34VP1528 Digital M&TE Record ADS VAC-A Instrument
34VP1529 Digital M&TE Record ADS VAC-B Instrument
34VP3029 Digital M&TE Record UFM-1 ADS 1-3 Instrument
34VP3027 Digital M&TE Record UFM-2 ADS 1-3 Instrument
34VP3031 Digital M&TE Record UFM-3 ADS 1-3 Instrument
34VP3033 Digital M&TE Record UFM-4 ADS 1-3 Instrument

Section 3T02
B-GEN-ITPCI-039-F269, ECS-ES-31 Component Test, Ver. 1.0
B-GEN-ITPCI-039-F270, ECS-ES-32 Component Test, Ver. 1.0
B-GEN-ITPCI-039-F271, ECS-ES-41 Component Test, Ver. 1.0
B-GEN-ITPCI-039-F272, ECS-ES-42 Component Test, Ver. 1.0
B-GEN-ITPCI-039-F273, ECS-ES-51 Component Test, Ver. 1.0
B-GEN-ITPCI-039-F274, ECS-ES-52 Component Test, Ver. 1.0
B-GEN-ITPCI-039-F275, ECS-ES-61 Component Test, Ver. 1.0
B-GEN-ITPCI-039-F276, ECS-ES-62 Component Test, Version 1.0
CP Number: 2.1.02.13b-U4-CP-Rev0, RCS Reactor Coolant Pumps Trip Control From PMS, Rev. 0
ND-22-0646
WO 1196120
WO 1289047
WO 1289048
WO 1289049
WO 1289050
WO 1289051
WO 1289052
WO 1289053

Section 3T03
SV4-CNS-ITR-800118, Unit 4 Test Results for CAS Containment Isolation Valve – Loss of Motive Power Testing: ITAAC 2.2.01.11b, Rev. 0
SV4-CNS-ITR-801118, Unit 4 Test Results for CCS Containment Isolation Valve – Loss of Motive Power Testing: ITAAC 2.2.01.11b, Rev. 0
SV4-CNS-ITR-802118, Unit 4 Test Results for SFS Containment Isolation Valve – Loss of Motive Power Testing: ITAAC 2.2.01.11b, Rev. 0
SV4-CNS-ITR-803118, Unit 4 Test Results for VFS Containment Isolation Valve – Loss of Motive Power Testing: ITAAC 2.2.01.11b, Rev. 0
SV4-CNS-ITR-804118, Unit 4 Test Results for VWS Containment Isolation Valve – Loss of Motive Power Testing: ITAAC 2.2.01.11b, Rev. 0

SV4-CNS-ITR-805118, Unit 4 Test Results for WLS Containment Isolation Valve – Loss of Motive Power Testing: ITAAC 2.2.01.11b, Rev. 0
WO 1189901
WO 1190298
WO 1191780
WO 1191775
WO 1288906
WO 1203063
WO 1203207
WO 1203099
WO 1203069
WO 1203251
WO 1291585
WO 1203844
WO 1203968
WO 1204002
WO 1206354
WO 1206363
WO 1206373
WO 1206407

Section 3T04

CR 50160177
2.2.03.08c.i.01-U4-CP-Rev0, PXS Low-Pressure Injection Test CMT Flow Resistance, Rev. 0
4-PXS-ITPP-506, PXS CMT Mapping and Line Resistance Test, Version 1.1
APP-PXS-T1-501, Passive Core Cooling System Preoperational Test Specification, Rev. 4
ND-22-0645, Southern Nuclear Operating Company - Vogtle Electric Generating Plant Unit 4 - ITAAC Closure Notification on Completion of ITAAC 2.2.03.08c.i.01 [Index Number 177], Dated: Oct 14, 2022
SV4-PXS-ITR-800177, Unit 4 Recorded Results of PXS Core Makeup Tank Injection Line Flow Resistance: ITAAC 2.2.03.08c.i.01 - NRC Index Number: 177, Rev. 1
SV4-PXS-T2C-005, Vogtle Unit 4 4-PXS-ITPP-506 Sections 4.2 & 4.4 CMT Injection Line Flow Resistance Test Calculation, Rev. 0
SV4-PXS-T2R-005, Vogtle Unit 4 4-PXS-ITPP-506 Sections 4.2 & 4.4 CMT Injection Line Flow Resistance Test Engineering Report, Rev. 0
SV4-PY25-GNR-000002, SV4-PXS-PY-R01 A/B Orifice Bore Diameter Change - ESRs 50148574/50148446, Rev. 0
Traveler Number: 919463-001, PCI Quality Assurance Traveler, Rev. 0
ESR 50141071
ESR 50148446
ESR 50148574
ESR 50152004
WO 1191263

Section 3T05

4-PXS-ITPP-507, IRWST Flow Tests, Ver. 1.0
NMP-MA-053, M&TE Calibration Services Receipt Checklist For 34VP1666, 11/10/2021
NMP-MA-053, M&TE Calibration Services Receipt Checklist For C4000000774194, 11/10/2021
SV4-PXS-T0W-1191264

ND-22-0521, ITAAC Closure Notification on Completion of ITAAC 2.2.03.08c.i.03 [Index Number 179], 01/20/2023
SV4-PXS-T2C-001, Vogtle Unit 4 4-PXS-ITPP-507 Section 4.2 IRWST Injection to DVI Nozzle Flow Resistance Test Calculation, Rev. 0
2.2.03.08c.i.03-U4-CP, ITAAC Completion Package, Rev. 0
APP-PXS-T1-501, Passive Core Cooling System Preoperational Test Specification, Rev. 4

Section 3T06

4-PXS-ITPP-507, IRWST Flow Tests, Ver. 1.0
APP-PXS-T1-501, Passive Core Cooling System Preoperational Test Specification, Rev. 4
Completion Package for U4-2.2.03.08c.i.04, NRC_180 PXS Low-Pressure Injection Test Containment Recirculation Flow Resistance
CR 50146836
ES 50145446
M&TE Certification No: C4000000773938:1658142460
M&TE Certification No: C4000000773939:1658146726
M&TE Certification No: C4000000774165:1632318135
M&TE Certification No: C4000000774179:1632304915
M&TE Certification No: C4000000774203:1632320117
ND-22-0522, Southern Nuclear Operating Company - Vogtle Electric Generating Plant Unit 4 - ITAAC Closure Notification on Completion of ITAAC 2.2.03.08c.i.04 [Index Number 180], Dated: January 19, 2023
SV4-PXS-T2R-020, Vogtle Unit 4 4-PXS-ITPP-507 Section 4.3.2 and Section 4.3.4 Containment Recirculation Sump to DVI Nozzle Flow Resistance Test Engineering Report, Rev. 0
WO 1191264

Section 3T07

SV4-PXS-T2C-006, Vogtle Unit 4 4-PXS-ITPP-503 Sections 4.4 & 4.5 CMT Cold Leg Balance Line Flow Resistance Test Calculation, Rev. 0
APP-PXS-T1-501, Passive Core Cooling System Preoperational Test Specification, Rev. 4
WO SV4-PXS-T0W-1191260
ND-23-0039, ITAAC Closure Notification on Completion of ITAAC 2.2.03.08c.ii [Index Number 181], 02/03/2023

Section 3T08

SV4-PXS-T0W-1191264, (ITAAC) Perform Preop Test IAW 4-PXS-ITPP-507, Rev. 0
4-PXS-ITPP-507-V1.0-01, TPC for IRWST Flow Tests, Rev. 1.0
SV4-PXS-T1-501, Passive Core Cooling System Preoperational Test Specification, Rev. 4
SV4-PXS-T2C-003, Vogtle Unit 4 4-PXS-ITPP-507 Section 4.3.1 and 4.3.3 IRWST to Containment Recirc Sump Flow Resistance Test Calculation, Rev. 0
2.2.03.09a.i-U4-CP, ITAAC Completion Package, Rev0
APP-PXS-M3C-019, IRWST/Cont Sump Injection Lines & ADS Line Resistances, Rev. 5
APP-PXS-M3C-033, Containment Flood-Up Volume Calculation, Rev. 3
APP-PXS-M3C-034, Containment Flood-up Level, Rev. 5
C4000000774165, Sump Low DP-2 Instrument Calibration Document
C4000000774179, Sump Hi DP-1 Instrument Calibration Document
C4000000774203, PT L113A Instrument Calibration Document

Section 3T09

2.2.03.12a.iv-U4-CP-Rev0, PXS Check Valves Position, Rev. 0
4-PXS-ITPP-502, PXS Accumulator Mapping and Line Resistance Test, Ver. 1.0
4-PXS-ITPP-503, Passive Core Cooling System Pre-Core Flow Testing with RV Head Installed Preoperational Test Procedure, Ver. 1.0
4-PXS-ITPP-506, PXS CMT Mapping and Line Resistance Test, Ver. 1.1
4-PXS-ITPP-507, IRWST Flow Tests, Ver. 1.0
Certification No: 34VP3002:1642777594
CR 50141654
ND-23-0026, Southern Nuclear Operating Company - Vogtle Electric Generating Plant Unit 4 - ITAAC Closure Notification on Completion of ITAAC 2.2.03.12a.iv [Index Number 216], Dated: January 13, 2023
SV4-PXS-ITR-800216, Unit 4 Recorded Results of PXS Check Valves Change Position as Indicated in Table 2.2.3-1: ITAAC 2.2.03.12a.iv - NRC Index Number: 216, Rev. 0
SV4-PXS-T2C-004, Vogtle Unit 4 4-PXS-ITPP-502 Sections 4.1 - 4.4 Accumulator Injection Line Flow Resistance Test Calculation, Rev. 0
SV4-PXS-T2R-004, Vogtle Unit 4 4-PXS-ITPP-502 Sections 4.1 - 4.4 Accumulator Injection Line Flow Resistance Test Summary Report, Rev. 0
WO 1191256 (502)
WO 1191260 (503)
WO 1191263 (506)
WO 1191264 (507)

Section 3T10

4-PMS-ITPP-521, Protection and Safety Monitoring System Logic Test Preoperational Test Procedure, Ver. 1.0
B-GEN-ITPCI-001-011, PMS Cabinets - Cabinet Diagnostics, Ver. 2.1
B-GEN-ITPCI-001-012, PMS Cabinets - Division Diagnostics, Ver. 1.0
B-GEN-ITPCI-001, PMS Cabinets, Ver. 4.0
WO 1236131
WO 1288975
WO 1236106
WO 1236104
WO 1236102

Section 3T11

4-IDS-ITPP-505, IDSA Class 1E DC and UPS Preoperational Test, Ver. 1
4-IDS-ITPP-506, IDSB Class 1E DC and UPS Preoperational Test, Ver. 1
4-IDS-ITPP-507, IDSC Class 1E DC and UPS Preoperational Test, Ver. 1
4-IDS-ITPP-509, IDSS Class 1E Battery and Charger Preoperational Test, Ver. 1
B-GEN-ITPCE-006, ENERSYS Batteries, Ver. 8.1
B-GEN-ITPCE-008, Class 1E and Non-Class 1E Battery Testing, Ver. 12
B-GEN-ITPCE-009, Battery Charger Load Test, Ver. 3
4-GEN-ITPCE-011-V1.0-01, TPC for Class 1E DC Inverter Capacity Test, Static Transfer Switch Test, and Regulating Transformer Capacity Test, Ver. 1
APP-DB01-Z0-001, Design Specification for Class 1E 250 VDC Batteries and Racks, Rev. 10
WO 1290475
WO 1290477
WO 1290478

WO 1290479
WO 1290480

Section 3T12
B-GEN_ITPCI-039-F482, VFS-PL-V800A Component Test, Ver. 0
B-GEN_ITPCI-039-F483, VFS-PL-V800B Component Test, Ver. 0
ND-23-0223, ITAAC Closure Notification on Completion of ITAAC 2.7.06.02.ii, 03/16/2023
SV4-VFS-T0W-1203251, Perform PMS/PLS Interface Test for SV4-VFS-PL-V800A, Rev. 0
SV4-VFS-T0W-1291585, Perform PMS/PLS Interface Test for SV4-VFS-PL-V800B, Rev. 0

ITAAC INSPECTED

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
32	2.1.02.08d.i	8.d) The RCS provides automatic depressurization during design basis events.	i) A low pressure flow test and associated analysis will be conducted to determine the total piping flow resistance of each ADS valve group connected to the pressurizer (i.e., ADS Stages 1-3) from the pressurizer through the outlet of the downstream ADS control valves. The reactor coolant system will be at cold conditions with the pressurizer full of water. The normal residual heat removal pumps will be used to provide injection flow into the RCS discharging through the ADS valves. Inspections and associated analysis of the piping flow paths from the discharge of the ADS valve groups connected to the pressurizer (i.e., ADS Stages 1-3) to the spargers will be conducted to verify the line routings are consistent with the line routings used for design flow resistance calculations.	i) The calculated ADS piping flow resistance from the pressurizer through the sparger with all valves of each ADS group open is < 2.91E-6 ft/gpm2.
46	2.1.02.11a.i	11.a) Controls exist in the MCR to cause the remotely operated valves identified in Table 2.1.2-1 to perform active functions.	i) Testing will be performed on the squib valves identified in Table 2.1.2-1 using controls in the MCR without stroking the valve.	i) Controls in the MCR operate to cause a signal at the squib valve electrical leads which is capable of actuating the squib valve.

47	2.1.02.11a.ii	10. Safety-related displays identified in Table 2.1.2-1 can be retrieved in the MCR. 11.a) Controls exist in the MCR to cause the remotely operated valves identified in Table 2.1.2-1 to perform active functions. 11.b) The valves identified in Table 2.1.2-1 as having PMS control perform an active safety function after receiving a signal from the PMS. 12.b) After loss of motive power, the remotely operated valves identified in Table 2.1.2-1 assume the indicated loss of motive power position.	Inspection will be performed for retrievability of the safety-related displays in the MCR. ii) Stroke testing will be performed on the other remotely operated valves listed in Table 2.1.2-1 using controls in the MCR. ii) Testing will be performed on the other remotely operated valves identified in Table 2.1.2-1 using real or simulated signals into the PMS. iii) Testing will be performed to demonstrate that remotely operated RCS valves RCS-V001A/B, V002A/B, V003A/B, V011A/B, V012A/B, V013A/B open within the required response times. Testing of the remotely operated valves will be performed under the conditions of loss of motive power.	Safety-related displays identified in Table 2.1.2-1 can be retrieved in the MCR. ii) Controls in the MCR operate to cause the remotely operated valves (other than squib valves) to perform active functions. ii) The other remotely operated valves identified in Table 2.1.2-1 as having PMS control perform the active function identified in the table after receiving a signal from PMS. iii) These valves open within the following times after receipt of an actuation signal: V001A/B < 40 sec V002A/B, V003A/B < 100 sec V011A/B < 30 sec V012A/B, V013A/B < 60 sec Upon loss of motive power, each remotely operated valve identified in Table 2.1.2-1 assumes the indicated loss of motive power position.
48	2.1.02.11b.i	11.b) The valves identified in Table 2.1.2-1 as having PMS control perform an active safety function after receiving a signal from the PMS.	i) Testing will be performed on the squib valves identified in Table 2.1.2-1 using real or simulated signals into the PMS without stroking the valve.	i) The squib valves receive a signal at the valve electrical leads that is capable of actuating the squib valve.

64	2.1.02.13b	13.b) The RCPs trip after receiving a signal from the PMS.	Testing will be performed using real or simulated signals into the PMS.	The RCPs trip after receiving a signal from the PMS.
110	2.2.01.09	9. Safety-related displays identified in Table 2.2.1-1 can be retrieved in the MCR. 10.a) Controls exist in the MCR to cause those remotely operated valves identified in Table 2.2.1-1 to perform active functions. 10.b) The valves identified in Table 2.2.1-1 as having PMS control perform an active safety function after receiving a signal from the PMS.	Inspection will be performed for retrievability of the safety-related displays in the MCR. Stroke testing will be performed on remotely operated valves identified in Table 2.2.1-1 using the controls in the MCR. Testing will be performed on remotely operated valves listed in Table 2.2.1-1 using real or simulated signals into the PMS.	Safety-related displays identified in Table 2.2.1-1 can be retrieved in the MCR. Controls in the MCR operate to cause remotely operated valves identified in Table 2.2.1-1 to perform active safety functions. The remotely operated valves identified in Table 2.2.1-1 as having PMS control perform the active function identified in the table after receiving a signal from PMS.
118	2.2.01.11b	11.b) After loss of motive power, the remotely operated valves identified in Table 2.2.1-1 assume the indicated loss of motive power position.	Testing of the remotely operated valves will be performed under the conditions of loss of motive power.	After loss of motive power, each remotely operated valve identified in Table 2.2.1-1 assumes the indicated loss of motive power position.
138	2.2.02.07b.i	7.a) The PCS delivers water from the PCCWST to the outside, top of the containment vessel. 7.b) The PCS wets the outside surface of the containment vessel. The inside and the outside of the containment vessel above the operating deck are coated with	i) Testing will be performed to measure the PCCWST delivery rate from each one of the three parallel flow paths. ii) Testing and or analysis will be performed to demonstrate the PCCWST inventory provides 72 hours of adequate water flow. i) Testing will be	i) When tested, each one of the three flow paths delivers water at greater than or equal to: – 469.1 gpm at a PCCWST water level of 27.4 ft + 0.2, - 0.0 ft above the tank floor – 226.6 gpm when the PCCWST water level uncovers the first (i.e. tallest) standpipe –

		an inorganic zinc material. 7.c) The PCS provides air flow over the outside of the containment vessel by a natural circulation air flow path from the air inlets to the air discharge structure. 7.d) The PCS drains the excess water from the outside of the containment vessel through the two upper annulus drains. 7.e) The PCS provides a flow path for long-term water makeup to the PCCWST. 9. Safety-related displays identified in Table 2.2.2-1 can be retrieved in the MCR. 10.a) Controls exist in the MCR to cause the remotely operated valves identified in Table 2.2.2-1 to perform active functions. 10.b) The valves identified in Table 2.2.2-1 as having PMS control perform an active safety function after receiving a signal from the PMS. 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 11.b) After loss of	performed to measure the outside wetted surface of the containment vessel with one of the three parallel flow paths delivering water to the top of the containment vessel. ii) Inspection of the containment vessel exterior coating will be conducted. iii) Inspection of the containment vessel interior coating will be conducted. Inspections of the air flow path segments will be performed. Testing will be performed to verify the upper annulus drain flow performance. ii) Testing will be performed to measure the delivery rate from the long-term makeup connection to the PCCWST. Inspection will be performed for retrievability of the safety-related displays in the MCR. Stroke testing will be performed on the remotely operated valves identified in Table 2.2.2-1 using the controls in the MCR. Testing will be performed on the remotely operated valves in Table 2.2.2-1 using real or simulated signals into the PMS.	176.3 gpm when the PCCWST water level uncovers the second tallest standpipe – 144.2 gpm when the PCCWST water level uncovers the third tallest standpipe – or a report exists and concludes that the as-measured flow rates delivered by the PCCWST to the containment vessel provides sufficient heat removal capability such that the limiting containment pressure and temperature values are not affected and the PCS is able to perform its safety function to remove heat from containment to maintain plant safety. ii) When tested and/or analyzed with all flow paths delivering and an initial water level at 27.4 + 0.2, - 0.00 ft, the PCCWST water inventory provides greater than or equal to 72 hours of flow, and the flow rate at 72 hours is greater than or equal to 100.7 gpm or a report exists and concludes that the as-measured flow rates delivered by the PCCWST to the

		motive power, the remotely operated valves identified in Table 2.2.2-1 assume the indicated loss of motive power position.	iii) Tests of the motor-operated valves will be performed under preoperational flow, differential pressure, and temperature conditions. Testing of the remotely operated valves will be performed under the conditions of loss of motive power.	containment vessel provides sufficient heat removal capability such that the limiting containment pressure and temperature values are not affected and the PCS is able to perform its safety function to remove heat from containment to maintain plant safety. i) A report exists and concludes that when the water in the PCCWST uncovers the standpipes at the following levels, the water delivered by one of the three parallel flow paths to the containment shell provides coverage measured at the spring line that is equal to or greater than the stated coverages. - 24.1 ± 0.2 ft above the tank floor; at least 90% of the perimeter is wetted. - 20.3 ± 0.2 ft above the tank floor; at least 72.9% of the perimeter is wetted. - 16.8 ± 0.2 ft above the tank floor; at least 59.6% of the perimeter is wetted ii) A report exists and concludes that the containment vessel exterior surface is coated with an inorganic zinc coating above elevation 135'-3". iii) A report exists and concludes that the containment

				vessel interior surface is coated with an inorganic zinc coating above the operating deck. Flow paths exist at each of the following locations: – Air inlets – Base of the outer annulus – Base of the inner annulus – Discharge structure With a water level within the upper annulus 10" + 1" above the annulus drain inlet, the flow rate through each drain is greater than or equal to 525 gpm. ii) With a water supply connected to the PCS long-term makeup connection, each PCS recirculation pump delivers greater than or equal to 100 gpm when tested separately. Safety-related displays identified in Table 2.2.2-1 can be retrieved in the MCR. Controls in the MCR operate to cause remotely operated valves identified in Table 2.2.2-1 to perform active functions. The remotely operated valves identified in Table 2.2.2-1 as having PMS control perform the active function identified in the table after receiving a signal from the PMS. iii) Each motor-

				operated valve changes position as indicated in Table 2.2.2-1 under preoperational test conditions. After loss of motive power, each remotely operated valve identified in Table 2.2.2-1 assumes the indicated loss of motive power position.
177	2.2.03.08c.i.01	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. 1. CMTs: Each CMT will be initially filled with water. All valves in these lines will be open during the test.	i) The injection line flow resistance from each source is as follows: 1. CMTs: The calculated flow resistance between each CMT and the reactor vessel is ≥ 1.81 x 10-5 ft/gpm2 and ≤ 2.25 x 10-5 ft/gpm2.
179	2.2.03.08c.i.03	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 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: ≥ 5.35 x 10-6 ft/gpm2 and ≤ 9.09 x 10-6 ft/gpm2 and Line B: ≥ 6.15 x 10-6 ft/gpm2 and ≤ 1.05 x 10-5 ft/gpm2.

180	2.2.03.08c.i.04	8.c) The PXS provides RCS	i) A low-pressure injection test and analysis for each CMT, each accumulator, each IRWST injection line,	i) The injection line flow resistance from each source is as follows: 4. Containment
		makeup, boration, and safety injection during design basis events.	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. 4. Containment Recirculation: A temporary water supply will be connected to the recirculation lines. All valves in these lines will be open during the test. Sufficient flow will be provided to open the check valves.	Recirculation: The calculated flow resistance for each containment recirculation line between the containment and the reactor vessel is: Line A: ≤ 1.33 x 10-5 ft/gpm2 and Line B: ≤ 1.21 x 10-5 ft/gpm2.
181	2.2.03.08c.ii	8.c) The PXS provides RCS makeup, boration, and safety injection during design basis events.	ii) A low-pressure test and analysis will be conducted for each CMT to determine piping flow resistance from the cold leg to the CMT. The test will be performed by filling the CMT via the cold leg balance line by operating the normal residual heat removal pumps.	ii) The flow resistance from the cold leg to the CMT is ≤ 7.21 x 10-6 ft/gpm2.
201	2.2.03.09a.i	9.a) The PXS provides a function to cool the outside of the reactor vessel during a severe accident.	i) A flow test and analysis for each IRWST drain line to the containment will be conducted. The test is initiated by opening isolation valves in each line. Test fixtures may be used to simulate squib valves.	i) The calculated flow resistance for each IRWST drain line between the IRWST and the containment is ≤ 4.44x 10-6 ft/gpm2.

206	2.2.03.10	10. Safety-related displays of the parameters identified in Table 2.2.3-1 can be retrieved in the MCR. 11.a) Controls exist in the MCR to cause the remotely operated valves identified in Table 2.2.3-1 to perform their active function(s). 11.b) The valves identified in Table 2.2.3-1 as having PMS control perform their active function after receiving a signal from the PMS. 12.b) After loss of motive power, the remotely operated valves identified in Table 2.2.3-1 assume the indicated loss of motive power position. 13. Displays of the parameters identified in Table 2.2.3-3 can be retrieved in the MCR.	Inspection will be performed for the retrievability of the safety-related displays in the MCR. ii) Stroke testing will be performed on remotely operated valves other than squib valves identified in Table 2.2.3-1 using the controls in the MCR. ii) Testing will be performed on the remotely operated valves other than squib valves identified in Table 2.2.3-1 using real or simulated signals into the PMS. iii) Testing will be performed to demonstrate that remotely operated PXS isolation valves PXS-V014A/B, V015A/B, V108A/B open within the required response times. Testing of the remotely operated valves will be performed under the conditions of loss of motive power. Inspection will be performed for retrievability of the displays identified in Table 2.2.3-3 in the MCR.	Safety-related displays identified in Table 2.2.3-1 can be retrieved in the MCR. ii) Controls in the MCR operate to cause remotely operated valves other than squib valves to perform their active functions. ii) Remotely operated valves other than squib valves perform the active function identified in the table after a signal is input to the PMS. iii) These valves open within 20 seconds after receipt of an actuation signal. After loss of motive power, each remotely operated valve identified in Table 2.2.3-1 assumes the indicated loss of motive power position. Displays identified in Table 2.2.3-3 can be retrieved in the MCR.
209	2.2.03.11b.i	11.b) The valves identified in Table 2.2.3-1 as having PMS control perform their active function after receiving a signal from the PMS.	i) Testing will be performed on the squib valves identified in Table 2.2.3-1 using real or simulated signals into the PMS without stroking the valve.	i) Squib valves receive an electrical signal at the valve electrical leads that is capable of actuating the valve after a signal is input to the PMS.
216	2.2.03.12a.iv	12.a) The squib valves and check valves identified in Table 2.2.3-1	iv) Exercise testing of the check valves with active safety functions identified in Table 2.2.3-1	iv) Each check valve changes position as indicated in Table2.2.3-1

		perform an active safety-related function to change position as indicated in the table.	will be performed under preoperational test pressure, temperature, and fluid flow conditions.	
530	2.5.02.06a.ii	6.a) The PMS initiates an automatic reactor trip, as identified in Table 2.5.2-2, when plant process signals reach specified limits. 6.b) The PMS initiates automatic actuation of engineered safety features, as identified in Table 2.5.2-3, when plant process signals reach specified limits. 6.c) The PMS provides manual initiation of reactor trip and selected engineered safety features as identified in Table 2.5.2-4. 8.a) The PMS provides for the minimum inventory of displays, visual alerts, and fixed position controls, as identified in Table 2.5.2-5. The plant parameters listed with a "Yes" in the "Display" column and visual alerts listed with a "Yes" in the "Alert" column can be retrieved in the MCR. The fixed position controls listed with a "Yes" in the "Control" column are provided in the MCR. 8.c) Displays of the open/closed status of the reactor trip breakers can be retrieved in the MCR.	An operational test of the as-built PMS will be performed using real or simulated test signals. An operational test of the as-built PMS will be performed using real or simulated test signals. An operational test of the as-built PMS will be performed using the PMS manual actuation controls. i) An inspection will be performed for retrievability of plant parameters in the MCR. iii) An operational test of the as-built system will be performed using each MCR fixed position control. Inspection will be performed for retrievability of displays of the open/closed status of the reactor trip breakers in the MCR. An operational test of the as-built PMS will be performed using real or simulated test signals. An operational test of the as-built PMS will be	ii) PMS output signals to the reactor trip switchgear are generated after the test signal reaches the specified limit. This needs to be verified for each automatic reactor trip function. Appropriate PMS output signals are generated after the test signal reaches the specified limit. These output signals remain following removal of the test signal. Tests from the actuation signal to the actuated device(s) are performed as part of the system-related inspection, test, analysis, and acceptance criteria. ii) PMS output signals are generated for reactor trip and selected engineered safety features as identified in Table 2.5.2-4 after the manual initiation controls are actuated. i) The plant parameters listed in Table 2.5.2-5 with a

		9.a) The PMS automatically removes blocks of reactor trip and engineered safety features actuation when the plant approaches conditions for which the associated function is designed to provide protection. These blocks are identified in Table 2.5.2-6. 9.b) The PMS two-out-of-four initiation logic reverts to a two-out-of-three coincidence logic if one of the four channels is bypassed. All bypassed channels are alarmed in the MCR. 9.c) The PMS does not allow simultaneous bypass of two redundant channels.	performed. An operational test of the as-built PMS will be performed. With one channel in bypass, an attempt will be made to place a redundant channel in bypass.	"Yes" in the "Display" column, can be retrieved in the MCR. iii) For each test of an as-built fixed position control listed in Table 2.5.2-5 with a "Yes" in the "Control" column, an actuation signal is generated. Tests from the actuation signal to the actuated device(s) are performed as part of the system-related inspection, test, analysis and acceptance criteria. Displays of the open/closed status of the reactor trip breakers can be retrieved in the MCR. The PMS blocks are automatically removed when the test signal reaches the specified limit. The PMS two-out-of-four initiation logic reverts to a two-out-of-three coincidence logic if one of the four channels is bypassed. All bypassed channels are alarmed in the MCR. The redundant channel cannot be placed in bypass.
603	2.6.03.04c	4.c) Each IDS 24-hour battery bank supplies a dc switchboard bus load for a period of 24 hours without recharging. 4.d) Each IDS 72-hour	Testing of each 24-hour as-built battery bank will be performed by applying a simulated or real load, or a combination of simulated or real loads which envelope	The battery terminal voltage is greater than or equal to 210 V after a period of no less than 24 hours with an equivalent load that equals or exceeds

		battery bank supplies a dc switchboard bus load for a period of 72 hours without recharging. 4.e) The IDS spare battery bank supplies a dc load equal to or greater than the most severe switchboard bus load for the required period without recharging. 4.f) Each IDS 24-hour inverter supplies its ac load. 4.g) Each IDS 72-hour inverter supplies its ac load. 4.h) Each IDS 24-hour battery charger provides the PMS with two loss-of-ac input voltage signals. 5.a) Each IDS 24-hour battery charger supplies a dc switchboard bus load while maintaining the corresponding battery charged. 5.b) Each IDS 72-hour battery charger supplies a dc switchboard bus load while maintaining the corresponding battery charged. 5.c) Each IDS regulating transformer supplies an ac load when powered from the 480 V MCC. 6. Safety-related displays identified in Table 2.6.3-1 can be retrieved in the MCR. 11. Displays of the parameters identified in Table 2.6.3-2 can be retrieved in the MCR.	the battery bank design duty cycle. The test will be conducted on a battery bank that has been fully charged and has been connected to a battery charger maintained at 270±2 V for a period of no less than 24 hours prior to the test. Testing of each 72-hour as-built battery bank will be performed by applying a simulated or real load, or a combination of simulated or real loads which envelope the battery bank design duty cycle. The test will be conducted on a battery bank that has been fully charged and has been connected to a battery charger maintained at 270±2 V for a period of no less than 24 hours prior to the test. Testing of the as-built spare battery bank will be performed by applying a simulated or real load, or a combination of simulated or real loads which envelope the most severe of the division batteries design duty cycle. The test will be conducted on a battery bank that has been fully charged and has been connected to a battery charger maintained at270±2 V for a period of no less than 24 hours prior to the test. Testing of each 24-hour as-built inverter will be performed by applying a	the battery bank design duty cycle capacity. The battery terminal voltage is greater than or equal to 210 V after a period of no less than 72 hours with an equivalent load that equals or exceeds the battery bank design duty cycle capacity. The battery terminal voltage is greater than or equal to 210 V after a period with a load and duration that equals or exceeds the most severe battery bank design duty cycle capacity. Each 24-hour inverter supplies a line-to-line output voltage of 208 ± 2% V at a frequency of 60 ± 0.5% Hz. Each 72-hour inverter supplies a line-to-line output voltage of 208 ± 2% V at a frequency of 60 ± 0.5% Hz. Two PMS input signals exist from each 24-hour battery charger indicating loss of ac input voltage when the loss-of-input voltage condition is simulated. Each 24-hour battery charger provides an output current of at least 150 A with an output voltage in the range 210 to 280 V. Each 72-hour battery charger provides an output current of at least 125 A with an output voltage in the range 210 to 280 V. Each regulating transformer supplies a line-to-line output voltage of 208 ± 2% V. Safety-related displays identified in Table 2.6.3-1 can be retrieved in the MCR. Displays identified in Table 2.6.3-2 can be retrieved in the MCR.

			simulated or real load, or a combination of simulated or real loads, equivalent to a resistive load greater than 12 kW. The inverter input voltage will be no more than 210 Vdc during the test. Testing of each 72-hour as-built inverter will be performed by applying a simulated or real load, or a combination of simulated or real loads, equivalent to a resistive load greater than 7 kW. The inverter input voltage will be no more than 210 Vdc during the test. Testing will be performed by simulating a loss of input voltage to each 24-hour battery charger. Testing of each as-built 24-hour battery charger will be performed by applying a simulated or real load, or a combination of simulated or real loads. Testing of each 72-hour as-built battery charger will be performed by applying a simulated or real load, or a combination of simulated or real loads. Testing of each as-built regulating transformer will be performed by applying a simulated or real load, or a combination of simulated or real loads, equivalent to a resistive load greater than 30 kW	

			when powered from the 480 V MCC. Inspection will be performed for retrievability of the safety-related displays in the MCR. Inspection will be performed for retrievability of the displays identified in Table 2.6.3-2 in the MCR.	
725	2.7.06.02.ii	2. The VFS provides the safety-related functions of preserving containment integrity by isolation of the VFS lines penetrating containment and providing vacuum relief for the containment vessel.	ii) Testing will be performed to demonstrate that remotely operated containment vacuum relief isolation valves open within the required response time.	ii) The containment vacuum relief isolation valves (VFS-PL-V800A and VFS-PL-V800B) open within 30 seconds.