UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

August 10, 2017

Mr. Ronald A. Jones
Vice President, New Nuclear Operations
South Carolina Electric and Gas
P.O. Box 88 (Mail Code P40)
Jenkinsville, SC 29065-0088

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION UNIT 2, VIRGIL C. SUMMER NUCLEAR STATION UNIT 3 - NRC INTEGRATED INSPECTION REPORTS 05200027/2017002, 05200028/2017002

Dear Mr. Jones:

On June 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Virgil C. Summer Nuclear Station Units 2 and 3. The enclosed inspection report documents the inspection results, which the inspectors discussed on July 19, 2017, with you and other members of your staff. Subsequent to the end of this inspection period, on July 31, 2017, SCANA Corporation announced their decision to cease construction of the V.C. Summer Units 2 and 3 and file a Petition for Approval of Abandonment with the Public Service Commission of South Carolina. All NRC inspection activities were suspended after the announcement. This report documents those inspections that were completed from April 1, 2017 through June 30, 2017.

The inspection examined a sample of construction 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.

Two NRC-identified findings of very low safety significance (Green) were identified during this inspection. These findings were determined to involve a violation of NRC requirements. However, because of their very low safety significance, and because the issues were entered into your corrective action program, the NRC is treating the issues as non-cited violations (NCV) in accordance with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector office at the Virgil C. Summer Nuclear Station Units 2 and 3.

If you disagree with the cross-cutting aspects assigned to either finding, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector office at the Virgil C. Summer Nuclear Station Units 2 and 3.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with 10 Code of Federal Regulations (CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding."

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

Sincerely,

/RA/

Michael Ernstes, Chief
Construction Inspection Branch 3
Division of Construction Oversight

Docket Nos.: 5200027, 5200028
License Nos: NPF-93, NPF-94

Enclosure: NRC Inspection Report (IR) 05200027/2017002, 05200028/2017002
w/Attachment: Supplemental Information

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SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION UNIT 2, VIRGIL C. SUMMER NUCLEAR STATION UNIT 3 - NRC INTEGRATED INSPECTION REPORTS 05200027/2017002, 05200028/2017002

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U.S. NUCLEAR REGULATORY COMMISSION
Region II

Docket Numbers:	5200027 5200028
License Numbers:	NPF-93 NPF-94
Report Numbers:	05200027/2017002 05200028/2017002
Licensee:	South Carolina Electric & Gas
Facility:	Virgil C. Summer Nuclear Station Unit 2 Virgil C. Summer Nuclear Station Unit 3
Location:	Jenkinsville, SC
Inspection Dates:	April 1, 2017 through June 30, 2017
Inspectors:	J. Baptist, Senior Construction Inspector, DCO P. Carman, Construction Inspector, DCO L. Castelli, Senior Construction Inspector, DCO C. Cheung, Construction Project Inspector, DCO J. Christensen, Construction Inspector, DCO N. Coovert, Senior Construction Inspector, DCO P. Donnelly, Resident Inspector, DCO G. Galletti, Vendor Inspector, DCIP N. Karlovich, Resident Inspector, DCO M. Magyar, Construction Inspector, DCO R. Mathis, Construction Inspector, DCO K. McCurry, Construction Inspector, DCO T. Nazario, Senior Resident Inspector, DCO A. Ponko, Senior Construction Inspector, DCO C. Read, Resident Inspector, DCO S. Smith, Senior Construction Inspector, DCO C. Smith, Construction Inspector, DCO T. Steadham, Senior Construction Inspector, DCO J. Vasquez, Construction Inspector, DCO J. Walker, Resident Inspector, DCO
Accompanying Personnel:	Jorge Cintron, Electrical Engineer, NRR/DE/EEEB/EET Yiu Law, Mechanical Engineer, NRO/DEIA/MEB Sheila Ray, Sr. Electrical Engineer, NRR/DE/EEEB Thomas Scarbrough, Sr. Mechanical Engineer, NRO/DEIA/MEB
Approved by:	Michael Ernstes, Branch Chief Construction Inspection Branch 3 Division of Construction Oversight

Enclosure

SUMMARY OF FINDINGS

Inspection Report (IR) 05200027/2017002, 05200028/2017002; 04/01/2017 through 06/30/2017; Virgil C. Summer Nuclear Station Unit 2, Virgil C. Summer Nuclear Station Unit 3, routine integrated inspection report.

This report covers a three month period of inspection by regional and resident inspectors, and announced Inspections, Tests, Analysis, and Inspection Criteria (ITAAC) inspections by regional inspectors. Two green NCVs associated with the Design / Engineering and Inspection / Testing cornerstones were identified consistent with the NRC Enforcement Policy, Section 2.3. 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." Construction Cross Cutting Aspects are determined using IMC 0613, "Power Reactor Construction Inspection Reports." The NRC's program for overseeing the 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: The NRC identified an ITAAC finding of very low safety significance (Green) and associated non-cited violation (NCV) of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix B, Criterion III, "Design Control" for the licensee's failure through their contractor Westinghouse Electric Company (WEC) to perform thermal stress analysis in the ASME design report for the shear cap and valve body of the 14-inch fourth-stage automatic depressurization system (ADS) squib valves, RCS-PL-V004A/B/C/D. The licensee entered this finding into their corrective action program as CR-17-30805 (additional CR for CAPAL 100478313 was in process, but is no longer being created due to the decision announced on July 31, 2017, to cease construction of the project) and WEC CAPALs 100478099 and 100481984. The licensee performed immediate corrective actions to demonstrate with reasonable assurance through design analysis that the component would have been able to meet its design function. Additional long-term corrective actions included performance of additional analysis and revisions to the ASME design report and supporting documentation, but due to the cancellation of the project will not be pursued at this time. The inspectors determined this finding was associated with the Design/Engineering Cornerstone. The finding was determined to be more than minor because the performance deficiency represented an adverse condition that rendered the quality of component indeterminate, and required substantive corrective action. The inspectors also determined that the finding was more than minor because it represented an ITAAC finding that was material to the acceptance criteria of V.C. Summer Units 2 & 3 ITAAC 13 (2.1.02.02a), and if left uncorrected, the licensee may not have been able to demonstrate that the acceptance criteria of this ITAAC was met. The inspectors evaluated the finding in accordance with IMC 2519, Appendix A, "AP1000 Construction Significance Determination Process," and determined the finding was of very low safety significance (Green) because it was associated with the RCS system which is assigned to the high risk importance column of the AP1000 Construction Significance Determination Matrix, and the licensee was able to demonstrate with reasonable assurance that the design function of the applicable structure or system would not be impaired by the deficiency. The inspectors determined the finding was indicative of present licensee performance and was associated with the cross-cutting aspect of Documentation, in the area of Human Performance, in accordance with IMC 0613, Appendix F, "Construction Cross-Cutting Areas and Aspects." Specifically, the

licensee failed to maintain complete, accurate, and up-to-date design documentation for the 14-inch ADS squib valves [H.7]. (Section 1A01)

Green: The inspectors identified an ITAAC finding of very low safety significance (Green) and associated non-cited violation (NCV) of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix B, Criterion IX, "Control of Special Processes" for South Carolina Electric & Gas's (SCE&G) failure, through a subcontractor, to ensure that safety-related welds were in compliance with applicable codes and standards. Section 3.8.3.2 of the Updated Final Safety Analysis Report (UFSAR) requires compliance with American Welding Society (AWS) D1.1:2000. The licensee and contractor entered this finding into their corrective action programs as condition report (CR) CR-17-30376 and discrete issue (DI) 100456560. The finding was associated with the Inspection/Testing Cornerstone. The inspectors determined the performance deficiency was more than minor following the guidance in IMC 0613, "Power Reactor Construction Inspection Reports," Appendix E, because the issue rendered the quality of a safety-related structure indeterminate and required substantive corrective action. Specifically, an inspection of basemat attachment plates for a safety-related structure failed to identify nonconforming fit-up gaps and allowed welding to proceed. The inspectors evaluated the finding using the construction significance determination process and determined the finding was of very low safety significance (Green). Although the finding was associated with a portion of a structure whose structural integrity is required to ensure functionality of the reactor coolant system (RCS) system, the nonconforming welds that were identified by the inspectors would not have affected the ability of the structure to meet its design function. The finding was determined to be an ITAAC finding because it was material to the acceptance criteria of Unit 3 ITAAC 760 (3.3.00.02a.i.a). The acceptance criteria of this ITAAC requires the as-built containment internal structures, including the critical sections, to conform to the approved design and to withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions. This finding is associated with deviations from design requirements that would not have been reconciled by the licensee as required by the ITAAC. The inspectors screened the finding for a possible construction cross-cutting aspect in accordance with Appendix F, "Construction Cross-Cutting Areas and Aspects," of IMC 0613. This finding has a cross-cutting aspect in the area of Human Performance, because the licensee's contractor failed to utilize the procedures, specifications, and other resources that were available to perform the inspection. [H.12] (Section 1A31)

B. Licensee-Identified Violations

None

REPORT DETAILS

Summary of Plant Construction Status

In Unit 2, the third of 3 rings that make up the vertical walls of the containment vessel was installed and welded to ring 2, bringing it to elevation 244'-2.5". Inside containment, the west side concrete was placed up to elevation 103', making up the bottom of the in-containment refueling water storage tank. Steam generator #1 was placed in the west steam generator compartment and fit-up of the reactor coolant piping to the reactor coolant pump casings began. In the auxiliary building, walls are progressing up to the 117' elevation.

In Unit 3, concrete was placed in the third course of steel-composite shield panels, which go up to elevation 123'-6". Welding progressed on the embed plates that hold the CA01 module to the concrete floor, which makes up the steam generator, pressurizer and refueling cavity. Concrete was placed in the east side of the containment vessel up to elevation 87'6". Auxiliary building walls are progressing up to the 100' elevation.

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 2) ITAAC Number 2.1.02.02a (13) / Family 06F
(Unit 3) ITAAC Number 2.1.02.02a (13) / Family 06F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.02a (13). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.06 - Inspection of ITAAC-Related Installation of Mechanical Components
- 65001.06-02.05 - Problem Identification and Resolution
- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.01 - Design Document Review
- 65001.F-02.02 - Fabrication Records Review
- 65001.F-02.04 - General Quality Assurance (QA) Review

The inspectors reviewed design and fabrication documents associated with the Unit 2 14-inch fourth-stage automatic depressurization system (ADS) squib valves (S/Ns 0920-164453-3-1, 0920-164453-3-2, 0920-164453-3-3, and 0920-164453-3-4) to determine whether the documents adequately define the final design and arrangement. Specifically, the inspectors reviewed the ASME design reports, WEC design specification, valve datasheets, design drawings, plant and system transient analyses,

valve functional requirement analyses, and licensing bases documents for the 14-inch fourth-stage ADS squib valves.

The inspectors selected a sample of stress and design analyses related to the valve wall thickness, body, shear cap, and bolting material to verify that the design inputs were correctly identified and documented, and that the valves were designed in accordance with the ASME Section III requirements, specifically as they relate to the design requirements that ensure the component can meet design safety functions during a design-basis accident. The inspectors reviewed design specifications and transient analyses to verify that they were properly translated into the licensee's documentation, which includes the COL and UFSAR, specifically Chapter 15, Accident Analysis. The inspectors also verified that the component design and as-built conditions met the design assumptions in the WEC transient analysis. Additionally, the inspectors reviewed a sample of quality release and certificate of conformance documents to verify if as-built critical dimensions conform to stress and design parameters analyzed in the ASME design report and design drawings.

The inspectors selected a sample of critical attributes and scenarios to determine if internal and external events or hazards could affect the components performance and if they would result in a more than minimal impact to the conclusions made in the WEC transient analysis, and the licensee's UFSAR Chapter 15, Accident Analysis. The inspectors evaluated the following attributes and scenarios:

- Inadvertent mechanical actuation of one of the fourth-stage ADS valves,
- Adequate flow conditions with loss of one fourth-stage ADS valve,
- Thermal effects across the fourth-stage ADS valves, and
- Impacts on the valve and surrounding components and structures during the actuation of ADS.

The inspectors reviewed a sample of qualification records to verify if design documents were reviewed and approved by the responsible engineering group, and that personnel involved in the development of design documents met WEC and ASME Section III qualification requirements. Specifically, the inspectors reviewed qualification records for the Professional Engineers who developed the squib valve and piping system design specifications.

The inspectors reviewed a sample of deviation notices to verify that the conditions were adequately evaluated by the responsible organizations and that the accepted condition complies with the final design. The inspectors also reviewed corrective action documents issued during the inspection to verify that issues were entered into the licensee or applicable contractor corrective action program in accordance with program requirements.

b. Findings

Introduction

The NRC identified an ITAAC finding of very low safety significance (Green) and associated non-cited violation (NCV) of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix B, Criterion III, "Design Control" for South Carolina Electric

&Gas's (SCE&G) failure through their contractor Westinghouse Electric Company (WEC) to perform thermal stress analysis in the ASME design report for the shear cap and valve body of the 14-inch fourth-stage automatic depressurization system (ADS) squib valves, RCS-PL-V004A/B/C/D. Specifically, the inspectors identified that thermal transients in APP-RCS-M3C-051, "Design Transients for the AP1000 RCS Class A, B and C Valves and the RCS Class A Piping," were not appropriately transcribed to the valve transient document, valve data sheet, and design specification which resulted in the failure to meet ASME Section III requirements in the ASME design report, APP-PV70-VDR-101001, "Compilation of Design Reports for PV70 Datasheet 100."

Description

During the week of June 19, 2017, the inspectors identified that the ASME design report, APP-PV70-VDR-101001, "Compilation of Design Reports for PV70 Datasheet 100," for the 14-inch fourth-stage ADS squib valves, RCS-PL-V004A/B/C/D, did not analyze for thermal transients as required by ASME Boiler and Pressure Vessel Code (BPVC) Section III, Subsection NB. Specifically, the inspectors determined that the following ASME Section III requirements were not met: subparagraphs NB-3222.2, "Primary Plus Secondary Stress Intensity" and NB-3222.4, "Analysis for Cyclic Operation" for the shear cap, and subparagraph NB-3545.3, "Fatigue Requirements" for the valve body because the ASME design report did not account for thermal stresses that occur during normal and accident plant transients.

The inspectors noted that the valve datasheet for the 14-inch squib valves, AP1000 Valve Datasheet -PV70-Z0D-101 from APP-PV70-Z0R-001, "PV70 Squib (Pyrotechnic Actuated) Valves, ASME Section III Class 1, Data Sheet Report", stated that design transients are provided in the WEC design specification. Additionally, the valve datasheet stated that the valve body and valve shear cap shall be designed to withstand transient conditions.

Section 6.1.5.1 of the WEC design specification, APP-PV70-Z0-001, "Squib (Pyrotechnic Actuated) Valves, ASME Boiler and Pressure Vessel Code, Section III Class 1", Rev. 6, dated July 17, 2014, requires transient analysis to be performed in accordance with ASME BPVC Section III, Subsection NB-3550, and that the valves shall withstand thermal, pressure, and load transients. APP-PV70-Z0-001, Sections 3.3.2.1 and 6.1.5.1 also stated that the applicable plant and system transients to the squib valves are contained in APP-PV70-Z0Y-001, "Plant and System Transients Applicable to PV70 Valves." Design specification APP-PV70-Z0-001 identified APP-PV70-Z0Y-001 as an attachment to the design specification, and is listed in Appendix D of APP-PV70-Z0-001.

APP-PV70-Z0Y-001 contains the plant and system transients applicable to safety related squib valves. Section 2.1.1 states, in part, that reactor coolant system (RCS) design transients that apply to the valves specified in datasheet APP-PV-70-Z0D-101 are listed per Table 2.1. The transients listed in Table 2.1 are consistent with those found in APP-RCS-M3C-051, "Design Transients for the AP1000 RCS Class A, B and C Valves and the RCS Class A Piping."

The inspectors determined that the ASME design report, APP-PV70-VDR-101001, contained insufficient detail to show that the 14-inch ADS squib valves satisfy the thermal stress requirements. The RCS design transients in APP-RCS-M2C-051 evaluated both pressure and temperature variations resulting from design transients;

however, the temperature variations were not appropriately transcribed to the plant and system transients for the squib valves contained in APP-PV70-Z0Y-001, valve datasheet -PV70-Z0D-101, and WEC design specification APP-PV70-Z0-001. Additionally, the ASME design report, APP-PV70-VDR-101001, incorrectly stated that there were no thermal transients specified for the 14-inch squib valves, and did not completely analyze for thermal stresses on the shear cap and valve body in accordance with ASME BPVC Section III, Subsection NB requirements.

Analysis

The licensee's failure to perform thermal stress analysis in the ASME design report for the shear cap and valve body of the 14-inch ADS squib valves was a performance deficiency. The inspectors identified that thermal transients in APP-RCS-M3C-051 were not appropriately transcribed to the valve transient document, valve data sheet, and design specification which resulted in the failure to meet ASME Section III requirements in the ASME design report, APP-PV70-VDR-101001. The finding was determined to be more than minor because the performance deficiency represented an adverse condition that rendered the quality of component indeterminate, and required substantive corrective action. Specifically, WEC and the valve vendor performed additional analysis and calculations to verify that the valve would still meet its' design function and additional long-term corrective actions include revisions to the ASME design report and WEC documents. The inspectors also determined that the finding was more than minor because it represented an ITAAC finding that was material to the acceptance criteria of V.C. Summer Unit 2 ITAAC Number 2.1.02.02a (13), and if left uncorrected, the licensee may not have been able to demonstrate that the acceptance criteria of this ITAAC was met. Specifically, the acceptance criteria of this ITAAC requires that the ASME Code Section III design reports exist for the as-built component, the 14-inch fourth-stage ADS squib valves. ASME BPVC Section III, paragraph NCA-3350 states, in part, the designer shall prepare a design report in sufficient detail to show that the applicable stress limitations are satisfied when the component is subject to the loading conditions specified in the design specification. The inspectors determined that the design specification did not include all loading conditions; therefore, the ASME design report would not have had sufficient detail to show that the stress limitations were satisfied.

The inspectors determined this finding was associated with the Design / Engineering Cornerstone. The finding was not associated with a security finding; it was not associated with an IMC 2504 operational / construction program; and it was not associated with a repetitive, NRC-identified omission of a program critical attribute. Using IMC 2519, Appendix A, "AP1000 Construction Significance Determination Process," the inspectors determined that the finding was associated with a system or structure; it was associated with the RCS system which is assigned to the high risk importance column of the AP1000 Construction Significance Determination Matrix, and the licensee was able to demonstrate with reasonable assurance that the design function of the applicable structure or system would not be impaired by the deficiency (row 1 of the Construction Significance Determination Matrix). Therefore, this finding was of very low safety significance (Green).

The inspectors determined the finding was indicative of present licensee performance and was associated with the cross-cutting aspect of Documentation, in the area of Human Performance, in accordance with IMC 0613, Appendix F, "Construction Cross-

Cutting Areas and Aspects." Specifically, the licensee failed to maintain complete, accurate, and up-to-date design documentation for the 14-inch ADS squib valves [H.7].

Enforcement

Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures are established to assure that the design basis, for those structures, systems, and components to which Appendix B applies, are correctly translated into specifications. ASME BPVC Section III, paragraph NCA-3350 states, in part, the designer shall prepare a design report in sufficient detail to show that the applicable stress limitations are satisfied when the component is subject to the loading conditions specified in the design specification. Section 6.1.8.1 of WEC design specification APP-PV70-Z0-001, "Design Specification for Squib (Pyrotechnic Actuated) Valves, ASME BPVC, Section III Class 1," Rev. 6, states, ASME BPVC Section III design reports for class 1 valves shall be performed in accordance with the ASME BPVC Section III, NB-3500 in sufficient detail to demonstrate that the valve meets the requirements of the ASME BPVC. As an alternative the valve may be designed to ASME BPVC Section III, Subsection NB-3200. WEC document APP-RCS-M3C-051, "Design Transients for the AP1000 RCS Class A, B and C Valves and the RCS Class A Piping," Rev. 0 identifies the design transients applicable to the 14-inch ADS squib valves, which include thermal effects. Contrary to the above, since July 17, 2014, the licensee, through their contractor WEC, failed to translate the design basis into specifications. Document APP-PV70-Z0-001, "Design Specification for Squib (Pyrotechnic Actuated) Valves, ASME BPVC, Section III Class 1," Rev. 6, failed to account for the applicable stress limitations from thermal transients identified in document APP-RCS-M3C-051, "Design Transients for the AP1000 RCS Class A, B and C Valves and the RCS Class A Piping," Rev. 0, and as a result, failed to correctly translate the design requirements into resulting specifications, specifically the ASME design report.

The licensee performed immediate corrective actions to demonstrate with reasonable assurance through design analysis that the component would have been able to meet its design function. Supplemental calculations were developed to show the additional margin to the valve stress limit was sufficient to account for the original exclusion of the thermal stresses. The licensee entered this finding into their corrective action program as CR-17-30805 (additional CR for CAPAL 100478313 was in process, but is no longer being created due to the cancellation of the project) and WEC CAPALs 100478099 and 100481984. Additional long-term corrective actions included performance of additional analysis and revisions to the ASME design report and supporting documentation, but due to the cancellation of the project will not be pursued at this time. Since the corrective actions have not been fully implemented, this NCV will remain open until the NRC can verify that compliance is restored and the acceptance criteria of Unit 2 ITAAC 13 is not impacted. This violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the Enforcement Policy. This issue is identified as NCV 05200027/2017002-01 and NCV 05200028/2017002-01, Thermal Stress Analysis Not Performed for 14-inch ADS Squib Valves IAW with ASME Section III.

1A02 (Unit 2) ITAAC Number 2.1.02.02a (13) / Family 06F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.02a (13). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.06-02.02 - Component Welding
- 65001.06-02.05 - Problem Identification and Resolution
- 65001.F-02.02 - Fabrication Records Review

The inspectors reviewed Carolina Energy fabrication records associated with repairs made to a Unit 2 reactor coolant pump (RCP) casing, Serial No. 1288, to verify that the materials were acceptable, the personnel were qualified, and the repairs were made in accordance with *ASME Code Sections II and III, 1998 Edition including 2000 Addenda*. Specifically, the inspectors reviewed the quality assurance data package (QADP) for the repairs, which included drawings, cavity maps, weld travelers, code data reports, certificates of compliance, certified material test reports (CMTRs), nondestructive examination (NDE) records, and welder and NDE personnel qualifications, to verify four surface indications on the pump casing were adequately repaired.

The inspectors reviewed the documents in the QADP to verify traceability and acceptability of the pump number, materials, personnel, and repairs made throughout production. Specifically, the inspectors reviewed two CMTRs to verify the material's chemical composition and mechanical properties met the requirements stated in the applicable ASME Code sections. The inspectors also reviewed final NDE reports to verify NDE was performed and found acceptable by the proper certification level of NDE personnel and in accordance with the acceptance criteria listed in ASME Code Section III. Specifically, the inspectors reviewed 19 liquid penetrant examination reports and one radiography examination report to verify the final condition of the material had no rejectable indications.

The inspectors reviewed one welder and two NDE personnel qualifications to verify:

- each individual was assigned a unique identification number which was traceable to the activity performed;
- the individual demonstrated their skill by performing specific performance qualification tests;
- the qualification testing conditions and qualification limits were fully documented;
- the appropriate number of acceptable test results was achieved; and
- the individual was properly re-qualified at the required duration.

b. Findings

No findings were identified.

1A03 (Unit 2) ITAAC Number 2.1.02.03b (16) / Family 03B

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.03b (16). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.03-02.03 - Installation and Welding
- 65001.03-02.06 - Nondestructive Examination (NDE)
- 65001.B-02.02 - Welding Procedure Qualification
- 65001.B-02.03 - Welder Qualification
- 65001.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection

The inspectors observed machine GTAW welding of the 18” Surge Pipe Installation Pressurizer Piping. Specifically, the inspectors observed the in-process welding of piping spool number VS2-RCS-PLW-041-1, field weld 2. The inspectors observed the environment in which the welding took place to verify whether the weld joint was sufficiently protected from inclement conditions, such as high winds and rain. The welding took place inside an enclosed temporary tent. The inspectors also observed the work area to verify that welding procedures, detailed drawings, and weld travelers were available.

The inspectors reviewed the welding procedure specification (WPS), and supporting procedure qualification records (PQRs), to verify it was available, up to date, accurate, and in accordance with the codes and standards specified in the design documents. Specifically, the inspectors reviewed the PQRs to verify the type and number of qualification tests required were performed, and all the applicable essential, nonessential, and supplementary essential variables, along with the specific ranges qualified, were adequately recorded in the WPS, in accordance with ASME Section IX, 1998 Ed. The inspectors reviewed qualification records to verify whether the welders were qualified for the material, electrode, and positions in use by performing specific performance qualification tests in accordance with ASME Section IX.

The inspectors observed the fit-up of the weld joint to verify the gap and alignment dimensions were in accordance with the WPS. The inspectors also observed Quality Control’s (QC's) inspection of the weld joint fit-up to verify appropriate in-process inspection hold points were accomplished. The inspectors reviewed the liquid penetrant examination report to verify temporary attachments were removed and the surfaces were examined and found acceptable in accordance with the specified codes.

The inspectors observed that the settings for the welding machine, including dwell time, wire feed speed, travel speed, pulse frequency, and amps were in accordance with the WPS. The inspectors observed the welding setup to verify whether the gas composition and flow were in accordance with the weld procedure. The inspectors observed the filler material used and reviewed the weld traveler to verify whether the marked filler material used was in accordance with the welding procedure, ASME specifications, and the UFSAR. The inspectors reviewed the weld traveler to verify whether the gas purging

had been verified by QC to be in accordance with the WPS. The inspectors observed the welding and reviewed logs to verify whether the preheat temperatures met the WPS and interpass temperatures were not exceeded. The inspectors inspected the measuring and test equipment (M&TE) used to measure temperature to verify whether it was still in calibration. Inspectors observed the as-welded surfaces to determine if cleanliness was maintained prior to welding and between passes. The inspectors observed the welding setup to verify whether that the welding equipment was in good condition and the welding machine had been calibrated.

The inspectors also reviewed the computed radiography examination reports and images associated with the installation of the steam generator B hot leg and cold legs. Specifically, the inspectors reviewed the computed radiography procedure, NDE reports, and weld images for Weld Nos. BHL01 (reactor vessel to hot leg RCS-L001B), BHL02 (steam generator to hot leg RCS-L001B), BCL03 (steam generator to cold leg RCS-L002C), BCL04 (reactor vessel to cold leg RCS-L002C), BCL05 (steam generator to cold leg RCS-L002D), and BCL06 (reactor vessel to cold leg RCS-L002D), to verify:

- the NDE was performed in accordance with the procedure and by examiners of the appropriate qualification level;
- the type of source, source strength, source to film distance, type and thickness of material being radiographed, exposure times, and geometric unsharpness were in accordance with the procedure;
- the image quality indicators were the correct type and thickness;
- the required sensitivity, contrast, and brightness levels met the procedures and applicable code requirement; and the welds were acceptable per ASME Sections III and V, 1998 Edition

b. Findings

No findings were identified.

1A04 (Unit 2) ITAAC Number 2.1.02.05a.ii (20) / Family 14E
(Unit 3) ITAAC Number 2.1.02.05a.ii (20) / Family 14E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.05a.ii (20). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation
- 65001.E-02.06 - Problem Identification and Resolution

The inspectors reviewed documents, specifically equipment qualification data packages (EQDPs) APP-JE62-VBR-002, APP-PV01-VBR-012, APP-PV01-VBR-014, APP-PV70-VBR-005, and equipment qualification summary reports (EQSRs) APP-JE62-VBR-001, APP-PV01-VBR-011, APP-PV01-VBR-013, and APP-PV70-VBR-004 for reactor coolant

pump speed sensor (commodity JE62), motor operated valves (commodity PV01), and squib valves (commodity PV70) and interviewed personnel to verify if:

- the licensee used the appropriate limiting design basis parameters as input for the seismic qualification of the SSC and that the necessary design basis documents and calculations, as appropriate, were correctly incorporated into the qualification program for the SSC;
- seismic qualification was adequately completed and controlled in accordance with Regulatory Guide 1.100, IEEE Std. 344-1987, *ASME Boiler and Pressure Vessel (B&PV) Code Section III 1998-2000*, and design specifications;
- licensee records established an adequate basis for acceptance of the ITAAC with qualification criteria attributes and that the qualification report concluded that the SSC can withstand the conditions that would exist before, during, and following a design basis seismic event without loss of safety function for the time required to perform the safety function; and
- seismic qualification documentation was maintained in an auditable manner, was complete, and clearly documented completion of the ITAAC acceptance criteria for the samples inspected.

The inspectors reviewed all seismic functional qualification test anomalies identified during the qualification process, as documented in the EQDP applicable to each component, and evaluated the resolution of those issues based on the review of the applicable documentation and discussions with the licensee and supporting WEC personnel to determine the effectiveness of the licensee's corrective measures.
The inspectors reviewed the UFSAR to identify the limiting design basis parameters that were used as input for the qualification of the SSC to verify that all the necessary requirements for the qualification were incorporated such as:

- design codes;
- analysis and testing methodologies;
- load combinations;
- seismic acceleration; and
- required input motion and response spectrum.

Specifically, the inspectors performed these reviews for the following components associated with the indicated commodity:

- RCS-JE-ST281, RCP 1A Pump Speed Sensor (JE62)
- RCS-JE-ST282, RCP 1B Pump Speed Sensor (JE62)
- RCS-JE-ST283, RCP 2A Pump Speed Sensor (JE62)
- RCS-JE-ST284, RCP 2B Pump Speed Sensor (JE62)
- RCS-PL-V014A/B/C/D, Fourth-stage ADS MOV (PV01)
- RCS-PL-V001A/B, First-stage ADS motor operated valves (MOV) (PV01)
- RCS-PL-V004A/B/C/D, Fourth-stage ADS Squib Valve (PV70)

The inspectors performed these reviews to verify that the commodity codes listed in the EQDP were seismically qualified consistent with the requirements specified in the UFSAR. The inspectors also reviewed the design codes, analysis and testing methodologies, load combinations, seismic acceleration, and required input motion to verify consistency with the UFSAR requirements.

b. Findings

No findings were identified.

1A05 (Unit 2) ITAAC Number 2.1.02.07a.i (24) / Family 10E
(Unit 3) ITAAC Number 2.1.02.07a.i (24) / Family 10E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.07a.i (24). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation
- 65001.E-02.06 - Problem Identification and Resolution

The inspectors reviewed documents for Reactor Coolant Pump Speed Sensor (commodity JE62), motor operated valves (commodity PV01), and squib valves (commodity PV70) and interviewed personnel to verify that:

- the licensee used the appropriate limiting design basis parameters as input for the environmental qualification of the SSC and that the necessary design basis documents and calculations, as appropriate, were correctly incorporated into the qualification program for the SSC;
- environmental qualification of SSCs was adequately completed and controlled in accordance with the requirements in 10 CFR 50.49, applicable methodology in the UFSAR, regulatory guidance, and IEEE standards and the results meet the acceptance criteria stated in the design specification and the ITAAC ;
- the documented qualified life was consistent with the results of the qualification activities;
- licensee records established an adequate basis for acceptance of the ITAAC with qualification criteria attributes and that the qualification report concluded that the SSC can withstand the 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; and
- environmental qualification documentation was maintained in an auditable manner, was complete, and clearly documented completion of the ITAAC acceptance criteria for the samples inspected.

The inspectors reviewed all environmental qualification test anomalies identified during the qualification process, as documented in the EQDP applicable to each component, and to determine if the resolution of each anomaly to determine the effectiveness of the licensee's corrective measures and if met the requirements of IEEE Std. 323-1974. Specifically, the inspectors performed these reviews for the following components associated with the indicated commodities:

- RCS-JE-ST281, RCP 1A Pump Speed Sensor (JE62)
- RCS-JE-ST282, RCP 1B Pump Speed Sensor (JE62)

- RCS-JE-ST283, RCP 2A Pump Speed Sensor (JE62)
- RCS-JE-ST284, RCP 2B Pump Speed Sensor (JE62)
- RCS-PL-V011A, First-stage ADS Isolation MOV (PV01)
- RCS-PL-V001A, First-stage ADS MOV (PV01)
- RCS-PL-V004A/B/C/D, Fourth-stage ADS Squib Valve (PV70)

The inspectors reviewed the UFSAR to identify the limiting design basis parameters that were used as input for the qualification of the SSC. The inspectors reviewed the qualification program documents (such as procedures, test specifications, and test reports) to verify that all the necessary requirements for the qualification were incorporated such as:

- qualification methodology (i.e. test or analysis) per IEEE Std. 323-1974;
- environmental parameters under normal operating conditions, abnormal conditions, and design basis events;
- environmental temperature, pressure, total radiation dose, radiation dose rate, cycling, electrical parameters and humidity;
- simulated accident conditions, including, temperature, pressure, radiation, pH, and chemical additives;
- margin, as specified in IEEE Std. 323-1974; and
- post-accident conditions, including time and submergence, where applicable.

The inspectors reviewed the EQSR, EQDP, and applicable test procedures and test records related to the qualification for the expected environment to verify that qualification activities were adequately controlled and the methodology conformed to IEEE Std. 323-1974. The inspectors reviewed the environmental profiles documented in APP-VP-GW-030, “Plant Environmental Conditions,” to verify that the tested profiles enveloped the actual worst case environmental conditions that would be expected. The inspectors reviewed test procedures and test records to verify that the qualification was in accordance with IEEE Std. 323-1974 and that the valve actuator was qualified in accordance with IEEE Std. 382-1996, “IEEE Standard for Qualification of Actuators for Power-Operated Valve Assemblies With Safety-Related Functions for Nuclear Power Plants.”

b. Findings

No findings were identified.

1A06 (Unit 2) ITAAC Number 2.1.02.08d.vii (38) / Family 03A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.08d.vii (38). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.F-02.01 - Design Document Review

The inspectors reviewed the as-built drawings for the automatic depressurization system (ADS) spargers, VS2-PXS-MW-01A and VS2-PXS-MW-01B, to verify that they

adequately define the final design and arrangement of these SSCs. Specifically, the inspectors reviewed the drawings to verify whether they included diameter information on the 0.5-inch holes in the sparger, and that the calculated flow area from those as-built dimensions met the acceptance criteria of ITAAC 2.1.02.08d.vii. The inspectors conducted an inspection of both spargers in a lay down yard to verify whether general configuration, spacing, size and location of holes were in accordance with design drawings. The inspectors used a micrometer to independently measure a sample of seven holes on one of the arms for each sparger to verify that the radii met or exceeded the specified values used in the flow area in design calculations.

b. Findings

No findings were identified.

1A07 (Unit 2) ITAAC Number 2.1.02.12a.iv (56) / Family 07E
(Unit 3) ITAAC Number 2.1.02.12a.iv (56) / Family 07E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.12a.iv (56). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation
- 65001.E-02.06 - Problem Identification and Resolution

The inspectors reviewed documents, specifically EQDP APP-PV70-VBR-005, and EQSR APP-PV70-VBR-004 for the 14-inch ADS squib valves (Commodity PV70) and interviewed personnel to determine if:

- the licensee used the appropriate limiting design basis parameters as input for the mechanical functional qualification of the valves and that the necessary design basis documents and calculations, as appropriate, were correctly incorporated into the qualification program for the SSC;
- mechanical functional qualification was adequately completed and controlled in accordance with the provisions in ASME QME-1-2007, as specified in the UFSAR, and the results met the acceptance criteria stated in the design specification and the ITAAC;
- licensee records established an adequate basis for the functional qualification, and the qualification report demonstrated that the valves could perform their safety functions to operate under design conditions for the time required to perform the safety function; and
- mechanical functional qualification documentation was maintained in an auditable manner, was complete, and clearly documented completion of the ITAAC acceptance criteria for the samples inspected.

Specifically, the inspectors performed these reviews for the following components associated with the indicated commodities:

- RCS-PL-V004A, Fourth-stage ADS Squib Valve (PV70)
- RCS-PL-V004B, Fourth-stage ADS Squib Valve (PV70)
- RCS-PL-V004C, Fourth-stage ADS Squib Valve (PV70)
- RCS-PL-V004D, Fourth-stage ADS Squib Valve (PV70)

The inspectors reviewed the UFSAR to identify the limiting design-basis parameters that were used as input for the qualification of the 14-inch ADS squib valves. The inspectors reviewed the qualification program documents (such as design specifications, test procedures, and test specifications) to verify that all the necessary requirements for the qualification were incorporated such as:

- analysis and testing methodologies as per QME-1-2007;
- fluid temperature, flow, and pressure;
- environmental temperature; and
- required operating time.

The inspectors reviewed applicable test procedures and records to verify that the following were performed in accordance with ASME QME-1-2007, UFSAR Section 3.9.3.2.2, "Valve Operability," and Design Specification APP-PV70-Z0-001:

- the functional qualification of the 14-inch ADS squib valves,
- extrapolation of the functional qualification to address specific design adjustments,
- demonstration of the functional capability of production valve assemblies, and
- completion of the applicable Qualification Plans, Functional Qualification Reports, and Application Reports.

The inspectors reviewed all mechanical functional qualification issues and test anomalies identified during the functional qualification process, as documented in EQDP APP-PV70-VBR-005, and evaluated the resolution of those issues based on the review of the applicable documentation and discussions with the licensee and supporting WEC personnel to determine the effectiveness of the licensee's corrective measures.

b. Findings

No findings were identified.

1A08 (Unit 2) ITAAC Number 2.1.03.06.iii (77) / Family 05F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.03.06.iii (77). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.05 - Inspection of ITAAC-Related Installation of Reactor Pressure Vessel and Internals
- 65001.05-02.03 - RPV Installation
- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements

- 65001.F-02.01 - Design Document Review

The inspectors reviewed design documents and installation records, and observed the as-installed reactor pressure vessel (RPV) and supports to verify the as-built configuration was consistent with the design documents and bounded by the analyzed condition. Specifically, the inspectors reviewed design documents and engineering and design coordination reports (E&DCRs) associated with the reactor pressure vessel supports and embedments to verify the design was consistent with the licensing basis and applicable codes and standards, and met quality assurance requirements. The inspectors also reviewed the completed work package used for installation of the reactor pressure vessel and preliminary survey data to verify that any required quality assurance measures were performed, and the RPV was installed in accordance with the design drawings and UFSAR.

b. Findings

No findings were identified.

1A09 (Unit 2) ITAAC Number 2.2.01.05.ii (99) / Family 11E
(Unit 3) ITAAC Number 2.2.01.05.ii (99) / Family 11E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.05.ii (99). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation
- 65001.E-02.06 - Problem Identification and Resolution

The inspectors reviewed documents, specifically EQDP APP-PV11-VBR-006 and EQSR APP-PV11-VBR-005 for motor operated valves (commodity PV11) and interviewed personnel to verify that:

- the licensee used the appropriate limiting design basis parameters as input for the seismic qualification of the SSC and that the necessary design basis documents and calculations, as appropriate, were correctly incorporated into the qualification program for the SSC;
- seismic qualification was adequately completed and controlled in accordance with Regulatory Guide 1.100, IEEE Std. 344-1987, *ASME Boiler and Pressure Vessel (B&PV) Code Section III*, and design specifications;
- licensee records established an adequate basis for acceptance of the ITAAC with qualification criteria attributes and that the qualification report concluded that the SSC can withstand the conditions that would exist before, during, and following a design basis seismic event without loss of safety function for the time required to perform the safety function; and

- seismic qualification documentation was maintained in an auditable manner, was complete, and clearly documented completion of the ITAAC acceptance criteria for the samples inspected.

The inspectors reviewed all seismic functional qualification test anomalies identified during the qualification process, as documented in EQDP APP-PV11-VBR-006 to determine the effectiveness of the licensee's corrective measures.

The inspectors reviewed the UFSAR to identify the limiting design basis parameters that were used as input for the qualification of the SSC to verify that all the necessary requirements for the qualification were incorporated such as:

- design codes;
- analysis and testing methodologies;
- load combinations;
- seismic acceleration; and
- required input motion and response spectrum.

Specifically, the inspectors performed these reviews for CCS-PL-V207, CCS Containment Isolation MOV – Outlet Line IRC (PV11). The inspectors performed these reviews to verify that the commodity codes listed in the EQDP were seismically qualified consistent with the requirements specified in the UFSAR. The inspectors also reviewed the design codes, analysis and testing methodologies, load combinations, seismic acceleration, and required input motion to verify consistency with the UFSAR requirements.

b. Findings

No findings were identified.

1A10 (Unit 2) ITAAC Number 2.2.01.06a.i (101) / Family 08E
(Unit 3) ITAAC Number 2.2.01.06a.i (101) / Family 08E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.06a.i (101). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation
- 65001.E-02.06 - Problem Identification and Resolution

The inspectors reviewed documents, specifically EQDP APP-PV11-VBR-006 and EQSR APP-PV11-VBR-005 for motor operated valves (commodity PV11) and interviewed personnel and interviewed personnel to verify that:

- the licensee used the appropriate limiting design basis parameters as input for the environmental qualification of the SSC and that the necessary design basis

documents and calculations, as appropriate, were correctly incorporated into the qualification program for the SSC;
- environmental qualification was adequately completed and controlled in accordance with the requirements in 10 CFR 50.49, applicable methodology in the UFSAR, regulatory guidance, and IEEE standards and the results meet the acceptance criteria stated in the design specification and the ITAAC;
- the documented qualified life was consistent with the results of the qualification activities;
- licensee records established an adequate basis for acceptance of the ITAAC with qualification criteria attributes and that the qualification report concluded that the SSC can withstand the 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; and
- environmental qualification documentation was maintained in an auditable manner, was complete, and clearly documented completion of the ITAAC acceptance criteria for the samples inspected.

The inspectors reviewed all environmental qualification test anomalies identified during the qualification process, as documented in EQDP APP-PV11-VBR-006, and to determine if the resolution of each anomaly met the requirements of IEEE Std. 323-1974.

Specifically, the inspectors performed these reviews for SFS-PL-V034, SFS Suction Line Containment Isolation MOV – IRC (PV11).

The inspectors reviewed the UFSAR to identify the limiting design basis parameters that were used as input for the qualification of the SSC. The inspectors reviewed the qualification program documents (such as procedures, test specifications, and test reports) to verify that all the necessary requirements for the qualification were incorporated such as:

- qualification methodology (i.e. test or analysis) as per IEEE Std. 323-1974;
- environmental parameters under normal operating conditions, abnormal conditions, and design basis events
- environmental temperature, pressure, total radiation dose, radiation dose rate, cycling, electrical parameters and humidity;
- simulated accident conditions, including, temperature, pressure, radiation, pH, and chemical additives;
- margin, as specified in IEEE Std. 323-1974; and
- post-accident conditions, including time and submergence, where applicable.

The inspectors reviewed the EQSR, EQDP, and applicable test procedures and test records related to the qualification for the expected environment to verify that qualification activities were adequately controlled and that the methodology conformed to IEEE Std. 323-1974. The inspectors reviewed the environmental profiles documented in APP-VP-GW-030, “Plant Environmental Conditions,” to verify that the tested profiles enveloped the actual worst case environmental conditions that would be expected. The inspectors reviewed test procedures and test records to verify that the qualification was in conformance with IEEE Std. 323-1974 and that the valve actuator was qualified in conformance with IEEE Std. 382-1996, *“IEEE Standard for Qualification of Actuators for*

Power-Operated Valve Assemblies With Safety-Related Functions for Nuclear Power Plants."

b. Findings

No findings were identified.

1A11 (Unit 2) ITAAC Number 2.2.01.11a.i (114) / Family 07E
(Unit 3) ITAAC Number 2.2.01.11a.i (114) / Family 07E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.11a.i (114). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation
- 65001.E-02.06 - Problem Identification and Resolution

The inspectors reviewed documents, specifically EQDP APP-PV11-VBR-006, and EQSR APP-PV11-VBR-005 for motor operated valves (MOVs) (Commodity PV11) and interviewed personnel to determine if:

- the licensee used the appropriate limiting design basis parameters as input for the mechanical functional qualification of the SSC and that the necessary design basis documents and calculations, as appropriate, were correctly incorporated into the qualification program for the SSC;
- mechanical functional qualification was adequately completed and controlled in accordance with the applicable methodology in the UFSAR, regulatory guidance, and standards and the results meet the acceptance criteria stated in the design specification and the ITAAC;
- licensee records established an adequate basis for acceptance of the ITAAC with qualification criteria attributes and that the qualification report concluded that the SSC can withstand the conditions that would exist before, during, and following a design basis seismic event without loss of safety function for the time required to perform the safety function; and
- mechanical functional qualification documentation was maintained in an auditable manner, was complete, and clearly documented completion of the ITAAC acceptance criteria for the samples inspected.

The inspectors reviewed the UFSAR to identify the limiting design-basis parameters that were used as input for the qualification of the 14-inch ADS squib valves. The inspectors reviewed the qualification program documents (such as design specifications, test procedures, and test specifications) to verify that all the necessary requirements for the qualification were incorporated such as:

- analysis and testing methodologies as per QME-1-2007;
- fluid temperature, flow, and pressure;

- environmental temperature; and
- required operating time.

Specifically, the inspectors performed these reviews for the following components associated with the indicated commodities:

- SFS-PL-V038, SFS Discharge Line Containment Isolation MOV – ORC (PV11)
- SFS-PL-V035, SFS Suction Line Containment Isolation MOV – ORC (PV11)
- CCS-PL-V200, CCS Containment Isolation MOV – Inlet Line ORC (PV11)
- CCS-PL-V208, CCS Containment Isolation MOV – Outlet Line ORC (PV11)
- SFS-PL-V034, SFS Suction Line Containment Isolation MOV – IRC (PV11)
- CCS-PL-V207, CCS Containment Isolation MOV – Outlet Line IRC (PV11)
- VFS-PL-V800A, Vacuum Relief Containment Isolation A – ORC (PV11)
- VFS-PL-V800B, Vacuum Relief Containment Isolation B – ORC (PV11)

The inspectors reviewed applicable test procedures and records to verify if the following were performed in accordance with ASME QME-1-2007, UFSAR Section 3.9.3.2.2, "Valve Operability":

- functional qualification;
- extrapolation of the functional qualification to other valves;
- demonstration of the functional capability of production valve assemblies; and
- completion of the applicable Qualification Plans, Functional Qualification Reports, and Application Reports.

The inspectors reviewed all mechanical functional qualification issues test anomalies identified during the functional qualification process, as documented in EQDP APP-PV11-VBR-006, and the resolution of those issues to determine the effectiveness of the licensee's corrective measures.

b. Findings

Introduction: The inspectors identified an unresolved item (URI) related to the functional qualification of the PV11 MOVs. The inspectors found that the licensee did not have available documentation to demonstrate that the functional qualification activities were adequately controlled and that the methodology conformed to ASME QME-1-2007.

Description: The inspectors found that the sampled MOV Application Reports did not justify the functional qualification of the PV11 MOVs in accordance with ASME QME-1-2007 as specified in UFSAR Section 3.9.3.2.2, "Valve Operability," and Design Specification APP-PV11-Z0-001. The valve vendor tested an 8-inch butterfly valve and a 16-inch butterfly valve to support the functional qualification of the entire range of PV11 MOVs. In the sampled Application Reports for 4-inch and 6-inch butterfly valves, the inspectors found that the description of the functional qualification was not consistent with the provisions of ASME QME-1-2007 for the extrapolation of the functional qualification of valves.

For example, each sampled Application Report indicated that a valve vendor methodology had been applied in demonstrating the acceptability of its specific valve. Each report compared the flow test results for the 8-inch butterfly valve to the

torque predicted by the methodology to operate that 8-inch valve. With the methodology predicting a greater required torque than the actual test results for the 8-inch butterfly valve, the Application Reports asserted that the methodology could be applied to other butterfly valves. The inspectors found that the available documentation did not demonstrate that the valve vendor methodology could be reliably applied over the full range of sizes for the PV11 butterfly valves. Further, the available documentation failed to demonstrate that the implementation of the methodology would be controlled for the assumed parameters to determine the torque requirements for specific butterfly valves with a reliable margin to account for valve parameter uncertainties. The licensee stated that documentation to demonstrate the adequacy of the methodology and its control for the assumed parameters would need to be obtained from the valve vendor. The licensee and WEC initiated corrective actions (SCANA CR 17-30813,and WEC CAPAL 100478419) to obtain documentation to demonstrate the adequacy of the valve vendor methodology to predict the torque requirements to operate the PV11 MOVs under design-basis conditions with appropriate controls for the assumed valve parameters in order to achieve acceptable margin to account for valve parameter uncertainties. Planned corrective actions also including addressing the extent of condition to other valve commodities. This item is unresolved pending the inspectors' review of the licensee's corrective actions to determine if a more than minor performance deficiency exists. This unresolved item is identified as URI 05200027/2017002-02 and 05200028/2017002-02, "Extrapolation of Functional Qualification for PV11 MOVs."

1A12 (Unit 2) ITAAC Number 2.2.02.05a.ii (127) / Family 14E
(Unit 3) ITAAC Number 2.2.02.05a.ii (127) / Family 14E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.02.05a.ii (127). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation
- 65001.E-02.06 - Problem Identification and Resolution

The inspectors reviewed documents, specifically EQDP APP-PV01-VBR-012 and EQSR APP-PV01-VBR-011 for MOVs (commodity PV01) and interviewed personnel to verify that:

- the licensee used the appropriate limiting design basis parameters as input for the seismic qualification of the SSC and that the necessary design basis documents and calculations, as appropriate, were correctly incorporated into the qualification program for the SSC;
- seismic qualification was adequately completed and controlled in accordance with Regulatory Guide 1.100, IEEE Std. 344-1987, *ASME Boiler and Pressure Vessel (B&PV) Code Section III*, and design specifications;
- licensee records established an adequate basis for acceptance of the ITAAC with qualification criteria attributes and that the qualification report concluded that the SSC can withstand the conditions that would exist before, during, and following a

design basis seismic event without loss of safety function for the time required to perform the safety function; and
- seismic qualification documentation was maintained in an auditable manner, was complete, and clearly documented completion of the ITAAC acceptance criteria for the samples inspected.

The inspectors reviewed all seismic functional qualification test anomalies identified during the qualification process, as documented in the EQDP APP-PV01-VBR-012, to determine the effectiveness of the licensee's corrective measures.

The inspectors reviewed the UFSAR to identify the limiting design basis parameters that were used as input for the qualification of the SSC to verify if all the necessary requirements for the qualification were incorporated such as:

- design codes;
- analysis and testing methodologies;
- load combinations;
- seismic acceleration; and
- required input motion and response spectrum.

Specifically, the inspectors performed these reviews for PCS-PL-V002A, PCCWST Isolation Block MOV (PV01).

The inspectors performed these reviews to verify that the commodity codes listed in the EQDP were seismically qualified consistent with the requirements specified in the UFSAR. The inspectors also reviewed the design codes, analysis and testing methodologies, load combinations, seismic acceleration, and required input motion to verify consistency with the UFSAR requirements.

b. Findings

No findings were identified.

1A13 (Unit 2) ITAAC Number 2.2.03.02a (159) / Family 06F
(Unit 3) ITAAC Number 2.2.03.02a (159) / Family 06F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.02a (159). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.06 - Inspection of ITAAC-Related Installation of Mechanical Components
- 65001.06-02.05 - Problem Identification and Resolution
- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.01 - Design Document Review
- 65001.F-02.04 - General QA Review

The inspectors reviewed design documents associated with the Unit 2, 8-inch passive core cooling system (PXS) squib valves, which included APP-PXS-PL-V118A/B, APP-PXS-PL-V120A/B, APP-PXS-PL-V123A/B, and APP-PXS-PL-V125A/B, to determine whether the documents adequately define the design and arrangement. Specifically, the inspectors reviewed the ASME design reports, WEC design specification, valve datasheets, design drawings, plant and system transient analyses, valve functional requirement analyses, and licensing bases documents for the 8-inch PXS squib valves. The inspectors selected a sample of stress and design analyses related to the valve wall thickness, body, and shear caps to verify that the design inputs were correctly identified and documented, and that the valves were designed in accordance with the ASME Section III requirements, specifically as they relate to the design requirements that ensure the component can meet design safety functions during a design-basis accident. The inspectors reviewed design specifications and transient analyses to verify that they were properly translated into the licensee's documentation, which includes the COL and UFSAR, specifically Chapter 15, Accident Analysis. The inspector also verified that the component design met the design assumptions in the WEC transient analysis. The inspectors selected a sample of critical attributes and scenarios to determine if internal and external events or hazards could affect the components performance and if they would result in a more than minimal impact to the conclusions made in the WEC transient analysis, and the licensee's UFSAR Chapter 15, Accident Analysis. The inspectors evaluated the following scenarios:

- Inadvertent mechanical actuation of one of the PXS valves,
- Adequate flow conditions with loss of one train of 8-inch PXS squib valves - V123A/B and 125A/B,
- Thermal and pressure effects across the 8-inch PXS squib valves, and
- Impacts on the squib valve, associated check valves -V121A/B and -V124A/B, and surrounding components if the potential exists for a water hammer event to occur during squib valve actuation.

The inspectors reviewed a sample of qualification records to verify design documents were reviewed and approved by the responsible engineering group, and that personnel involved in the development of design documents met WEC and ASME Section III qualification requirements. Specifically, the inspectors reviewed qualification records for the Professional Engineers who developed the squib valve and piping system design specifications.

The inspectors also reviewed corrective action documents issues during the inspection to verify that issues were entered into the licensee or applicable contractor corrective action program in accordance with program requirements.

b. Findings

No findings were identified.

1A14 (Unit 2) ITAAC Number 2.2.03.02b (160) / Family 03F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.02b (160). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.03-02.06 - Nondestructive Examination (NDE)
- 65001.03-02.07 - Review of Records
- 65001.F-02.02 - Fabrication Records Review

The inspectors reviewed procurement and fabrication records associated with the Unit 2 passive core cooling system (PXS) loop piping to verify that materials conformed to the applicable requirements of design documents and *ASME Code Sections II and III, Edition 2001 with 2002 Addenda*. Specifically, the inspectors reviewed quality assurance data packages, design and shop drawings, certificates of conformance (CofC), ASME code data reports, Certified Material Test Reports (CMTRs), and nondestructive examination records for the following pipe spool and pipe line numbers:

- PXS-PLW-014-1R1 from Line No. PXS-PL-L025A (Accumulator Line A)
- PXS-PLW-014-5 from Line No. PXS-PL-L027A (Accumulator Line A)
- PXS-PLW-01H-1 from Line No. PXS-PL-L132A (Containment Recirculation Line A)

For each pipe spool, the inspectors reviewed the associated QA data package, CofC, ASME Form NPP-1 code data report [fabricated and certified by CB&I Laurens (formerly B.F. Shaw) for WECTEC (formerly Stone & Webster), and weld traveler to determine whether the materials were traceable and complied with the ASME Code, appropriate fabrication hold points were established, and the pipe spool received the required signoffs from Shop, Quality Control (QC) and Authorized Nuclear Inspector (ANI) personnel.

The inspectors also reviewed the associated base and filler material CMTRs to determine whether the chemical compositions and mechanical properties met the applicable requirements of the ASME Code. The inspectors reviewed liquid penetrant and radiographic examination reports to verify the results (1) were reviewed and approved by the appropriate level of qualified NDE personnel and (2) concluded there were no rejectable defects on or beneath the surface of the pipe spools.

Lastly, the inspectors reviewed the shop drawings against the design isometrics to verify the fabricated dimensions, including pipe diameter and length, as well as materials used, matched the design.

b. Findings

No findings were identified.

1A15 (Unit 2) ITAAC Number 2.2.03.03b (162) / Family 03B

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.03b (162). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.03-02.03 - Installation and Welding
- 65001.03-02.06 - Nondestructive Examination (NDE)
- 65001.03-02.07 - Review of Records
- 65001.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection
- 65001.B-02.06 - Records

The inspectors observed QC inspections, performed independent inspections and observed in-process welding on PXS pipe spools that connect the containment recirculation line to the direct vessel injection line in room 11206 to determine if the installation activities were performed in accordance with approved drawings, qualified procedures, construction specifications and applicable codes and standards. Specifically, the inspectors observed the fit-up inspection of field weld VS2-PXS-PLW-01A-4 to determine if:

- the surfaces to be welded had been prepared, cleaned and free of oil, rust, scale, moisture or any other harmful foreign material, and inspected in accordance with applicable procedures;
- the weld joint was sufficiently protected from inclement conditions and that ambient temperature and the pipe met the preheat requirements of the weld procedure;
- the weld geometry was as specified in the drawing VS2-PXS-PLW-01A, "Passive Core Cooling System Containment Bldg Room 11206 from Containment Recirc. to DVI-A";
- the components to be welded were assembled at specified gap and alignment within the limits allowed by the weld procedure WPS1-8.8T01 and APP-GW-GEF-850150, "Weld End Configuration Proposed Changes to APP-GW-VFY-001";
- the piping material and welding consumables were of the specified type and grade and were uniquely identified by markings on the material;
- the tack welds were performed by a qualified welder in accordance with the qualified WPS; and
- the gas purging using the proper shielding gas was in accordance with the weld procedure.

In addition, the inspectors reviewed the contents of work package VS2-PXS-P0W-800036, "ASME Section III Install Piping VS2-PXS-PLW-01A" to determine if:

- identification of the piping and welding consumables was traceable from the material to the field to the weld record;

- the welding and NDE procedures and welders and examiners were recorded on the weld record;
- NDE results indicated that all acceptance criteria had been met; and
- the as-built configuration met the requirements of the design drawings.

The inspectors also reviewed the weld record and observed in-process inspections to determine if:

- planned inspections had proper hold points and included both in-process and completed weld inspections as required by code;
- the liquid penetrant test was performed in strict accordance with procedure QAD 09.31, "Liquid Penetrant Examination Requirements for Solvent Removable, Color Contrast Technique";
- the temperature of the weld surface was within the procedure requirements at the time of the exam;
- adequate dwell time was allowed within the procedure requirements; and
- the results of the exam were properly compared to the acceptance criteria within the procedure.

Finally, the inspectors reviewed the weld record 1610324 and the inspection report S562-17-10130 to determine if:

- the record provided traceability to all aspects of the welding activity and were reviewed and approved by the proper authority; and
- the accepted, rejected and repaired items were documented in written reports.

b. Findings

No findings were identified.

1A16 (Unit 2) ITAAC Number 2.2.03.03b (162) / Family 03B

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.03b (162). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.03-02.03 - Installation and Welding
- 65001.B-02.02 - Welding Procedure Qualification
- 65001.B-02.03 - Welder Qualification
- 65001.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection

The inspectors observed in-process welding activities and reviewed welding records associated with weld number FW-5 of the passive residual heat removal heat exchanger (PRHR HX) line RCS-L113. Specifically, the inspectors observed the weld joint fit-up and in-process machine GTAW welding to verify the following:

- The environment in which the welding took place, an enclosed temporary tent, sufficiently protected the weld joint from inclement conditions, such as high winds and rain;
- Applicable welding procedures, detailed drawings, and weld travelers were available in the work area;
- The fit-up gap and alignment dimensions were within the tolerances provided in the welding procedure specification (WPS);
- Surfaces to be welded were prepared, cleaned, inspected, and signed off by QC in accordance with procedures and the weld traveler;
- Gas purging was signed off by QC on the weld traveler as being used in accordance with the WPS;
- The settings for the welding machine, including voltage, amperage, travel speed, wire feed speed, wire feed type, and pulse frequency were within the allowable ranges specified in the WPS;
- The shielding gas composition and flow rate were in accordance with the WPS;
- Interpass temperatures were maintained in accordance with the WPS, and the instrumentation used was properly calibrated (ID CES-M255, expiration date 08/22/2017);
- Temporary attachments were removed, inspected by liquid penetrant examination, and signed off by QC in the weld traveler; and
- The welder's identification numbers were recorded on the weld traveler.

The inspectors reviewed the WPS, and supporting procedure qualification records (PQRs), to verify it was available, up to date, accurate, and in accordance with the codes and standards specified in the design documents. Specifically, the inspectors reviewed the PQRs to verify the type and number of qualification tests required were performed, and all applicable essential, nonessential, and supplementary essential variables, along with the specific ranges qualified, were adequately recorded in the WPS, in accordance with ASME Section IX, 1998 Edition. The inspectors also reviewed welder performance qualification (WPQ) records to determine whether the welders were qualified for the process, materials, pipe diameter and thickness, and positions in use by performing specific performance qualification tests in accordance with ASME Section IX.

The inspectors reviewed the work order and weld traveler associated with FW-5 to verify:

- Work was conducted in accordance with a weld traveler;
- The applicable drawings, welding procedures, NDE reports, and M&TE used were referenced;
- The type, grade, and heat numbers for the base and weld filler material, as well and welder identification numbers, were traceable throughout production; and
- All in-process welder and QC inspection hold points were adequately signed off.

b. Findings

No findings were identified.

1A17 (Unit 2) ITAAC Number 2.2.03.05a.ii (166) / Family 14E
(Unit 3) ITAAC Number 2.2.03.05a.ii (166) / Family 14E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.05a.ii (166). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation
- 65001.E-02.06 - Problem Identification and Resolution

The inspectors reviewed documents for MOVs (commodity PV01), Level Sensors (commodity JE61), and squib valves (commodity PV70) and interviewed personnel to verify that:

- the licensee used the appropriate limiting design basis parameters as input for the seismic qualification of the SSC and that the necessary design basis documents and calculations, as appropriate, were correctly incorporated into the qualification program for the SSC;
- seismic qualification was adequately completed and controlled in accordance with Regulatory Guide 1.100, IEEE Std. 344-1987, *ASME Boiler and Pressure Vessel (B&PV) Code Section III*, and design specifications;
- licensee records established an adequate basis for acceptance of the ITAAC with qualification criteria attributes and that the qualification report concluded that the SSC can withstand the conditions that would exist before, during, and following a design basis seismic event without loss of safety function for the time required to perform the safety function; and
- seismic qualification documentation was maintained in an auditable manner, was complete, and clearly documented completion of the ITAAC acceptance criteria for the samples inspected.

The inspectors reviewed all seismic functional qualification test anomalies identified during the qualification process, as documented in the EQDP applicable to each component, to determine the effectiveness of the licensee's corrective measures.

The inspectors reviewed the UFSAR to identify the limiting design basis parameters that were used as input for the qualification of the SSC to verify that all the necessary requirements for the qualification were incorporated such as:

- design codes;
- analysis and testing methodologies;
- load combinations;
- seismic acceleration; and
- required input motion and response spectrum.

Specifically, the inspectors performed these reviews for the following components associated with the indicated commodity:

- PXS-JE-LT011A/B/C/D, PXS-JE-LT013A/B/C/D, Core Makeup Tank (CMT) A Level Sensor (JE61)
- PXS-JE-LT012A/B/C/D, PXS-JE-LT014A/B/C/D, CMT B Level Sensor (JE61)
- PXS-PL-V118A/120A, Containment Recirculation A Squib Valve (PV70)
- PXS-PL-V118B/120B, Containment Recirculation B Squib Valve (PV70)
- PXS-PL-V123A/125A, IRWST Injection A Squib Valve (PV70)
- PXS-PL-V123B/125B, IRWST Injection B Squib Valve (PV70)
- PXS-PL-V002A, CMT A Inlet Isolation Motor-operated Valve (PV01)

The inspectors performed these reviews to verify that the commodity codes listed in the EQDP were seismically qualified consistent with the requirements specified in the UFSAR. The inspectors also reviewed the design codes, analysis and testing methodologies, load combinations, seismic acceleration, and required input motion to verify consistency with the UFSAR requirements.

b. Findings

No findings were identified.

1A18 (Unit 2) ITAAC Number 2.2.03.07a.i (170) / Family 10E
(Unit 3) ITAAC Number 2.2.03.07a.i (170) / Family 10E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.07a.i (170). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation
- 65001.E-02.06 - Problem Identification and Resolution

The inspectors reviewed documents, specifically EQDPs APP-JE61-VBR-002, APP-PV01-VBR-012, APP-PV70-VBR-003, and EQSRs APP-JE61-VBR-001, APP-PV01-VBR-011, and APP-PV70-VBR-002 for Level Sensors (commodity JE61), motor operated valves (commodity PV01), squib valves (commodity PV70) and interviewed personnel to verify that:

- the licensee used the appropriate limiting design basis parameters as input for the environmental qualification of the SSC and that the necessary design basis documents and calculations, as appropriate, were correctly incorporated into the qualification program for the SSC;
- environmental qualification was adequately completed and controlled in accordance with the requirements in 10 CFR 50.49, applicable methodology in the UFSAR, regulatory guidance, and IEEE standards and the results meet the acceptance criteria stated in the design specification and the ITAAC;
- the documented qualified life was consistent with the results of the qualification activities;

- licensee records established an adequate basis for acceptance of the ITAAC with qualification criteria attributes and that the qualification report concluded that the SSC can withstand the 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;
- environmental qualification documentation was maintained in an auditable manner, was complete, and clearly documented completion of the ITAAC acceptance criteria for the samples inspected.

The inspectors reviewed all environmental qualification test anomalies identified during the qualification process, as documented in the EQDP applicable to each component, to determine the effectiveness of the licensee's corrective measures and if requirements of IEEE Std. 323-1974 were met.

Specifically, the inspectors performed these reviews for the following components associated with the indicated commodities:

- PXS-JE-LE050/51/52, Containment Flood-up Level Sensor (JE61)
- PXS-JE-LT011A/B/C/D, PXS-JE-LT013A/B/C/D, Core Makeup Tank A Level Sensor (JE61)
- PXS-JE-LT012A/B/C/D, PXS-JE-LT014A/B/C/D, Core Makeup Tank B Level Sensor (JE61)
- PXS-PL-V002A, Core Makeup Tank A Inlet Isolation MOV (PV01)
- PXS-PL-V118A/120A, Containment Recirculation A Squib Valve (PV70)
- PXS-PL-V118B/120B, Containment Recirculation B Squib Valve (PV70)
- PXS-PL-V123A/125A, IRWST Injection A Squib Valve (PV70)
- PXS-PL-V123B/125B, IRWST Injection B Squib Valve (PV70)

The inspectors reviewed the UFSAR to identify the limiting design basis parameters that were used as input for the qualification of the SSC. The inspectors reviewed the qualification program documents (such as procedures, test specifications, and test reports) to verify that all the necessary requirements for the qualification were incorporated such as:

- qualification methodology (i.e. test or analysis) as per IEEE Std. 323-1974;
- environmental parameters under normal operating conditions, abnormal conditions, and design basis events
- environmental temperature, pressure, total radiation dose, radiation dose rate, cycling, electrical parameters and humidity;
- simulated accident conditions, including, temperature, pressure, radiation, pH, and chemical additives;
- margin, as specified in IEEE Std. 323-1974; and
- post-accident conditions, including time and submergence, where applicable.

The inspectors reviewed the EQSR, EQDP, and applicable test procedures and test records related to the qualification for the expected environment to determine if qualification activities were adequately controlled and that the methodology conformed to IEEE Std. 323-1974. The inspectors reviewed the environmental profiles documented in APP-VP-GW-030, "Plant Environmental Conditions," to verify that the tested profiles enveloped the worst case environmental conditions that would be expected. The inspectors reviewed test procedures and test records to verify that the qualification was

in conformance with IEEE Std. 323-1974, and that the valve actuators were qualified in accordance with IEEE 382-1996, "IEEE Standard for Qualification of Actuators for Power-Operated Valve Assemblies With Safety-Related Functions for Nuclear Power Plants," and that the connectors were qualified in accordance with IEEE Std. 572-1985.

b. Findings

No findings were identified.

1A19 (Unit 2) ITAAC Number 2.2.03.12a.i (214) / Family 07E
(Unit 3) ITAAC Number 2.2.03.12a.i (214) / Family 07E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.12a.i (214). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation
- 65001.E-02.06 - Problem Identification and Resolution

The inspectors reviewed documents, specifically EQDP APP-PV70-VBR-003 and EQSR APP-PV70-VBR-002 for 8-inch PXS squib valves (Commodity PV70) and interviewed personnel to determine if:

- the licensee used the appropriate limiting design basis parameters as input for the mechanical functional qualification of the valves and that the necessary design basis documents and calculations, as appropriate, were correctly incorporated into the qualification program for the SSC;
- mechanical functional qualification was adequately completed and controlled in accordance with the provisions in ASME QME-1-2007, as specified in the UFSAR, and the results met the acceptance criteria stated in the design specification and the ITAAC;
- licensee records established an adequate basis for the functional qualification of the valves, and the qualification report demonstrated that the valves could perform their safety function to operate under design conditions for the time required to perform the safety function; and
- mechanical functional qualification documentation was maintained in an auditable manner, was complete, and clearly documented completion of the ITAAC acceptance criteria for the samples inspected.

Specifically, the inspectors performed these reviews for the following components associated with the indicated commodity:

- PXS-PL-V118A/120A, Containment Recirculation A Squib Valve (PV70)
- PXS-PL-V118B/120B, Containment Recirculation B Squib Valve (PV70)
- PXS-PL-V123A/125A, IRWST Injection A Squib Valve (PV70)
- PXS-PL-V123B/125B, IRWST Injection B Squib Valve (PV70)

The inspectors reviewed the UFSAR to identify the limiting design-basis parameters that were used as input for the qualification of the 8-inch ADS squib valves. The inspectors reviewed the qualification program documents (such as design specifications, test procedures, and test specifications) to verify that all the necessary requirements for the qualification were incorporated such as:

- analysis and testing methodologies as per QME-1-2007;
- fluid temperature, flow, and pressure;
- environmental temperature; and
- required operating time.

The inspectors reviewed applicable test procedures and records to verify if the following were performed in accordance with ASME QME-1-2007, UFSAR Section 3.9.3.2.2, and Design Specification APP-PV70-Z0-001:

- the functional qualification of the 8-inch PXS squib valves;
- extrapolation of the functional qualification to address specific design adjustments;
- demonstration of the functional capability of production valve assemblies; and
- completion of the applicable Qualification Plans, Functional Qualification Reports, and Application Reports.

The inspectors reviewed all mechanical functional qualification issues and test anomalies identified during the functional qualification process, as documented in EQDP APP-PV70-VBR-003, and the resolution of those issues to determine the effectiveness of the licensee's corrective measures.

b. Findings

No findings were identified.

1A20 (Unit 2) ITAAC Number 2.3.06.05a.ii (362) / Family 06E
(Unit 3) ITAAC Number 2.3.06.05a.ii (362) / Family 06E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.3.06.05a.ii (362). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation
- 65001.E-02.06 - Problem Identification and Resolution

The inspectors reviewed documents, specifically EQDP APP-PV01-VBR-012 and EQSR APP-PV01-VBR-011 for MOVs (commodity PV01) and interviewed personnel to verify that:

- the licensee used the appropriate limiting design basis parameters as input for the seismic qualification of the SSC and that the necessary design basis documents and calculations, as appropriate, were correctly incorporated into the qualification program for the SSC;
- seismic qualification was adequately completed and controlled in accordance with Regulatory Guide 1.100, IEEE Std. 344-1987, *ASME Boiler and Pressure Vessel (B&PV) Code Section III*, and design specifications;
- licensee records established an adequate basis for acceptance of the ITAAC with qualification criteria attributes and that the qualification report concluded that the SSC can withstand the conditions that would exist before, during, and following a design basis seismic event without loss of safety function for the time required to perform the safety function; and
- seismic qualification documentation was maintained in an auditable manner, was complete, and clearly documented completion of the ITAAC acceptance criteria for the samples inspected.

The inspectors reviewed all seismic functional qualification test anomalies identified during the qualification process, as documented in EQDP APP-PV01-VBR-012, to determine the effectiveness of the licensee's corrective measures.

The inspectors reviewed the UFSAR to identify the limiting design basis parameters that were used as input for the qualification of the SSC to verify that all the necessary requirements for the qualification were incorporated such as:

- design codes;
- analysis and testing methodologies;
- load combinations;
- seismic acceleration; and
- required input motion and response spectrum.

Specifically, the inspectors performed these reviews for RNS-PL-V001A, RCS Inner Hot Leg Suction Motor-operated Isolation Valve (PV01).

The inspectors performed these reviews to verify that the commodity codes listed in the EQDP were seismically qualified consistent with the requirements specified in the UFSAR. The inspectors also reviewed the design codes, analysis and testing methodologies, load combinations, seismic acceleration, and required input motion to verify consistency with the UFSAR requirements.

b. Findings

No findings were identified.

1A21 (Unit 2) ITAAC Number 2.5.02.07a (534) / Family 10E
(Unit 3) ITAAC Number 2.5.02.07a (534) / Family 10E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.5.02.07a (534). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation

The inspectors conducted reviewed the design basis of the Protection and Monitoring System (PMS) isolation devices to determine if the isolation devices prevent the maximum credible faults from propagating into the PMS when PMS provides process signals to the Plant Control System (PLS). The inspectors reviewed the design specification documents to verify that the licensee was using the appropriate design basis parameters for fault testing and to verify that the design basis was appropriately translated and documented in the qualification testing summary reports, APP-PMS-VBR-015, “Protection and Safety Monitoring System Isolation Summary Report for Use in the AP1000 Plant,” Rev. 2 and APP-JY50-T2R-001, “Reactor Trip Switchgear IEEE 384 Fault Test Report,” Rev. 0.

Additionally, the inspectors reviewed test reports to verify that the isolation devices were qualified in accordance with WCAP-15776 and IEEE Std. 384-1981 and that the results met the acceptance criteria stated in the design specification and the ITAAC. The inspectors also reviewed procedures, plans, design changes, assembly drawings, and design specifications to verify details within the test reports.

The inspectors reviewed documentation of the licensee’s review and acceptance of the qualification testing summary reports to verify that a licensee review of the ITAAC record was performed per NND-AP-0032, "Implementation of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC),” Rev. 7. The inspectors also reviewed the documentation to verify that the licensee’s review concludes that the ITAAC requirements had been met.

b. Findings

No findings were identified.

1A22 (Unit 2) ITAAC Number 2.5.02.07d (537) / Family 10E
(Unit 3) ITAAC Number 2.5.02.07d (537) / Family 10E

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.5.02.07d (537). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.E-02.01 - Design Basis Requirements
- 65001.E-02.03 - Qualification
- 65001.E-02.04 - Documentation

The inspectors conducted interviews and reviewed documents associated with the Component Interface Module (CIM) Priority type testing, including APP-PMS-T1P-080, “AP1000 Protection and Safety Monitoring System Integration Test CIM Priority Test

Procedure" and APP-PMS-T2R-080, "AP1000 Protection and Safety Monitoring System Integration Test CIM Priority Test Report" to verify if:

- the licensee was using the appropriate design basis parameters for testing and that the design basis was appropriately translated into Component Interface Module (CIM) Priority qualification type test;
- all the necessary requirements for the testing were incorporated, including ITAAC requirements and acceptance criteria;
- the testing was conducted in accordance with the specification, the results met the acceptance criteria stated in the design specification and the ITAAC;
- required testing of the CIM Priority Logic was adequately completed and controlled in accordance with regulatory requirements, applicable industry standards, design specifications, and approved procedures;
- licensee records established an adequate basis for acceptance of the ITAAC with testing criteria attributes; and
- the documentation included a licensee review of the ITAAC records and documentation that the ITAAC requirements have been met.

Specifically, the inspectors sampled test cases for a component with onerous consequences, a motor-operated valve (MOV), and an air-operated valve (AOV) to verify that the automatic safety function and the Class 1E manual controls both have priority over the non-Class 1E soft controls. The inspectors reviewed the Automated Record Gatherer and Operator Simulator (ARGOS) and Standard Input / Output Simulator (SOIS) input files in comparison with the CIM priority test results to ensure that the test cases development for testing the CIM priority logic was adequate to demonstrate the prioritization of automatic safety functions and Class 1E manual controls over non-Class 1E soft controls.

The inspectors reviewed test report APP-PMS-T2R-080 to verify that any anomalies associated with CIM priority testing were documented and dispositioned in accordance with APP-PMS-T5-001, "AP1000 Protection and Safety Monitoring System Test Plan," and NA 4.19.9, "Issue Reporting and Resolution."

b. Findings

No findings were identified.

1A23 (Unit 2) ITAAC Number 2.5.02.14 (553) / Family 10F
(Unit 3) ITAAC Number 2.5.02.14 (553) / Family 10F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.5.02.14 (553). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.22-A1.03 - Inspection Requirements and Guidance
- 65001.22-A2.03.03 - Requirements Phase Documentation
- 65001.22-A3.03.04 - Design Phase Documentation
- 65001.22-A4.03.02 - Integration Phase Documentation

- 65001.22-A5.03.01 - Verification and Validation (V&V)
- 65001.22-A5.03.02 - System/Software Testing
- 65001.22-A5.03.03 - Validation & Test Phase Safety Analysis
- 65001.22-A5.03.04 - Documentation
- 65001.22-A5.03.04 - Documentation
- 65001.22-A6.03.04 - Installation Testing

The inspectors conducted interviews and reviewed Westinghouse's documentation, associated with the Protection and Monitoring System (PMS) Component Interface Module (CIM) Safety Remote Node Controller (SRNC) subsystem lifecycle to assess conformance with the licensing basis, the design commitment, ITA, and acceptance criteria of ITAAC 2.5.02.14.

The CIM-SRNC subsystem provides the interface to control an engineered safety feature (ESF) component from the PMS, the Plant Control System (PLS) and the local control on the CIM. The CIM employs a priority arbitration logic to determine which input to use.

The inspectors reviewed prior NRC Inspection Reports (IR) 99900404/2014-201 (ML14058A995) and IR 99900404/2016-201 (ML15363A360), to verify if each lifecycle phase was adequately evaluated. The inspectors reviewed the lifecycle phase activities associated with the CIM-SRNC subsystem, in accordance with the description provided in Sections 2 through 7 and Appendix B, of APP-GW-GLR-611, "ITAAC 2.5.02.14: Component Interface Module Design Process Technical Report," Revision 3.

CIM-SRNC Subsystem Design Requirements Phase

The design requirements phase consists of the project concept and planning activities and during this phase of the CIM lifecycle, the project requirements and planning documents are developed. The inspectors reviewed 6105-00015, "CIM-SRNC Software Program Manual," Rev. 7 and the planning documents identified in the ITAAC Technical Report to determine if a planned design process was developed in accordance with the licensing basis. In addition, the inspectors reviewed 6105-00017, "CIM-SRNC Regulatory Guide and Industry Standards Compliance Exceptions," Rev. 01, to determine if the exceptions noted were in compliance with regulatory requirements and the licensing basis. Specifically, two exceptions were reviewed, CIM-1028-002 and CIM-1028-003 that discussed the exceptions taken during the CIM's development process and the changes that will be made to CIMs developed in the future.

CIM-SRNC Subsystem System Definition Phase

During this phase of the CIM lifecycle, the hardware and software requirements are developed. This phase is referred to as the Requirements Phase in the CIM-SRNC Management Plan. In addition the failure modes and software hazards are evaluated in a Failure Modes and Effects Analysis (FMEA) and a Software Hazards Analysis (SHA). Following completion of the requirements and analysis the Independent Verification & Validation (IV&V) team performs a review in accordance with the CIM-SRNC IV&V Plan and documents the review in a Phase Summary Report.
The inspectors reviewed the IV&V Phase Summary Report, 6105-00092, "CIM SRNC IV&V Summary Report," Rev. 11, Section 2.6, "Requirements IV&V (Development Process)" in which Westinghouse recorded a series of activities (tasks) performed in accordance with individual work instructions. The inspectors reviewed a sample of the

system definition phase task reports and associated work instructions to assess whether the instructions provided adequate review guidance consistent with IEEE Standard 1012-1998 and Appendix B to 10 CFR Part 50. These tasks included:

- traceability analysis
- software requirements evaluation
- interface analysis
- criticality analysis
- IV&V test plan generation
- configuration management assessment
- hazard analysis
- risk analysis
- security assessment
- test evaluation
- user documentation assessment
- audit performance
- baseline change assessment
- regression analysis

The inspectors reviewed the task reports to verify if documentation of corrective actions during the system definition / requirements phase was in accordance with the licensing basis. Specifically the inspectors reviewed details associated with OnTime Ticket number 6027 regarding anomalies associated with the requirements evaluation and OnTime Ticket number 6043 associated with the hazards analysis task for the requirements phase. The inspectors performed the review to verify if the issues and resolutions were adequately documented in the OnTime reporting system. In addition, the inspectors reviewed, 6105-60019, "CIM-SRNC Software Hazard Analysis Report," Rev. 3 to verify if the resolution was adequately captured.

The inspectors reviewed the Failure Modes and Effects Analysis (FMEA) to determine if the CIM-SRNC subsystem was evaluated and plausible failures included in the FMEA analysis. The inspectors reviewed Westinghouse documents 6105-10008 and 6105-20008, "SRNC Reliability Analysis," Rev. 5, and "CIM Reliability Analysis," Rev. 7 to verify if the component level FMEA met the requirements of WNA-DS-01271-GEN, "CIM Hardware Requirements Specification," and WNA-DS-01272-GEN, "SRNC Requirements Specification."

CIM-SRNC Hardware and Software Development Phase

The Hardware and Software development phase corresponds to the design and implementation phase in the CIM-SRNC Management Plan. Both hardware and software are developed and during the implementation portion the Hardware Description Language (HDL) is authored. Additionally, compiling, simulating, synthesizing, place and route, and generation of the binary image for the SRNC-CIM FPGA is completed. The inspectors reviewed the IV&V phase summary report, Section 2.7, "Design IV&V (Development Process)" to verify if documentation of the design phase was performed in accordance with the licensing basis. Specifically, the inspectors reviewed eight anomalies associated with the Requirements Traceability Analysis (RTA) performed by the IV&V team. These eight anomalies generated three OnTime tickets. The inspectors reviewed the details associated with OnTime Ticket numbers 6089, 6094 and 6096 regarding these anomalies associated with the RTA. The inspectors performed the review to verify if the issues and resolutions were adequately documented in the OnTime

reporting system. In addition, the inspectors reviewed Hardware Requirements Specification, WNA-DS-01271-GEN requirement R008.12 which describes the "hot swap" capabilities of the CIM. The inspectors interviewed Westinghouse's design team to verify if the correctness and completeness of this requirement to ensure the CIM-SRNC subsystem remained functional after the removal and insertion of the CIM module.

The inspectors reviewed the tasks documented in the IV&V Phase Summary Report, Section 2.8, "Implementation IV&V." These tasks included:

- traceability analysis
- source code generation documentation review
- interface analysis
- criticality analysis
- test case generation and evaluation
- test procedure generation and verification
- component verification and validation (V&V) test execution and verification
- IV&V acceptance test and verification
- hazard analysis
- risk analysis
- security assessment
- test evaluation
- baseline change assessment

The inspectors reviewed a sample of the work instructions for these tasks, to assess whether the instructions provided adequate review guidance, consistent with IEEE Standard 1012-1998 and Appendix B to 10 CFR Part 50. The inspectors also reviewed a sample of the IV&V task reports to verify if individual task activities were adequately documented and consistent with the work instructions. Specifically, the inspectors reviewed reports 6105-60128 and "6105-50132 associated with source code evaluation and test evaluation. The inspectors performed the review to determine if the task reports detailed the activities identified in each work instruction, and any anomalies identified from the IV&V review were documented in accordance with Defect Management work instruction.

The inspectors reviewed the details associated with OnTime Ticket number 6119 regarding anomalies associated with mapping of requirements to component-level ISE tests and sub-system level SIOS tests identified during review of the Requirements Traceability Matrix (RTMs). The inspectors performed the review to verify if the issues and resolutions were adequately documented in the OnTime reporting system. In addition, the inspectors reviewed Section 2.9.2, "Test Procedure Generation and Verification," of the IV&V phase summary report to verify that the results were also reviewed and documented by the IV&V team.

The inspectors reviewed the IV&V Test Plan, 6105-00005, "CIM-SRNC Test Plan," Revision 11, to verify if it provided an adequate description for the evaluation of implementation activities, and that those activities were performed and documented in Section 2.8, "Implementation IV&V," of 6105-00092, "CIM-SRNC IV&V Phase Summary Report," Revision 11.

<u>CIM-SRNC System Integration and Test Phase Review</u>

During this phase of the CIM lifecycle, software and hardware are integrated and type tested. Register Transfer Level (RTL) modules are combined into the top-level design for use in simulation testing, creating the image to be flashed onto the FPGAs, and testing the integrated CIM-SRNC. These activities are referred to as the Test Phase in the CIM-SRNC Management Plan.

The inspectors reviewed the IV&V Test Plan, 6105-00005, "CIM-SRNC Test Plan," Revision 11, to determine if it provided adequate description for the evaluation of integration and testing activities in accordance with IEEE 1012-1998, 6105-00015, "CIM-SRNC Software Program Manual," and 6105-00013, "CIM-SRNC IV&V Plan." In addition, the inspectors reviewed the test activities to verify they were performed and documented in Section 2.9, "Test IV&V," of 6105-00092, "CIM-SRNC IV&V Phase Summary Report," Rev. 11.

The inspectors reviewed the tasks documented in the IV&V Phase Summary Report Section 2.9. These tasks included:

- traceability analysis
- test procedure generation and verification
- IV&V acceptance test and verification
- hazard analysis
- risk analysis
- security assessment
- test evaluation
- baseline change and regression analysis

The inspectors reviewed a sample of the work instructions for these tasks, to verify if the instructions provided adequate review guidance, consistent with IEEE Standard 1012-1998 and Appendix B to 10 CFR Part 50.

The inspectors also reviewed a sample of the IV&V test phase task reports to verify that individual task activities were adequately documented and were consistent with the work instructions. Specifically, the inspectors reviewed reports 6105-60140 and 6105-60144 associated with baseline change and regression analysis and test procedure generation and verification. The inspectors reviewed the task reports to verify if the activities identified in each work instruction, and any anomalies identified from the IV&V review were documented in accordance with Defect Management work instruction.
The inspectors reviewed the details associated with OnTime Ticket number 2160 regarding anomalies identified during test procedure generation and verification to verify if the issues and resolutions were adequately documented in the OnTime reporting system. In addition, the inspectors reviewed Section 2.9.2, "Test Procedure Generation and Verification," of the IV&V phase summary report to verify that the results were adequately captured.

The inspectors reviewed CAPAL 100078270 that documented issues associated with a gap in CIM IV&V simulation environment (ISE) testing. The issue was identified from an internal evaluation of prior peer review activities associated with the testing. In response, Westinghouse developed testbench code and documentation updates, performed additional ISE testing, and performed additional peer review activities after the additional ISE testing was completed. The inspectors reviewed both the IV&V Simulation Environment (ISE) Test Task Report, 61005-60136, and the ISE Peer Review

Task Report, to verify if the additional testing addressed the issues identified in CAPAL 1000078270. The inspectors reviewed the test objectives to assess whether they were documented and that the results reflected completion of those objectives. In addition the inspectors reviewed the criteria in the peer review to verify it evaluated test cases, models, monitor checkers, and compiler directives, and the task results documented rationale for acceptance of the test results.

CIM-SRNC Sub-system Installation Phase Review

During this phase of the CIM lifecycle, FPGA images are loaded onto the CIM/SRNC and verified and validated through IV&V testing. The subassemblies are combined and tested further in the production environment during manufacturing to ensure hardware / software are functioning properly.

The inspectors reviewed Westinghouse's IV&V test plan, 6105-00005, "CIM-SRNC Test Plan," Rev. 11, to verify if it provided adequate description for the evaluation of installation activities, and that those activities were performed and documented in Section 2.10, "Installation and Checkout IV&V," of 6105-00092, "CIM-SRNC IV&V Phase Summary Report," Rev. 11. Per the IV&V phase summary report, Section 2.10, "Installation and Checkout," Westinghouse's performed a series of activities (tasks) in accordance with individual work instructions. These tasks included:

- installation review
- hazard analysis update
- risk analysis
- security assessment
- test evaluation
- configuration management review

The inspectors reviewed a sample of the work instructions for these tasks, to verify if the instructions provided adequate review guidance, consistent with IEEE Standard 1012-1998 and Appendix B to 10 CFR Part 50. The inspectors also reviewed a sample of the IV&V Installation Phase task reports to verify that individual task activities were adequately documented and were consistent with the work instructions. Specifically, the inspectors reviewed reports 6105-60149, 6105-60146, 6105-60145, 6105-60148 and 6105-60150 associated with installation, hazard analysis, risk analysis, security assessment, and test evaluation. The inspectors reviewed the task reports to verify if the activities identified in each work instruction, and any anomalies identified from the IV&V review were documented in accordance with Defect Management work instruction.

CIM-SRNC IV&V Final Summary Report

Additionally, the inspectors reviewed 6105-00092, "CIM SRNC IV&V Summary Report," Rev. 11. The inspection team reviewed the ten "deferred items," which describe anomalies that have been identified and evaluated by design and verification and validation (V&V) team members and determined that the issues are benign and will be considered for correction if the design is updated at a future date. From the ten items, three were selected for further review. OnTime Tickets 6338, 6950 and 6971 were reviewed to verify if they were documented in accordance with Defect Management work instruction.

b. Findings

No findings were identified.

1A24 (Unit 2) ITAAC Number 2.6.09.01 (641) / Family 17E
(Unit 2) ITAAC Number 3.3.00.14 (820) / Family 17E

a. Inspection Scope

The inspectors performed an inspection for the above ITAAC. The details of this inspection are Security Related and included in the non-public security report 05200027/2017402.

b. Findings

No findings were identified.

1A25 (Unit 2) ITAAC Number 3.3.00.02a.i.a (760) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.a (760). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.A.02.02 - Installation Records Review

The inspectors observed concrete placed within the CA05 structural module walls located inside the Unit 2 containment vessel and reviewed records to determine whether the documents reflected the as-built condition. Specifically, the inspectors:

- Observed the time limit between mixing and placement did not exceed the requirements of American Society for Testing and Materials (ASTM) C94-94, "Standard Specification for Ready Mix Concrete" as required by ACI-349-01, "Code Requirements for Nuclear Safety Related Concrete Structures."
- Concrete temperature limits were maintained within the constraints contained in specification VS2-CC01-Z0-026, "Safety Related Mixing and Delivering Concrete."
- Slump flow test results were taken at the point of placement and met the requirements of specification VS2-CC01-Z0-026.
- Batch tickets for the placement were reviewed for verification of proper mix, transport time, and placement location to determine if the records furnish documentary evidence that the SSC was constructed in accordance with the final design.
- Placement drop heights did not exceed the requirements of specification VS2-CC01-Z0-031, "Safety Related Placing Concrete and Reinforcing Steel."
- Inspection during placement was performed per Quality Inspection Plan F-C113-001, "Concrete Placement Inspection."

b. Findings

No findings were identified.

1A26 (Unit 2) ITAAC Number 3.3.00.02a.i.a (760) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.a (760). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.01-02.05 - Steel Structures
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors reviewed assembly records for the fabrication of steel structures making up the submodules for the In-Containment Refueling Water Storage Tank (IRWST). Specifically, the inspectors reviewed documentation from the CA03-01 submodule. The inspectors reviewed certified material test reports (CMTRs) to verify the materials used were in conformance with the required material specifications. The inspectors reviewed weld travelers to verify that identification of welds and welders were maintained for each weld and appropriate hold points had been established for code-required nondestructive examinations (NDE). The inspectors also reviewed receipt inspection records to verify that a general receipt inspection was performed (e.g. shipping damage, cleanliness, presence of supplier documentation). Additionally, the inspectors reviewed the receipt inspection documentation to determine if CA03-01 was examined for conformance with requirements specified in the procurement documents.

The inspectors reviewed a sample of design changes as controlled by Engineering Design Change Request (EDCRs) associated with the CA03-01 submodule. The inspectors reviewed these reports to determine if the disposition was properly justified against the original design. To determine if the changes were properly documented, the inspectors reviewed the reports to verify whether the condition was properly evaluated, and that a licensing basis review was conducted.

b. Findings

No findings were identified.

1A27 (Unit 2) ITAAC Number 3.3.00.02a.i.a (760) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.a (760). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.01-02.05 - Steel Structures
- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.B-02.02 - Welding Procedure Qualification
- 65001.B-02.03 - Welder Qualification

- 65001.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection
- 65001.F-02.02 - Fabrication Records Review

The inspectors performed a review of Unit 2 containment internal modules CA55 and CA56 located at elevation 135'-3" above the internal refueling water storage tank (IRWST), to demonstrate that the structures, systems, or components (SSC's) were designed and fabricated in conformance with requirements in the facility license, applicable codes and standards, licensing commitments, the Final Safety Analysis Report (FSAR), and regulations. Specifically, inspectors performed the following:

- Reviewed a sample of procurement documents for structural steel to verify that the shape, size, dimensions, type, and grade of material conform to the approved specifications and design drawings; and verified by direct inspection that the items on-site are what was ordered by procurement.
- Verified that an adequate marking system is used to maintain the identity of material from storage to installation; structural steel is protected from corrosion caused by exposure to weather, and that corrosion limits match design criteria; and nonconforming material is adequately identified and segregated.
- Verified that the minimum concrete edge distance for studs with shear loading was as specified.
- Verified that the licensee was identifying problems at an appropriate threshold and entering them into the corrective action program.

The inspectors observed in-process welding on Unit 2 containment internal Submodule CA55-01, located at elevation 135'-3" above the IRWST, to demonstrate that SSC's were welded in accordance with the AWS D1.1 2000 Structural Welding Code-Steel. Specifically, the inspectors performed the following:

- Verified Welding Procedure Specifications (WPS) were qualified in conformance with the applicable Code requirements. WPSs were available, and up to date and accurate. Pre-qualified procedures for structural steel welding were in conformance with the AWS code.
- Verified that welding positions qualified for a WPS were in accordance with the applicable code.
- Verified that the WPS specified all the applicable essential, nonessential supplementary variables referenced in the code. The specific ranges of values of the WPS variables were obtained from one or more procedure qualification record (PQR).

The inspectors also reviewed welder's qualification records to verify that:

- welding personnel have demonstrated their skill by performing specific performance qualification tests prescribed by the applicable code; and
- performance qualification tests were fully documented and the welder qualification procedures included adequate provisions to verify the identity of the welder who was undergoing the performance qualification test.

Inspectors observed in-process welding and reviewed production control documents to determine if:

- the weld was performed in accordance with a "traveler," weld data record or similar document which coordinated and sequenced all operations, references procedures and instructions, established hold points, and provided for production welding and inspection sign offs;
- the weld joint was sufficiently protected from inclement conditions and welding was not performed when the ambient temperature in the vicinity of the weld was below the WPS limit without preheat or when surfaces were wet or exposed to rain, snow, dust, or high wind;
- surfaces to be welded were smooth, uniform, and free from significant surface discontinuities such as cracks or seams, and free from paint, oil, rust, scale, slag, grease, moisture or other harmful foreign materials that are detrimental to welding for at least 2 inches from the weld joint;
- weld joint geometry, including root opening and fit-up tolerances, were as specified;
- the temperature of the base material at the joint prior to welding met the preheat requirements of the WPS;
- the welding consumables utilized were in compliance with the WPS, manufacturer's recommendations, and the applicable Code specification;
- each weld was traceable to the welder;
- inspectors performing welding inspection were qualified;
- inspections include both in-process and completed weld inspections and contain appropriate inspection hold points; and
- nondestructive testing methods and acceptance criteria were qualified and approved.

The inspectors also reviewed a sample of fabrication records to verify that they were adequate to furnish evidence that activities affecting quality and SSCs conformed to applicable codes, standards, regulations, and quality and technical requirements.

b. Findings

No findings were identified.

1A28 (Unit 2) ITAAC Number 3.3.00.02a.i.c (762) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.c (762). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.01-02.01 - Procedures
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.B-02.01 - Program and Procedures Review
- 65001.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection

The inspectors observed cadwelding on the rebar surrounding the main steam line penetration located in the north wall of the lower main steam isolation valve (MSIV)

compartment A (Wall 11 from P to Q). Specifically, the inspectors witnessed the welding and QC inspection of Coupler No. VS2-14-CAD-00092 to verify WECTEC Procedure No. NCSP 03-43-3, “Exothermic Splicing of Reinforcing Steel,” and Quality Inspection Plan No. F-S510-001, “Exothermic Splicing of Reinforcing Steel (Cadweld),” were followed. The inspectors reviewed the procedures in the field to verify they were properly approved, available, and had adequate administrative and procedural controls, work processes, and inspection requirements. Through independent visual inspection, the inspectors also measured the void depth to verify it was in conformance with the manufactures limits for spot and full circumference voids.

The inspectors reviewed the associated “Exothermic Rebar Splice Qualified Installers Log,” “Multi-Verification/Inspection Data Sheet,” and “Exothermic Rebar Coupler Control Record” to verify (1) the personnel conducting work were qualified, (2) tensile testing was performed at the required intervals and received acceptable results, and (3) work was controlled though a work package with adequate QC hold points and signatures

b. Findings

No findings were identified.

1A29 (Unit 2) ITAAC Number 3.3.00.02a.i.d (763) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.d (763). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.A.02.02 - Installation Records Review
- 65001.A.02.04 - Review As-built Deviations/Nonconformance
- 65001.F-02.02 - Fabrication Records Review

The inspectors observed installation activities for the wall sections along column line 5, between column line I and the shield building and between elevations 100'-0" and 117'-6". The activities observed were associated with the installation of vertical, horizontal, shear steel reinforcement bars; embed plates; and vertical wall dowel bars extending above elevation 117'-6". Also, the inspectors performed a walkdown of the wall and reviewed a sample of as-built records to determine whether:

- The installation of reinforcing steel bars and embed plates was performed in accordance with the applicable specifications, codes, drawings, and procedures;
- Reinforcing steel, embedments, and conduit penetrations were located properly in the structure and were secured and free of concrete or excessive rust, and had proper clearances; and
- Embed plate and conduit materials were controlled in accordance with specifications, codes, drawings, and procedures.

The inspectors reviewed a sample of design deviations and non-conformances used to identify differences between the as-designed and as-built conditions to determine if:

- Any design changes or field modifications relevant to the work observed were properly controlled and processed in accordance with quality and technical requirements;
- The difference, if not corrected to comply with the as-designed conditions, was properly documented and incorporated in the final as-built drawings;
- Any differences between documents used for construction and the corresponding document used for a design analysis were appropriately reconciled by the person or organization responsible for the design;
- Items dispositioned as "repair", the repair was performed in accordance with applicable codes, standards, regulations, and quality and technical requirements and also in compliance with the final design; and
- Items dispositioned as "use -as-is", the condition was adequately evaluated by the responsible design organizations and that any design change was completed in accordance with codes, standards, regulations, and quality and technical requirements.

b. Findings

No findings were identified.

1A30 (Unit 2) ITAAC Number 3.3.00.02a.i.d (763) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.d (763). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.F-02.04 - General QA Review

The inspectors inspected the installation of reinforcing steel and embed plates for the pre-cast floor sections in Unit 2 room 12255 located between column lines 5 and 7.3 and column line I and the shield building wall located in the radiation controlled area of the auxiliary building at elevation 82’6”. These floor sections are associated with the chemical and volume control system (CVCS) pump makeup room. The inspectors performed independent measurements and inspected the installation to verify whether:

- reinforcing steel, and embedments were located properly in the structure, and were sized as specified in drawings; and
- reinforcing steel and embedments were secured and free of concrete or excessive rust.

b. Findings

No findings were identified.

1A31 (Unit 3) ITAAC Number 3.3.00.02a.i.a (760) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.a (760). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.A.02.04 - Review As-built Deviations/Nonconformance
- 65001.B-02.02 - Welding Procedure Qualification
- 65001.B-02.03 - Welder Qualification
- 65001.B-02.04 - Production Controls
- 65001.B-02.05 – Inspection

The inspectors observed in-process welding of Unit 3 CA01 basemat connection plates (B-plates) which were welded to the bottom of the CA01 module and are used to anchor the CA01 module to the basemat via attached rebar. The CA01 module consists of the reactor and fuel transfer compartments, two steam generator compartments, and a pressurizer compartment. The inspectors observed welding on B-plates 101, 106, 109, 114, and 116, which were attached to the bottom of the east steam generator compartment. The inspectors observed fit-up, root and fill passes, and performed a final visual inspection to determine if the concrete liner plate of CA01 was fitted and welded to the B-plates in accordance with specifications, codes, drawings, and procedures.

The inspectors reviewed the Welding Procedure Specifications (WPS) to determine if welding activities complied with applicable code requirements. Inspectors also reviewed the welding positions and processes used for the welds to determine if they complied with applicable code requirements. Inspectors observed fit-up inspections performed by Field Welding Engineers to determine if the root gap and bevel angle were within the allowed ranges. Inspectors observed pre-heat temperatures, filler material type and handling, and proper cleaning of flux between fill passes to determine if production controls were in place and complied with the WPS and site specifications.

The inspectors reviewed drawings, welding procedures, weld records, and welder qualifications to determine if the identification of welds and welders was maintained for each weld and to determine if the welders were qualified. The inspectors reviewed material issue records and certified material test reports to determine if welding rods complied with design, procurement, and technical requirements and maintained traceability.

The inspectors reviewed a sample of documents that were used to identify differences between the as-designed and as-built structure to determine if the conditions were properly evaluated and either reconciled or corrected.

b. Findings

Introduction

The NRC inspectors identified an ITAAC finding of very low safety significance (Green) and associated non-cited violation (NCV) of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix B, Criterion IX, “Control of Special Processes” for South Carolina Electric & Gas’s (SCE&G) failure, through their subcontractor, to ensure that safety-related welds were in compliance with applicable codes and standards.

Description

On March 2, 2017, the inspectors observed a Field Welding Engineer (FWE) performing an inspection of Unit 3 CA01 basemat attachment plates (B-plates). The FWE accepted a fit-up root gap of 5/8” between B-plates B-106 and B-109 and the CA01 module. During a review of design requirements, inspectors determined that the prequalified joint TC-U4a of American Welding Society (AWS) D1.1:2000 permitted a maximum root gap, including tolerances, of 1/2” using the Shielded Metal Arc Welding (SMAW) process in a horizontal position. Discussions with the FWE revealed that he was determining the required root gap based on his experience and had not referred to the procedure. Section 3.8.3.2 of the Updated Final Safety Analysis Report (UFSAR) requires compliance with AWS D1.1:2000. To bring the two B-plates into compliance, the licensee's contractor cut out the welds and re-welded them in accordance with approved procedures and AWS D1.1:2000.

Analysis

The inspectors determined that the failure to ensure that safety-related welds complied with applicable codes and standards represented a performance deficiency. The finding was determined to be more than minor because the failure to ensure the applicable root gap rendered the quality of a safety-related structure indeterminate and required substantive corrective action. The inspectors observed the subcontractor’s Field Welding Engineer failing to adequately measure root gaps during fit-up inspections of the welds between the Unit 3 CA01 module and two B-plates. The B-plates anchor the CA01 module to the basemat and are required for seismic restraint. The two B-plates that were noncompliant were connected to the east steam generator compartment along with 25 other B-plates. The finding was determined to be an ITAAC finding because it was material to the acceptance criteria of Unit 3 ITAAC 760 (3.3.00.02a.i.a). The acceptance criteria of this ITAAC requires the as-built containment internal structures, including the critical sections, to conform to the approved design and to withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions. The welds impacted by this deficiency are included within the scope of ITAAC 760, and the unqualified welds would not have been reconciled by the licensee as required by the ITAAC.

The inspectors concluded that this finding was associated with the Inspection / Testing cornerstone. The inspectors used Appendix A of IMC 2519, “Construction Significance Determination Process,” to evaluate the finding. The inspectors determined that the finding was of very low safety significance (Green). Although the finding was associated with a portion of a structure whose structural integrity is required to ensure functionality of the RCS system, the nonconforming welds that were identified by the inspectors would not have affected the ability of the structure to meet its design function.
The inspectors screened the finding for a possible construction cross-cutting aspect in accordance with Appendix F, “Construction Cross-Cutting Components and Aspects” of IMC 0613. This finding has a cross-cutting aspect in the area of Human Performance,

[H.12] Avoid Complacency, because the licensee's contractor failed to utilize the procedures, specifications, and other resources that were available to perform the inspection.

Enforcement

10 CFR Part 50, Appendix B, Criterion IX, "Control of Special Processes," requires, in part, that that special processes, including welding, are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes and standards. Section 3.8.3.2 of the UFSAR requires compliance with AWS D1.1:2000. Contrary to the above, on March 2, 2017, the licensee, through its subcontractor, failed to ensure that welding was controlled and accomplished using qualified procedures in that nonconforming fit-up root gaps for safety-related welds that were prequalified per AWS D1.1:2000 were not identified. This resulted in the quality of the welds being indeterminate.

The licensee and contractor entered this finding into their corrective action programs as condition report (CR) CR-17-30376 and discrete issue (DI) 100456560. Because this violation was of very low safety significance (Green) and it was entered into the corrective action program, this violation is being treated as a non-cited violation (NCV 05200028/2017002-03), "Failure to Identify Nonconforming Weld Root Gaps for a Safety Related Structure," consistent with Section 2.3.2.a of the NRC Enforcement Policy.

The licensee restored compliance with AWS D1.1:2000 for the affected welds by cutting out and re-welding them. Corrective actions are still being evaluated through the causal analysis and extent of condition. Potential noncompliances identified during the extent of condition do not present an immediate safety or quality concern because the plant is not operational, they do not present industrial safety concerns, and they are accessible for repair, if necessary.

1A32 (Unit 3) ITAAC Number 3.3.00.02a.i.a (760) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.a (760). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.01-02.06 - Records
- 65001.A.02.04 - Review As-built Deviations / Nonconformance
- 65001.F-02.02 - Fabrication Records Review

The inspectors reviewed quality records and performed independent verification of construction activities associated with the containment structural modules for V.C. Summer Unit 3. Module CA03 is the curved outer wall of the in-containment refueling water storage tank. Seventeen panels comprise the CA03 module. The inspectors sampled structural deviations associated with the seam weld between the CA03-12 and CA03-13 panels.

The inspectors reviewed a sample of nonconformances associated with the CA03-12 and CA03-13 panels to determine if any affected the design or quality of the seam weld

between the panels. The inspectors reviewed a sample of engineering design changes that pertained to the seam weld to determine if:

- changes to the as-designed conditions were adequately documented and evaluated;
- proper reviews and approvals were provided for design changes;
- design changes were evaluated for potential licensing basis impacts; and
- the revised design conformed to applicable codes, standards, quality requirements, and technical requirements.

The inspectors interviewed welding and quality assurance staff to determine if issues were being identified and documented at an appropriate threshold.

b. Findings

No findings were identified.

1A33 (Unit 3) ITAAC Number 3.3.00.02a.i.a (760) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.a (760). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.01-02.05 - Steel Structures
- 65001.B-02.03 - Welder Qualification
- 65001.B-02.04 - Production Controls
- 65001.B-02.06 - Records

The inspectors observed in-process welding of a fill pass for the Unit 3 seam weld between the stainless steel panels CA03-02 and CA03-03, and reviewed associated weld records to verify whether welding processes were adequately controlled. The specific weld number for the welding observed was VS3-CA03-VWK-800017-FW-02-VP02. The CA03 module makes up the curved wall of the In-Containment Refueling Water Storage Tank. The inspectors observed the environment in which the welding took place to verify whether the weld joint was sufficiently protected from inclement conditions, such as high winds and rain. Similar to all the other seams between submodules for the U3 CA03 module, the seam welding took place inside a building. The inspectors observed that the welder's progressions and travel speed were in accordance with the WPS. The inspectors observed no arc strikes outside the weld. The inspector observed the welding setup and material issue records to verify the gas composition and flow, voltage, filler material were in accordance with the welding procedure specification (WPS). The inspectors reviewed documents associated with the weld to verify whether they identified the welder and weld number. The inspectors reviewed the material issue report associated with the weld filler material to verify whether the welder was qualified for the weld procedure. The inspectors visually examined the weld after it had been inspected by QC to verify whether the weld met the AWS D1.6 requirements for an acceptable weld. The inspectors reviewed the records of

the final liquid penetrant testing (PT) and the final ultrasonic testing (UT) to verify whether the weld was considered acceptable.

Inspectors observed in-process welding of the CA03 seam weld between panels CA03-16 and CA03-17 which make up the end of the wall. Inspectors observed in-process flux cored arc welding (FCAW) and performed an independent visual inspection of the weld. Inspectors used the Weld Record and Welding Procedure Specification (WPS) to determine if the work was conducted in accordance with the established procedural requirements. Inspectors observed the as-welded surfaces to determine if cleanliness was maintained prior to welding and between passes. Inspectors observed shielding gas flow and composition to determine if the values were allowed per the WPS. Inspectors observed the filler material to determine if the type and handling were in accordance with the WPS and site procedures. Inspectors reviewed material issue records (MIR) for the filler material to determine if the material was produced and controlled in accordance with codes, standards, and site procedures. Inspectors had previously reviewed the qualification records of the welder to determine if he was qualified to perform American Welding Society (AWS) D1.6 welding using the FCAW process in Inspection Report 05200028/2017001. Inspectors reviewed structural deviations that affected the seam weld. Inspectors reviewed qualification records for the welder. The inspectors reviewed the records of the final liquid penetrant testing (PT) and the final ultrasonic testing (UT) to verify whether the weld was considered acceptable. The inspectors visually examined the weld after it had been inspected by QC to verify whether the weld met the AWS D1.6 requirements for an acceptable weld.

b. Findings

No findings were identified.

1A34 (Unit 3) ITAAC Number 3.3.00.02a.i.b (761) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.b (761). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.01-02.06 - Records
- 65001.F-02.02 - Fabrication Records Review
- 65001.F-02.03 - Observation of Fabrication Activities

The inspectors observed welding activities associated with Course 03 of the shield building steel composite (SC) panels at V.C. Summer Unit 3. Specifically, the inspectors witnessed in-process field welding of SC panels 01H and 03F between elevation 113'-6" and elevation 123'-6" at azimuth 183 degrees and panels 03F and 03G between elevation 113'-6" and elevation 123'-6" at azimuth 235 degrees. The inspectors reviewed the weld operator's qualification documentation to verify if the weld operator was qualified in accordance with AWS D1.1:2000. Inspectors observed in-process welding to determine if:

- preheating was performed in accordance with the Welding Procedure Specification (WPS);

- the weld operator maintained welding parameters within allowed ranges in the WPS; and
- shielding gas type and flow rate were in accordance with the WPS.

The inspectors reviewed the certified material test report (CMTR) of E71T1M filler material to determine if it was in accordance with the specification for shield building carbon steel electrodes.

The inspectors performed an independent visual inspection of the 03F to 03G weld to determine if it met the visual acceptance criteria of site procedures and AWS D1.1:2000.

The inspectors reviewed the nondestructive testing records for both welds to determine if:

- records were complete and reviewed and approved by the proper authority;
- instrumentation and couplant were properly identified;
- the scan plan was adequate based on the equipment;
- indications were properly identified and evaluated; and
- the technician was qualified to perform the testing.

b. Findings

No findings were identified.

1A35 (Unit 3) ITAAC Number 3.3.00.02a.i.b (761) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.b (761). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.F-02.04 - General QA Review

The inspectors observed a Unit 3 Course 3 concrete pour for shield building wall, elevation 113’6” to 123’6”. The inspectors observed concrete delivery and reviewed batch plant records to determine whether:

- concrete was batched in accordance the specified mix design;
- specifications, procedures, codes, and design requirements were followed;
- meters were calibrated;
- batch records were generated, controlled, and indicated placement location, mix, volume, date, time, and special instructions;
- transporting equipment was suitable, reliable, and in an acceptable condition;
- the time limit between mixing and placement was not been exceeded;
- temperature limits were not exceeded;
- batch tickets were reviewed for verification of proper mix, transport time, and placement location;

- records were produced, reviewed, and indicated mix, location, time placed, temperature of the concrete mix, and ambient conditions;
- the use of vibrators was within procedural limits;
- the placement drop distances did not exceed specification requirements and did not result in segregation;
- the placement had been cleaned per the specification; and
- inspection during placement was performed as required.

The inspectors performed a review of N&D's created and dispositioned in the month following the placement, and none were found to be associated with the placement of Course 3 observed.

b. Findings

No findings were identified.

1A36 (Unit 3) ITAAC Number 3.3.00.02a.i.b (761) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.b (761). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement

The inspectors observed the QC testing associated with concrete pour of the U3 nuclear island wedge, elevations 89'6" to 96'6" to verify whether the testing methodology and results were acceptable in accordance with ASTM standards and specifications. The wedge is located in the radiation portion of the auxiliary building. The inspectors also observed the testing and reviewed QC records to verify that concrete temperature, slump, and air content were being determined at the proper frequency as required by design.

The inspectors observed concrete delivery and reviewed batch plant records to determine whether:

- concrete was batched in accordance the specified mix design;
- specifications, procedures, codes, and design requirements were followed;
- meters were calibrated;
- batch records were generated, controlled, and indicated placement location, mix, volume, date, time, and special instructions;
- transporting equipment was suitable, reliable, and in an acceptable condition;
- the time limit between mixing and placement was not been exceeded;
- temperature limits were not exceeded;
- batch ticket was reviewed for verification of proper mix, transport time, and placement location; and
- records were produced, reviewed, and indicated mix, location, time placed, temperature of the concrete mix, and ambient conditions.

b. Findings

No findings were identified.

1A37 (Unit 3) ITAAC Number 3.3.00.02a.i.c (762) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.c (762). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.02-02.06 - Record Review
- 65001.A.02.02 - Installation Records Review
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors reviewed quality records and performed direct inspection of construction activities associated with the non-radiologically controlled area of the auxiliary building for V.C. Summer Unit 3. Specifically, the inspectors observed construction activities associated with the following wall sections between elevations 82'-6" and 99'-3":

- wall section along column line J between column lines 7.3 and 11
- wall section along column line K between column lines 7.3 and 11
- wall section along column line 9.3 between column lines J and K
- wall section along column line 9.05 between column lines J and K

The inspectors independently measured the clear cover between the formwork and the rebar prior to concrete placement to determine if minimum clear cover requirements were followed.

The inspectors observed concrete delivery and reviewed batch plant records to determine whether:

- concrete was batched in accordance the specified mix design;
- specifications, procedures, codes, and design requirements were followed;
- scales and meters were calibrated;
- each truck was measured and each trip received proper ticketing and documentation;
- batch records were generated, controlled, and indicated placement location, mix, volume, date, time, and special instructions;
- transporting equipment was suitable, reliable, and in an acceptable condition;
- the time limit between mixing and placement was not been exceeded; and
- temperature limits were not exceeded;

The inspectors observed concrete placement activities to determine whether:

- accepted procedures and specifications were followed throughout the concrete placement;
- the equipment used was suitable and sized for the work;
- each batch ticket was reviewed for verification of proper mix, transport time, and placement location;
- mixing time and rotations were adequate;
- placement drop distances did not exceed specification requirements and did not result in segregation;
- use of vibrators was within procedural limits for self-consolidating concrete;
- concrete was placed in lifts in accordance with the concrete placement plan;
- inspection during placement was performed as required;
- records were produced, reviewed, and indicated mix, location, time placed, temperature of the concrete mix, and ambient conditions; and
- concrete was protected from rainwater adding additional water to the mix.

The inspectors interviewed licensee and contractor personnel to determine whether:

- contractors performing safety-related work followed approved implementing procedures that describe administrative and procedural controls, approved work processes, and inspection requirements;
- personnel conducting work and quality assurance roles were qualified and knowledgeable; and
- effective oversight in accordance with specifications and program requirements was implemented for the installation activities observed.

Following the concrete placement, the inspectors reviewed in-process concrete testing records to determine whether:

- concrete temperature, slump, air content, and unit weight were determined at the proper location and frequency as required by procedures, specifications, and ASTM standards; and
- concrete strength test sample cylinders were made at the required location and frequency.

The inspectors reviewed compression testing records to determine whether the concrete test cylinders had the requisite strength.

The inspectors observed curing activities to determine whether curing was in accordance with specifications and procedures. The inspectors performed independent inspection and measurements of the as-built concrete walls to determine whether the as-built configuration met the design specifications including adequate consolidation around embedded items.

b. Findings

No findings were identified.

1A38 (Unit 3) ITAAC Number 3.3.00.02a.i.d (763) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.d (763). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.02-02.06 - Record Review
- 65001.02-02.07 - Problem Identification and Resolution
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.A.02.03 - Independent Assessment / Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations / Nonconformance

The inspectors reviewed quality records and performed direct inspection of construction activities associated with the radiologically controlled area of the auxiliary building for V.C. Summer Unit 3. Specifically, the inspectors observed construction activities associated with the wall section along column line J-1 between column line 4 and the shield building between elevations 82'-6" to 105'-0".

The inspectors observed installation activities associated with formwork, embedments, and steel reinforcement, including horizontal and vertical reinforcing steel bars, shear reinforcement, steel reinforcement extending into the floor below elevation 82'-6", mechanical connections from the CA20 module to the J-1 wall via threaded couplers, and bar splices, to determine whether:

- the installation activities met applicable quality and technical requirements established by approved procedures, specifications, and drawings;
- piping, penetrations, reinforcing steel, and embedments had proper clearances and additional reinforcement;
- reinforcing steel and embedments were secured and free of contaminants and excessive rust; and
- forms were secure, leak tight, and free from debris or excess water.

The inspectors performed independent inspection and measurements to determine whether the steel reinforcement, embedments, and formwork conformed to the design specifications.

The inspectors reviewed a sample of in-process work packages for reinforcing steel and embedments to determine whether:

- the latest approved procedures, drawings, and other work instructions were available at the installation area;
- the installation, inspection, and testing sequences were maintained;
- the licensee had verified that the items to be installed met specified requirements;
- the items being installed were not damaged prior to installation;

- materials, tools, and other equipment being used were qualified and approved in accordance with site procedures;
- nonconforming items were clearly identified and dispositioned;
- inspection and test reports were current, accurate, and complete; and
- design changes, field modifications, and nonconformances associated with the work observed were properly controlled and processed in accordance with the approved quality assurance program.

The inspectors interviewed licensee and contractor personnel to determine whether:

- contractors performing safety-related work followed approved implementing procedures that describe administrative and procedural controls, approved work processes, and inspection requirements; and
- effective oversight in accordance with specifications and program requirements was implemented for the installation activities observed.

The inspectors reviewed a sample of nonconformances to verify if:

- the licensee was identifying deviations at an appropriate threshold and entering them into the corrective action program;
- any differences between the as-built and as-designed SSCs were documented and dispositioned in accordance with approved modification or change procedures; and
- the nonconformances were resolved and their dispositions had adequate technical bases.

b. Findings

No findings were identified.

1A39 (Unit 3) ITAAC Number 3.3.00.02a.i.d (763) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.d (763). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.01-02.05 - Steel Structures
- 65001.01-02.06 - Records
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.A.02.02 - Installation Records Review
- 65001.A.02.03 - Independent Assessment / Measurement Inspection
- 65001.B-02.02 - Welding Procedure Qualification
- 65001.B-02.03 - Welder Qualification
- 65001.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection
- 65001.B-02.06 - Records

Inspectors reviewed quality records and performed independent verification of construction activities associated with the radiologically controlled area of the auxiliary building for V.C. Summer Unit 3. The inspectors sampled welds associated with structural module CA20 during on-site assembly. CA20 is a module that contains fuel handling and storage areas, as well as pumps and water processing systems. Specifically, the welds that were inspected include:

- Seam weld between CA20_10 and CA20_15, which is located on the south wall of the CA20 module, between column lines J-2 and K-2 and along column line 2. The vertical weld is carbon steel to carbon steel from elevation 66'6" to 89'10" and duplex stainless steel to duplex stainless steel from 89'10" to 135'3".
- Seam weld between CA20_14 and CA20_17, which is located on the north wall of the CA20 module, between column lines J-2 and K-2 and along column line 4. The vertical weld is carbon steel to carbon steel and extends from elevation 66'6" to 134'0".

Inspectors reviewed a sample of procedures and records to determine if:

- the identification of welds and welders was maintained for each weld;
- welding procedures and welders were qualified in accordance with American Welding Society (AWS) D1.1 and D1.6 requirements for structural steel welding;
- welding material and processes were adequately controlled as specified in project specifications and AWS codes;
- nondestructive examination methods were adequately documented in examination records and indications were adequately identified and evaluated; and
- records reflected compliance with project requirements, licensing bases, and ITAAC and were reviewed and approved by the appropriate authority.

Inspectors reviewed documents and observed a sample of in-process welding activities to determine if:

- materials were identified and controlled in accordance with the latest approved-for-construction drawings, material take-off lists, material issue records, and site procedures;
- the latest approved-for-construction specifications, procedures, drawings, and work instructions were available at the installation area and controlled the welding activities;
- processes, materials, tools, and other equipment being used were qualified and approved in accordance with site procedures;
- personnel conducting work and quality assurance roles were qualified in accordance with site procedures;
- installation, inspection, and testing sequences were being maintained; and
- nonconforming items were clearly identified, segregated, and dispositioned.

Inspectors reviewed a sample of installation records to determine if the records reflected the as-built facility and furnish documentary evidence that the applicable quality and technical requirements were met. Inspectors performed an independent visual inspection of the CA20_14 to CA20_17 weld and a portion of the CA20_10 to CA20_15 duplex stainless steel weld to determine whether the welds conformed to the final design and AWS D1.1 and D1.6 acceptance criteria.

Inspectors reviewed a sample of welder performance qualification records to determine if those welders had demonstrated their skill by performing specific performance qualification tests prescribed by AWS D1.1, AWS D1.6, and ASME Section IX.

Inspectors observed a sample of in-process welding of both welds to determine if:

- welding activities complied with the requirements in the welding procedure specifications (WPS);
- welding activities were controlled by a weld data record, hold points, and signatures;
- welds were sufficiently protected from inclement weather conditions;
- surfaces to be welded were be smooth, uniform, and free from significant surface discontinuities such as cracks or seams, and free from deleterious materials;
- shielding gas flow and composition was in accordance with the WPS;
- temperature of the base material at the joint prior to welding met the preheat requirements of the WPS; and
- welding consumables were in controlled accordance with the WPS and site procedures.

Inspectors reviewed records to determine if nondestructive examinations (NDE) of the completed welds were performed in accordance with site procedures and specifications. Inspectors reviewed qualification records for a sample of NDE technicians to determine if they met the visual acuity and performance testing requirements.

Inspectors reviewed a sample of design change records associated with panels CA20_10, CA20_14, CA20_15, and CA20_17. Inspectors did not identify any records that affected the design of the seam welds between panels.

b. Findings

No findings were identified.

1A40 (Unit 3) ITAAC Number 3.3.00.03b (778) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.03b (778). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.01-02.06 - Records
- 65001.A.02.02 - Installation Records Review

The inspectors reviewed records from survey reports for the V.C. Summer Unit 3 shield building wall from elevations 100’-0” to 103’-6” from column lines N to Q. This inspection was to verify the as-built thickness of the shield building wall was in conformance with the requirements of Table 3.3-1 of the V.C. Summer Unit 2 & 3 UFSAR Tier 1. The inspectors also reviewed concrete testing reports to determine if the UFSAR density requirements (12.3.2.2 – General Shielding Design) for general shielding design were

met. Additionally, the inspectors reviewed these records to verify whether they were properly reviewed and approved in the responsible organization.

b. Findings

No findings were identified.

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

1P01 Construction QA Criterion 16

- 35007-A16.04.02 - Inspection of QA Program Implementation

a. Inspection Scope

Daily Corrective Action Program Review

As part of the various inspections discussed in previous sections of this report, the inspectors routinely reviewed issues during inspection activities and plant status reviews to verify they were being entered into the licensee's corrective action program at an appropriate threshold. The inspectors verified that adequate attention was being given to timely corrective actions and any adverse trends were identified and addressed. The inspectors reviewed corrective action program procedure revisions and evaluated implementation of these procedures, with a focus on the changes, to determine whether the procedures contained guidance for the following attributes:

- classification, prioritization, and evaluation for reportability (i.e., 10 CFR 50.55(e)) of conditions adverse to quality;
- complete and accurate identification of the problem in a timely manner commensurate with its significance and ease of discovery;
- screening of items entered into the CAP to determine the proper level of evaluation;
- identification and correction of procurement documents errors, deviations from procurement document requirements, defective items, poor workmanship, incorrect vendor instructions, significant recurring deficiencies at both vendor shops and on site, and generic procurement related deficiencies;
- identification and correction of design deficiencies;
- consideration of extent of condition, generic implications, common cause, and previous occurrences;
- classification and prioritization of the resolution of the problem commensurate with its safety significance;
- identification of corrective actions that are appropriately focused to correct the problem;
- identification of root and contributing causes, as well as actions to preclude recurrence for significant conditions adverse to quality;
- completion of corrective actions is in a timely manner commensurate with the safety significance of the issue;
- provisions for escalating to higher management those corrective actions that are not adequate or not timely; and

- conditions adverse to quality were trended to pro-actively identify potential adverse trends and potential common cause problems, and the trending results were reported to management.

Routine Review of Items Entered into the Corrective Action Program

On a routine basis, the inspectors screened a sample of issues entered into the licensee's and the contractor's corrective action programs. The inspectors attended several weekly management review committee meetings at the site and held discussions with licensee and contractor personnel responsible for the screening and correction of the issues to determine if:

- the licensee and the contractor were identifying equipment, human performance, and program issues at an appropriate threshold and were entering the issues into their respective corrective action programs;
- the licensee and the contractor appropriately classified the issues and took appropriate short-term corrective actions;
- conditions adverse to quality were controlled in accordance with each company's quality assurance program; and
- potential adverse trends were appropriately identified and corrected by the licensee or their contractors.

Focused In-Depth Review

The inspectors reviewed SCE&G corrective action document CR-17-30161 and WEC corrective action document DI-100447985 associated with concrete low strength breaks of self-consolidating concrete (SCC). The inspectors also reviewed the recommendation(s) of the "Self-Consolidating Concrete (SCC) Instability and Low Strength Evaluation" report. Inspectors met with subject material experts to discuss the technical report and verify that recommendations were properly captured in corrective action documents. Following the meeting with subject material experts, DI-100471373 was initiated on May 18, 2017 to address recommendations contained in the technical report. The inspectors verified the attributes listed below were performed by the licensee in accordance with their implementing procedures, their QAPD, and their FSAR:

- complete and accurate identification of the problem in a timely manner commensurate with its significance and ease of discovery;
- screening of items entered into the CAP, as necessary to determine the proper level of evaluation;
- classification and prioritization of the resolution of the problem commensurate with its safety significance;
- identification of root and contributing causes, as well as actions to preclude recurrence for significant conditions adverse to quality;
- identification of corrective actions that are appropriately focused to correct the problem; and
- completion of corrective actions in a timely manner commensurate with the safety significance of the issue.

b. Findings

No findings were identified.

3. OPERATIONAL READINESS

Cornerstones: Operational Programs

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

3P01 Environmental Qualification

- 51080 - PART 52, Environmental Qualification Program for Electrical and Mechanical Equipment
- 51080-02.01 - Team Members and Responsibilities
- 51080-02.02 - Pre-Inspection Tasks
- 51080-02.03 - Inspection Tasks

a. Inspection Scope

The inspectors reviewed environmental qualification documents for commodity codes JE61, JE62, PV01, PV11, and PV70 to verify that the documents contained:

- the qualification specification for the equipment;
- adequate documentation of the qualification of the equipment; and
- a positive statement that the documentation has been reviewed, approved, and the equipment determined to be qualified for its application.

Specifically, the inspectors performed these reviews for the following components associated with the indicated commodities:

- PXS-JE-LE050/51/52, Containment Flood-up Level Sensor (JE61)
- PXS-JE-LT011A/B/C/D, CMT A Level Sensor (JE61)
- PXS-JE-LT012A/B/C/D, CMT B Level Sensor (JE61)
- PXS-JE-LT013A/B/C/D, CMT A Level Sensor (JE61)
- PXS-JE-LT014A/B/C/D, CMT B Level Sensor (JE61)
- RCS-JE-ST281, RCP 1A Pump Speed Sensor (JE62)
- RCS-JE-ST282, RCP 1B Pump Speed Sensor (JE62)
- RCS-JE-ST283, RCP 2A Pump Speed Sensor (JE62)
- RCS-JE-ST284, RCP 2B Pump Speed Sensor (JE62)
- RCS-PL-V011A, First-stage ADS Isolation MOV (PV01)
- RCS-PL-V001A, First-stage ADS MOV (PV01)
- PXS-PL-V002A, CMT A Inlet Isolation MOV (PV01)
- SFS-PL-V034, SFS Suction Line Containment Isolation MOV (PV11)
- RCS-PL-V004A/B/C/D, Fourth-stage ADS Squib Valve (PV70)
- PXS-PL-V118B/120B, Containment Recirculation B Squib Valve (PV70)
- PXS-PL-V123A/125A, IRWST Injection A Squib Valve (PV70)
- PXS-PL-V118A/120A, Containment Recirculation A Squib Valve (PV70)
- PXS-PL-V123B/125B, IRWST Injection B Squib Valve (PV70)

To perform these reviews, the inspectors reviewed the UFSAR to identify the limiting design basis parameters that were used as input for the qualification of the SSCs. The inspectors reviewed the qualification program documents (such as procedures, test specifications, and test reports) to verify that all the necessary requirements for the qualification were incorporated such as:

- qualification methodology (i.e. test or analysis) per IEEE Std. 323-1974;
- environmental parameters under normal operating conditions, abnormal conditions, and design basis events;
- environmental temperature, pressure, total radiation dose, radiation dose rate, cycling, electrical parameters and humidity;
- simulated accident conditions, including, temperature, pressure, radiation, pH, and chemical additives;
- margin, as specified in IEEE Std. 323-1974; and
- post-accident conditions, including time and submergence, where applicable.

The inspectors reviewed the EQSR, EQDP, and applicable test procedures and test records related to the qualification for the expected environment to verify that qualification activities were adequately controlled and that the methodology conformed to IEEE Std. 323-1974. The inspectors reviewed the environmental profiles documented in APP-VP-GW-030, "Plant Environmental Conditions," to verify that the tested profiles enveloped the actual worst case environmental conditions that would be expected. The inspectors reviewed test procedures and test records to verify that the qualification was in conformance with IEEE Std. 323-1974 and that the valve actuator was qualified in conformance with IEEE Std. 382-1996, "IEEE Standard for Qualification of Actuators for Power-Operated Valve Assemblies With Safety-Related Functions for Nuclear Power Plants."

b. Findings

No findings were identified.

3P02 Preservice Inspection

- 73754 - Part 52 - Preservice Inspection - Non-Destructive Examination
- 73754-02.02 - Personnel Qualification & Certification
- 73754-02.03 - Non-destructive Examination (NDE) Review

a. Inspection Scope

The inspectors conducted an onsite review of the implementation of the licensee's preservice inspection (PSI) program for Units 2 and 3. The PSI program is designed to provide the baseline examination data for which future inservice inspection (ISI) results can be compared to monitor degradation of pressure retaining components in vital system boundaries. The scope of this program includes components within the reactor coolant system boundary, risk-significant piping boundaries, and containment system boundaries.

IP 73754, Section 02.02 - Personnel Qualification and Certification

The inspectors reviewed the qualification and certification records of one level III non-destructive examination (NDE) technician performing the examinations discussed below to determine if they were in compliance with ASME Section XI Code requirements and to verify that qualification certificates, visual acuity examinations, and color vision test results were part of the NDE records.

IP 73754, Section 02.03 - Non-Destructive Examination (NDE) Review

The inspectors reviewed the licensee's contractor's (Wesdyne) implementing procedure WDI-STD-1099, "AP1000 PSI for UT of Austenitic Pipe Welds (PDI-UT-2)," Rev. 2 to verify the following:

- Requirements are specified and agree with ASME section XI code requirements.
- Essentially 100 percent of the examination volume is discussed and any limitations that may be found are adequately documented.
- There are provisions in procedure WDI-STD-1099 that ensure that the dissimilar metal pipe welds are examined both axially and circumferentially, as described in 10 CFR 50.55a(b)(2)(xv)(A) and ASME Section XI Mandatory Appendix I, Article I-3200.
- Qualification of NDE personnel are specified and in accordance with the licensee's PSI program.
- Methods of recording, evaluating, and disposition findings are established and reporting requirements are in compliance with the applicable code requirements.

The inspectors directly observed the NDE activities listed below to verify that approved procedures were available, were being followed, and specified NDE equipment was being used. These activities were mandated by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code of Record: 2007 Edition with 2008 Addenda). The inspectors evaluated the NDE activities for compliance with the requirements in Section XI and Section V of the ASME Code. The inspectors also evaluated examination and evaluation of the results to verify that any identified indications or defects were dispositioned in accordance with the licensees' PSI program and NDE procedures. Additionally, the inspectors reviewed the qualifications of the NDE technicians performing the examinations to determine if they were in compliance with ASME Code requirements.

- Observation: Manual Ultrasonic Examination (UT) of VS2-RCS-PLW-01K-SW1, Elbow to Safety Valve V005A, Cat. B-J, Item B9.11, ASME Class 1
- Observation: Manual UT of VS2-RCS-PLW-01K-SW2, Pipe to Elbow, Cat. B-J, Item B9.11, ASME Class 1

b. Findings

No findings were identified.

3P03 Reactor Vessel Material Surveillance

- 50054 - Reactor Vessel Material Surveillance Program

- 50054-02.01 - General Inspection Guidance
- 50054-02.02 - Specific Requirements

a. Inspection Scope

The inspectors performed a direct inspection of the licensee's documentation to verify that the reactor vessel (RV) surveillance capsule program, as described in the combined operating license (COL), was in compliance with commitments and regulatory requirements. Specifically, the review focused on the following program attributes:

- The RV specimen guide baskets are designed, fabricated, and installed as per the design document and operational program description.
- The capsules are designed, fabricated, and installed as per design documents and operational program description.
- Test specimens that are included in capsules conform to the surveillance capsule program.

IP 50054, Section 02.02.a, Reactor Vessel Specimen Guide Baskets

IP 50054, Section 02.02.a.1, Design Specification

The inspectors reviewed the design documents to verify that the RV specimen guide baskets were appropriately designed and contained sufficient instructions to ensure construction and orientation that would satisfy design commitments. Specifically, design documents were reviewed to ensure that the RV specimen guide baskets conformed with the *American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Sections III and IX, 1998 Edition with 2000 Addenda*, requirements for attachment to RV internals and American Society for Testing and Materials (ASTM) requirements for proper placement to ensure lead factors between 1 and 3. Initial design documentation (Revision 15 of the AP1000 Design Control Document (DCD)) identified that the RV specimen guide baskets would be welded to the outer wall of the core barrel and at a modified circumferential location of 45 degree azimuth instead of the original proposal of 29.7 degree azimuth.

The licensee is in the process of revising updated final safety analysis report (UFSAR) Subsection 5.3.2.6, as it currently states that RV material specimens are contained in guide baskets that are welded to the outside of the core barrel as shown in UFSAR Figure 5.3-4; however, Figure 5.3-4 indicates that the baskets are bolted to the core barrel. The UFSAR revision will change the UFSAR description of "welded" to match the design of "bolted." The inspectors reviewed the design change paperwork to verify that design change specifications were properly screened and that the design did not adversely impact the original design.

In order to satisfy the licensee's commitment to ASTM E-185 "*Standard Practice for Design of Surveillance Programs for Light-Water Moderated Nuclear Power Reactor Vessels," 1982 Edition*, the specimen guide baskets will be located azimuthally near the lowest fluence locations at 135, 225, and 315 degrees. The original population of eight specimen capsules was maintained by reconfiguring to three guide baskets at the 135 and 315 degree azimuthal locations and two baskets at the 225 degree location. This reconfiguration resulted in calculated lead factors of 1.8 to 2.3. The inspectors reviewed

the calculations associated with lead factor determination and the design change documentation to ensure proper screening methodology was utilized.

IP 50054, Section 02.02.a.2, Fabrication

The inspectors reviewed design, purchasing, and construction paperwork to verify that the RV surveillance capsule samples and specimen guide baskets complied with the updated design specifications. Specifically, the inspectors reviewed the following:

- Licensee documentation to verify that the materials and construction of the RV specimen guide baskets conformed with the requirements of the current design specifications. The inspectors reviewed Units 2 and 3 Reactor Vessel Surveillance Materials Quality Release and Certificate of Conformance for material information.
- Welding documentation contained in "8 Reactor Vessel Surveillance Capsules," to verify that they conformed with the specified welding procedures, qualifications, and materials.
- Fabrication documentation of RV specimen guide baskets with the associated welds and bolting to verify that they met the requirements of the design specification and/or *ASME BPVC Section III and Section IX*.

IP 50054, Section 02.02.b, Capsule Design and Fabrication

The inspectors reviewed the RV specimen capsule documentation to verify that the capsules were designed and fabricated in accordance with design requirements and encapsulation commitments of ASTM E-185. Specimen encapsulation documentation was reviewed to verify that the specimens would be maintained in a suitable environment within capsules constructed of acceptable materials. Specifically, the inspectors reviewed the following design aspects:

- The capsule assembly design and fabrication documentation was reviewed to verify it conformed with the requirements of the capsule program (i.e., number and type of specimens loaded).
- Helium leak tests were reviewed to ensure the encapsulation would provide an inert environment.
- The capsule assembly design and fabrication documentation was reviewed to verify that the capsule assembly maintained a corrosion-resistant environment to prevent deterioration of specimen surfaces during radiation exposure.
- The capsule assembly design and fabrication documentation was reviewed to ensure that proper welding procedures, welder qualifications, and welding materials were used.

IP 50054, Section 02.02.c, Capsule Contents

The RV materials surveillance test specimens are required to meet the requirements of ASTM E-185 and 10 CFR Part 50, Appendix H. The inspectors reviewed material selection and test data documentation to verify that the test specimens for the program represent the materials used in the reactor beltline region and included Charpy V-notch impact, tensile, and compact tension specimens from the limiting beltline region. The review also ensured that each capsule would contain Charpy V-notch impact specimens

of weld heat-affected-zone (HAZ) metal, as well as dosimeters and thermal monitors to measure the integrated neutron flux and temperature in the individual test capsules.

Documents reviewed are included in the Attachment.

b. Findings

No findings were identified.

4. OTHER INSPECTION RESULTS

4OA6 Meetings, Including Exit

Exit Meeting.

On July 19, 2017, the inspectors presented the inspection results to R. Jones, V.C. Summer Units 2 & 3 Vice President, Nuclear Construction and Startup, along with other licensee and WECTEC staff members. The inspectors stated that no proprietary information would be included in the inspection report.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensees and Contractor Personnel

M. Terry, SCE&G Operational Readiness Engineering
B. Schelger, WEC Senior Engineer
S. Feder, WEC Senior Engineer
E. Drake, WEC Principal Engineer
A. Miller, WEC Licensing Engineer
R. Wessel, WEC Principal Engineer
A. Miller, WEC Licensing Engineer
M. Klinvex, WEC Licensing Engineer
R. Wessel, WEC Principal Engineer
G. Riegel, WEC Principal Engineer
A. Trupiano, WEC Pricipal Engineer
S. Willoughby, WEC Senior Engineer
S. DiTomasso, WEC Licensing Manager
P. Russ, WEC Director, New Plant Licensing

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Type	Status	Description
05200027/2017002-01 05200028/2017002-01	Non Cited Violation	Open	Thermal Stress Analysis Not Performed for 14-inch ADS Squib Valves IAW with ASME Section III
05200027/2017002-02 05200028/2017002-02	Unresolved Item	Open	Extrapolation of Functional Qualification for PV11 MOVs
05200028/2017002-03	Non Cited Violation	Open	Failure to Identify Nonconforming Weld Root Gaps for a Safety Related Structure

LIST OF DOCUMENTS REVIEWED

Section 1
[2502 Documents]

[2503 Documents]

Section 1A01
Design Documents
APP-GW-Z0-002, “AP1000 ASME Section III Piping System Design Specification,” Revision 2, Dated 9/15/2016
APP-PV70-V2-003, “14” Squib Valve Assembly Drawing Sheet 1 of 3, Revision 3, Dated 4/20/2016
APP-PV70-V2-005, “14” Squib Valve Assembly Drawing Sheet 3 of 3, Revision 3, Dated 4/20/2016
APP-PV70-VDR-101001, “Compilation of Design Reports for PV70 Datasheet 101,” Revision 0, 8/19/2014
APP-PV70-VDR-103, “Prototype Functional Testing Report Summary,” Revision 0, Dated 3/4/2015
APP-PV70-VDR-104, “Structural Analysis Report for 14” Squib Valves,” Revision 0, Dated 3/5/2015
APP-PV70-Z0-001, “Squib (Pyrotechnic Actuated) Valves, ASME Boiler and Pressure Vessel Code, Section III Class 1,” Revision 6, Dated 7/17/2014
APP-PV70-Z0R-001, “PV70 Squib (Pyrotechnic Actuated) Valves, ASME Section III Class 1, Data Sheet Report,” Revision 7, Dated 6/1/2012
WEC Letter DCP_DCP_008831, "ADS-4 Squib Valve Thermal Evaluation," Dated 7/17/2017

Transient Documents
APP-PV70-Z0Y-001, “Plant and System Transients Applicable to PV70 Valves,” Revision 1, Dated 8/1/2011
APP-PXS-M3C-038, “Squib Valve Functional Requirements for Stage 4 ADS Valves,” Revision 8, Dated 12/15/2016
APP-PXS-M3C-205, “Passive Core Cooling System (PXS) Design Transients,” Revision 4, Dated 3/9/2011
APP-RCS-M3C-046, "AP1000 PRHR Inlet and ADS 4th Stage B - Thermal Stratification Analysis," Revision 5
APP-RCS-M3C-051, “Design Transients for the AP1000 RCS Class A, B and C Valves and the RCS Class A Piping,” Revision 0, Dated 8/2/2007
APP-SSAR-GSC-130, “AP1000 Plant Small-Break LOCA Steady-State Model,” Revision 2, Dated 9/4/2014
APP-SSAR-GSC-131, “AP1000 Plant Small-Break Loss-of-Coolant Accident (SBLOCA) 2-Inch & 10-Inch Cold Leg Break and Inadvertent ADS Transients,” Revision 1, Dated 2/11/2015

Procedures
QA-2.11, “Registered Professional Engineer Qualification,” Revision 0.0, Dated 1/8/2016
W2-8.4-105, “Signing and Sealing by Professional Engineers,” Revision 0.0, Dated 1/8/2016

Quality Assurance Records

SV3-PV70-VQQ-002, “Quality Release & Certificate of Conformance for PV70 Squib Valves,” Revision 1, Dated 2/24/2017
SV4-PV70-VQQ-001, “Quality Release & Certificate of Conformance for PV70 Squib Valves,” Revision 0, Dated 4/20/2017

Qualification Records
F-2.11-1 Professional Engineer’s Qualification Record, RPE-44911-09-2015, Dated 9/15/2015
F-QA-2.11-1 Professional Engineer’s Qualification Record, RPE-29749-03-206, Dated 3/23/2016

Licensing Documents
APP-FSAR-GLN-699, “AP1000 Licensing Applicability Determination and 10 CFR 50.59 , 10 CDR 52 Appendix D Section VIII Screening: DCP APP-GW-GEE-5051, DP-855; DCP APP-GW-GEE-5054, DP-861; LAR-114,” Revision C
V.C. Summer Nuclear Station, Units 2 and 3 Updated Final Safety Analysis Report (UFSAR), Revision 4B, Section 15.6

Deviation Notice
APP-PV70-GNR-011, “14 Inch Squib Valve Outlet Support Hole Location Deviation Notice,” Revision 0, Dated 10/4/2011
APP-PV70-GNR-326, “Squib Valve Deviation Notice (14” Body S/N TN-2712-2, -3, -4, -5, -7, -14, -16, -17, -25, -26, -29), Revision 1, Dated 6/4/2012
APP-PV70-GNR-339, “Squib Valve Deviation Notice (14” Body S/N TN-2712-5), Revision 0, Dated 3/28/2012

Corrective Action Documents
CR-17-30805 (VCS)
CR 17-30806 (VCS)
CAPAL 100478099
CAPAL 100478313
CAPAL 100478387
CAPAL 100478597
CAPAL 100481984

Section 1A02
4401721-R2-1288, "Mechanical Surveillance Cavity Map, RCP Casing 1288," Rev. 0
ASME Section IX – Welder Performance Qualification (WPQ), for Welder ID No. CES0011, dated 4/11/2016
Certificate of Compliance No. 4401721-A, Heat No. 740400, Lot Nos. DT9336 and CT9336, dated 9/06/2016
Certificate of Conformance No. 4401721-VCS-CofC-01, dated 1/12/2017
CM-4401721-1288, Cavity Map, RCP Casing 1288, dated 8/31/2016
CMTR No. 114432B, Heat No. 740400, Lot No. DT9336, dated 3/01/2011
CMTR No. 115929, Heat No. 740400, Lot No. CT9336, dated 3/01/2011
Drawing No. WM-4401721-01, "RCP Pump Casing Water Wash PT 1288 Weld Repair," Rev. 1
Form N-2 Certificate Holder’s Data Report for Identical Nuclear Parts and Appurtenances, S/N 1288, dated 1/12/2017 [Manufactures and certified by WEC Carolina Energy Solutions for Westinghouse Electric Company at location V.C. Summer Power Plant, Unit 2]
PT-4401721-002, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/16/2016

PT-4401721-004, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/17/2016
PT-4401721-005, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/17/2016
PT-4401721-006, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/17/2016
PT-4401721-007, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/20/2016
PT-4401721-008, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/20/2016
PT-4401721-009, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/20/2016
PT-4401721-010, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/21/2016
PT-4401721-011, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/22/2016
PT-4401721-012, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/22/2016
PT-4401721-013, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/23/2016
PT-4401721-021, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/27/2016
PT-4401721-022, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/27/2016
PT-4401721-028, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 6/28/2016
PT-4401721-052, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 7/18/2016
PT-4401721-054, Report of Nondestructive Examination – Visible, Water Washable, Liquid Penetrant Examination, dated 7/19/2016
PT-4401721-064, Report of Nondestructive Examination – Visible, Solvent Removable Liquid Penetrant Examination, dated 8/01/2016 (After Indication Removal)
PT-4401721-065, Report of Nondestructive Examination – Visible, Solvent Removable Liquid Penetrant Examination, dated 8/01/2016 (After Indication Removal)
PT-4401721-068, Report of Nondestructive Examination – Visible, Solvent Removable Liquid Penetrant Examination, dated 9/09/2016 (After Weld Repair)
Quality Assurance Data Package for AP1000 Reactor Coolant Pump Casing S/N 1288 Repair, WEC Carolina Energy Solution Project No. 4401721, CW-EMD Purchase Order No. 498201, WEC Purchase Order No. 4500443207
SAP No. 79541, NDE VT Level III Personnel Certificate, dated 3/18/2016
SAP No. 79541, NDE UT Level III Personnel Certificate, dated 3/18/2016
SAP No. 79541, NDE RT Level III Personnel Certificate, dated 3/18/2016
SAP No. 79541, NDE PT Level III Personnel Certificate, dated 3/18/2016
SAP No. 79541, NDE MT Level III Personnel Certificate, dated 3/18/2016
SAP No. 86052, Vision Examination Report, dated 3/01/2016
SAP No. 86052, NDE VT Level II Personnel Certificate, dated 2/18/2016
SAP No. 86052, NDE PT Level II Personnel Certificate, dated 2/18/2016
SAP No. 89692, Vision Examination Report, dated 3/21/2016
V2-16-A-R10011, Radiography Examination Report, dated 11/6/2016

Section 1A03

CWPS-8-8-T-A01, Rev. 4
PQR No. 600, Rev. 8
PQR No. 899, Rev. 4
PQR No. 062, Rev. 3
PQR No. 864, Rev. 2
Weld traveler WT-4403761-SUR2-05, "Surge Line Piping / V.C. Summer Unit 2," Rev. 0
DWG-4403761-SUR2-100, "Surge Line Installation Weld Map, Surge Line," Rev. 2
WO QAT-4403761-SUR2-101, "Pressurizer Piping - 18" Surge Pipe Installation"
092816-13,-14, Welder Qualification record for welder CES0927
032217-01,-02 Welder Qualification record for welder CES0119
PT-4403761-007, "Report of Nondestructive Examination, Visible, Solvent Removable Liquid Penetrant Examination," dated 6/22/2017
Drawing No. WM-4403001-2-01, "RCS Component Installation RCL Piping Weld Map," Rev. 0
V2-17-A-R-10041, "Computed Radiography Examination Report," Weld No. BHL01, dated 2/21/2017
V2-17-A-R-10042, "Computed Radiography Examination Report," Weld No. BCL04, dated 2/21/2017
V2-17-A-R-10043, "Computed Radiography Examination Report," Weld No. BCL06, dated 2/21/2017
V2-17-A-R-10046, "Computed Radiography Examination Report," Weld No. BCL04 Repair, dated 2/21/2017
V2-17-A-R-10047, "Computed Radiography Examination Report," Weld No. BHL02, dated 2/21/2017
V2-17-A-R-10048, "Computed Radiography Examination Report," Weld No. BCL03, dated 2/21/2017
V2-17-A-R-10049, "Computed Radiography Examination Report," Weld No. BCL05, dated 2/21/2017
100-RT-302, "Radiographic Examination Using Computed Radiography In Accordance with ASME Section V, Article 2," Rev. 6

Section 1A04

APP-PV70-VBR-005, “Equipment Qualification Data Package for 14” Squib Valves for Use in the AP1000 Plant,” Rev. 1
APP-PV70-VDR-101001, “Compilation of Design Reports for PV70 Datasheet 101,” Rev. 1
APP-PV01-VBR-014, “Equipment Qualification Data Package for Flowserve Globe Stop Valves with Limitorque Motor Operators for Use in the AP1000 Plant,” Rev. 1
APP-PV01-VPR-001 “Functional Qualification Summary and Analysis Report per ASME QME-1-2007,” Rev. 0
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PQR No. 899, Rev. 4
PQR No. 062, Rev. 3
PQR No. 864, Rev. 2
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APP-JE61-Z0-010, “AP1000 Design Specification for Class 1E Containment Flood-Up Level Transmitters,” Rev. 2
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APP-PV95-VPR-106, “MOV Long Life Grade 0 Grease Justification for Geared Limit Switches in Safety-Related Limitorque Motor Operators in AP1000 Plant Environmental Zone 5,” Rev. 0

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See non-public security report 05200027/2017402 for details.

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VS2-CC01-Z0-026, "Safety Related Mixing and Delivering Concrete," Rev. 7
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F-C113-001, "Concrete Placement Inspection," Rev. 16.00
Batch Ticket 54345, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54346, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54347, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54348, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54349, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54350, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54351, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54352, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54353, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54354, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54355, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54356, "CA05 Walls Inside Containment," 4/1/2017

Batch Ticket 54357, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54358, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54359, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54360, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54361, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54362, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 54366, "CA05 Walls Inside Containment," 4/1/2017
Batch Ticket 68909, "CA05 Walls Inside Containment," 4/1/2017

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APP-CA03-GEF-010, “CA03 Conflicting Drawing Dimensions,” Rev. 0
APP-CA03-GEF-013, “CA03 20” Stainless Steel Pipe Material Correction,” Rev. 0
APP-CA03-GEF-047, “Weld End Terminations for CA03 Submodules,” Rev. 0
APP-CA03-GEF-050, “Weld End Terminations for CA03 Submodules,” Rev. 0
APP-CA03-GEF-850011, “CA03 Angle Material Substitution,” Rev. 1
APP-CA03-GEF-850012, “CA03 Angle Material Substitution," Rev. 1
APP-CA03-GEF-850017, "CA03 Angle Material Substitution," Rev. 0
APP-CA03-GEF-850015, “Ca03 T-Section Splice E&DCR,” Rev. 0
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Turnover Package No: VS3-CA03-01-001 Rev. 0
430000-MTR-13-000397
430000-MTR-13-000398
4300-RIR-13-001771
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QP-NDT-UT-302, “Ultrasonic Testing (AWS D1.6/D1.1, Annex K),” Rev. 2a
QP-NDT-PT-301, “Penetrant Testing (Type II, Method C),” Rev. 4a

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Enter your documents in this format:
Document Number, "Document Title", Revision X (If there is no revision number, enter the date)

Inspection Plan:
F-Q445-001, Receipt Inspection Plan, Rev. 08.02

Unit 2 Submodule CA56

Work Package:
VS2-CA56-CAW-001

Weld Traveler:
153453

EDCR:
APP-CA56-GEF-850006, Rev. 0

Welder Qualifications:
LBS3327

PT Qualifications:
EID: 505488

CMTR's:
Heat No.1238T; Supplied by the Lincoln Electric Company
Heat No.1238V; Supplied by the Lincoln Electric Company

Procedures:
100-PT-304, Liquid Penetrant Examination in Accordance with the AWS Structural Welding Code, Rev. 8

Drawings:
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VS2-CA56-S5-006, Containment Building Area 1 & 2 CA56 Floor EL. 135'-3" Sections and Details, Rev. 1
VS2-CA56-S5-007, Containment Building Area 1 & 2 CA56 Floor EL. 135'-3" Module Installation, Rev. 1
VS2-CA56-S5-008, Containment Building Area 1 & 2 CA56 Floor EL. 135'-3" Module Location, Rev. 1
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Weld Traveler:
1706477

Welding Procedure Specification:
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Welder Qualifications:
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CMTR's:
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ERICO Instruction Manual – CADWELD for Rebar Splicing System, No Revision
Form No. NCSP0212FORM83, “Multi-Verification / Inspection Data Sheet (Non-ASME III), Exothermic Splicing of Reinforcing Steal (Cadwelds),” dated 4/25/2017
Form No. NCSP0343FORM81, “Exothermic Rebar Splice Qualified Installers Log,” dated 3/15/2017 (qualified till 09/23/17)
Form No. NCSP0343FORM82, “(Cadweld) Exothermic Rebar Coupler Control Record,” dated 4/25/2017
Quality Inspection Plan No. F-S510-001, “Exothermic Splicing of Reinforcing Steel (Cadweld),” Rev. 01.00
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VS2-1230-C0W-004-ITAAC

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VS2-CR01-GNR-000494, Rev. 0

EDCR:
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VS2-1223-CPY-042-R0, "Auxiliary Building Area 3&4 Floor El 82’6” Concrete precast panel 1223-CP-SO4 Detail Reinforcement (3/3)," Rev. 0
VS2-1223-CPY-050-R3, "Auxiliary Building Area 3 Floor El 82’6” Concrete precast panel 1223-CP-SO5 Layout and Reinforcement Details," Rev. 4
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Certificate of Compliance (CoC) and Certified Material Test Report (CMTR) 6964559 for Lot 1231J welding rods, dated 6/5/2015
Discrete Issue (DI) 100452609, “CA01 B-Plate End Conditions,” dated 2/24/2017
DI 100456560, “CA01 B plate excessive root opening,” dated 3/10/2017
MIR 1700132-020, dated 2/21/2017
MIR 1700132-021, dated 2/21/2017
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VS3-CA01-GNR-000056, “Wrong root opening suspected,” Rev. 0
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Weld Record VS3-CA01-VWK-800274-FW-B-106-BDU1-C1, dated 5/8/2017
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Weld Record VS3-CA01-VWK-800274-FW-B-109-BDU1-RW2, dated 5/10/2017
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WPS2-1.1S03, Rev. 6

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APP-CH00-GEF-850008, “3/8” Radius Weld Access Hole,” Rev. 0
VSG-CA03-GEF-000028, “CA03 Permanent Seam Backing,” Rev. 0

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MIR 167943-010
WO VS3-CA03-S4W-853002
WPS5-10H.10HF20, AWS D1.6 A240 to A240 FCAW, Rev. 4
V3-17-W-P-00427, PT of Seam weld VS3-CA03-VWK-800017-FW-VP-002, dated 5/5/17
V3-17-W-U-10234, UT of VS3-CA03-VWK-800017-FW-VP-002, dated 5/4/17
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V3-17-W-U-10285, UT of seam weld VS3-CA03-VWK-800031-FW-16-VP-002, dated 5/22/2017

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VS3-1238-VWK-003, "Course 03 Assembly Weld Map," Rev. A
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Procedure Qualification Record 13404, Rev. 0
Material Issue Record 163698-071, dated 5/2/2017
Nondestructive Examination Report VCS-17-UT-312-0415, dated 5/19/2017
Nondestructive Examination Report VCS-17-UT-312-0435, dated 5/23/2017
Nondestructive Testing Certifications for EID# 509924, dated 12/7/2016 and 1/23/2017
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C113-17-10067, Concrete Placement Inspection, 6/2/2017
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C113-17-10048, Concrete Placement Inspection, 4/17/17
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C113-17-10044, “Concrete Placement Inspection,” dated 4/2/2017

C-17-00180, “Self-Consolidating Concrete Field Testing and Compression Data Record,” dated 4/4/2017, 4/6/2017, 4/10/2017, and 5/1/2017
F-C113-001, “Concrete Placement Inspection,” Rev. 16.00
VS3-CC01-Z0-031, Safety Related Placing Concrete and Reinforcing Steel, Westinghouse Seismic Category I and II, Safety Class C “Nuclear Safety,” Rev. 8

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VS3-1224-CE-933, “Auxiliary Building Area 4 Embedments Wall J-1 Elevation 82’-6”, East View,” Rev. 3
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Welding Material Requisition 28645, dated 2/9/2017
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NDE Report VCS-17-UT-310-0098, dated 2/7/2017
NDE Qualification Records for Technician ID 513180, dated 7/26/2016, 8/4/2016, and 9/13/2016
NDE Qualification Records for Technician ID 510312, dated 12/2/2014 and 11/10/2016
Weld Record for Weld VS3-CA20-VWK-202-FW-1510-001, dated 4/25/2017
Material Issue Record 152681-054, dated 2/3/2017

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C-17-00012, “Conventional Concrete Field Testing & Compression Data Record,” Rev. 0

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W2-5.1-101, "Westinghouse Corrective Action Program Procedure," Rev. 2.0
W2-5.1-101, "Westinghouse Corrective Action Program Procedure," Rev. 3.0
DI-100447985, "RC01 and MSFW Concrete Low Strength Breaks," 2/2/2017
DI-100471373, "Self-Consolidating Concrete (SCC) Stability and Strength Evaluation for the RC01/RC02 and Feed Water," 5/18/17

3. OPERATIONAL READINESS

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Section 3P01

APP-JE61-VBR-001 “Equipment Qualification Summary Report for Krohne Class 1E Magnetically Actuated Float Level Transmitter for Use in the AP1000 Plant,” Rev. 3
APP-JE62-VBR-001, “Equipment Qualification Summary Report for Reactor Coolant Pump Speed Sensor for Use in the AP1000 Plant,” Rev. 1
APP-JE62-VBR-002, “AP1000 Equipment Qualification Data Package for Reactor Coolant Pump Speed Sensor for Use in the AP1000 Plant,” Rev. 1
APP-JE62-VPC-001, “AP1000 Reactor Coolant Pump Speed Sensor Equipment Qualification Thermal Aging Calculation,” Rev. 1
APP-JE62-VPR-002, “AP1000 Reactor Coolant Pump Speed Sensor Qualification Thermal Aging Test Report,” Rev. 0.
APP-PV01-VBR-011, “Equipment Qualification Summary Report for the FlowServe Flex Wedge Gate Valves with Limitorque Motor Operators for Use in the AP1000 Plant,” Rev. 1
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APP-PV11-VBR-005, “Equipment Qualification Summary Report for Motor-Operated TRICENTRIC Butterfly Valves for the AP1000 Plant,” Rev. 2

APP-PV11-VBR-006, “Equipment Qualification Data Package for Motor-Operated TRICENTRIC Butterfly Valves for the AP1000 Plant,” Rev. 3
APP-PV01-VBR-013, “Equipment Qualification Summary Report for Flowserve Globe Stop Valves with Limitorque Motor Operators for Use in the AP1000 Plant,” Rev. 1
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APP-PV70-VPR-012, “Test Report for Nuclear Environmental Qualification of Squib Valve Connector Assembly Marks Part No. 23063-025 and Low
Profile Support Assembly for Squib Valve Connectors Part No. 23063-021 for 20-Year Qualified Life on 14-inch Squib Valve,” Rev. 0
APP-PV70-VPP-004, “Test Procedure for Nuclear Environmental Qualification of Squib Valve Connector Assembly Mark 3 Part Number 23063-025 and Low Profile Support Assembly for Squib Valve Connector Assemblies Part Number 23063-021,” Rev. 0
APP-PV70-VPR-024, “Qualification Test Report for Safety-Related 8” LP and 14” ADS Squib Valve Actuators for use in the Westinghouse AP1000 Nuclear Power Plants for Westinghouse Electric Company,” Rev. 0
APP-PV95-VPR-001, “Equipment Qualification Test Report for the Limitorque Valve Actuators for Use in the AP1000 Plant," Rev. 0
APP-PV95-VPR-106, “MOV Long Life Grade 0 Grease Justification for Geared Limit Switches in Safety-Related Limitorque Motor Operators in AP1000 Plant Environmental Zone 5,” Rev. 0
APP-PV95-VPR-102, “Equipment Qualification Report for Peerless-Winsmith DC Motors for Use with Limitorque Valve Actuators in the AP1000 Plant,” Rev. 0
APP-PV95-VP-002, “AP1000 Limitorque Valve Actuator Justification for Use of a Modified Harsh Environment Test Sequence,” Rev. 0
APP-PV95-VPR-029, “Limitorque Type SMB/SB Series Valve Actuator Test Specimen Selection and Methodology for Westinghouse AP-1000 Environmental Qualification Testing,” Rev. 0
APP-PV95-VPC-002, “Radiation Qualification of AP1000 Valve Actuators and DC Motors,” Rev. 0
APP-GE-VBR-004, “Equipment Qualification Summary Report for TopWorx SV7 GO Switches for Use in AP1000 Plant,” Rev. 1
APP-GW-J4-003, “AP1000 Interface Specification for Class 1E DC Motor-Operated Valves." Rev. 2
APP-GW-VPR-002, “Methodologies for Evaluating Revised DBA Transients,” Rev. 1
APP-GW-VBR-001, “Equipment Qualification Summary Report for TopWorx C7 GO Switches for Use in the AP1000 Plant,” Rev. 1
APP-GW-VP-030, “AP1000 Environmental Conditions,” Rev. 6
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CN-SEE-15-16, “Review of the Performance of DC Motors with PEEK insulation – Impact of IEEE Qualification on Motor Performance,” Rev. 0
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SPX Corporation Report No. 11.1.318, “SPX DBA Reconciliation for TopWorx C7 Switch,” Rev. 4
LTR-EQ-10-1, “Equivalent Gamma for Beta Radiation,” Rev. 1
DCR-120711, “Design Calculation,” Rev. 3
LTR-EQ-14-19, “Squib Valve Connector/Bracket Redesign” (Westinghouse Purchase Order 4500615900)

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WDI-STD-1099, "AP1000 PSI for UT of Austenitic Pipe Welds (PDI-UT-2)," Rev. 2
SSI Certificate of Qualification: III/MT, III/PT, III-PDI/UT, III/VT-1, III/VT-2, III/VT-3, Blecha, dated 08/29/16
SSI Vision Acuity Record: Blecha, dated 08/29/16

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APP-MI01-V2-132, "AP1000 Reactor Internals Core Barrel Assembly," Rev. 2
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APP-MI01-V2-134, "AP1000 Reactor Internals Core Barrel Assembly," Rev. 2
APP-FSAR-GLN-810, "AP1000 Licensing Applicability Determination and 10 CFR 50.59 / 10 CFR 52 Appendix D Section VIII Screening: CAPAL Issue ID 100303313, NL-1059," Rev.0
RN-16-136, Revision Notice for AP1000 Licensing Applicability Determination and 10 CFR 50.59 I 10 CFR 52 Appendix D Section VIII Screening: CAPAL Issue ID 100303313, NL-1059, dated 01/23/2017
VSL-VSG-000468, Evaluation of AP1000 Licensing Basis Departures – GLN-013 / FL-0007, GLN-050 / FL-0008, GLN-680 / NL-0376, GLN-807 / NL-1148, GLN-810 / NL-1059, GLN-818 / NL-0915, and GLN-823 / NL-1178, dated 10/31/2016
APP-GW-GLR-023, "Surveillance Capsule Lead Factor and Azimuthal Location Confirmation," Rev. 0
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CN-AMLRS-12-2, "V.C. Summer Units 2 and 3 RV Integrity Calculations for Surveillance Capsule Materials Selection," Rev. 2
MCOE-TR-14-13, "V.C. Summer Unit 2 Reactor Vessel Surveillance Program Baseline Test Report," Rev. 1

LIST OF ACRONYMS

10 CFR	Title 10 of the Code of Federal Regulations
ADAMS	Agency Wide Documents Access & Management System
ADS	Automatic Depressurization System
ANI	Authorized Nuclear Inspector
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
B&PV	Boiler and Pressure Vessel
BPVC	Boiler and Pressure Vessel Code
CAP	Corrective Action Program
CAPAL	Corrective Action, Prevention, and Learning
CB&I	Chicago Bridge and Iron
CES	Carolina Energy Services
CIM	Component Interface Module
CMT	Core Makeup Tank
CMTR	Certified Material Test Report
CofC	Certificates of Conformance
COL	Combined License
CR	Condition Report
CVCS	Chemical and Volume Control system
DI	Discrete Issue
E&DCR	Engineering and Design Coordination Report
EDCRs	Engineering Design Change Request
EQDP	Equipment Qualification Data Package
EQSR	Equipment Qualification Summary Report
FCAW	Flux Cored Arc Welding
FMEA	Failure Modes and Effects Analysis
FSAR	Final Safety Analysis Report
FWE	Field Welding Engineer
GTAW	Gas Tungsten Arc Welding
IEEE	Institute of Electrical and Electronics Engineers
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
IRC	Issue Review Committee
IRWST	In-containment Refueling Water Storage Tank
ISE	IV&V Simulation Environment
ISI	Inservice Inspection
ITAAC	Inspections, Tests, Analyses, and Acceptance Criteria
IV&V	Independent Verification and Validation
M&TE	Measuring and Test Equipment
MOV	Motor Operated Valve
NCV	Non-cited Violation
N&D	Nonconformance and Disposition Reports
NDE	Nondestructive Examination
NPF	Nuclear Power Facility
NRC	Nuclear Regulatory Commission
PARS	Publically Available Records

PLS	Plant Control System
PMS	Protection and Safety Monitoring System
PQR	Procedure Qualification Records
PSI	Preservice Inspection
PT	Penetrant Testing
PXS	Passive Core Cooling System
QA	Quality Assurance
QAPD	Quality Assurance Program Document
QC	Quality Control
RCS	Reactor Coolant System
Rev.	Revision
RG	Regulatory Guide
RP	Radiation Protection
RTA	Requirements Traceability Analysis
RTL	Register Transfer Level
RV	Reactor Vessel
SCE&G	South Carolina Electric and Gas
SG	Steam Generator
SMAW	Shielded Metal Arc Welding
SRNC	Safety Remote Node Controller
SSC	Structures, Systems, and Components
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Testing/Examination
V&V	Verification and Validation
VT	Visual Examination
WEC	Westinghouse Electric Company
WPS	Welding Procedure Specification

ITAAC INSPECTED

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
13	2.1.02.02a	2.a) The components identified in Table 2.1.2-1 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 2.1.2-1 as ASME Code Section III.
16	2.1.02.03b	3.b) Pressure boundary welds in piping identified in Table 2.1.2-2 as ASME Code Section III meet ASME Code Section III requirements.	Inspection of the as-built pressure boundary welds will be performed in accordance with the ASME Code Section III.	A report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.
20	2.1.02.05a.ii	5.a) The seismic Category I equipment identified in Table 2.1.2-1 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 loads without loss of safety function.
24	2.1.02.07a.i	7.a) The Class 1E equipment identified in Table 2.1.2-1 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 2.1.2-1 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.
38	2.1.02.08d.vii	8.d) The RCS provides automatic depressurization during design basis events.	vii) Inspection of each ADS sparger will be conducted to determine the flow area through the sparger holes.	vii) The flow area through the holes in each ADS sparger is > 274 in2.

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
56	2.1.02.12a.iv	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.
77	2.1.03.06.iii	6. The seismic Category I equipment identified in Table 2.1.3-1 can withstand seismic design basis loads without loss of safety function.	iii) Inspection will be performed for the existence of a report verifying that the as-built equipment including anchorage is seismically bounded by the tested or analyzed conditions.	iii) A report exists and concludes that the as-built equipment including anchorage is seismically bounded by the tested or analyzed conditions.
99	2.2.01.05.ii	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.
101	2.2.01.06a.i	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.

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
114	2.2.01.11a.i	11.a) The motor-operated and check valves identified in Table 2.2.1-1 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 each valve to operate under design conditions.	i) A test report exists and concludes that each motor-operated valve changes position as indicated in Table 2.2.1-1 under design conditions.
127	2.2.02.05a.ii	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.
159	2.2.03.02a	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.
160	2.2.03.02b	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.
162	2.2.03.03b	3.b) Pressure boundary welds in piping identified in Table 2.2.3-2 as ASME Code Section III meet ASME Code Section III requirements.	Inspection of the as-built pressure boundary welds will be performed in accordance with the ASME Code Section III.	A report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
166	2.2.03.05a.ii	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.
170	2.2.03.07a.i	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.
214	2.2.03.12a.i	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.

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
362	2.3.06.05a.ii	5.a) The seismic Category I equipment identified in Table 2.3.6-1 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.
534	2.5.02.07a	7.a) The PMS provides process signals to the PLS through isolation devices.	Type tests, analyses, or a combination of type tests and analyses of the isolation devices will be performed.	A report exists and concludes that the isolation devices prevent credible faults from propagating into the PMS.
537	2.5.02.07d	7.d) The PMS ensures that the automatic safety function and the Class 1E manual controls both have priority over the non-Class 1E soft controls.	Type tests, analyses, or a combination of type tests and analyses of the PMS manual control circuits and algorithms will be performed.	A report exists and concludes that the automatic safety function and the Class 1E manual controls both have priority over the non-Class 1E soft controls.
553	2.5.02.14	14. The Component Interface Module (CIM) is developed using a planned design process which provides for specific design documentation and reviews. {Design Acceptance Criteria}	An inspection and or an audit will be performed of the processes used to design the hardware, development software, qualification and testing.	A report exists and concludes that CIM meets the below listed life cycle stages. Life cycle stages: a. Design requirements phase, may be referred to as conceptual or project definition phase b. System definition phase c. Hardware and software development phase, consisting of hardware and software design and implementation d. System integration and test phase e. Installation phase

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
760	3.3.00.02a.i.a	2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	i) An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed for the design basis loads.	i.a) A report exists which reconciles deviations during construction and concludes that the as-built containment internal structures, including the critical sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions.
761	3.3.00.02a.i.b	2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	i) An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed for the design basis loads.	i.b) A report exists which reconciles deviations during construction and concludes that the as-built shield building structures, including the critical sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions.

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
762	3.3.00.02a.i.c	2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	i) An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed for the design basis loads.	i.c) A report exists which reconciles deviations during construction and concludes that the as-built structures in the non-radiologically controlled area of the auxiliary building, including the critical sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions.
763	3.3.00.02a.i.d	2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	i) An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed for the design basis loads.	i.d) A report exists which reconciles deviations during construction and concludes that the as-built structures in the radiologically controlled area of the auxiliary building, including the critical sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions.
778	3.3.00.03b	3. Walls and floors of the nuclear island structures as defined on Table 3.3-1 except for designed openings or penetrations provide shielding during normal operations.	Inspection of the as-built nuclear island structures wall and floor thicknesses will be performed.	b) A report exists and concludes that the shield walls of the shield building structures as defined in Table 3.3-1 except for designed openings or penetrations are consistent with the concrete wall thicknesses provided in Table 3.3-1.