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

May 12, 2016

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 UNITS 2 AND 3 – NRC INTEGRATED INSPECTION REPORTS 05200027/2016001, 05200028/2016001

Dear Mr. Jones:

On, March 31, 2016, 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 April 20, 2016, with you and other members of your staff.

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.

No findings were identified during this inspection.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room). To the extent possible, your response should not include any personal privacy or proprietary, information so that it can be made available to the Public without redaction.

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

Sincerely,

/RA/

Michael Ernstes, Chief
Construction Projects Branch 4
Division of Construction Projects

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

Enclosure: NRC Inspection Report (IR) 05200027/2016001, 05200028/2016001
w/attachment: Supplemental Information

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ADAMS: ☐ Yes ACCESSION NUMBER: ML16134A092_ ☐ SUNSI REVIEW COMPLETE ☐ FORM665 ATTACHED

OFFICE	RII:DCP	RII:DCP	RII:DCP	RII:DCP	RII:DCI	RII:DCI	RII:DCI
SIGNATURE	/RA via email/	/RA via email/	/RA via email/	/RA via email/	/RA via email/	/RA via email/	/RA via email/
NAME	T. Nazario	N. Karlovich	D. Piccirillo	P. Donnelly	L. Castelli	R. Mathis III	C. Oelstrom
DATE	5/4/2016	5/4/2016	4/27/2016	5/3/2016	5/3/2016	4/29/2016	5/2/2016
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
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NAME	T. Steadham	G. Galletti	M. Ernstes				
DATE	4/27/2016	4/29/2016	5/12/2016	5/ /2016	5/ /2016	5/ /2016	5/ /2016
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OFFICIAL RECORD COPY NAME: G/CCI/DCP/CPB4/V.C. Summer Integrated IRs 05200027-28 2016001

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Numbers:	5200027 5200028
License Numbers:	NPF-93 NPF-94
Report Numbers:	05200027/2016001 05200028/2016001
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:	January 1, 2016 through March 31, 2016
Inspectors:	P. Carman, Construction Inspector, DCI L. Castelli, Senior Construction Inspector, DCI J. Christensen, Construction Inspector, DCP P. Donnelly, Resident Inspector, DCP B. Griman, Construction Inspector, DCI N. Karlovich, Resident Inspector, DCP A. Lerch, Construction Project Inspector, DCP J. Lizardi-Barreto, Construction Inspector, DCI R. Mathis, Construction Inspector, DCI T. Nazario, Senior Construction Resident Inspector, DCP C. Oelstrom, Construction Inspector, DCI D. Piccirillo, Senior Construction Project Inspector, DCP T. Steadham, Senior Construction Inspector, DCI
Accompanying Personnel:	Ken Mott, Technical Reviewer
Approved by:	Michael Ernstes, Chief Construction Projects Branch 4 Division of Construction Projects

Enclosure

SUMMARY

Inspection Report (IR) 05200027/2016001, 05200028/2016001; 01/01/2016 through 03/31/2016; 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 resident inspectors and announced Inspections, Tests, Analysis, and Acceptance Criteria (ITAAC) inspections by both regional and resident inspectors. The Nuclear Regulatory Commission's (NRC's) program for overseeing the construction of commercial nuclear power reactors is described in Inspection Manual Chapter (IMC) 2506, "Construction Reactor Oversight Process General Guidance and Basis Document."

A. NRC-Identified and Self Revealed Findings

No findings were identified.

B. Licensee-Identified Violations

No findings were identified.

REPORT DETAILS

Summary of Plant Construction Status

During this inspection period Westinghouse Electric Company, LLC (WEC) completed its acquisition of CB&I Stone & Webster, Inc. (Stone & Webster), the nuclear construction and integrated services business of Chicago Bridge & Iron N.V. (CB&I). Additionally, Fluor Corporation (Fluor) was subcontracted by WEC as the construction manager for the project.

The licensee continued construction of the Unit 2 floors in the non-radiological area of the auxiliary building and the radiologically controlled area. Unit 2 concrete was placed inside containment up to elevation 96' for the west side of containment. Shield building for Unit 3, ongoing work included auxiliary building wall and floor construction. Unit 3 auxiliary building module CA20 Subassembly 3 and 4 was lifted and set during the inspection period. Work also continued on the auxiliary building module Unit 3 CA20 Subassembly 1 and 2 and Unit 2 CA03 which is the in-containment refueling water storage tank module.

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 2.1.02.08a.i (28) / Family 07A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.08a.i (28). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.07-02.01 - General Installation
- 65001.07-02.05 - Problem Identification and Resolution
- 65001.A.02.02 - Installation Records Review

The inspectors reviewed quality assurance (QA) data packages associated with the Unit 2 pressurizer safety valves (S/N N900028-00-0011 and N900028-00-0012) to verify the capacity of the valves documented on American Society of Mechanical Engineers (ASME) Code plates meets the acceptance criteria. Specifically, the inspectors reviewed the valve ASME Code plates to verify the sum of the relieving capacity of the two valves exceeded the requirements of Updated Final Safety Analysis Report (UFSAR) Table 5.4-17, "Pressurizer Safety Valves - Design Parameters" and the Westinghouse design specification. The inspectors reviewed the ASME Code plate information to verify that it was documented in accordance with ASME Boiler and Pressure Vessel (B&PV) Code requirements and all required information was included on the valve plate. Additionally, the inspectors reviewed ASME NV-1 Valve Data Report Forms containing the relieving capacities certified by the National Board to verify it matched that of the information on the valve plates and was approved by an Authorized Nuclear Inspector (ANI).

b. Findings

No findings were identified.

1A02 (Unit 2) ITAAC Number 2.1.02.08a.ii (29) / Family 07C

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.08a.ii (29). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.07-02.04 - Testing and Verification
- 65001.07-02.05 - Problem Identification and Resolution
- 65001.C-02.03 - Licensee Acceptance and Documentation
- 65001.C-A3.07 - Valves

The inspectors reviewed QA data packages associated with the Unit 2 pressurizer safety valves (S/N N900028-00-0011 and N900028-00-0012) to verify the safety valve set pressure meets the acceptance criteria. Specifically, the inspectors reviewed the set pressure test conducted by the valve vendor to verify that the set pressure was correctly set and tested. The inspectors reviewed the results of the final set pressure test and an operational steam test conducted by the vendor to verify the values were within the required design and technical specification range of 2460 psig to 2510 psig.

The inspectors reviewed the relief valve set pressure identified in the Westinghouse design specification to verify it met ASME Boiler and Pressure Vessel (B&PV) Section III Code overpressure protection requirements. The inspectors compared independent calculations of the maximum valve overpressure and minimum reseat pressure from operational steam tests with ASME Code requirements. Additionally, the inspectors reviewed ASME NV-1 Valve Data Report Forms for the safety valves to verify set pressure information was documented on the NV-1 Forms and was approved by an ANI. The inspectors reviewed valve ASME Code plates to verify set pressure information was contained on valve Code plates in accordance with ASME B&PV Section III Code requirements.

b. Findings

No findings were identified.

1A03 (Unit 2) ITAAC Number 2.2.01.01 (90) / Family 11A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.01 (90). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.11-02.08 - Electrical and Instrumentation and Controls Penetrations

The inspectors reviewed the design drawings for penetrations P19, P20, and P22 to verify that the containment penetrations complied with Figure 2.2.1-1 of Appendix C of the VC Summer 2 and 3 UFSAR. The inspectors obtained a sample of dimensions of the as-installed penetrations to verify that the dimensions were in accordance with design drawings. The inspectors also reviewed the design drawings to verify that the penetrations were installed in the proper location, elevation, and orientation on the containment vessel bottom head. Finally, the inspectors observed the penetration coverings to verify that there was no visible damage to the penetrations and that the penetrations were covered and protected to prevent damage from adjacent work.

b. Findings

No findings were identified.

1A04 (Unit 2) ITAAC Number 2.2.03.08c.vi.01 (189) / Family 06A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.03.08c.vi.01 (189). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.06-02.04 - Testing and Verification
- 65001.A.02.04 - Review As-built Deviations/Nonconformance
- 65001.F-02.02 - Fabrication Records Review

The inspectors reviewed a sample of fabrication records related to core makeup tanks (CMT) A and B. The inspectors reviewed records of the volumetric measurements to determine if the volume met the acceptance criteria of the ITAAC and UFSAR Section 5.4.13. Specifically, the inspectors reviewed deviation notices to determine if the deviations in as-built tanks from the design documents were appropriately reconciled. The inspectors also reviewed core makeup tank volumetric scanning reports to determine if the method and controls used by the licensee to verify that the as-built dimensions conformed to the licensing basis were adequate. In addition, the inspectors reviewed and CMT as-built analysis to determine if the as-built tank volume and dimensions were in accordance with the final design, ITAAC, and UFSAR.

The inspectors reviewed calculations and independently calculated the tank volume using the inputs described in the as-built design documents, which were measured on-site by a laser scanner.

The inspectors reviewed measuring and test equipment (M&TE) procedures to determine if the M&TE that was used had the appropriate accuracy.

b. Findings

No findings were identified.

1A05 (Unit 2) ITAAC Number 2.5.01.03c (513) / Family 10F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.5.01.03c (513). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.16-02.03 - Design Documents
- 65001.F-02.01 - Design Document Review

The inspectors interviewed responsible design personnel and performed a review of licensee records and design documentation to verify that software diversity has been achieved between the Diverse Actuation System (DAS) and the Protection and Safety Monitoring System (PMS) as specified in ITAAC 2.5.01.03c. The inspectors assessed licensee conformance with 10 CFR 50.55a(h), 10 CFR 50 Appendix A - General Design Criterion 22, NUREG/CR-6303, "Method for Performing Diversity and Defense-in-Depth Analyses of Reactor Protection Systems, " Branch Technical Position 7-19 (NUREG-800), "Guidance for Evaluation of Diversity and Defense-In-Depth in Digital Computer-Based Instrumentation and Control Systems, " and the acceptance criteria of ITAAC 2.5.01.03c. Software diversity between the DAS and PMS was sampled in the following areas: Algorithms, Logic, Program Architecture, Executable Operating System, and Executable Software/Logic.

Algorithms

The inspectors verified that algorithm diversity was achieved consistent with the ITAAC acceptance criteria by reviewing the PMS and DAS design documents of the digital systems that compare plant parameter incoming signals (i.e., proper steam generator water level, in-range reactor coolant pressure) to pre-defined setpoints which determined whether or not to initiate a protective action. The NRC inspectors reviewed a sampling of design specifications, functional requirements, system specifications to verify that the algorithms used were diverse between the PMS and DAS. The inspectors noted that the algorithms performed for the PMS were implemented through Common Q software, whereas the DAS executed algorithms were implemented within the Field Programmable Gate Array (FPGA). Specifically, the algorithm for the steam generator water level compensation was reviewed to ensure that algorithm definitions were different between PMS and DAS.

The inspection team also reviewed the attribute of algorithm diversity for the cyclic redundancy check (CRC) polynomials for the Component Interface Module (CIM), a PMS subsystem, and DAS. The inspectors completed a code review walk-through with the independent reviewer that originally performed the code review. The inspectors noted the Verilog code for the CIM subsystem and the DAS CRC32 modules were implemented using a different sequence of logic steps.

Logic

The inspectors reviewed the logic for the PMS and DAS to determine how each system accomplishes their setpoint comparison and trip actuation to confirm conformance to the software logic diversity acceptance criteria of the ITAAC. The inspectors reviewed

DAS FPGA functional requirements, logic diagrams, and implemented logic for DAS partial trip protective function actuations. It was noted that the logic path for the partial trip setpoint comparison and actuation for the DAS was handled by the Advanced Logic System (ALS) FPGA platform control logic board (CLB) with logic that is implemented on an FPGA chip. For the PMS reactor trip signal, the inspectors reviewed design specifications and software design descriptions. The corresponding PMS reactor trip comparison and actuation logic path was noted by the inspectors to be executed in the Bistable Processor Logic (BPL) subsystem. It was observed that the process and activities required to physically program the DAS FPGA chip, such as simulation, synthesis and "place and route" tasks, are not a part of the PMS's BPL software development process. In reference to the PMS, the inspectors observed that the BPL software development process includes developing protective safety function application specific software and loading that software onto a BPL processor module, of which the diverse DAS FPGA chip does not contain a processor module.

Program Architecture

The inspectors focused on verifying program architectural diversity based on an evaluation of the various communication methodologies employed within each subsystem and a review of each individual FPGA chip design. Specifically, the inspectors reviewed PMS/CIM and DAS system design descriptions, block diagrams, and software requirements specifications (SRS) to confirm adequate identification and fulfillment of the system level requirements for communication technology diversity between the Safety Remote Node Controller/Component Interface Module (SRNC/CIM) and DAS sub-systems. The inspection team confirmed that the PMS/CIM employed a combination of communication protocols consisting of: (Advant) High Speed Datalink (HSL) protocol, X-Bus, and Y-Bus. The PMS uses HSL for interdivisional communication, AF100 for intra-divisional communication, and User Datagram Protocol (UDP) for Flat-panel Display System (FPDS) auxiliary communications. Additionally, Global Memory Data Elements (MDATs) are used for communications on the AC160 backplane used in the PMS. For the DAS communication, the Reliable ALS Bus (RAB) and Test ALS Bus (TAB) communication protocols are employed. The inspectors verified that each communication protocol was adequately defined and passed down to the subsystem requirements specifications as required. The inspectors confirmed that the utilization of the various communication protocols was either unique for each subsystem or used to fulfill different subsystem level requirements within each subsystem. For example, the use of discrete copper in the PMS/CIM architecture fulfilled subsystem level requirements that were different than the application of the same protocol used in the DAS subsystem.

The inspectors also reviewed various FPGA design documentation, including selected block diagrams for the PMS/CIM and the DAS subsystems and discussed the differences in the designs of these FPGAs with the vendor's staff to confirm that I/O structure, communication protocols, and design implementation of each was different for the PMS/CIM and DAS subsystems. The inspectors also reviewed the FPGA design specifications for each FPGA model and verified the chip designs were significantly different in terms of physical chip size, gate population, and ram block size. The inspectors noted that these differences enabled the use of different code structure and densities within the FPGA. The inspectors also verified that important characteristics of each FPGA design were implemented differently for each chip model. Specifically, the inspectors verified that the CIM FPGA used a non-segmented

routing hierarchy, while the DAS FPGA utilizes a segmented hierarchical routing and clock structure. Clock conditioning circuits between the two FPGA designs were significantly different in density, layering, numbers of VersaTiles (D-flip-flops), and maximum user I/O's for each chip type.

In addition, the inspectors verified that the FPGA chips were physically dissimilar as a result of a visual inspection of prototype PMS/CIM and DAS circuit boards. The inspectors verified that each chip was uniquely labeled, and the physical dimensions were verified to be significantly different from each other. The inspectors verified that the work travelers for each PMS/CIM and DAS circuit board included inspection records which identified each FPGA by unique serial number in accordance with the visual inspection procedure requirements.

Executable Operating System and Executable Software

The inspectors reviewed technical reports, design specifications, software and hardware requirements, logic specifications, and functional requirements to assess that software diversity between the PMS and DAS was achieved in the areas of executable operating system and executable software. The inspectors noted that the safety function actuation logic executed in the PMS is generated by a microprocessor operating on a Common Q platform. In contrast, the DAS performs its functions using a FPGA technology platform. The inspectors also noted that the SRNC/CIM, a subsystem of PMS, also functions on an FPGA platform. The inspectors observed that FPGA technology does not inherently function on an executable operating system and therefore does not utilize executable software. The inspectors noted the diversity between the PMS using a microprocessor based Common Q executable operating system/software and the DAS using an SRNC/CIM FPGA technology based system that does not have an executable operating system/software.

The inspectors also assessed the licensee's formal review and acceptance of Westinghouse document APP-DAS-J0R-002, "AP1000 Diverse Actuation System Diversity Analysis," Revision 0. This document is the Principal Closure Document (PCD) for ITAAC 2.5.01.03c and is cited in the ITAAC Determination Basis and directly supports the conclusion that the ITAAC Acceptance Criteria are met. The ITAAC Determination Basis is the information provided in the ITAAC Closure Notification that summarizes the methodology for conducting the inspections, tests and analyses, and the results that demonstrate the acceptance criteria are met. The inspectors verified that a Principal Closure Document Review checklist was completed and documented in accordance with procedure, NND-AP-0032, "Implementation of Inspections, Test, Analyses and Acceptance Criteria (ITAAC)," Revision 5. In addition, the inspectors reviewed a sample of the qualification records for the ITAAC Technical Owner to determine whether the reviewer was qualified in accordance with NND-AP-0006, "NND Personnel In-Processing, Training, and Qualification," Revision 9.

b. Findings

No findings were identified.

1A06 (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.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection
- 65001.F-02.04 - General QA Review

The inspectors observed in-process manual gas tungsten arc welding (GTAW) on weld No. VS2-CA03-VWK-042-FW-09-VP-002A located between submodules CA03-09 and CA03-10. The weld joined two A240 stainless-steel members which form part of the Inside Containment Refueling Water Storage Tank (IRWST). Specifically, the inspectors reviewed drawings, welding procedures, weld records, and material issue records to determine if the identification of welds and welders was maintained for each weld and the welders were qualified. In addition, the inspectors verified welding parameters such as amperage, voltage, pre-heat temperature, shielding gas flow rate, shielding gas type, and that the appropriate type of filler metal used was in accordance with welding procedure specifications.

The inspectors observed the final visual inspection, in-process liquid penetrant examination (PT), and ultrasonic seismic examinations (UT) on weld No. VS2-CA03-VWK-043-FW-10-VP-002A-BDU1 were in accordance with procedures. The weld joined two A240 stainless-steel members, submodules CA03-10 and CA03-11, which form part of the IRWST. Specifically, the inspectors observed dwell times and cleaning methodology for the PT test to verify that they were in accordance with procedure. For the UT, the inspectors observed the calibration check, the proper use of couplant, and the performance of the exam to verify that the exam was in accordance with procedures. The inspectors also inspected the instruments to verify the calibration and that they were the proper type.

The inspectors observed portions of the in-process manual GTAW of the root pass of weld No VS2-CA03-VWk-043-FW-10-VP-002-BDU1 which is also located between submodules CA03-10 and CA03-11. The inspectors observed shielding gas flow rate, shielding gas type, and that the appropriate type of filler metal used was in accordance with welding procedure specifications.

b. Findings

No findings were identified.

1A07 (Unit 2) 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:

- 65001.01-02.05 - Steel Structures
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.02-02.04 - Expansion Anchor Installation
- 65001.02-02.06 - Record Review
- 65001.02-02.07 - Problem Identification and Resolution
- 65001.A.02.02 - Installation Records Review
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.B-02.06 - Records

The inspectors observed on-going construction activities associated with two Unit 2 shield building reinforced concrete to steel concrete composite (RC/SC) vertical connections located approximately at azimuths 182 and 342 degrees, respectively, and between elevations 103'-0" and 113'-0". The inspectors verified field measurements, performed visual observations, reviewed documents, and interviewed licensee personnel to assess the implementation of the QA program specific to the mechanical connection between the shield building reinforced concrete (RC) walls and the steel concrete composite (SC) wall panels along the western perimeter of the shield building. These activities were performed in order to verify:

- installation of structural modules was completed in accordance with applicable specifications, drawings, and approved procedures;
- deviations were being addressed in accordance with procedure requirements; and
- nonconforming conditions identified by the licensee were being appropriately resolved.

The inspectors reviewed design drawings, and work packages, including attached engineering and design coordination reports (E&DCRs), associated with the mechanical connections for the following shield building RC/SC vertical transition modules:

- RC/SC vertical connection panel 01H which is located approximately at azimuth 182 degrees along the interface with the reinforced concrete shield building wall between elevations 103"-4" and 125'-3"

- RC/SC vertical connection panel 01Q which is located approximately at azimuth 342 degrees along the interface with the reinforced concrete shield building wall between elevations 106"-6" and 117'-41/2"

The inspectors reviewed documentation related to the installation of the heavy hex nuts and flat washers to the horizontal reinforcement to verify they were installed in accordance with applicable requirements. Specifically, the inspectors reviewed Quality

Assurance Inspection Reports to ensure that quality control inspectors verified connection surfaces were free of foreign materials, bolts and nuts achieved one hundred percent thread engagement, and nuts cannot be unloosened without the use of a wrench. The inspectors verified in the field that the nuts were properly installed in accordance with the drawings. The inspectors also observed concrete placement activities associated with this section of the shield building RC/SC vertical connection modules. The inspectors performed direct observations, interviewed licensee personnel, and reviewed associated documentation from the work package for the concrete placement to ensure:

- pre-placement planning and training was completed as required to assure good quality construction and to protect against unplanned construction joints;
- pre-placement inspections were performed by quality control (QC) prior to concrete placement;
- the pump truck used to deliver the concrete to the point of placement was of suitable size and condition for the work;
- batch tickets were reviewed for verification of proper mix, transport time, placement location, and amount of temper water being added at the truck delivery point;
- placement drop distances did not exceed specification requirements and did not result in segregation;
- special attention was given to areas of high reinforcing steel congestion and material was consolidated within the RC/SC horizontal connection modules such that excess concrete was observed exiting the vent holes in the horizontal support plates;
- concrete was placed in lifts in accordance with the concrete placement plan;
- inspection during placement was performed as required;
- records were produced and reviewed, and indicated mix, location, time placed, water additions, and temperature of the concrete mix and ambient conditions;
- in process testing for concrete temperature, slump, air content, and unit weight were being determined at the proper location and frequency as required in the design specifications;
- test specimen samples, for concrete strength determination, were sampled at the required location and frequency and are cured in accordance with specified requirements; and
- concrete curing was in accordance with specifications and procedures with regard to the method, materials, duration, temperature, inspections, and records.

b. Findings

No findings were identified.

1A08 (Unit 2) 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.A.02.01 - Observation of in-Process Installation Activities

The inspectors performed direct inspections of the concrete placement inside the third course of the steel composite shield building panels from elevation 113'-6" to 123'-6". These panels make up the west side of the shield building and span from column line N to column line Q. The inspectors verified the following:

- the placement had been cleaned as defined in the construction specification;
- batch tickets were reviewed to verify the mix, transport time, placement location, and cement/water ratio were in accordance with the applicable concrete specifications;
- placement drop distances did not exceed the specification requirements and did not result in segregation;
- consolidation of concrete using mechanical vibrating equipment was performed in accordance with specifications; and
- concrete testing including concrete temperature, slump, air content, and unit weight were performed at the frequency specified in the design specifications and the techniques followed the American Society for Testing and Materials (ASTM) standards specified.

b. Findings

No findings were identified.

1A09 (Unit 3) ITAAC Number 2.1.02.08a.i (28) / Family 07A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.08a.i (28). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.07-02.01 - General Installation
- 65001.07-02.05 - Problem Identification and Resolution
- 65001.A.02.02 - Installation Records Review

The inspectors reviewed QA data packages associated with the Unit 3 pressurizer safety valves (S/N N900028-00-0015 and N900028-00-0016) to verify the capacity of the valves documented on ASME Code plates meets the acceptance criteria. Specifically, the inspectors reviewed the valve ASME Code plates to verify the sum of the relieving capacity of the two valves exceeded the requirements of UFSAR Table 5.4-17, "Pressurizer Safety Valves - Design Parameters" and the Westinghouse design specification. The inspectors reviewed the ASME Code plate information to verify that it was documented in accordance with ASME Boiler and Pressure Vessel (B&PV) Code requirements and all required information was included on the valve plate. Additionally, the inspectors reviewed ASME NV-1 Valve Data Report Forms containing the relieving capacities certified by the National Board to verify it matched that of the information on the valve plates and was approved by an ANI.

b. Findings

No findings were identified.

1A10 (Unit 3) ITAAC Number 2.1.02.08a.ii (29) / Family 07C

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.1.02.08a.ii (29). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.07-02.04 - Testing and Verification
- 65001.07-02.05 - Problem Identification and Resolution
- 65001.C-02.03 - Construction Test Record Review
- 65001.C-A3.07 - Valves

The inspectors reviewed QA data packages associated with the Unit 3 pressurizer safety valves (S/N N900028-00-0015 and N900028-00-0016) to verify the safety valve set pressure meets the acceptance criteria. Specifically, the inspectors reviewed the set pressure test conducted by the valve vendor to verify that the set pressure was correctly set and tested. The inspectors reviewed the results of the final set pressure test and an operational steam test conducted by the vendor to verify the values were within the required design and technical specification range of 2460 psig to 2510 psig.

The inspectors reviewed the relief valve set pressure identified in the Westinghouse design specification to verify it met ASME Boiler and Pressure Vessel (B&PV) Section III Code overpressure protection requirements. The inspectors compared independent calculations of the maximum valve overpressure and minimum reseat pressure from operational steam tests with ASME Code requirements. Additionally, the inspectors reviewed ASME NV-1 Valve Data Report Forms for the safety valves to verify set pressure information was documented on the NV-1 Forms and was approved by an ANI. The inspectors reviewed valve ASME Code plates to verify set pressure information was contained on valve Code plates in accordance with ASME B&PV Section III Code requirements.

b. Findings

No findings were identified.

1A11 (Unit 3) ITAAC Number 2.2.02.07b.ii (139) / Family 06F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.02.07b.ii (139). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.06-02.04 - Testing and Verification
- 65001.F-02.01 - Design Document Review
- 65001.F-02.02 - Fabrication Records Review

- 65001.F-02.03 - Observation of Fabrication Activities
- 65001.F-02.04 - General QA Review

The inspectors performed a direct inspection of the inorganic zinc coating activities being performed on the exterior of the containment vessel above elevation 135'-3". The inspectors reviewed Westinghouse Design Specification APP-GW-Z0-604, "Design Specifications for the Application of Protective Coatings to Systems, Structures, and Components for the AP1000 Reactor Plant for All Systems," Revision 7 as guidance for the inspection. The inspectors reviewed the Williams Specialty Services Receiving Inspection Report for the Carbozinc 11HSN base material, the zinc filler material, and the Activator to verify that the material was adequately inspected upon arrival. The inspectors also reviewed the Certificate of Conformance provided by the manufacturer, Carboline, to verify that the material purchased met the requirements in the Westinghouse Design Specification.

The inspectors reviewed documentation for coatings on the exterior of the containment vessel. Specifically, the inspectors reviewed the Environmental Conditions Log for panels B3-C1, B3-C2, B3-D3, and B3-D8 to verify that the environmental conditions were in accordance with the Westinghouse Design Specification. The inspectors then reviewed the Pre/Post Surface Preparation Inspection Log for panels B3-C1, B3-C2, B3-D3, and B3-D8 to verify that the blasting was performed in accordance with the design specification. During this review, the inspectors reviewed the calibration date for the Dry Film Thickness gage to verify that the component was within its calibration date. The inspectors reviewed the Pre Coating Material Inspection Log to verify that the components of the inorganic zinc coating were not expired and were the correct components for as defined in the Westinghouse Design Specification. The inspectors reviewed the Post Coating Application Inspection Log to verify that the dry film thickness was in accordance with the design specification. Finally, the inspectors reviewed a Methyl Ethyl Ketone (MEK) Rub Test Report to verify that the test was performed in accordance with Westinghouse Design Specification and that the test results were acceptable for the panel that was tested.

During the inspection, an issue with the coating material was identified by Williams and CB&I services, contractors onsite. During mixing, the base material of one specific batch was clumping and not mixing as designed. The inspectors reviewed Williams Action Request Number WSS-2016-3018-0001 to verify that the issue was adequately documented and resolved. The inspectors reviewed the documentation from the manufacturer, Carboline, stating that all previous material of that batch that mixed properly was adequate and would meet the requirements as specified in the purchase order and associated documents. The material from this batch had previously been used on the interior and exterior of the Unit 3 containment vessel (CV) lower ring. The inspectors reviewed 18 MEK Rub Tests performed by Williams to verify that the material met the requirements of the Westinghouse Design Specification. All discrepant material was returned to the manufacturer and replaced with new material. Additionally, the inspectors reviewed CB&I Services Observation Report Number OR-VCS-2016-012 to verify that the issue was adequately documented and resolved.

b. Findings

No findings were identified.

1A12 (Unit 3) ITAAC Number 2.2.02.07b.iii (140) / Family 06F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.02.07b.iii (140). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.06-02.03 - Post Installation Activities
- 65001.06-02.04 - Testing and Verification
- 65001.06-02.05 - Problem Identification and Resolution
- 65001.F-02.02 - Fabrication Records Review

The inspectors performed an inspection of the inorganic zinc coating activities being performed on the interior of the containment vessel 7' above the operating deck and higher. The inspectors reviewed Westinghouse Design Specification APP-GW-Z0-604, "Design Specifications for the Application of Protective Coatings to Systems, Structures, and Components for the AP1000 Reactor Plant for All Systems," Revision 7 as guidance for the inspection. The inspectors reviewed the Williams Specialty Services Receiving Inspection Report for the Carbozinc 11HSN base material, the Zinc filler material, and the Activator to verify that the material was adequately inspected upon arrival. The inspectors also reviewed the Certificate of Conformance provided by the manufacturer, Carboline, to verify that the material purchased met the requirements in the Westinghouse Design Specification.

The inspectors reviewed documentation for coatings on the interior of the containment vessel. Specifically, the inspectors reviewed the Environmental Conditions Log for panels B3-D2, B3-C4, B3-A6, and parts of B3-D8 and B3-B11 to verify that the environmental conditions were in accordance with the Westinghouse Design Specification. The inspectors then reviewed the Pre/Post Surface Preparation Inspection Log for panels B3-D2, B3-C4, B3-A6, and parts of B3-D8 and B3-B11 to verify that the blasting was performed in accordance with the design specification. During this review, the inspectors reviewed the calibration date for the Dry Film Thickness gage to verify that the component was within its calibration date. The inspectors reviewed the Pre Coating Material Inspection Log to verify that the components of the inorganic zinc coating were not expired and were the correct components for as defined in the Westinghouse Design Specification. The inspectors reviewed the Post Coating Application Inspection Log to verify that the dry film thickness was in accordance with the design specification. Finally, the inspectors reviewed a Methyl Ethyl Ketone (MEK) Rub Test Report to verify that the test was performed in accordance with Westinghouse Design Specification and that the test results were acceptable for the panel that was tested.

During the inspection, an issue with the coating material was identified by Williams and CB&I services, contractors onsite. During mixing, the base material of one specific batch was clumping and not mixing as designed. The inspectors reviewed Williams Action Request Number WSS-2016-3018-0001 to verify that the issue was adequately documented and resolved. The inspectors reviewed the documentation from the manufacturer, Carboline, stating that all previous material of that batch that mixed properly was adequate and would meet the requirements as purchased. The material from this batch had previously been used on the interior and exterior of the Unit 3

Containment Vessel Lower Ring. The inspectors reviewed 18 MEK Rub Tests performed on the interior and exterior panels coated with this material by Williams to verify that the material met the requirements of the Westinghouse Design Specification. All discrepant material was returned to the manufacturer and replaced with new material. Additionally, the inspectors reviewed CB&I Services Observation Report Number OR-VCS-2016-012 to verify that the issue was adequately documented and resolved.

b. Findings

No findings were identified.

1A13 (Unit 3) ITAAC Number 2.5.01.03c (513) / Family 10F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.5.01.03c (513). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.16-02.03 - Design Documents
- 65001.F-02.01 - Design Document Review

The inspectors interviewed responsible design personnel and performed a review of licensee records and design documentation to verify that software diversity has been achieved between the Diverse Actuation System (DAS) and the Protection and Safety Monitoring System (PMS) as specified in ITAAC 2.5.01.03c. The inspectors assessed licensee conformance with 10 CFR 50.55a(h), 10 CFR 50 Appendix A - General Design Criterion 22, NUREG/CR-6303, "Method for Performing Diversity and Defense-in-Depth Analyses of Reactor Protection Systems, " Branch Technical Position 7-19 (NUREG-800), "Guidance for Evaluation of Diversity and Defense-In-Depth in Digital Computer-Based Instrumentation and Control Systems, " and the acceptance criteria of ITAAC 2.5.01.03c. Software diversity between the DAS and PMS was sampled in the following areas: Algorithms, Logic, Program Architecture, Executable Operating System, and Executable Software/Logic.

Algorithms

The inspectors verified that algorithm diversity was achieved consistent with the ITAAC acceptance criteria by reviewing the PMS and DAS design documents of the digital systems that compare plant parameter incoming signals (i.e., proper steam generator water level, in-range reactor coolant pressure) to pre-defined setpoints which determined whether or not to initiate a protective action. The NRC inspectors reviewed a sampling of design specifications, functional requirements, system specifications to verify that the algorithms used were diverse between the PMS and DAS. The inspectors noted that the algorithms performed for the PMS were implemented through Common Q software, whereas the DAS executed algorithms were implemented within the Field Programmable Gate Array (FPGA). Specifically, the algorithm for the steam generator water level compensation was reviewed to ensure that algorithm definitions were different between PMS and DAS.

The inspection team also reviewed the attribute of algorithm diversity for the cyclic redundancy check (CRC) polynomials for the Component Interface Module (CIM), a PMS subsystem, and DAS. The inspectors completed a code review walk-through with the independent reviewer that originally performed the code review. The inspectors noted the Verilog code for the CIM subsystem and the DAS CRC32 modules were implemented using a different sequence of logic steps.

Logic

The inspectors reviewed the logic for the PMS and DAS to determine how each system accomplishes their setpoint comparison and trip actuation to confirm conformance to the software logic diversity acceptance criteria of the ITAAC. The inspectors reviewed DAS FPGA functional requirements, logic diagrams, and implemented logic for DAS partial trip protective function actuations. It was noted that the logic path for the partial trip setpoint comparison and actuation for the DAS was handled by the Advanced Logic System (ALS) FPGA platform control logic board (CLB) with logic that is implemented on an FPGA chip. For the PMS reactor trip signal, the inspectors reviewed design specifications and software design descriptions. The corresponding PMS reactor trip comparison and actuation logic path was noted by the inspectors to be executed in the Bistable Processor Logic (BPL) subsystem. It was observed that the process and activities required to physically program the DAS FPGA chip, such as simulation, synthesis and “place and route” tasks, are not a part of the PMS’s BPL software development process. In reference to the PMS, the inspectors observed that the BPL software development process includes developing protective safety function application specific software and loading that software onto a BPL processor module, of which the diverse DAS FPGA chip does not contain a processor module.

Program Architecture

The inspectors focused on verifying program architectural diversity based on an evaluation of the various communication methodologies employed within each subsystem and a review of each individual FPGA chip design. Specifically, the inspectors reviewed PMS/CIM and DAS system design descriptions, block diagrams, and software requirements specifications (SRS) to confirm adequate identification and fulfillment of the system level requirements for communication technology diversity between the Safety Remote Node Controller/Component Interface Module (SRNC/CIM) and DAS sub-systems. The inspection team confirmed that the PMS/CIM employed a combination of communication protocols consisting of: (Advant) High Speed Datalink (HSL) protocol, X-Bus, and Y-Bus. The PMS uses HSL for interdivisional communication, AF100 for intra-divisional communication, and User Datagram Protocol (UDP) for Flat-panel Display System (FPDS) auxiliary communications. Additionally, Global Memory Data Elements (MDATs) are used for communications on the AC160 backplane used in the PMS. For the DAS communication, the Reliable ALS Bus (RAB) and Test ALS Bus (TAB) communication protocols are employed. The inspectors verified that each communication protocol was adequately defined and passed down to the subsystem requirements specifications as required. The inspectors confirmed that the utilization of the various communication protocols was either unique for each subsystem or used to fulfill different subsystem level requirements within each subsystem. For example, the use of discrete copper in the PMS/CIM architecture fulfilled subsystem level requirements that were different than the application of the same protocol used in the DAS subsystem.

The inspectors also reviewed various FPGA design documentation, including selected block diagrams for the PMS/CIM and the DAS subsystems and discussed the differences in the designs of these FPGAs with the vendor's staff to confirm that I/O structure, communication protocols, and design implementation of each was different for the PMS/CIM and DAS subsystems. The inspectors also reviewed the FPGA design specifications for each FPGA model and verified the chip designs were significantly different in terms of physical chip size, gate population, and ram block size. The inspectors noted that these differences enabled the use of different code structure and densities within the FPGA. The inspectors also verified that important characteristics of each FPGA design were implemented differently for each chip model. Specifically, the inspectors verified that the CIM FPGA used a non-segmented routing hierarchy, while the DAS FPGA utilizes a segmented hierarchical routing and clock structure. Clock conditioning circuits between the two FPGA designs were significantly different in density, layering, numbers of VersaTiles (D-flip-flops), and maximum user I/O's for each chip type.

In addition, the inspectors verified that the FPGA chips were physically dissimilar as a result of a visual inspection of prototype PMS/CIM and DAS circuit boards. The inspectors verified that each chip was uniquely labeled, and the physical dimensions were verified to be significantly different from each other. The inspectors verified that the work travelers for each PMS/CIM and DAS circuit board included inspection records which identified each FPGA by unique serial number in accordance with the visual inspection procedure requirements.

Executable Operating System and Executable Software

The inspectors reviewed technical reports, design specifications, software and hardware requirements, logic specifications, and functional requirements to assess that software diversity between the PMS and DAS was achieved in the areas of executable operating system and executable software. The inspectors noted that the safety function actuation logic executed in the PMS is generated by a microprocessor operating on a Common Q platform. In contrast, the DAS performs its functions using a FPGA technology platform. The inspectors also noted that the SRNC/CIM, a subsystem of PMS, also functions on an FPGA platform. The inspectors observed that FPGA technology does not inherently function on an executable operating system and therefore does not utilize executable software. The inspectors noted the diversity between the PMS using a microprocessor based Common Q executable operating system/software and the DAS using an SRNC/CIM FPGA technology based system that does not have an executable operating system/software.

The inspectors also assessed the licensee's formal review and acceptance of Westinghouse document APP-DAS-J0R-002, "AP1000 Diverse Actuation System Diversity Analysis," Revision 0. This document is the Principal Closure Document (PCD) for ITAAC 2.5.01.03c and is cited in the ITAAC Determination Basis and directly supports the conclusion that the ITAAC Acceptance Criteria are met. The ITAAC Determination Basis is the information provided in the ITAAC Closure Notification that summarizes the methodology for conducting the inspections, tests and analyses, and the results that demonstrate the acceptance criteria are met. The inspectors verified that a Principal Closure Document Review checklist was completed and documented in accordance with procedure, NND-AP-0032, "Implementation of Inspections, Test, Analyses and Acceptance Criteria (ITAAC)," Revision 5. In addition, the inspectors

reviewed a sample of the qualification records for the ITAAC Technical Owner to determine whether the reviewer was qualified in accordance with NND-AP-0006, "NND Personnel In-Processing, Training, and Qualification," Revision 9.

b. Findings

No findings were identified.

1A14 (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.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.F-02.02 - Fabrication Records Review

The inspectors reviewed the receipt inspection package and associated certified material test reports (CMTRs) for submodules CA01-19 and CA01-25 to verify whether the materials met the specified testing requirements, in accordance with ASME standards. E&DCRs were reviewed to verify whether the dispositions were in accordance with codes and standards. CA01-25 is a portion of the north refueling cavity wall and goes from elevation 98' to 107'2". CA01-19 is a corner piece that contains portions of the following walls:

- West wall of the refueling cavity, from elevation 97'9" to 135'3"
- West wall of the reactor vessel cavity, from elevation 83' to 152' 10 ½"
- South wall of the west steam generator compartment, from elevation 83' to 152' 10 ½"

The inspectors reviewed the receipt package and associated documents for submodule CA01-14. CA01-14 is a portion of the north wall of the reactor cavity and goes from 83' to 135'3" in elevation. Specifically, inspectors reviewed CMTRs to verify whether materials met the specified testing requirements, in accordance with ASME standards. The specific CMTRs reviewed were:

- FN-0586, welding material DW-309LP, heat #F4C23914141, dated 3/28/2014
- IN-1943, welding material DW-60, heat AV4280, dated 2/14/2014
- NSW-350-10, studs material A108 Grade 1015, dated 9/25/14
- PNQS-14-061, Plate material A572 Grade 60, dated 4/28/2014
- 302059/4054370.R00, Plate material A240 S32101, dated 8/29/2015

The inspectors reviewed weld travelers in the package to verify traceability. The inspectors reviewed nonconformance and disposition reports (N&Ds) in the package to verify that disposition was in accordance with applicable codes and standards.

The inspectors performed direct measurements and reviewed the condition of submodule CA01-14 in the laydown yard, which is a structural wall module that is a portion of the north reactor vessel cavity wall and is used as a primary shield wall around the reactor vessel compartment. The inspectors inspected the submodule in the laydown yard to verify that the shape, size and dimensions conformed to the approved specifications and design drawings.

The inspector took measurements of submodules CA01-25, CA01-04, and CA01-19 to verify that the shape, size, and dimensions conformed to approved design drawings and associated E&DCRs. Measurements for CA01-19 were taken before it had been set in place in the modular assembly building. Measurements for CA01-25 were taken after adjacent submodules had been welded to it. CA01-04 was measured in a laydown yard. CA01-04 is a corner piece that contain the following walls:

- East wall of the refueling cavity, from elevation 97'9" to 135'3"
- East wall of the reactor vessel cavity, from elevation 83' to 152' 10 ½"
- South wall of the east steam generator compartment, from elevation 83' to 152' 10 ½"

b. Findings

No findings were identified.

1A15 (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-02.04 - Production Controls
- 65001.F-02.04 - General QA Review

The inspectors inspected the completed weld, VS3-CA05-VWK-008-FW-0807, located between submodules CA05-08 and CA05-07 to verify whether it met the visual inspection criteria in American Welding Society (AWS) D.1.1-2000. The weld joined two A572 grade 60 carbon steel members which form part of the east wall for the Chemical and Volume Control System room inside containment. Additionally, the inspectors reviewed the weld records and welder qualifications to verify that the welders were qualified. The inspectors also reviewed the magnetic particle and ultrasonic examination reports and rework records to verify whether the weld was acceptable.

b. Findings

No findings were identified.

1A16 (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.A - As-Built Attributes for SSCs associated with ITAAC
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors performed an inspection of the vertical and horizontal reinforcement for wall section located at the southeast outside annulus portion (i.e. section of concrete Layer D2 from column line 5 to wedge between approximately azimuth 100 and 160 degrees) of the Unit 3 shield building from elevation 82'-6" to 90'-6". The inspectors independently measured horizontal and vertical lap splices, reinforcing steel spacing, and clear cover dimensions to determine whether field conditions conform to regulatory and design requirements, including American Concrete Institute Code (ACI) 349-01. In addition, the inspectors interviewed quality control and field engineering personnel to determine if procedures were followed and deviations were adequately addressed. The inspectors verified the following:

- the steel reinforcement was the appropriate size, was free of excessive rust, and the forms were free of concrete;
- the applicable revisions of approved procedures, drawings, and instructions were being followed;
- nonconforming items were clearly identified, segregated, and dispositioned;
- any design changes or field modifications relevant to the work observed were properly controlled and processed in accordance with quality and technical requirements; and
- the steel reinforcement was assembled in accordance with the latest approved-for-construction drawings, manufacturer's instructions, and procedures.

b. Findings

No findings were identified.

1A17 (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:

- 65001.01-02.05 - Steel Structures
- 65001.A- As-Built Attributes for SSCs associated with ITAAC
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors performed a field inspection of construction activities associated with the Unit 3 shield building. The inspectors conducted field measurements, reviewed documents, and interviewed licensee personnel to assess the implementation of the portion of the quality assurance (QA) program specific to structural module design and fabrication activities. The inspectors reviewed various documents, such as design drawings, certified material test reports, weld travelers, specifications and receipt inspection documents, including attached nonconformity reports (NCRs) and N&Ds, to verify:

- design and fabrication of structural modules was completed in accordance with applicable specifications, drawings, and approved procedures;
- key building critical dimensions, materials, and separation satisfied design specifications, requirements, and relevant ITAAC;
- the licensee confirmed that components inspected conformed to design drawings and that deviations were being addressed in accordance with procedure requirements;
- nonconforming conditions identified by the licensee were being appropriately resolved; and
- if the as-built configuration was in accordance with the final design of the facility and met the associated ITAAC.

The inspectors performed independent measurements on the following samples of steel concrete composite structural sub-modules for the Unit 3 shield building:

- vertical reinforced concrete to steel concrete composite (RC/SC) connection panel 01H which is located approximately at azimuth 182 degrees along the interface with the reinforced concrete shield building wall between elevations 103"-4" and 125'-3"
- vertical RC/SC connection panel 01Q which is located approximately at azimuth 342 degrees along the interface with the reinforced concrete shield building wall between elevations 106"-6" and 117'-41/2"
- steel concrete composite (SC) panel 03K which is located in the northwest quadrant (approximately between azimuth 295 and 325 degrees) of the cylindrical shield building wall between elevation 113'-6" and 123'-6"
- SC panels 04K which is located in the northwest quadrant (approximately between azimuth 272.5 and 302.5 degrees) of the cylindrical shield building wall between elevation 123'-6" and 131'-6"
- horizontal RC/SC connection panel 01M which is located in the northwest quadrant (approximately between azimuth 270 and 295 degrees) of the cylindrical shield building wall between elevations 100"-0" and 103'-6"
- horizontal RC/SC connection panel 01L which is located in the southwest quadrant (approximately between azimuth 235 and 265 degrees) of the cylindrical shield building wall between elevations 100"-0" and 103'-6"

Specifically, the inspectors measured the following sub-module components: headed stud spacing and dimensions; module plate thickness; gusset plate dimensions and locations; and tie-bar spacing and dimensions. The inspectors also observed reinforcing steel placement, general module assembly, and welds.
The inspectors reviewed various documents, such as sub-module design drawings and specifications, to verify:

- the shape, size, dimensions, type, and grade of material conformed to the approved specifications and design drawings;
- design documents associated with ITAAC adequately defined the design and arrangement of the sub-module fabrication;
- applicable construction specifications, installation specifications, shop and field drawings, and construction procedures correctly identified and documented sub-modules for review and approval by responsible engineering personnel;
- fit-up tolerances for length, depth, and straightness of structural members were as specified; and
- critical attributes of as-built SSC conform to the design.

b. Findings

No findings were identified.

1A18 (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:

- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.01-02.06 - Records
- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.F-02.01 - Design Document Review
- 65001.F-02.03 - Observation of Fabrication Activities

The inspectors observed and reviewed the installation of reinforcing steel from elevation 82'-6" to 100'-0" between the plant east side of the auxiliary building I line wall from column line 7.3 to column line 10 for Unit 3. The inspectors observed reinforcing steel placement and reviewed applicable design drawings and specifications to determine whether structural concrete work was being performed in accordance with design specifications and approved procedures. Specifically, the inspectors verified:

- structural concrete design and construction was accomplished under controlled conditions and in accordance with applicable procedures, specifications, drawings, and approved procedures using qualified personnel;
- key building critical dimensions and materials satisfied design specifications, requirements, and relevant ITAAC;
- deviations from the design due to as-built conditions were identified and documented appropriately;
- records reflected that completed work met design specifications and acceptance criteria;
- reinforcing steel installation was controlled and performed in accordance with the applicable specifications, codes, drawings, and procedures; and
- reinforcing steel was located properly in the structures, secured, free of excess rust, and had proper clearances.

- In addition, inspectors reviewed applicable E&DCRs associated with the reinforcing steel installation to determine whether:
- the licensee was identifying problems at an appropriate threshold and entering them into the corrective action program;
- nonconforming material was adequately identified and segregated; and
- deviations from requirements were effectively resolved.

Finally, the inspectors witnessed inspection of the reinforcing steel to verify that the inspector was performing an adequate inspection in accordance with the design specifications and requirements. The inspectors verified that all issues identified by the QC personnel in IRs were adequately corrected.

b. Findings

No findings were identified.

1A19 (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:

- 65001.01-02.06 - Records
- 65001.B-02.03 - Welder Qualification
- 65001.B-02.06 - Records
- 65001.F-02.01 - Design Document Review
- 65001.F-02.02 - Fabrication Records Review
- 65001.F-02.03 - Observation of Fabrication Activities

The inspectors observed the construction activities related to welds VS3-CA20-VWK-097-FW-1823-007 and VS3-CA20-VWK-097-FW-1823-008. These welds were between submodules CA20-18 and CA20-23, which makeup part of module CA20. Module CA20 is a series of steel walls in the radiation area of the auxiliary building. These submodules are located on along column line 2, which is the south wall of CA20. The inspectors observed in-process welding and reviewed associated welding documentation, including welder qualification records, to verify that this activity was performed in accordance with welding procedures. The inspectors also observed fit up and tacking of backing plate for the welds located between submodules CA20-26 and CA20-27, and the fit up of the backing plate between submodules CA20-18 and CA20-19. The inspectors also reviewed design drawings as well as design deviations.

b. Findings

No findings were identified.

1A20 (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.A - As-Built Attributes for SSCs associated with ITAAC
- 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.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors observed as-built configuration of the vertical and horizontal reinforcing bars from the wall along column line I between column lines 1 and 4 at elevation 82'-6" through 100'-0" within the radiologically controlled area of the Unit 3 auxiliary building. The inspectors independently measured a sample of horizontal lap splices, reinforcement spacing, shear reinforcement, clear cover dimensions, and vertical development lengths to determine if field conditions conform to regulatory and design requirements, including American Concrete Institute Code 349-01. In addition, the inspectors verified that steel reinforcement was the appropriate size, free of excessive rust, and had the required concrete cover. While in the inspection area the inspectors were able to determine if:

- the applicable revisions of approved procedures, drawings, and instructions were being followed;
- non-conforming items were clearly identified and dispositioned;
- any design changes or field modifications relevant to the work observed were properly controlled and processed in accordance with quality and technical requirements; and
- the steel reinforcement was assembled in accordance with the latest approved-for-construction drawings, manufacturer’s instructions, and procedures.

b. Findings

No findings were identified.

1A21 (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.B-02.01 - Program and Procedures Review
- 65001.B-02.02 - Welding Procedure Qualification
- 65001.B-02.04 - Production Controls

- 65001.B-02.05 - Inspection

The inspectors observed activities and reviewed documents associated with assembly of the Unit 3 spent fuel area floor modules located in the radiologically controlled area of the auxiliary building CA20 module to determine whether activities were conducted in accordance with approved procedures and specifications and met the requirements of the UFSAR and10 CFR Part 50 Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants." Specifically, the inspectors observed welding activities and completed welds and reviewed the work package, drawings, procedures, and weld data records for fillet weld lap joints (VS3-CA20-VWK-800097-FW-01, FW-03 and FW-05) on CA20-47 and CA20-50 sub-modules which form part of the spent fuel pool floor south and north sections to verify the following:

- welding had approved procedures describing administrative controls and work processes,
- procedures prescribed adequate methods of quality assurance to ensure the as-built condition met engineering requirements,
- welding Procedure Specifications (WPS) were qualified and pre-qualified procedures were in conformance with AWS D1.1-2000 requirements. WPSs were available, up to date and accurate,
- welding positions qualified for a WPS were in accordance with AWS D1.1-2000,
- the WPS specified all the applicable essential and nonessential supplementary variables referenced in the Code,
- work was conducted in accordance with weld data records,
- the weld joint is sufficiently protected from inclement conditions,
- surfaces to be welded were smooth, uniform, and free from significant surface discontinuities and free from harmful foreign materials,
- welding material and processes are adequately controlled as specified,
- weld joint geometry was as specified,
- welding variables specified in the WPS were routinely verified,
- inspections included both in-process and completed weld inspections and contained appropriate inspection hold points,
- nondestructive examination methods and acceptance criteria are as specified,
- inspection procedures ensured that the size, length, and location of welds conform to design requirements,
- acceptance criteria for completed welds were in accordance with AISC N690-94 and AWS D1.1-2000, and
- the identification of welds and welders were maintained for each weld.

Additionally, the inspectors reviewed a sample of design output documents and engineering design and coordination reports (E&DCRs) associated with structural modules to verify that AISC N690-94, AWS D1.1-2000, and UFSAR welding requirements were being adequately implemented.

b. Findings

No findings were identified.

1A22 (Unit 3) ITAAC Number 3.3.00.02a.ii.a (764) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.ii.a (764). The inspectors used the following NRC IPs/sections to perform this inspection:

- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors measured the thickness of submodule CA02-05 to verify that it was in accordance with the requirements of Appendix C, Table 3.3-1 of the V.C. Summer Unit 3 Combined Operating License document. Submodule CA02-05 is a portion of the northeast wall of the IRWST. The thickness was measured in a laydown yard, prior to any welding or concrete pours.

b. Findings

No findings were identified.

1A23 (Unit 3) ITAAC Number 3.3.00.02a.ii.b (765) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.ii.b (765). The inspectors used the following NRC IPs/sections to perform this inspection:

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

The inspectors reviewed survey data contained in Nonconformance & Disposition Report VS3-1020-GNR-000001, which included 30 surveying data points, to determine if the thickness of the basemat beneath the V.C. Summer Unit 3 Shield Building was in accordance with Table 3.8.5-3 of the UFSAR. At the time of the inspection, the concrete was already poured from elevation 66'-0" up to 82'-6". During the N&D review, the inspectors noticed that all the survey data points were within tolerance except for one point as documented in VS3-1020-GNR-000001. The corrective actions proposed by the licensee to address this nonconformance had not been performed yet, however a corrective action plan was developed. The inspectors verified the adequacy of this corrective action plan.

b. Findings

No findings were identified.

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

1P01 Construction QA Criterion 7

a. Inspection Scope

The inspectors reviewed surveillance reports to determine whether the licensee had adequately implemented the quality requirements of 10 CFR Part 50, Appendix B, Criterion VII, "Control of Purchased Material, Equipment, and Services." Furthermore, the inspectors reviewed surveillance reports to determine whether the licensee had appropriately assessed the effectiveness of the control of quality by their subcontractors at intervals consistent with the importance, complexity, and quantity of the product or services. The inspectors also reviewed these reports to determine whether (1) the reports were adequate records of activities affecting quality, (2) the reports were completed in accordance with the licensee's quality assurance program implementing procedures, and (3) any issues identified by the licensee were appropriately identified (documented) and corrected in accordance with the project quality requirements.

b. Findings

No findings were identified.

1P02 Construction QA Criterion 10

a. Inspection Scope

The inspectors observed in-process inspections and reviewed documentation and records associated with welding and pipe spool fabrication to determine if the licensee, through their contractor WECTEC, is meeting the requirements of 10 CFR Part 50, Appendix B, Criteria X.

The inspectors observed the inspection of welds associated with rebar couplers welded to stainless steel embed plates fabricated for use inside Unit 2 and Unit 3 containment at elevation 83'. The tests were performed per Nonconformance and Disposition Report VSG-CE01-GNR-000010. The inspectors observed surface preparation and cleaning to determine if the requirements of GWS-5, Stainless Structural Steel General Welding Specification, Section 10.0 Post Weld Surface Conditioning were met. The inspectors reviewed procedure QAD 09.32, Liquid Penetrant Examination AWS Structural Welding Code D1.1 and D1.6, to determine if it met the requirements of ASTM E 165, Standard Test Method for Liquid Penetrant Examination, as required by AWS D1.6-1999 Section 6.7.6. The inspectors also observed in-process visual and liquid penetrant examinations performed by qualified WECTEC QC inspectors to determine if the inspections met applicable code and procedural requirements, including AISC N690-1994 Section Q1.26.2.3 and AWS D1.6-1999 Section 6.7.6. In addition, the inspectors reviewed the inspection reports generated by the QC inspectors to determine if the records met the requirements of NQA-1-1994 and the applicable procedure.

In addition, the inspectors reviewed documentation associated with the inspection of welds that attached steel frame platforms to overlay plates on the inside surface of the Unit 2 containment vessel. Specifically the inspectors reviewed documents associated with platforms SPL-22 and SPL-24. The inspectors reviewed the documents to determine if the QC inspections performed met the requirements of AISC N690-1994. Specifically, the inspectors reviewed weld records to determine if QC hold points were properly specified and adhered to and the inspection reports generated met the requirements of NQA-1-1994 and the applicable procedure.

Finally and during the inspection period, the inspectors observed QC inspectors performing inspections on Passive Core Cooling System (PXS) pipe spools. Specifically, the inspectors observed QC performing ultrasonic thickness tests and dimensional accuracy measurements including minimum wall thickness, ovality, bend angle, bend offset, slope, and configuration on pipe spool VS2-PXS-PLW-066, Spool #3. These inspections were performed to determine if received piping met the requirements of Westinghouse specifications VS2-PL02-Z0-001, Piping Class Sheets and Standard Details and VS2-GW-P0-007, AP1000 Specification for Shop Fabricated Piping. The inspectors observed QC inspectors performing calibration checks on the ultrasonic instrument using calibrated blocks and obtaining thickness measurements as required by procedure QAD 09.52, Ultrasonic Thickness Measurement. The inspectors also reviewed inspection reports generated by QC to determine if they met the requirements of NQA-1-1994 and the applicable procedure. Finally, where discrepancies were noted, the inspectors reviewed the Nonconformance and Disposition Reports generated to determine if the non-conforming conditions noted in the record matched the as-found conditions in the field.

b. Findings

No findings were identified.

1P03 Construction QA Criterion 16

a. Inspection Scope

Daily Corrective Action Program Review

As part of the various inspection procedures 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 procedures and evaluated implementation of these procedures 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 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 proactively 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 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.

Selected Issues for Follow-Up Inspection

Based on the inspectors' routine screening of corrective action records, the inspectors selected a sample of issues entered in the corrective action programs to determine if the handling of these issues was consistent with the applicable quality assurance program requirements and 10 CFR Part 50, Appendix B. Specifically, the inspectors reviewed the corrective action records listed in the documents reviewed section of this report. The inspectors reviewed these corrective action documents to determine if:

- conditions adverse to quality were promptly identified and corrected;
- classification and prioritization of the resolution of the problem was commensurate with its safety significance;

- for significant conditions adverse to quality, the cause was determined, corrective actions were taken to prevent recurrence, and the cause and corrective actions taken were documented and reported to appropriate levels of management;
- conditions were appropriately screened;
- the licensee and their contractors properly evaluated and reported the condition in accordance with 10 CFR 50.55(e) and 10 CFR 21;
- the identification and correction of design deficiencies were being adequately addressed;
- extent of condition was being adequately addressed; and
- appropriate corrective actions were developed and implemented.

The inspectors reviewed in detail actions associated with Westinghouse corrective action documents (CAPAL) 100360709 and 100360056, which addressed a change in the reinforcing layout to an auxiliary building exterior wall below grade. The design of shear ties in the wall were changed from T-headed bars, as described in UFSAR 3.8.4.4.1, to replace the T-head with a hook bend along one face of the wall. The inspectors independently reviewed applicable codes and standards to verify that the revised design met the applicable provisions. The inspectors also reviewed the licensee's nuclear safety evaluation, apparent cause evaluation, extent of condition determination, and corrective actions to verify the adequacy of the licensee's corrective action program to identify, address, and resolve these issues.

Additional corrective action documents reviewed are listed in the attachment to this report.

b. Findings

No findings were identified.

1P04 Construction QA Criterion 18

a. Inspection Scope

The inspectors examined audit schedules, audit reports, and associated documentation to verify implementation of the licensee's process for conducting audits. The inspectors examined the long-range South Carolina Gas & Electric (SCE&G) audit schedules to verify that areas to be audited and audit frequencies identified were consistent with commitments. The inspectors reviewed records of audits to verify that audits were included in the schedule, performed in accordance with the audit plan and completed within the scheduled time frame. The inspectors reviewed audit plans and related correspondence to verify that audit plans were prepared and issued. The inspectors conducted interviews to verify that auditors did not have direct responsibility in the areas that were auditing, they did not perform the work being audited, and they had direct access to the levels of management of the activities being audited. The inspectors reviewed audit reports to verify that they included a determination of effectiveness of implementation and compliance with the quality assurance program, and a summary of identified deficiencies. The inspectors also verified that audit results were reviewed by responsible management. The inspectors reviewed entries into the corrective action program, including corrective action reports (CARs), supplier corrective action reports (SCARs), condition reports (CRs), and supplier responses to

audit findings to verify that deficiencies identified during quality assurance audits were entered in the applicable corrective action program and were resolved.

b. Findings

No findings were identified.

4. OTHER INSPECTION RESULTS

4OA3 Follow-up of Licensee Reports

a. Inspection Scope

On September 10, 2014, the licensee made a 10 CFR 50.55(e) notification (Event Notification No. 50442) due to the identification of a significant breakdown in the QA Program of CB&I Lake Charles facility, a sub-supplier to CB&I-Power. Safety related structural modules manufactured by CB&I-Lake Charles and supplied to V.C. Summer contained welds that were made using welding procedure specifications that did not comply with AWS D1.1. Although previous revisions to the applicable welding procedures complied with AWS D1.1, the Lake Charles facility later revised the welding procedures without the review and approval of CB&I-Power. These later revisions utilized welding process variables that were not in accordance with the original procedure qualification record and were therefore no longer qualified in accordance with AWS D1.1.

CB&I-Power was notified by the Lake Charles facility of the QA breakdown and subsequently entered the issue into their corrective action program as CAR 2014-1316. CB&I-Power evaluated the condition in CB&I evaluation number 14-402, determined that the issue constituted a reportable event, and notified the licensee on September 4, 2014. The licensee subsequently entered the issue into their corrective action program as CR-NND-14-01217 and made the notification six days later as described above. The inspectors reviewed the events and circumstances related to the issue, including the referenced corrective action documents, to determine if the licensee:

- effectively classified, prioritized, and evaluated the condition for reportability;
- completely and accurately identified the problem in a timely manner, commensurate with its significance and ease of discovery;
- reported the issue in accordance with the reporting requirements of 10CFR50.55(e);
- identified the cause and implemented corrective actions to prevent recurrence of similar deficiencies;
- considered the extent of condition, generic implications, common cause, and previous occurrences;
- classified and prioritized corrective actions commensurate with the safety significance of the issue;
- identified corrective actions that were appropriately focused to correct the problem; and
- completed corrective actions in a timely manner commensurate with the safety significance of the issue.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

.1 Exit Meeting.

On April 20, 2016, the inspectors presented the inspection results to Mr. R. Jones, Vice President of New Nuclear Operations, along with other licensee and WEC 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

Z. Ashcraft, SCE&G Construction Supervisor
C. Baucom, WECTEC Licensing
D. Beauchamp, WECTEC Quality Program
B. Bedford, WEC ITAAC Manager
B. Bickley, SCE&G ITAAC
J. Bouknight, SCE&G Licensing Supervisor
K. Brown, SCE&G Licensing
L. Cunningham, SCE&G Quality Systems Manager
J. Cole, WEC Licensing Manager
S. DiTomasso, WEC ITAAC Manager
J. Dudiak, WEC Vice President
G. Glenn, WEC Licensing
P. Gibbons, SCE&G Construction Supervisor
B. Hirmanpour, SNC Licensing – ITAAC
J. Johnson, WECTEC Site QA Manager
M. Klinvex, WEC Licensing
N. Kellenberger, SCE&G Interim ITAAC Supervisor
B. McIntyre, WEC Licensing Director
R. Paese, WEC Licensing
B. Peters, SCE&G ITAAC
B. Philips, WEC Licensing
A. Rice, SCE&G Licensing Manager
F. Salter, SCE&G Construction
G. Sanders, SCE&G Licensing
B. Tune, SCE&G Construction
K. Young, SCE&G Construction Manager
P. Young, WEC Engineering Director

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Type	Status	Description
None			

LIST OF DOCUMENTS REVIEWED

Section 1

[2503 Documents]

Section 1A01

VS2-PV62-VQQ-001, "Quality Release & C of C for PV62 Valves," Rev. 1, Dated 10/28/2014
Westinghouse Design Specification APP-PV62-Z0-001, “Pressurizer Safety Valve, ASME B&PV Code, Section III, Class 1,” Rev. 7, Dated 9/27/2012
APP-PV62-Z0R-001, “Pressurizer Safety Valves (PSV), ASME Code Section III, Class I Valve Datasheet Report,” Rev. 4
V.C. Summer Nuclear Station, Units 2 and 3 Updated Final Safety Analysis Report, Section 5.4.9, "Reactor Coolant System Pressure Relief Devices," Rev. 3

Section 1A02

VS2-PV62-VQQ-001, "Quality Release & C of C for PV62 Valves," Rev. 1, Dated 10/28/2014
Westinghouse Design Specification APP-PV62-Z0-001, “Pressurizer Safety Valve, ASME B&PV Code, Section III, Class 1,” Rev. 7, Dated 9/27/2012
APP-PV62-Z0R-001, “Pressurizer Safety Valves (PSV), ASME Code Section III, Class I Valve Datasheet Report,” Rev. 4
Summer Unit 2 COL, Appendix A, Technical Specifications, Section 3.4.6, "Pressurizer Safety Valves"
V.C. Summer Nuclear Station, Units 2 and 3 Updated Final Safety Analysis Report, Section 5.4.9, "Reactor Coolant System Pressure Relief Devices," Rev. 3

CAPALs
100000651
100013265

CRs Generated from Inspection
CR-NND-16-00492

Section 1A03

APP-ML10-V6-003, "AP1000 Flued Head Detail Drawing for Penetration P19," Revision 1 dated 08/11/2015

APP-ML10-V6-009, "AP1000 Flued Head Detail Drawing for Penetration P20,” Revision 1 dated 08/11/2015

APP-ML10-V6-010, "AP1000 Flued Head Detail Drawing for Penetration P22,” Revision 1 dated 08/11/2015

APP-MV50-V1-019, "AP1000 Containment Vessel Mechanical Penetration Sleeves Bottom Head,” Revision 4 dated 12/22/2015

APP-1100-P0-906, "Steel Containment Vessel Mechanical Penetration Details,” Revision 4 dated 05/04/2010

Section 1A04

VS2-MT01-VDR-001 Rev.1, "AP1000 V.C. Summer Unit 2 Core Makeup Tanks Volumetric Scanning Report
VS2-MT01-Z0R-201 Rev. 0, "AP1000 Core Makeup Tank- V.C. Summer Unit 2 (VS2) As-Built Analysis
VC Summer Unit 2 & 3 Final Safety Analysis Report, dated 07/01/2015
VS2-MT01-GNR-018, Rev.0, "DN for As-Built Dimensions Out of Tolerance for the AP1000 Core Makeup Tanks (VS2, Component 1)"
VS2-MT01-GNR-019, Rev.1, "DN for As-Built Dimensions Out of Tolerance for the AP1000 Core Makeup Tanks (VS2, Component 2)"
PI-2411309-MT-001-CMT_4599, Rev. 1, "VC Summer Core Make-Up and Accumulator Tanks Data Collection and Volume Verification Plan" (Component 1)
PI-2411309-MT-001-CMT_4600, Rev. 1, "VC Summer Core Make-Up and Accumulator Tanks Data Collection and Volume Verification Plan" (Component 2)
PI-2411309-MT-002, Rev. 1, "VC Summer Core Make-Up Tank and Accumulator Tanks Invar Bar Measurement Check"

Section 1A05

Design Documents
1200-10211, “ALS 102, FPGA Binary, DAS Production,” Revision 3, February 2013
6105-10003, “SRNC Hardware Specification,” Revision 4, Dated March 25, 2013
6105-10004, “SRNC FPGA Software Requirements Specification,” Revision 13, Dated June 2015
6105-10014, “SRNC FPGA Software Design Description,” Revision 5, Dated June 2015
6105-00011, “CIM-SRNC Protocol Specification,” Revision 10, Dated February 2015
6105-20003, “CIM Hardware Specification,” Revision 4, Dated January 24, 2013
6105-20004, “CIM FPGA Software Requirements Specification,” Revision 17, Dated July 2015
6105-20014, “CIM FPGA Software Design Description,” Revision 5, Dated July 2015
6106-00105, “DAS ALS Design Specification,” Revision 6, Dated August 2014
6106-00401, “DAS FPGA Functional Requirements,” Revision 3, Dated August 2014
6106-00501, “DAS FPGA Design Specification,” Revision 3, Dated August 2014
6002-10204, “ALS-102 Core B FPGA Design Specification,” Revision 1, Dated August 23, 2012
6002-00010, “ALS Platform Requirements Specification,” Revision 18, Dated December 2013
APP-DAS-J1-001, “AP1000 Diverse Actuation System Functional Requirements,” Revision 7, Dated December 2015
APP-DAS-J3-321, “AP1000 Diverse Actuation System Detailed Functional Logic Diagram Instrument Channels,” Revision 4, November 2015
APP-DAS-J3-326, “Diverse Actuation System Detailed Functional Logic Diagram Reactor Trip,” Revision 3, November 2015
APP-DAS-J4-001, “Diverse Actuation System System Design Specification,” Revision 4, Dated July 2014
APP-DAS-J0R-002, “AP1000 Diverse Actuation System Diversity Analysis,” Revision 0, Dated December 2015
APP-PMS-J1-001, “AP1000 Protection and Safety Monitoring System Functional Requirements,” Revision 11, Dated December 2015
APP-PMS-J3-322, “Detailed Functional Diagram Steam Generator 2 Narrow Range Water Level Reactor Trips,” Revision 7, December 2015

APP-PMS-J4-020, “AP1000 System Design Specification for the Protection and Safety Monitoring System,” Revision 10, Dated January 2015
APP-PMS-J4-102, “AP1000 Protection and Safety Monitoring System Software Requirements Specification,” Revision 14, Dated May 15, 2014
APP-PMS-J4-020, “AP1000 System Design Specification for the Protection and Safety Monitoring System,” Revision 10, Dated May 15, 2014
WCAP-15775, “AP1000 Instrumentation and Control Defense-in-Depth and Diversity Report,” Revision 7, Dated November 2015
WCAP-16097-P-A, “Common Qualified Platform Topical Report,” Revision 3, Dated February 2013
WCAP-16675-P, “AP1000 Protection and Safety Monitoring System Architecture Technical Report,” Revision 7, Dated August 2015
WCAP-17179-P, “AP1000 Component Interface Module Technical Report,” Revision 5, Dated January 2014
WCAP-17184-P, “AP1000 Diverse Actuation System Planning and Functional Design Summary Technical Report,” Revision 10, Dated November 2015
WNA-DS-01271-GEN, “Component Interface Module Hardware Requirements Specification,” Revision 10, Dated January 2013
WNA-DS-01272-GEN, “Safety System Remote Node Controller Requirements Specification,” Revision 9, Dated September 2013
WNA-DS-02331-GEN, “Component Interface Module Logic Specification,” Revision 2, Dated March 2014
CIM code files, CIM-crc_32bit.v v1.2
DAS code files, DAS-b_crc32.v v1.8
DCP_DCP_005874, “Independent Reports for CIM and DAS Diversity”

Condition Reports
WEC CAPAL 100359279
WEC CAPAL 100359126
SCE&G Condition Report CR-NND-16-00176
SCE&G Condition Report CR-NND-16-00171

Procedures
NND-AP-0032, “Implementation of Inspections, Tests, Analysis and Acceptance Criteria (ITAAC),” Revision 5, September 4, 2015
NND-AP-0032, Attachment 3, “Principal Closure Document Review Checklist” for Unit 2 ITAAC 2.5.01.03c, Revision 0, December 9, 2015
NND-AP-0032, Attachment 3, “Principal Closure Document Review Checklist” for Unit 3 ITAAC 2.5.01.03c, Revision 0, December 9, 2015
NND-AP-0006, “NND Personnel In-Processing, Training, and Qualification,” Revision 9, April 30, 2014
Training Records

Selected Training Records, ITAAC 2.5.01.03c Technical Owner

Miscellaneous

NEI 08-01, “Industry Guideline for the ITAAC Closure Process under 10CFR Part 52,” Revision 5
Microsemi specification sheet, “”ProASIC3L Low Power Flash FPGAs,” Revision 13, January 2013
Actel specification sheet, “ProASIC3L, Low Power Flash FPGAs,” Version 1.3, February 2009

Actel specification sheet, “ProASICplus Flash Family FPGAs,” Version 5.8, June 2009
3BDS005666R101, “PC Elements AC160 for Westinghouse Version 1.3 Reference Manual,” Revision C
9008-00004, “PCBA Inspection Record,” Revision 12, April 2013
Standards/NRC Staff Guidance
NUREG/CR-6303, "Method for Performing Diversity and Defense-in-Depth Analyses of Reactor Protection Systems"
BRANCH TECHNICAL POSITION 7-19 (NUREG-800), "Guidance for Evaluation of Diversity and Defense-In-Depth in Digital Computer-Based Instrumentation and Control Systems"

Section 1A06

Weld Record 142686
100-PT-304, Liquid Penetrant Examination, Rev. 6
100-UT-304, Ultrasonic Examination, Rev. 1
100-UTMOK-311-026, NDE PQR/Scan plan
WPS5-10H.HT70, GTAW of A240, Rev. 6
VS2-CA03-VWK-043, CA03 Assembly Seam 10 Weld Map Sheet 2, Rev. D
VS2-CA03-VWK-042, CA03 Assembly Seam 9 Weld Map Sheet 2, Rev. D

Section 1A07

Quality Assurance Inspection Reports
CBI Nuclear Quality Assurance Inspection Report Type A C155-15-10111
CBI Nuclear Quality Assurance Inspection Report Type A C155-15-10109

Drawings
VS2-1208-SC-966-R1, Shield Building Steel Wall Panels El. 100’-0” to El. 248’-61/2” Connection Panel Details 6
VS2-1208-SC-966-R1, Shield Building Steel Wall Panels El. 100’-0” to El. 248’-61/2” Connection Panel Details 6
VS2-1208-SC-112-R0, Shield Building Steel Wall Panels Critical Erection Tolerances
VS2-1208-SC-271-R5, Shield Building Steel Wall Panels Connection Panel Group 27
VS2-1208-SC-935-R7, Shield Building Steel Wall Panels Wall Q Connection Details Sheet 1
VS2-1208-SC-936-R8, Shield Building Steel Wall Panels Wall Q Connection Details Sheet 2
VS2-1208-SC-926-R4, Shield Building Steel Wall Panels Wall Q Connection Details Sheet 3
VS2-1208-SC-925-R1, Shield Building Steel Wall Panels Wall Q Connection Details Sheet 4
VS2-1208-SC-114-R0, Shield Building Steel Wall Panels Critical Erection Tolerances
VS2-1208-SC-531-R2, Shield Building Steel Wall Panels Type 1 Panel Group 53
VS2-1208-SC-934-R4, Shield Building Steel Wall Panels Wall N Connection Details Sheet 1
VS2-1208-SC-924-R3, Shield Building Steel Wall Panels Wall N Connection Details Sheet 2
VS2-1208-SC-914-R3, Shield Building Steel Wall Panels Wall N Connection Details Sheet 3
VS2-1208-SC-532-R1, Shield Building Steel Wall Panels Type 1 Panel Group 53 Detail 1
VS2-1208-SC-563-R0, Shield Building Steel Wall Panels Type 1 Panel Group 56 Detail 2
VS2-1208-SC-573-R0, Shield Building Steel Wall Panels Type 1 Panel Group 57 Detail 2

Work Packages
VS2-1238-SCW-011
VS2-1238-SCW-021

Section 1A08

VS2-CC01-Z0-026, Safety Related Mixing and Delivering Concrete, Rev 7
VS2-CC01-Z0-031, Safety Related Placing Concrete and Reinforcing Steel, Rev 7

Section 1A09

VS3-PV62-VQQ-001, "Quality Release and Certificate of Conformance for PV62 Pressurizer Safety Valves," Rev. 1, Dated 11/17/2014
Westinghouse Design Specification APP-PV62-Z0-001, “Pressurizer Safety Valve, ASME B&PV Code, Section III, Class 1,” Rev. 7, Dated 9/27/2012
APP-PV62-Z0R-001, “Pressurizer Safety Valves (PSV), ASME Code Section III, Class I Valve Datasheet Report,” Rev. 4
V.C. Summer Nuclear Station, Units 2 and 3 Updated Final Safety Analysis Report, Section 5.4.9, "Reactor Coolant System Pressure Relief Devices," Rev. 3

CRs Generated from Inspection
CR-NND-16-00491
CR-NND-16-00493

Section 1A10

VS3-PV62-VQQ-001, "Quality Release and Certificate of Conformance for PV62 Pressurizer Safety Valves," Rev. 1, Dated 11/17/2014
Westinghouse Design Specification APP-PV62-Z0-001, “Pressurizer Safety Valve, ASME B&PV Code, Section III, Class 1,” Rev. 7, Dated 9/27/2012
APP-PV62-Z0R-001, “Pressurizer Safety Valves (PSV), ASME Code Section III, Class I Valve Datasheet Report,” Rev. 4
Summer Unit 3 COL, Appendix A, Technical Specifications, Section 3.4.6, "Pressurizer Safety Valves"
V.C. Summer Nuclear Station, Units 2 and 3 Updated Final Safety Analysis Report, Section 5.4.9, "Reactor Coolant System Pressure Relief Devices," Rev. 3

CAPALs
100000651
100013265

Section 1A11

Westinghouse Design Specification APP-GW-Z0-604, "Design Specifications for the Application of Protective Coatings to Systems, Structures, and Components for the AP1000 Reactor Plant for All Systems,” Revision 7
Williams Receiving Inspection Report 3081-026 dated 12/08/2014
Carboline Company Certificate of Compliance for Shipment 1207606-1 dated 12/02/2014
Williams Environmental Condition Log EXT-PANELS-U3LR-001 dated 12/31/2014
Williams Pre/Post Surface Preparation Inspection Log EXT-PANELS-U3LR-001 dated 12/29/2014
Williams Pre/Post Surface Preparation Inspection Log EXT-PANELS-U3LR-002 dated 12/30/2014

Williams Pre Coating Material Inspection Report EXT-PANELS-U3LR-001 dated 12/31/2014
Williams Post Coating Application Inspection Log EXT-PANELS-U3LR-001 dated 01/28/2015
Williams Action request Number WSS-2016-3081-0001 dated 03/15/2016
Williams Methyl Ethyl Ketone Rub Test Reports INT-EXT-U3LR-003 through-020 dated 03/22/2016
Carboline Product Data Sheet for Carbozinc 11HSN dated 11/2015

Section 1A12

Westinghouse Design Specification APP-GW-Z0-604, "Design Specifications for the Application of Protective Coatings to Systems, Structures, and Components for the AP1000 Reactor Plant for All Systems," Revision 7
Williams Receiving Inspection Report 3081-026 dated 12/08/2014
Carboline Company Certificate of Compliance for Shipment 1207606-1 dated 12/02/2014
Williams Environmental Condition Log INT-PANELS-U3LR-002 dated 02/18/2015
Williams Pre/Post Surface Preparation Inspection Log INT-PANELS-U3LR-002 dated 02/18/2015
Williams Pre Coating Material Inspection Report INT-PANELS-U3LR-001 dated 02/18/2015
Williams Action request Number WSS-2016-3081-0001 dated 03/15/2016
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FN-0562 (Welding)

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NND-SUR-2016-055, PT inspection of ASME Section III pipe spools, dated February 10, 2016
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NND-SUR-2016-068, PT examination on Cives embed welds for Unit 2, dated February 15, 2016
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VS2-GW-P0-007, AP1000 Specification for Shop Fabricated Piping, Rev 7
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Codes and Standards
AISC N690-1994, American National Standard Specification for the Design, Fabrication, and Erection of Steel Safety-related Structures for Nuclear Facilities
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V2-16-W-U-0139
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V3-15-W-P-0155
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VS2-1160-SSK-006-FW-A-003
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VS2-1160-SSK-006-FW-A-006
VS2-1160-SSK-006-FW-A-007
VS2-1160-SSK-006-FW-A-008
VS2-1161-SSK-005-FW-24-003
VS2-1161-SSK-005-FW-24-004
VS2-1161-SSK-005-FW-24-005

Nonconformance and Disposition Reports
VS2-PXS-GNR-000041, Rev 0
VS2-PXS-GNR-000043, Rev 0
VS2-PXS-GNR-000046, Rev 0

Section 1P03

CAR 2016-0720, Conforming Material mixed with non-conforming materials, dated 2/15/2016
CAR 2015-3989, Unit 3 CA-04 Module Repairs, dated 10/20/15
CAR 2015-3384, Lack of N690 Mag Particle Testing of Cives SR Welded Coupler Embeds, dated 9/02/15
CAR 2015-1006, VCS Unit 3 CA20-21 submodule shipped and received from Lake Charles with non-conforming rebar/coupler assemblies, dated 3/17/15

Section 1P04

NND-QS-0004, NND Supplier Quality Oversight Program, Revision 2, 7/08/15
2016 NND Quality Systems Audit Schedule, Rev 0, dated 11/11/15
2015 Units 2 and 3 Audit Schedule, Rev 1, dated 6/12/15
NND-QS-0006, NND QS Audits, Revision 2, 12/16/14
NND QS-Quality Assurance Construction Oversight Strategy, dated 3/1/16
NND-QS-0005, Surveillances, Revision 3, 10/1/15
NNDG-AP-0002, Criteria for Document Selection, Revision 0
NND-AUD-201515, VCS Units 2 and 3 Audit, dated December 9, 2015
NND-AUD-201514, CB&I QA Program Implementation Audit, dated October 19, 2015
NND-AUD-201513, WEC QA Program Implementation Audit, dated September 10, 2015
NND-AUD-201512, Equipment Preservation Audit, dated July 29, 2015
NND-AUD-201505, Construction Activities Audit, dated June 26, 2015
NND-AUD-201310-0, Design Control Audit, dated December 3, 2013

4. OTHER INSPECTION RESULTS

[4OA3 Documents]
SCE&G Documents:
CR-NND-14-01217
Audit NND-SUR-2015-106, CB&I Lake Charles Audit, dated 6/25/15
Audit NND-SUR-2015-075, CB&I Lake Charles Audit, dated 7/10/14

Audit NND-SUR-2015-073, CB&I Lake Charles Audit, dated 7/9/14

CB&I-Power:
CAR 2015-0335
CAR 2014-1316
Evaluation ID 14-402, QA Program Issues Associated with CB&I Lake Charles WPS Nonconformances, dated 9/3/14

WEC:
APP-GW-GNR-850034, Rev. 0, WPS 1-1-141, Non-Compliance to AWS Code Requirements
APP-GW-GNR-850050, Rev. 0, WPS 1-10-115, Non-Compliance to AWS Code Requirements
APP-GW-GNR-850077, Rev. 0, WPS 1-10-379, Non-Compliance to AWS Code Requirements
APP-GW-GNR-850213, Rev. 0, WPS 1-1-141, Non-Compliance to AWS Code Requirements
APP-GW-GNR-850217, Rev. 0, WPS 1-1-164, Non-Compliance to AWS Code Requirements

CB&I-Lake Charles:
CR 2013-1641
Root Cause Evaluation 2013-1641

Drawings:
APP-1200-CR-932, "Auxiliary Building Areas 3 & 4 Concrete Reinforcement Wall I Elevation," Revision 23
APP-1220-CR-932, "Auxiliary Building Areas 3 & 4 Concrete Reinforcement Wall I Sections and Details EL 82'-6"," Revision 9
APP-1220-CR-931, "Auxiliary Building Areas 3 & 4 Concrete Reinforcement Wall 7.3 Sections and Details EL 82'-6"," Revision 5

E&DCRs:
VS3-CR01-GEF-000088 - Vertical Dowel Bend Around Pipe
VS3-CR01-GNR-000106 - 7.3 Line Bars Fabricated too Short

ITAAC INSPECTED

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
28	2.1.02.08a.i	8.a) The pressurizer safety valves provide overpressure protection in accordance with Section III of the ASME Boiler and Pressure Vessel Code.	i) Inspections will be conducted to confirm that the value of the vendor code plate rating is greater than or equal to system relief requirements.	i) The sum of the rated capacities recorded on the valve ASME Code plates of the safety valves exceeds 1,500,000 lb/hr.
29	2.1.02.08a.ii	8.a) The pressurizer safety valves provide overpressure protection in accordance with Section III of the ASME Boiler and Pressure Vessel Code.	ii) Testing and analysis in accordance with ASME Code Section III will be performed to determine set pressure.	ii) A report exists and concludes that the safety valves set pressure is 2485 psig ± 25 psi.
90	2.2.01.01	1. The functional arrangement of the CNS and associated systems is as described in the Design Description of this Section 2.2.1.	Inspection of the as-built system will be performed.	The as-built CNS conforms with the functional arrangement as described in the Design Description of this Section 2.2.1.
139	2.2.02.07b.ii	7.b) The PCS wets the outside surface of the containment vessel. The inside and the outside of the containment vessel above the operating deck are coated with an inorganic zinc material.	ii) Inspection of the containment vessel exterior coating will be conducted.	ii) A report exists and concludes that the containment vessel exterior surface is coated with an inorganic zinc coating above elevation 135'-3".
140	2.2.02.07b.iii	7.b) The PCS wets the outside surface of the containment vessel. The inside and the outside of the containment vessel above the operating deck are coated with an inorganic zinc material.	iii) Inspection of the containment vessel interior coating will be conducted.	iii) A report exists and concludes that the containment vessel interior surface is coated with an inorganic zinc coating above 7' above the operating deck.

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
189	2.2.03.08c.vi.01	8.c) The PXS provides RCS makeup, boration, and safety injection during design basis events.	vi) Inspections of each of the following tanks will be conducted: 1. CMTs	vi) The calculated volume of each of the following tanks is as follows: 1. CMTs ≥ 2487 ft3
513	2.5.01.03c	3.c) Software diversity between the DAS and PMS will be achieved through the use of different algorithms, logic, program architecture, executable operating system, and executable software/logic.	Inspection of the DAS and PMS design documentation will be performed.	Any DAS algorithms, logic, program architecture, executable operating systems, and executable software/logic are different than those used in the PMS.
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.

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
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.
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.

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
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.
764	3.3.00.02a.ii.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.	ii) An inspection of the as-built concrete thickness will be performed.	ii.a) A report exists that concludes that the containment internal structures as-built concrete thicknesses conform to the building sections defined in Table 3.3-1.

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
765	3.3.00.02a.ii.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.	ii) An inspection of the as-built concrete thickness will be performed.	ii.b) A report exists that concludes that the as-built concrete thicknesses of the shield building sections conform to the building sections defined in Table 3.3-1.

LIST OF ACRONYMS

ACI	American Concrete Institute
ADAMS	Agencywide Documents Access & Management System
AISC	American Institute of Steel Construction
ANI	Authorized Nuclear Inspector
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
BPL	Bistable Processor Logic
CB&I	Chicago Bridge and Iron
CFR	Code of Federal Regulations
CIM	Component Interface Module
CLB	Control Logic Board
CRC	Cyclic Redundancy Check
CMT	Core Makeup Tank
CMTR	Certified Material Test Report
COL	Combined License
CV	Containment Vessel
DAS	Diverse Actuation System
E&DCR	Engineering and Design Coordination Report
EPC	Engineering, Procurement, and Construction
FW	Field Welds
GMAW	Gas Metal Arc Welding
GTAW	Gas Tungsten Arc Welding
HSL	High Speed Datalink
IP	Inspection Procedures
IR	Inspection Report
IRWST	In-Containment Refueling Water Storage Tank
ITAAC	Inspections, Tests, Analysis, and Acceptance Criteria
MDATs	Memory Data Elements
M&TE	Measuring & Test Equipment
N&D	Nonconformance and Disposition Report
NDE	Nondestructive Examination
NI	Nuclear Island
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
PCD	Principal Closure Document
PMS	Protection and Safety Monitoring System
PQR	Procedure Qualification Record
PT	Liquid Penetrant Testing
QA	Quality Assurance
QC	Quality Control
RC	Reinforced Concrete
SC	Steel Concrete Composite

SCE&G	South Carolina Gas & Electric
SG	Steam Generator
SRNC	Safety Remote Node Controller
SRS	Software Requirements Specifications
SSC	Structures, Systems, and Components
UDP	User Datagram Protocol
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Testing
WEC	Westinghouse Electric Company
WPS	Welding Procedure Specification

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Letter to R. Jones from Michael Ernstes dated May 12, 2016

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION UNITS 2 AND 3 – NRC INTEGRATED INSPECTION REPORTS 05200027/2016001, 05200028/2016001

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