

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

April 30, 2015

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 05200027/2015001,  
05200028/2015001

Dear Mr. Jones:

On March 31, 2015, 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 13, 2015, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

One NRC-identified finding of very low safety significance (Green) was identified during this inspection. This finding was determined to involve a violation of NRC requirements. However, because of the very low safety significance, and because the issue was entered into your corrective action program, the NRC is treating this issue as a non-cited violation (NCV) in accordance with Section 2.3.2.a of the NRC Enforcement Policy.

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

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

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be 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).

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

Sincerely,

**/RA/**

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

Docket Nos.: 5200027, 5200028

License Nos.: NPF-93 (Unit 2), NPF-94 (Unit 3)

Enclosure: NRC Inspection Report 05200027/2015001  
and 05200028/2015001  
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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Letter to R. Jones from Michael E. Ernstes dated April 30, 2015

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION UNITS 2 AND 3  
NRC INTEGRATED INSPECTION REPORTS 05200027/2015001  
AND 05200028/2015001

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**U.S. NUCLEAR REGULATORY COMMISSION  
Region II**

Docket Numbers: 5200027  
5200028

License Numbers: NPF-93  
NPF-94

Report Numbers: 05200027/2015001  
05200028/2015001

Licensee: South Carolina Electric & Gas

Facility: Virgil C. Summer Nuclear Station Unit 2  
Virgil C. Summer Nuclear Station Unit 3

Location:  
Inspection Dates: January 1, 2015 through March 31, 2015

Inspectors: A. Artayet, Senior Construction Inspector, DCI  
A. Buford, Construction Inspector, DCI  
P. Carman, Construction Inspector, DCI  
L. Castelli, Senior Construction Inspector, DCI  
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R. Mathis, Construction Inspector, DCI  
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A. Ponko, Senior Construction Inspector, DCI  
M. Shannon, Senior Construction Inspector, DCI  
C. Smith, Construction Inspector, DCI  
S. Smith, Vendor Inspector, NRO  
J. Vasquez, Construction Inspector, DCI

Accompanying Personnel: K. Mott, Electronics Engineer, NRO

Approved by: Michael Ernstes,  
Branch Chief  
Construction Projects Branch 4  
Division of Construction Projects

Enclosure



## SUMMARY OF FINDINGS

Inspection Report (IR) 05200027/2015001, 05200028/2015001; 01/01/2015 through 03/31/2015; Virgil C. Summer Nuclear Station Unit 2, Virgil C. Summer Nuclear Station Unit 3. Tests, Analyses, and Acceptance Criteria (ITAAC)-Related Work Inspections, and Construction Inspection Program: Inspection of Construction and Operational Programs.

This report covers a three month period of inspection by resident and regional inspectors, and announced Inspections, Tests, Analysis, and Inspection Criteria (ITAAC) inspections by regional inspectors. A green non-cited violation associated with the Design/Engineering cornerstone was identified consistent with the NRC Enforcement Policy, Section 2.3 and the temporary enforcement guidance outlined in enforcement guidance memorandum number EGM-11 006. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter (IMC) 2519, "Construction Significance Determination Process". Construction Cross Cutting Aspects are determined using IMC 0613, "Power Reactor Construction Inspection Reports." The Nuclear Regulatory Commission's (NRC's) program for overseeing the construction of commercial nuclear power reactors is described in IMC 2506, "Construction Reactor Oversight Process General Guidance and Basis Document."

### A. NRC-Identified and Self Revealed Findings

#### Cornerstone: Design Engineering

- Green. The inspectors identified an ITAAC finding of very low safety significance (Green) and associated non-cited violation (NCV) of 10 Code of Federal Regulations (CFR) Part 50, Appendix B, Criterion III, "Design Control" for South Carolina Electric and Gas' (SCE&G) failure, through their contractor Westinghouse, to include a design input into a design analysis document. The licensee entered this issue into their corrective action program as CR-NND-15-00496.

The finding was associated with the Design/Engineering cornerstone. The inspectors determined the performance deficiency was more than minor because it represented a non-conservative error in a calculation that defines the technical requirements for the Unit 2 wall on column line 2 located in the radiologically controlled area of the Auxiliary Building. The inspectors evaluated the finding using the construction significance determination process and determined the finding was of very low safety significance (Green) because it was associated with a portion of a structure assigned to the intermediate risk importance column of the construction significance determination matrix. The finding was determined to be an ITAAC finding because it was material to the acceptance criteria of Unit 2 ITAAC 763 (3.3.00.02a.i.d). The acceptance criteria of this ITAAC requires that a reconciliation report, concluding the "as-built" construction conforms to the approved design, is completed for the areas associated with the ITAAC. This finding is associated with deviations from design requirements that would not have been reconciled by the licensee as required by the ITAAC. This finding has a cross-cutting aspect in the area of Human Performance, Procedure Adherence, because the licensee failed to follow procedures associated with the control of design inputs for design analysis documents [H.8]. (Section 1A11)

**B. Licensee-Identified Violations**

No findings were identified.

## REPORT DETAILS

### Summary of Plant Construction Status

During this inspection period the licensee continued constructing the auxiliary building walls up to elevation 100' in Unit 2 and up to elevation 82'6" in Unit 3. Fabrication of floors began in the non-radiological area of the auxiliary building at the 82'6" level. Reinforcing bar installation is ongoing in the Unit 2 containment vessel up to elevation 83'. Fabrication continued on CA01, the module that will make up the steam generator rooms, pressurizer room and fuel transfer canal. Finally, several major components were received on site including both Unit 2 steam generators and the Unit 2 pressurizer.

### 1. CONSTRUCTION REACTOR SAFETY

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

#### IMC 2503, ITAAC-Related Work Inspections

1A01 (Unit 2) ITAAC Number 2.2.01.02a (91) / Family 06F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.02a (91):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
The components identified in Table 2.2.1-1 as ASME Code Section III are designed and constructed in accordance with ASME Code Section III requirements.	Inspection will be conducted of the as-built components as documented in the ASME design reports.	The ASME Code Section III design reports exist for the as-built components identified in Table 2.2.1-1 as ASME Code Section III.

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.06-02.01 - General Installation
- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.02 - Fabrication Records Review

The inspectors selected a sample of plates used to fabricate the upper ring of the containment vessel and reviewed the associated certified material test reports (CMTRs), certificate of conformance, and receipt inspection reports, to verify that they met the applicable quality and American Society of Mechanical Engineers (ASME) Code requirements. The CMTRs were specifically reviewed to determine if the plates met the chemical and physical property requirements of ASME Code Section II. The specific plates selected were: B2-E-19, B2-C-38, B2-E-13, B2-D-25, and B3-E-23.

b. Findings

No findings were identified.

1A02 (Unit 2) ITAAC Number 2.2.01.03a (93) / Family 06B

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.03a (93):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
Pressure boundary welds in components identified in Table 2.2.1-1 as ASME Code Section III meet ASME Code Section III requirements.	Inspection of the as-built pressure boundary welds will be performed in accordance with the ASME Code Section III.	A report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.06-02.01 - General Installation
- 65001.06-02.02 - Component Welding
- 65001.B-02.01-Program and Procedures Review
- 65001.B-02.02-Welding Procedure Qualification
- 65001.B-02.03-Welder Qualification
- 65001.B-02.04-Production Controls
- 65001.B-02.05-Inspection
- 65001.B-02.06-Records
- 65001.11-02.03 - Installation and Welding
- 65001.11-02.05 - Nondestructive Examination
- 65001.11-02.04 - Post Weld Heat Treatment
- 65001.F-02.02-Fabrication Records Review
- 65001.11-02.01 - Purchase Orders

The inspectors selected four pressure boundary welds comprising the upper ring of the containment vessel and reviewed a selection of records to verify that they were welded in accordance with the applicable quality and ASME Code requirements. The welds selected were: B2-E-19 to B2-E-20, B2-E-13 to B2-E-17, B2-D-25 to B2-D-31, and B3-E-23 to B3-E-24 and for each weld the inspectors:

- reviewed the weld filler metal CMTR to verify it met the requirements of the ASME Code;
- viewed the radiographic film to verify that the weld was free of rejectable defects;
- reviewed the associated nondestructive evaluation (NDE) reports to verify that the welds had been inspected by qualified personnel and in accordance with the requirements of the ASME Code;

- reviewed the welding procedures used and their associated qualification records to verify that the welds had been made with qualified procedures in accordance with the ASME Code requirements;
- reviewed the welders' qualification records to verify that the welds had been made by welders qualified in accordance with the ASME Code requirements; and
- reviewed the weld traveler to verify that the welding process had been laid out, controlled, and signed as required by their quality assurance procedures.

The inspectors observed welding of the top head of the containment vessel to verify that it was being fabricated in accordance with applicable quality and ASME Code requirements. Specifically the inspectors observed submerged arc welding of weld TH5-F and shielded metal arc tack welding of weld TH5-E. For weld TH5-F the inspectors verified that welding variables, including heat input, were controlled and within the limits of the welding procedure, verified that measurements were taken using calibrated measuring equipment, that interpass temperatures were within the limits of the welding procedure, that the weld area was clean and free of detrimental contaminants, that the correct size and type of filler metal was being used, and that the traveler was at the area and correctly signed and indicated the current activities. Additionally the inspectors reviewed the welding procedure, ENi4/OK10.72 Rev. 7, and qualification record, procedure qualification record 13087, to verify that it had been written and qualified in accordance with the requirements of the ASME Code.

The inspectors observed weld TH5-E during initial tack welding using shielded metal arc welding. The inspectors verified that welding variables were in accordance with the welding procedure, verified that the size and type of welding rods being used were as prescribed in the procedure, that preheating was performed and verified by the welders before and during welding, that the weld area was clean and free of detrimental contaminants, and that the traveler was complete and accurate for the stage of work being performed.

b. Findings

No findings were identified.

1A03 (Unit 2) ITAAC Number 2.2.01.04a.ii (96) / Family 06F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.04a.ii (96):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
The components identified in Table 2.2.1-1 as ASME Code Section III retain their pressure boundary integrity at their design pressure.	Impact testing will be performed on the containment and pressure-retaining penetration materials in accordance with the ASME Code Section III, Subsection NE, to confirm the fracture toughness of the materials.	A report exists and concludes that the containment and pressure-retaining penetration materials conform with fracture toughness requirements of the ASME Code Section III.

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.F-02.01-Design Document Review
- 65001.F-02.02-Fabrication Records Review

The inspectors selected a sample of five plates used to fabricate the containment vessel upper ring [plates B2-E-19, B2-C-38, B2-E-13, B2-D-25, and B3-E-23] and reviewed the CMTRs to verify that impact toughness testing had been performed and resulted in toughness that met the requirements of the ASME Code.

b. Findings

No findings were identified.

1A04 (Unit 2) ITAAC Number 2.5.02.13 (552) / Family 10F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.5.02.13 (552):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
The use of commercial grade computer hardware and software items in the PMS is accomplished through a process that specifies requirements for: a) Review of supplier design control, configuration management, problem reporting, and change control. b) Review of product performance. c) Receipt acceptance of the commercial grade item. d) Acceptance based on equipment qualification and software validation in the integrated system.	Inspection will be performed of the process defined to use commercial grade components in the application.	A report exists and concludes that the process has requirements for: a) Review of supplier design control, configuration management, problem reporting, and change control. b) Review of product performance. c) Receipt acceptance of the commercial grade item. d) Acceptance based on equipment qualification and software validation in the integrated system.

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 43004-02.01 - Technical Evaluations
- 43004-02.02 - Controls for Acceptance of a Commercial Grade Item
- 43004-02.03 - Commercial Grade Dedication Plan

- 65001-Inspections of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Related Work

#### ITAAC Acceptance Criteria Verification:

The inspectors reviewed documents and records identified by the licensee to support closure of ITAAC 2.5.02.13 and reviewed the scope and results of previous NRC inspections (Inspection Report 99900404/2014-202 (ML14112A168)). The review was performed to verify that the inspected activities appropriately support ITAAC closure.

Specifically, the NRC inspection team reviewed the ITAAC principal closure document (PCD), APP-GW-GLR-616 "AP1000 Design Certification ITAAC 2.5.02.13: The Process used in the Commercial Grade Dedication of PMS Components" Technical Report, Revision 0, December 2014, and the associated implementing documents that were established for accomplishing the use of commercial grade computer hardware and software in the PMS. The purpose of the PCD was to provide a road map to the documentation that fulfilled the Inspection and Acceptance Criteria for the ITAAC and therefore confirmed that the Design Commitment was verified to be met.

The inspection included interviews with responsible licensee personnel and reviews of procedures, commercial dedication instructions (CDI), and other process control documents necessary for controlling use of commercial grade components in the PMS. The inspection included determining whether the applicable implementing documents established controls for:

- reviews of supplier design control, configuration management, problem reporting, and change control;
- reviews of product performance;
- receipt acceptance of the commercial grade items; and
- acceptance based on equipment qualification and software validation in the integrated system.

#### Commercial grade services:

The inspectors performed reviews of ITAAC 2.5.02.13 (parts a, b, and, c) completion documentation associated with the use of commercial grade services. The inspectors reviewed the Westinghouse procedures and CDI which had been identified in the PCD as applicable to the use of "build-to-print" fabrication services. The inspection scope also included a review of commercial controls that had not been identified in the PCD. Specifically, procurement specifications issued for "build-to-print" fabrication services were reviewed in order to verify the applicable attributes of ITAAC 2.5.02.13 were addressed. The review of the process for use of commercial grade fabrication services included a determination whether the guidance for conduct of commercial grade surveys and dedications of fabricated commercial grade items were accomplished in accordance with applicable regulations contained in 10 CFR Part 50 Appendix B and 10 CFR Part 21.

#### AC160 Nuclear Critical Components:

The inspectors performed reviews of ITAAC completion documentation associated with ITAAC 2.5.02.13 (parts a, b, and, c) in regards to the use of the AC160 Components.

The AC160 Controller assemblies consist of processors, communications and input/output modules which are used to perform safety related tasks for the PMS. The AC160 hardware is a product line purchased from ABB as a commercial grade product. As it relates to the use of commercial grade components in the PMS, the inspectors reviewed the Westinghouse procedures and CDI which had been identified in the PCD as applicable to the AC160 Nuclear Critical Components. Specifically, the AC160 hardware procurement specification was reviewed in order to verify the applicable attributes of ITAAC 2.5.02.13 were addressed. Commercial grade surveys, test reports and inspection procedures were reviewed to ensure that the governing procedures prescribed a process that would be acceptable to meet the requirements for the use of commercially acquired AC160 hardware and was accomplished in accordance with applicable regulations contained in 10 CFR Part 50 Appendix B and 10 CFR Part 21.

#### Acceptance based on Equipment Qualification:

The inspectors reviewed ITAAC 2.5.02.13 (part d) completion documentation to verify that the use of commercial grade computer hardware and software items in the PMS was accomplished through a process that specified requirements for acceptance based on equipment qualification (EQ). The inspectors reviewed the PCD, which states in part, that EQ verification is accomplished using design reviews, alternate calculations, or qualification tests as described in Westinghouse procedures. The inspectors noted that the PCD cited Westinghouse procedures, NA 7.4, NA 7.6, NA 4.38, WEC 3.3.3, WEC 7.2, and CDI -2625 as the road map and processes used to complete the ITAAC commitment for acceptance based on equipment qualification. As it relates to the use of acceptance based on EQ in the PMS, the inspectors reviewed the Westinghouse procedures and CDI-2625. The inspectors noted that procedure NA 7.6, "Certificates on Conformance," is the final step in the process for verifying that environmental qualification was completed.

#### Acceptance Based on Software Validation in the Integrated System

The inspectors reviewed ITAAC completion documentation associated with ITAAC 2.5.02.13 (part d), in regards to software validation in the integrated system. The inspectors reviewed the PCD, Software Program Manual (SPM), Common Q Platform Topical Report, Software Verification and Validation Plan (SVVP), System Test Plan (STP), and the independent verification and validation (IV&V) Testing Process to verify they met the requirements of ITAAC 2.5.2.13. The PCD defines the PMS software items as software related to the AC160 controller and the Flat Panel Display Personal Computer node box. The PCD also states that the integrated system validation includes the commercial off-the-shelf software used in the PMS. The SPM provided an overview of the PMS integrated system software validation process and listed IV&V tasks of the validation process. The details of this IV&V process were provided in SVVP. In addition, the inspectors reviewed the requirements of U.S. NRC RG 1.68, Institute of Electrical and Electronics Engineers (IEEE) Std. 1012, and ITAAC 2.5.2.13 to the SPM and SVVP to ensure consistency and validity.

The inspectors evaluated the SPM and SVVP and STP documents to verify that the integrated system validation process contained:

- the requirements that the fully integrated PMS system contain the actual system hardware and software;



- the requirements that the PMS integrated system test are performed in an environment that is real, or as close to real as can reasonably be created;
- the test requirements to determine whether the system meets its functional requirements (i.e., functional operations, system level performance, external interfaces, internal interfaces, testability, and other requirements); and
- the requirements for the system integration test to provide cross-channel integrated systems testing for the PMS and to address the PMS requirements documented in the PMS functional and system design specifications.

In addition, the inspectors reviewed the IV&V Testing Process documents for Common Q Safety Systems to assess the PMS system integration tests. Specifically, the inspectors observed that the PMS system integration tests would test the PMS integrated system functional requirements for:

- integration of all of the cabinets in the safety system;
- system-level functional and performance requirements requiring interaction from different divisions;
- communications between cabinets in different divisions;
- redundancy and fault tolerance incorporated in the system design; and
- system time response.

b. Findings

No findings were identified.

1A05 (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):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
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.	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.	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.

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.01-02.06 - Records

- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.03 - Observation of Fabrication Activities

The inspectors observed welding and NDE on structural module CA-01 to determine if it was being fabricated in accordance with the applicable quality and American Welding Society (AWS) D1.1 Code requirements. Specifically the inspectors observed gas tungsten arc welding of duplex stainless steel field weld 2719 and noted that the welding variables were within the limits of the welding procedure, that the weld area was clean and free of contaminants, that the correct size and classification of filler metal was being used, that the inter-pass temperature was within the limits of the welding procedure, and that the welding procedure was readily available at the work location. The weld was located on the interior face of the south wall of the west steam generator, and joined the submodules CA01\_19 and CA01\_27.

Additionally, the inspectors observed magnetic particle examination of field weld 1927 on module CA-01 to determine if it was inspected in accordance with the procedure and the AWS code and that any indications were properly noted and addressed. Specifically the inspectors noted that the technician correctly used the pie gauge before beginning, used the technique required by the procedure, that the temperature of the weld was taken with calibrated instrumentation before beginning, and that the magnetic yolk had been calibrated. Additionally the inspectors reviewed weld records, ultrasonic (UT) examination records, and magnetic particle (MT) examination records associated with the field weld to verify that records were consistent with the applicable construction code and design specifications. This weld was located on the exterior face of the south wall of the west steam generator compartment and joined submodules CA01\_19 and CA01\_27.

The inspectors also reviewed nonconformance and disposition report (N&D) VS2-CA01-GNR-000220, which was associated with vertical seam weld VS2-CA01-S4W-04002-FW-0504-03-RW1 on module CA-01 to verify the adequacy of the disposition. The weld was located on the south wall of the east steam generator compartment and joined submodules CA01-05 and CA01-04. The inspectors reviewed weld records, UT examination records, and MT examination records associated with the repair the N&D described to verify that the repair was performed in accordance with applicable codes, standards, regulations, and quality and technical requirements.

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 inspection procedure/sections to perform this inspection:

- 65001.01-02.01 - Procedures

- 65001.01-02.05 - Steel Structures
- 65001.01-02.06 - Records
- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.F- Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.02-Fabrication Records Review
- 65001.B-02.01-Program and Procedures Review
- 65001.B-02.02-Welding Procedure Qualification
- 65001.B-02.03-Welder Qualification
- 65001.B-02.04-Production Controls
- 65001.B-02.06-Records
- 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
- 65001.F-02.01-Design Document Review

The inspectors performed a direct inspection of construction activities associated with the assembly of containment internal structures module CA01 in the module assembly building. The inspectors observed in-process welding and reviewed documentation associated the interior seam weld joining submodules CA01-29 and CA01-30 (FW 2930-2) which form part of the west wall of the west steam generator compartment from elevation 103'-0" to 153'-0". The inspectors observed in-process welding to verify that the work was be performed in accordance with approved procedures and the essential variables that could be verified were within the ranges of the applicable welding procedure specification (WPS). The inspectors reviewed design drawings, WPSs, and supporting procedure qualification records (PQRs) to determine whether the welding activities were performed in accordance with the approved design, construction specifications, and AWS D1.1, Structural Steel Welding Code. The inspectors also reviewed welder performance qualification records and filler material certificates of compliance to verify that the personnel performing the work and the material used met the requirements of the construction specifications, AWS D1.1, and the WPS, as applicable.

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):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are	An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed	A report exists which reconciles deviations during construction and concludes that the as-built shield building structures,

designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	for the design basis loads.	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.
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The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.01-02.05 - Steel Structures
- 65001.01-02.06 – Records
- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.F- Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.02-Fabrication Records Review
- 65001.B-02.02-Welding Procedure Qualification
- 65001.B-02.03-Welder Qualification
- 65001.B-02.04-Production Controls
- 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 a field inspection of construction activities associated with the Unit 2 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, engineering and design coordination reports (E&DCRs), nonconformance and disposition records (N&Ds), specifications and receipt inspection documents, 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 2 shield building:

- reinforced concrete to steel concrete composite connection panels 01J and 01P which are the southernmost and northernmost reinforced concrete to steel concrete composite connection pieces, respectively between elevation 100'-0" and 103'-6" on the west exterior wall of the shield building; and

- steel concrete composite panels 02H and 02J which are located in the southwest quadrant of the cylindrical shield building wall between elevation 103'-6" and 113'-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 structure conform to the design.

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 inspection procedure/sections to perform this inspection:

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

The inspectors observed the interiors of the full-scale mockups of the AP1000 enhanced shield building vertical and horizontal reinforced concrete to steel composite transition areas (RC/SC Connection Modules) and tension ring sections. These observations were conducted after the mockups were demolished in a controlled manner for examination. The intent of the observations was to:

- verify that the licensee had established and was implementing a construction mockup program as described in Section 3.8.4.8 of the UFSAR;

- verify that the proposed construction means and methods are capable of producing a completed structure that meets design and licensing requirements;
- verify that, if adequately implemented, the planned quality assurance measures are sufficient to provide reasonable assurance that the completed structure has been constructed in accordance with design and licensing requirements;
- verify that lessons learned from the construction mockup program are being appropriately incorporated into planned quality assurance measures, inspection techniques, and construction means and methods; and
- support future NRC inspection activities by providing insights into and familiarization with planned quality assurance measures and construction means and methods associated with construction of the AP1000 enhanced shield building.

Specifically, the inspectors observed the interiors of mockups after they had been demolished to verify the following:

- concrete was well consolidated and uniform with good distribution throughout the section;
- no areas of honeycomb or significant voids were present;
- no conditions that could affect structural integrity of the sections were present; and
- no other nonconforming conditions were present.

b. Findings

No findings were identified.

1A09 (Unit 2) ITAAC Number 3.3.00.02a.i.c (762) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.c (762):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
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.	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.	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.

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.A- As-Built Attributes for SSCs associated with ITAAC

The inspectors performed an inspection of the vertical and horizontal reinforcement installation for the wall on column line 7.3 within the non-radiologically controlled area of the auxiliary building from elevation 82' 6" to 100'. For the inspection of the steel reinforcement of concrete walls, the inspectors observed reinforcing steel placement and reviewed applicable design drawings and specifications to determine whether structural concrete work were being performed in accordance with design specifications and approved procedures. Specifically, the inspectors conducted those activities to verify that:

- 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;
- structural concrete design and construction was accomplished under controlled conditions and in accordance with applicable procedures, specifications, drawings, and approved procedures using qualified personnel;
- 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 and embedments were located properly in the structures, secured, free of excess rust, and had proper clearances

The inspectors performed observations and independent measurements on sample areas of the structural concrete reinforcement placement, reviewed applicable design drawings, work packages and specifications to verify that:

- contractors performing safety-related work had approved implementing procedures that described administrative and procedural controls, approved work processes, and inspection requirements;
- procedures clearly prescribed acceptable methods of quality control inspection which ensured that the as-built condition met specified design requirements, drawings and material specifications;
- procedures included appropriate quantitative and/or qualitative acceptance criteria for determining that the prescribed activities had been accomplished satisfactorily;
- construction records for reinforcing steel and embedments were adequate to furnish evidence of activities affecting quality and that SSCs conform to applicable codes, standards, regulations, and quality and technical requirements; and
- reinforcing steel was installed in accordance with the latest approved-for-construction drawings and procedures; and records related to inspected activities were accurate and that the recorded information met project requirements, UFSAR, specifications, and ITAAC.

b. Findings

No findings were identified.

1A10 (Unit 2) ITAAC Number 3.3.00.02a.i.c (762) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.c (762).

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.01-02.01 - Procedures
- 65001.01-02.05 - Steel Structures
- 65001.01-02.06 - Records
- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.F- Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.01-Design Document Review
- 65001.F-02.02-Fabrication Records Review
- 65001.F-02.04-General QA Review
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.02-02.06 - Record Review
- 65001.02-02.07 - Problem Identification and Resolution
- 65001.A.02.02 - Installation Records Review
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors performed a direct field inspection of work activities associated with construction of reinforced concrete walls and composite floors in the non-radiologically controlled area of the Unit 2 auxiliary building. The inspectors observed the installed structural components and details in the following areas to verify that construction was in accordance with applicable specifications, drawings, and approved procedures:

- reinforced concrete wall section along column line (CL) K from CLs 10 and 11 between elevations 82'-6" and 100'-0"; and
- composite floor slab at elevation 82'-6" in room 12202 bounded by CLs 9.3,11,J, and K.

The inspectors performed independent measurements and observations of reinforcing steel in the wall and floor sections identified above. The inspectors observed the concrete reinforcing steel placement, reviewed documents and applicable design drawings and specifications, and interviewed licensee personnel to verify construction activities were conducted in accordance with design documents and applicable processes and procedures. Specifically, the inspectors verified that the horizontal and vertical reinforcing steel in the wall section was of the correct size, type, and spacing; inspectors also independently measured installed lap splices to verify that splice lengths were in accordance with WEC AP1000 Concrete General Notes. For the composite floor slab, the inspectors verified that the horizontal reinforcement in both directions was of



the correct size, type, and spacing, and that the metal decking and studs were properly installed. The inspectors also verified that the supporting steel for the composite floor slab was installed in accordance with the design drawings and specifications.

Specifically, inspectors independently measured steel angles, plates, and beam supports, and fillet welds for conformance to design requirements. The inspectors also verified that records reflected that completed work met design specifications and acceptance criteria. In addition, the inspectors reviewed various documents within the work packages and design control documents for the reinforcing steel, to verify that reinforcing steel was controlled and placement performed in accordance with the applicable specifications, codes, drawings, and procedures.

The inspectors also reviewed applicable design specifications and an E&DCR associated with metal decking connection to edge supporting steel to determine whether:

- the licensee identified problems at an appropriate threshold and entered them into the corrective action program; and
- deviations from requirements were effectively resolved.

b. Findings

No findings were identified.

1A11 (Unit 2) ITAAC Number 3.3.00.02a.i.d (763) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.d (763):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
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.	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.	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.

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.02 - Inspection of ITAAC-Related Installation of Structural Concrete
- 65001.A- As-Built Attributes for SSCs associated with ITAAC

The inspectors performed an inspection of the vertical and horizontal reinforcement of the wall on column line 2 between column line 1 and the east wall on CA20 at EL. 82'-6" through 100'-0" within the radiologically controlled area of the auxiliary building. The inspectors independently measured horizontal lap splices, reinforcement spacing, clear cover dimensions, and vertical development lengths to determine if field conditions conform to American Concrete Institute (ACI) 349-01 and design specifications. In addition, the inspectors verified that steel reinforcement was the appropriate size, free of excessive rust, and that embedded items were properly positioned 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

Introduction

The NRC inspectors identified an ITAAC finding of very low safety significance (Green) and associate non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for SCE&G's failure, through their contractor Westinghouse, to include a design input into a design analysis document.

Description

On February 02, 2015, the inspectors identified that the licensee installed safety-related reinforcing steel in the VC Summer Unit 2 Auxiliary Building wall on column line 2 that was not compliant with the design basis requirements established by ACI 349-01, "Code Requirements for Nuclear Safety related Concrete Structures;" and design calculation APP-1200-S3C-104, Rev. 0, "Auxiliary Building Wall 2 Reinforcement Detail Evaluation". Specifically, vertical reinforcement bars, in auxiliary building wall 2, were installed at a location where the effective depth was less than that required by the aforementioned calculation. The inspectors reviewed E&DCR APP-1010-GEF-039, Rev. 0, which relocated the wall dowels closer to the centerline on column line 2, and determined that drawing APP-1010-CR-109, "Nuclear Island Basemat Dowel Plan at EL.66'-6" Auxiliary Building Area 5" Rev. 3, a document among the list of impacted documents, was not included as a design input for the calculation.

The licensee delegated overall project quality requirements for safety related activities to their contractors through Section 5.1, "Quality Assurance Program," of Article 5, "Quality Assurance", of the Engineering Procurement and Construction Agreement. This agreement required, in part, that safety-related activities be performed in accordance with the quality requirements of 10 CFR Part 50, Appendix B, Criterion III. CB&I Nuclear

Quality Assurance Program document SWSQAP, revision B, commits to the requirements of ASME NQA-1 1994.

NQA-1, 1994, Supplement 3S-1 "Supplementary Requirements for Design Control," requires, in part, that the approved design output documents and approved changes shall be relatable to the design input by documentation in sufficient detail to permit design verification.

Westinghouse procedure 3.2.6, "Design Analysis", Rev. 1, section 7.3, states, in part, that "Changes from approved design inputs, including the reasons for the changes, shall be identified, approved, and documented in the design analysis documentation and controlled as necessary."

The licensee failed to properly control the approved design changes contained in E&DCR APP-1010-GEF-039, Rev. 0, by not including the relevant impacted document, column line 2 dowel plan drawing APP-1010-CR-109, Rev. 3, as an applicable design input to calculation APP-1200-S3C-104, Rev. 0. As a result, the final location of the dowels on wall 2, as discovered by the inspectors, did not conform to the location specified by the design calculation leaving the structural capacity of the wall indeterminate or unacceptable.

#### Analysis.

The inspectors determined that the failure to properly control approved design changes into design analysis documents as required by 10 CFR Part 50, Appendix B, Criterion III, was a performance deficiency. The performance deficiency was determined to be more than minor following the guidance in IMC 0613, "Power Reactor Construction Inspection Reports," Appendix E. Specifically, the performance deficiency represents a non-conservative error in a calculation that defines the technical requirements for the Unit 2 wall on column line 2 located on the radiologically controlled area of the Auxiliary Building.

The inspectors concluded this finding was associated with the Design/Engineering Cornerstone.

The inspectors evaluated the finding using the construction SDP in accordance with IMC 2519, "Construction Significance Determination Process, and determined that the finding was of very low safety significance (Green). The inspectors also determined the finding was mainly associated with an Auxiliary Building structure (Intermediate Risk), and that the licensee demonstrated, with reasonable assurance by design analysis, that the wall would have been able to meet its design function, and was assigned to Row 1 of the risk importance table.

This finding is associated with deviations from design requirements that had not been identified and reconciled by the licensee as required by the ITAAC. This finding has a cross-cutting aspect in the area of Human Performance, Procedure Adherence, because the licensee failed to follow procedures associated with the control of design inputs for design analysis documents [H.8].

## Enforcement.

10 CFR Part 50, Appendix B, Criterion III, requires, in part, that “Measures shall be established to assure that applicable regulatory requirements and the design basis, as specified in the license application, for those structures, systems, and components, to which Appendix B applies, are correctly translated into specifications, drawings, procedures, and instructions.”

Contrary to the above, on or before February 2, 2015, the licensee failed to select previously approved design changes to a dowel plan drawing as a design input into a design verification calculation. Specifically, the final design output of calculation APP-1200-S3C-104, Rev. 0, for Unit 2, wall 2, provided a location for the vertical reinforcement that was not in conformance with the dowels installed in the field per E&DCR APP-1010-GEF-039, Rev. 0 from elevation 66’6” to 82’6”.

Because this violation was of very low safety significance (Green) and it was entered into the licensee’s corrective action program as CR-NND-15-00496 and into WEC’s corrective action program as CAPAL-100123539, this violation is being treated as a non-cited violation (NCV 05200027-2015001-01, Unit 2 Auxiliary Building Internal Structures) consistent with Section 2.3 of the NRC Enforcement Policy and EGM 11-006.

Immediate corrective actions included the creation of E&DCR APP-CR01-GEF-037, Rev. 0, which changed the reinforcement design for wall 2 above elevation 82’6”, and the creation of supplemental calculation APP-1200-GEO-003, Rev. 0, “Auxiliary Building Wall 2 Reinforcement Concrete Design Supplement to APP-1200-S3C-104 due to the increase of the Clear Cover to 3”. The calculation demonstrated that after implementing the design changes contained in E&DCR APP-1010-GEF-039, Rev. 0, and APP-CR01-GEF-037, Rev. 0, the wall on column line 2 will perform its intended safety function and meets the requirements of ACI 349-01. Therefore, the inspectors determined this NCV is closed because the condition no longer impacts the ITAAC acceptance criteria.

### 1A12 (Unit 2) ITAAC Number 3.3.00.02a.i.d (763) / Family 01F

#### a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.d (763).

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.02 - Inspection of ITAAC-Related Installation of Structural Concrete
- 65001.A- As-Built Attributes for SSCs associated with ITAAC

The inspectors performed an inspection of the vertical and horizontal reinforcement for the wall on column line 1 between column lines I and N within the radiologically controlled area of the auxiliary building from elevation 82’ 6” to 100’. The inspectors independently measured horizontal and vertical lap splices, reinforcement steel spacing, and clear cover dimensions to determine whether field conditions conform to ACI 349-01. In addition, the inspectors verified that steel reinforcement was the appropriate size,

and free of excessive rust. While in the inspection area, the inspectors were able to determine if:

- the applicable revisions of approved procedures, drawings, and instructions were being followed; and
- the steel reinforcement was assembled in accordance with the latest approved-for-construction drawings, and procedures.

b. Findings

No findings were identified.

1A13 (Unit 2) ITAAC Number 3.3.00.02a.i.d (763) / Family 01F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.i.d (763).

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.01-02.06 - Records
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.02-02.07 - Problem Identification and Resolution
- 65001.A.02.01 - Observation of in-Process Installation Activities

The inspectors performed a field inspection of construction activities associated with concrete placement in the radiologically controlled area of the Unit 2 auxiliary building. The inspectors performed direct observations and reviewed associated documentation from the work package addressing concrete placement in exterior wall along column line 1 (from column line I to J-2) to ensure the following:

- 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 ticket was 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 to preclude areas of voids or honeycombing;
- 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; and

- test specimen samples, for concrete strength determination, were sampled at the required location and frequency and are cured in accordance with specified requirements.

b. Findings

No findings were identified.

1A14 (Unit 2) 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):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
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.	An inspection of the as-built concrete thickness will be performed.	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.

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.01-02.01 - Procedures
- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.A.02.02 - Installation Records Review
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors verified that the thickness of the following containment building internal structure in the V.C. Summer Unit 2 nuclear island was in accordance with the combined license Appendix C, Table 3.3-1 "Definition of Wall Thickness for Nuclear Island Buildings, Turbine Building, and Annex Building":

- shield wall between reactor vessel cavity and reactor coolant drain tank room

The inspectors performed a walk-down of the Unit 2 nuclear island and conducted an independent, direct measurement of the dimension between the north wall of the reactor vessel cavity and the south wall of the reactor coolant drain tank room at EL. 75'-6".

The inspectors also reviewed the licensee's completed survey data as listed in VS2-CA04-S4-105 Rev. 1, "Containment Building Areas 1, 2, 3, & 4 Structural Outline Datum Point Locations" and VS2-CB65-S5-011 Rev. 1, "Containment Building Areas 2 & 3

Assembled CB65 Structural Outline Datum Point Locations” to verify that the shield wall thickness listed above was met. The inspectors reviewed the approved licensee procedures for performing field surveying activities. The inspectors verified that these procedures contained adequate instructions, a clear method of quality control of measuring and test equipment use, and clear acceptance criteria for the work activities. The inspectors also verified that the surveying activities and associated calculations were conducted in accordance with the licensee’s quality assurance program.

b. Findings

No findings were identified.

1A15 (Unit 3) ITAAC Number 2.2.01.02a (91) / Family 06F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.02a (91).

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.06-02.01 - General Installation
- 65001.06-02.02 - Component Welding
- 65001.F-02.02-Fabrication Records Review
- 65001.11-02.03 - Installation and Welding
- 65001.11-02.05 - Nondestructive Examination

The inspectors reviewed ten CMTRs for five butt joint groove welds of 1 3/4" thickness on pressure retaining shell plates of the containment vessel middle ring for vertical welds B, G, and J on course S5, and vertical welds F and K on course S6 to determine whether the testing and results of chemical analysis, mechanical properties, carbon equivalency, heat treatment, and manual longitudinal wave ultrasonic examination were in accordance with the requirements of ASME Section III, Subsection NE, Class MC Components, WEC APP-MV50-Z0-001, AP1000 Containment Vessel Design Specification, Revision 8, and CB&I MS-SA-738B-2765, Material Specification for SA 738 Grade B Steel Plate, Revision 6.

b. Findings

No findings were identified.

1A16 (Unit 3) ITAAC Number 2.2.01.02a (91) / Family 06F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.02a (91).

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.F-02.02-Fabrication Records Review
- 65001.11-02.05 - Nondestructive Examination
- 65001.11-02.07 - Offsite Fabrication of Assemblies

The inspectors selected a sample of plates used to fabricate the lower ring of the containment vessel and reviewed the associated CMTRs, Certificate of Conformances, and receipt inspection reports, to verify that they met the applicable quality and ASME Code requirements. The CMTRs were specifically reviewed to determine if the plates met the chemical and physical property requirements of ASME Code Section II. The specific plates selected were: B2-E-19, B2-C-38, B2-E-13, B2-D-25, and B3-E-23.

The inspectors reviewed the CMTRs associated with the weld filler metal used to weld the equipment hatch insert plate to the containment vessel to verify that the material comprising the pressure boundary had been tested and met the chemical and physical properties required by the ASME Code.

For spare penetration P42 the inspectors reviewed the CMTRs associated with the weld filler metal used to weld the insert plate to the containment vessel and also for welding of the flange to the sleeve of the penetration. The CMTRs were reviewed to verify that the materials had been tested and met the chemical and physical properties required by the ASME Code.

For mechanical penetrations P27 and P35 the inspectors reviewed the CMTRs associated with the weld filler metal used to weld the insert plates to the containment vessel. The CMTRs were reviewed to verify that the materials had been tested and met the chemical and physical properties required by the ASME Code.

b. Findings

No findings were identified.

1A17 (Unit 3) ITAAC Number 2.2.01.03a (93) / Family 06B

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.03a (93).

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.06-02.01 - General Installation
- 65001.06-02.02 - Component Welding
- 65001.B-02.02-Welding Procedure Qualification
- 65001.B-02.03-Welder Qualification
- 65001.B-02.04-Production Controls
- 65001.B-02.05-Inspection
- 65001.11-02.03 - Installation and Welding
- 65001.11-02.05 - Nondestructive Examination
- 65001.F-02.02-Fabrication Records Review



The inspectors reviewed five Chicago Bridge and Iron (CB&I) weld travelers associated with the documentation of completed vertical butt joint groove welds B, G, and J for course S5, and welds F and K for course S6 of the CV middle ring to determine whether the weld filler metals and welders/operators were traceable, and the intermittent QC-WEC-ANI inspection hold/witness points for fit-up and tack, and final visual examinations were completed and accepted in accordance with the requirements of the CB&I Nuclear Quality Assurance Manual and ASME Section III, Subsection NE, Class MC Components.

The inspectors reviewed the latest revisions of CB&I WPSs E9018M H4R, Rev. 9, and E91TG-H4, Rev. 11, to determine whether changes were in accordance with the requirements of ASME Section IX and did not affect the essential variables of the Shielded Metal Arc Welding and Flux-cored Arc Welding processes, respectively.

The inspectors reviewed one Lincoln Electric CMTR on Lot-No. 1129C for Classification E91TG-H4 and two ESAB CMTRs on Lot-Nos. NNN083 and 000017 for Classification E9018M-H4R to determine whether the actual chemical composition and mechanical properties (including impact testing) were in accordance with the applicable requirements of ASME Section II – Part C, Specification for Welding Rods, Electrodes, and Filler Metals, and ASME Section III, Subsection NE.

The inspectors reviewed thirty-seven multiple welding process performance qualification records for each of six welders/operators (with a unique identification stamp) tested by X-ray radiography to determine whether actual essential variables for manual, semiautomatic, and machine welding were within the range qualified for production welding activities in accordance with ASME Section IX, Article III, Welding Performance Qualifications.

The inspectors reviewed CB&I X-ray films and reports (using a step wedge comparison film and calibrated densitometer) for five completed welds B, G, and J for course S5, and welds F and K for course S6 of the containment vessel middle ring to determine whether the techniques used to achieve the proper film quality and sensitivity in the area of interest (using an IQI essential wire of 11) was performed and accepted in accordance with the requirements of ASME Section III, Article NE-5000, Examination, and Section V, Article 2, Radiographic Examination.

b. Findings

No findings were identified.

1A18 (Unit 3) ITAAC Number 2.2.01.03a (93) / Family 06B

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.03a (93).

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.06-02.01 - General Installation
- 65001.06-02.02 - Component Welding
- 65001.B-02.01-Program and Procedures Review
- 65001.B-02.02-Welding Procedure Qualification
- 65001.B-02.03-Welder Qualification
- 65001.B-02.04-Production Controls
- 65001.B-02.05-Inspection
- 65001.B-02.06-Records
- 65001.11-02.03 - Installation and Welding
- 65001.11-02.05 - Nondestructive Examination
- 65001.11-02.11 - Problem Identification and Resolution
- 65001.11-02.04 - Post Weld Heat Treatment
- 65001.F-02.02-Fabrication Records Review

The inspectors reviewed a selection of records associated with the insert plate to containment vessel welds for mechanical penetrations P27 and P35 to verify that they were welded in accordance with the applicable quality and ASME Code requirements. For each weld the inspectors:

- reviewed the weld filler metal CMTR to verify it met the requirements of the ASME Code;
- viewed the radiographic film to verify that the weld was free of rejectable defects.
- reviewed the associated NDE reports to verify that the welds had been inspected by qualified personnel and in accordance with the requirements of the ASME Code;
- reviewed the welding procedures used and their associated qualification records to verify that the welds had been made with qualified procedures in accordance with the ASME Code requirements;
- reviewed the welders' qualification records to verify that the welds had been made by welders qualified in accordance with the ASME Code requirements; and
- reviewed the weld traveler to verify that the welding process had been laid out, controlled, and signed as required by their quality assurance procedures.

The inspectors selected five pressure boundary welds comprising the lower ring of the containment vessel and reviewed a selection of records to verify that they were welded in accordance with the applicable quality and ASME Code requirements. The welds selected were: B3-D-9 to B3-D-7, B3-A-7 to B3-A5, B3-D-5 to B3-D-2, B3-A-9 to B3-A-8, and B3-D-3 to B3-D-6. For each weld the inspectors:

- reviewed the weld filler metal CMTR to verify it met the requirements of the ASME Code;
- viewed the radiographic film to verify that the weld was free of rejectable defects.
- reviewed the associated NDE reports to verify that the welds had been inspected by qualified personnel and in accordance with the requirements of the ASME Code;
- reviewed the welding procedures used and their associated qualification records to verify that the welds had been made with qualified procedures in accordance with the ASME Code requirements;
- reviewed the welders' qualification records to verify that the welds had been made by welders qualified in accordance with the ASME Code requirements; and

- reviewed the weld traveler to verify that the welding process had been laid out, controlled, and signed as required by their quality assurance procedures.

b. Findings

No findings were identified.

1A19 (Unit 3) ITAAC Number 2.2.01.04a.ii (96) / Family 06F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.04a.ii (96).

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.06-02.01 - General Installation
- 65001.06-02.02 - Component Welding
- 65001.06-02.04 - Testing and Verification
- 65001.F-02.02-Fabrication Records Review

The inspectors reviewed CMTRs for the middle ring shell plates and weld filler metals to determine whether the Charpy V-notch impact testing of pressure retaining materials were performed in accordance with the fracture toughness requirements of ASME Section III, Subsection NE, and WEC containment vessel design specification APP-MV50-Z0-001.

b. Findings

No findings were identified.

1A20 (Unit 3) ITAAC Number 2.2.01.04a.ii (96) / Family 06F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.2.01.04a.ii (96).

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.06-02.01 - General Installation
- 65001.F-02.02-Fabrication Records Review

The inspectors reviewed CMTRs associated with penetrations of the containment vessel to verify that pressure boundary materials met ASME Code requirements. Specifically the inspectors reviewed CMTRs associated with the sleeve for the fuel transfer tube penetration and the blind flange for spare penetration P42 to determine if the impact toughness as measured exceeded the minimum allowed by the ASME Code.

b. Findings

No findings were identified.

1A21 (Unit 3) ITAAC Number 2.5.02.13 (552) / Family 10F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.5.02.13 (552).

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 43004 - Inspection of Commercial-Grade Dedication Programs
- 43004-02.01 - Technical Evaluations
- 43004-02.02 - Controls for Acceptance of a Commercial Grade Item
- 43004-02.03 - Commercial Grade Dedication Plan
- 65001-Inspections of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Related Work

ITAAC Acceptance Criteria Verification:

The inspectors reviewed documents and records identified by the licensee to support closure of ITAAC 2.5.02.13 and reviewed the scope and results of previous NRC inspections (Inspection Report 99900404/2014-202 (ML14112A168)). The review was performed to verify that the inspected activities appropriately support ITAAC closure.

Specifically, the NRC inspection team reviewed the ITAAC PCD, APP-GW-GLR-616 "AP1000 Design Certification ITAAC 2.5.02.13: The Process used in the Commercial Grade Dedication of PMS Components" Technical Report, Revision 0, December 2014, and the associated implementing documents that were established for accomplishing the use of commercial grade computer hardware and software in the PMS. The purpose of the PCD was to provide a road map to the documentation that fulfilled the Inspection and Acceptance Criteria for the ITAAC and therefore confirmed that the Design Commitment was verified to be met.

The inspection included interviews with responsible licensee personnel and reviews of procedures, CDI, and other process control documents necessary for controlling use of commercial grade components in the PMS. The inspection included determining whether the applicable implementing documents established controls for:

- reviews of supplier design control, configuration management, problem reporting, and change control;
- reviews of product performance;
- receipt acceptance of the commercial grade items; and
- acceptance based on equipment qualification and software validation in the integrated system.

### Commercial Grade Services:

The inspectors performed reviews of ITAAC 2.5.02.13 (parts a, b, and, c) completion documentation associated with the use of commercial grade services. The inspectors reviewed the Westinghouse procedures and CDI which had been identified in the PCD as applicable to the use of "build-to-print" fabrication services. The inspection scope also included a review of commercial controls that had not been identified in the PCD. Specifically, procurement specifications issued for "build-to-print" fabrication services were reviewed in order to verify the applicable attributes of ITAAC 2.5.02.13 were addressed. The review of the process for use of commercial grade fabrication services included a determination whether the guidance for conduct of commercial grade surveys and dedications of fabricated commercial grade items were accomplished in accordance with applicable regulations contained in 10 CFR Part 50 Appendix B and 10 CFR Part 21.

### AC160 Nuclear Critical Components:

The inspectors performed reviews of ITAAC completion documentation associated with ITAAC 2.5.02.13 (parts a, b, and, c) in regards to the use of the AC160 Components. The AC160 Controller assemblies consist of processors, communications and input/output modules which are used to perform safety related tasks for the PMS. The AC160 hardware is a product line purchased from ABB as a commercial grade product. As it relates to the use of commercial grade components in the PMS, the inspectors reviewed the Westinghouse procedures and CDI which had been identified in the PCD as applicable to the AC160 Nuclear Critical Components. Specifically, the AC160 hardware procurement specification was reviewed in order to verify the applicable attributes of ITAAC 2.5.02.13 were addressed. Commercial grade surveys, test reports and inspection procedures were reviewed to ensure that the governing procedures prescribed a process that would be acceptable to meet the requirements for the use of commercially acquired AC160 hardware and was accomplished in accordance with applicable regulations contained in 10 CFR Part 50 Appendix B and 10 CFR Part 21.

### Acceptance Based on Equipment Qualification:

The inspectors reviewed ITAAC 2.5.02.13 (part d) completion documentation to verify that the use of commercial grade computer hardware and software items in the PMS was accomplished through a process that specified requirements for acceptance based on EQ. The inspectors reviewed the PCD, which states in part, that EQ verification is accomplished using design reviews, alternate calculations, or qualification tests as described in Westinghouse procedures. The inspectors noted that the PCD cited Westinghouse procedures, NA 7.4, NA 7.6, NA 4.38, WEC 3.3.3, WEC 7.2, and CDI - 2625 as the road map and processes used to complete the ITAAC commitment for acceptance based on equipment qualification. As it relates to the use of acceptance based on EQ in the PMS, the inspectors reviewed the Westinghouse procedures and CDI-2625. The inspectors noted that procedure NA 7.6, "Certificates on Conformance," is the final step in the process for verifying that environmental qualification was completed.

## Acceptance Based on Software Validation in the Integrated System

The inspectors reviewed ITAAC completion documentation associated with ITAAC 2.5.02.13 (part d), in regards to software validation in the integrated system. The inspectors reviewed the PCD, SPM, Common Q Platform Topical Report, SVVP, STP, and IV&V testing process to verify they met the requirements of ITAAC 2.5.2.13. The PCD defines the PMS software items as software related to the AC160 controller and the Flat Panel Display Personal Computer node box. The PCD also states that the integrated system validation includes the commercial off-the-shelf software used in the PMS. The SPM provided an overview of the PMS integrated system software validation process and listed IV&V tasks of the validation process. The details of this IV&V process were provided in SVVP. In addition, the inspectors reviewed the requirements of U.S. NRC RG 1.68, IEEE Std. 1012, and ITAAC 2.5.2.13 to the SPM and SVVP to ensure consistency and validity.

The inspectors evaluated the SPM and SVVP and STP documents to verify that the integrated system validation process contained:

- the requirements that the fully integrated PMS system contain the actual system hardware and software;
- the requirements that the PMS integrated system test are performed in an environment that is real, or as close to real as can reasonably be created;
- the test requirements to determine whether the system meets its functional requirements (i.e., functional operations, system level performance, external interfaces, internal interfaces, testability, and other requirements); and
- the requirements for the system integration test to provide cross-channel integrated systems testing for the PMS and to address the PMS requirements documented in the PMS functional and system design specifications.

In addition, the inspectors reviewed the IV&V Testing Process documents for Common Q Safety Systems to assess the PMS system integration tests. Specifically, the inspectors observed that the PMS system integration tests would test the PMS integrated system functional requirements for:

- integration of all of the cabinets in the safety system;
- system-level functional and performance requirements requiring interaction from different divisions;
- communications between cabinets in different divisions;
- redundancy and fault tolerance incorporated in the system design; and
- system time response.

### b. Findings

No findings were identified.

## 1A22 (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 inspection procedure/sections to perform this inspection:

- 65001.01-02.06 - Records
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.F-02.01-Design Document Review

The inspectors performed a field inspection of construction activities associated with construction of the Unit 3 shield building. The inspectors conducted inspections of the concrete reinforcing steel installation and reviewed documents and applicable design drawings and specifications.

The inspectors performed independent measurements and observations of horizontal and vertical reinforcement and wall dowels in the west exterior cylindrical wall of the shield building between elevation 66'-6" and approximately 78'-6". Specifically, the inspectors observed reinforcing steel placement, and various documents within the work packages and design control documents associated with reinforcing steel placement, to verify:

- reinforcing steel spacing, splices, and development lengths were in accordance with the applicable specifications, codes, drawings, and procedures; and
- reinforcing steel was located properly in the structure, secured, free of concrete or excessive rust, and had proper clearances.

b. Findings

No findings were identified.

1A23 (Unit 3) ITAAC Number 3.3.00.02a.i.b (761) / Family 01F

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 inspection procedure/sections to perform this inspection:

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

The inspectors observed the interiors of the full-scale mockups of the AP1000 enhanced shield building vertical and horizontal reinforced concrete to steel composite transition areas (RC/SC Connection Modules) and tension ring sections. These observations were conducted after the mockups were demolished in a controlled manner for examination. The intent of the observations was to:

- verify that the licensee had established and was implementing a construction mockup program as described in Section 3.8.4.8 of the UFSAR;
- verify that the proposed construction means and methods are capable of producing a completed structure that meets design and licensing requirements;

- verify that, if adequately implemented, the planned quality assurance measures are sufficient to provide reasonable assurance that the completed structure has been constructed in accordance with design and licensing requirements;
- verify that lessons learned from the construction mockup program are being appropriately incorporated into planned quality assurance measures, inspection techniques, and construction means and methods; and
- support future NRC inspection activities by providing insights into and familiarization with planned quality assurance measures and construction means and methods associated with construction of the AP1000 enhanced shield building.

Specifically, the inspectors observed the interiors of the mockups after they had been demolished to verify the following:

- concrete was well consolidated and uniform with good distribution throughout the section;
- no areas of honeycomb or significant voids were present;
- no conditions that could affect structural integrity of the sections were present; and
- no other nonconforming conditions were present.

b. Findings

No findings were identified.

1A24 (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 inspection procedure/sections to perform this inspection:

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.F-02.03-Observation of Fabrication Activities
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.A- As-Built Attributes for SSCs associated with ITAAC

The inspectors performed an inspection of the vertical and horizontal reinforcement of the wall on column line K between walls on column lines 7.3 and 11 at EL. 66'-6" through 82'-6" within the non-radiologically controlled area of the auxiliary building. The inspectors independently measured horizontal lap splices, reinforcement spacing, clear cover dimensions, and vertical development lengths to determine if field conditions conform to ACI 349-01 and design specifications. In addition, the inspectors verified that steel reinforcement was the appropriate size, free of excessive rust, and that embedded items were properly positioned 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;
- 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 and procedures.

b. Findings

No findings were identified.

1A25 (Unit 3) ITAAC Number 3.3.00.09 (814) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.09 (814):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
The reactor cavity sump has a minimum concrete thickness as shown in Table 3.3-5 between the bottom of the sump and the steel containment.	An inspection of the as-built containment building internal structures will be performed.	A report exists and concludes that the reactor cavity sump has a minimum concrete thickness as shown on Table 3.3-5 between the bottom of the sump and the steel containment.

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.01-02.01 - Procedures
- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.A.02.01 - Observation of in-Process Installation Activities

The inspectors verified that the following key dimension in the V.C. Summer Unit 3 nuclear island is in accordance with the combined license Appendix C, Table 3.3-5 "Key Dimensions of Nuclear Island Building Features":

- distance from bottom of containment sump to top surface of embedded containment shell

The inspectors observed the activities of the survey team in the Unit 3 nuclear island as they conducted acceptance testing of the dimension between the bottom of module KQ11, reactor cavity sump, and the top surface of the containment vessel bottom head following concrete placement. The inspectors verified that the survey equipment was within its calibration date, and that the daily, pre-measurement, and post-measurement calibration checks were performed.

The inspectors reviewed the approved procedures for performing field surveying activities. The inspectors verified that these procedures contained adequate instructions, a clear method of quality control of measuring and test equipment use, and clear acceptance criteria for the work activities.

The inspectors also reviewed the completed survey data as listed in VS3-KQ11-MTK-001 Rev. B, "Verification for Unit 3 Module 1110-KQ-11 WLS Sump Pump Structural Interfaces," to verify that the key dimension listed above was met following concrete placement. The inspectors verified that the surveying activities and associated calculations were conducted in accordance with the licensee's quality assurance program.

b. Findings

No findings were identified.

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

1P01 Quality Assurance Implementation, Appendix 5, Inspection of Criterion V – Instructions, Procedures, and Drawings (IP 35007)

a. Inspection Scope

The inspectors reviewed implementing documents associated with construction of safety related items to determine whether the documents addressed the quality assurance program document (QAPD), Updated Final Safety Analysis (UFSAR), and NQA-1 1994 commitments for implementing documents for seismic category I structures in the Auxiliary Building. The inspectors determined whether the licensee's documents established adequate measures to provide for the following:

- adequate information to allow another person with similar training and qualification to recreate the specific activity;
- if another method is used instead of preparing an implementing document, then information is incorporated by reference in, or as attachment to, the implementing document;
- prerequisites;
- quantitative and qualitative acceptance criteria for determining that activities have been satisfactorily accomplished; and
- person(s) responsible for implementing activities are described in the implementing document.

b. Findings

No findings were identified.

1P02 Quality Assurance Implementation, Appendix 13, Inspection of Criterion XIII – Handling, Storage and Shipping (IP 35007)

a. Inspection Scope

The inspectors reviewed the following quality assurance (QA) program implementing documents to ensure that they address the QAPD and UFSAR commitments for the handling, storage, and shipping of safety related and risk significant non-safety related items:

- Nuclear Procurement Procedure NPP 10-01, Rev. 04, Material Receipt, Storage, and Control;
- Nuclear Construction and Startup Procedure NCSP 03-16-2, Preventive Maintenance (PM) Program;
- Nuclear Construction and Startup Procedure NCSP-03-10-4, Measuring and Test Equipment Control;
- Nuclear Construction and Startup Procedure NCSP-04-45-1, Insulation Resistance Testing;
- Nuclear Construction and Startup Procedure NCSP-02-09-2, Construction Materials Management;
- Nuclear Construction and Startup Procedure NCSP-02-16-3, Construction Documents, Records Management and Control;
- Nuclear Quality Standard QS 13.01 Rev. 2, Rigging, Lifting and Transportation;
- Nuclear Quality Standard QS 13.11 Rev. 1, Material, Equipment Storage;
- Nuclear Quality Standard QS 13.13 Rev. 0, Material and Equipment Handling; and
- Nuclear Quality Standard QS 13.14 Rev. 1, Packaging and Shipping of Equipment and Materials.

The inspectors reviewed the on-site storage of the following of safety related and risk significant non-safety related items:

- Unit 2 reactor vessel;
- Unit 2 reactor vessel closure head (with integrated head package);
- Unit 2 steam generators;
- Unit 2 pressurizer;
- Unit 3 core makeup tanks;
- Unit 2 condensate pump motors;
- Unit 2 startup feedwater pump motors;
- Unit 2 6-inch motor-operated containment isolation valve with DC motor;
- Unit 2 and 3 diesel generators;
- Unit 2 and 3 feedwater heaters;
- Unit 2 digital rod position indication cabinet; and
- Unit 2 diverse actuation system cabinet.

The inspectors verified that the storage locations for these items met the storage requirements specified in the associated vendor manuals and Nuclear Quality Standard QS 13.11 Rev. 1, Material, Equipment Storage. The inspectors performed a walk-down of the storage spaces and verified that reasonable cleanliness and good housekeeping practices were being maintained, the area was free of excessive moisture and contaminants, and that the associated cribbing, pallets, and skids were not damaged. The inspectors verified that all access control, temperature, humidity, and nitrogen blanket requirements were being met or those discrepancies had been documented and

disposed in accordance with Nuclear Construction and Startup Procedure NCSP-02-08-1, Nonconformance Reporting and Control.

The inspectors reviewed the equipment preservation history cards and equipment preservation check records associated with the safety related and risk significant non-safety related items listed above to verify that the records were being completed and maintained in accordance with Nuclear Construction and Startup Procedure NCSP 03-16-2, Preventive Maintenance Program. The inspectors observed numerous preventive maintenance activities being conducted on these safety related and risk significant non-safety related items, including performance of moisture checks, insulation resistance testing, verification of electric space heater operation, motor shaft rotation, and inspection and repair of foreign material exclusion covers. The inspectors verified that these preventive maintenance activities were performed in accordance with the associated equipment preservation check records.

The inspectors observed either the preparations for or the handling of the following items, all of which had special handling requirements:

- Unit 2 steam generators;
- Unit 3 diesel generators;
- Unit 2 pressurizer; and
- Unit 3 core makeup tanks.

The inspectors reviewed the following equipment handling procedures to verify that special handling requirements were properly documented:

- VSG-VH01-VHH-001, Steam Generator Offload – Critical (ARFD and Manitowoc 18000);
- VSG-VH01-VHH-002, Steam Generator Handling with AFRD – Critical;
- VSG-MS40-VHH-001, Diesel Generator Unit Offload;
- VSG-MS40-VHH-002, Diesel Generator Unit Transport Plan;
- VSG-MV20-VEH-001, Offloading AP1000 Pressurizer;
- VSG-MT01-VHH-001, Core Makeup Tank Offload – Critical Lift Plan; and
- VSG-MT01-VHH-002, Core Makeup Tank Upending & Handling – Critical Lift Plan.

The inspectors reviewed the following shipping and handling records to verify that Nuclear Quality Standard QS 13.14 Rev. 1, Packaging and Shipping of Equipment and Materials, was properly implemented:

- shipping and handling records associated with the return of safety-related embed plate APP-11202-CE-PF311 to the vendor for rework per Q445-15-10191, Receipt Inspection – Embed Plates & Anchor Bolts; and
- shipping and handling records associated with the return of ASME Section VIII pressure vessel VS2-WLS-MV-02, WLS Degassifier Column to the vendor for rework per nonconformance and disposition report VS2-KB16-GNR-000002 Rev. 2.

b. Findings

No findings were identified.

1P03 Quality Assurance Implementation, Appendix 16, Inspection of Criterion XVI – Corrective Action (IP 35007)

.1 Daily Corrective Action Program Review

a. Inspection Scope

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;
- 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 root and contributing causes, as well as actions to preclude recurrence for significant conditions adverse to quality; and
- completion of corrective actions in a timely manner commensurate with the safety significance of the issue.

b. Findings

No findings were identified.

.2 Routine Review of Items Entered into the Corrective Action Program

a. Inspection Scope

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

- the licensee and the EPC consortium 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 EPC consortium 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

- potentially adverse trends were appropriately identified and corrected by the licensee or their contractors.

b. Findings

No findings were identified.

.3 Selected Issues for Follow-Up Inspection

a. Inspection Scope

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 List of Documents Reviewed section of this report.

The inspectors reviewed these corrective action documents to verify that:

- 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.

b. Findings

No findings were identified.

**4. OTHER INSPECTION RESULTS**

**40A5 OTHER ACTIVITIES**

.1 (Closed) NCV 05200027/2014003-001, "Inadequate Quality-Related Records Regarding Accumulator Tank Volume Calculation"

a. Inspection Scope

The inspectors performed a direct follow-up inspection of construction activities associated with NCV 05200027/2014003-001, which impacted ITAAC Number 2.2.03.08c.vi.02 (190).

The inspectors used the following NRC inspection procedure/sections to perform this inspection:

- 65001.06 - Inspection of ITAAC-Related Installation of Mechanical Components
- 65001.06-02.01 - General Installation
- 65001.A- As-Built Attributes for SSCs associated with ITAAC

The inspectors performed a review of the volumetric measurements performed on the Unit 2 accumulator tanks 1 and 2 to verify that the tank volumes were in accordance with the associated Inspections, Tests, Analyses, and Acceptance Criteria. The inspectors reviewed the scanning methodology, the data analysis methodology, and the calculated volumes of the Unit 2 accumulator tanks as provided in VS2-MT02-VDR-001, Rev. 1 "AP1000 V.C. Summer Unit 2 Accumulator Tanks Volumetric Scanning Report". Specifically, the inspectors verified that the measured volume of each of the Unit 2 accumulator tanks, assuming maximum instrument uncertainty, is greater than 2000 cubic feet.

Therefore, the inspectors determined that NCV 05200027/2014003-001 is closed because the condition no longer impacts the ITAAC acceptance criteria.

b. Findings

No findings were identified.

.2 Follow-up for Unit 2 ITAAC Number 2.2.01.02a (91) / Family 06F

Previous inspection reports documented inspection activities associated with welding and NDE of pressure boundary components (ITAAC 93). These inspections also applied to design and construction of ASME Section III components (ITAAC 91). The following provide reference to those inspection reports.

a. Inspection Scope

Inspection Report 05200027/2012-003 (ML12219A188), section 2503.4 discusses inspection activities associated with ITAAC 2.2.01.03a (93). This section also applies to ITAAC 2.2.01.02a (91).

Inspection Report 05200027/2012-004 (ML12319A648), section 2503.2 and section 2503.3 discuss inspection activities associated with ITAAC 2.2.01.03a. These sections also apply to ITAAC 2.2.01.02a.

Inspection Report 05200027/2013-004 (ML13304A907), section 1A03 and the associated documents reviewed discuss inspection activities associated with ITAAC 2.2.01.03a. This section also applies to ITAAC 2.2.01.02a.

Inspection Report 05200027/2014-002 (ML14119A251), section 1A02 discusses inspection activities associated with ITAAC 2.2.01.03a. This section also applies to ITAAC 2.2.01.02a.

b. Findings

No findings were identified.

.3 (Unit 2) ITAAC Number 2.5.02.12 (551) / Family 10F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.5.02.12 (551):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
<p>The PMS software is designed, tested, installed, and maintained using a process which incorporates a graded approach according to the relative importance of the software to safety and specifies requirements for: a) Software management including documentation requirements, standards, review requirements, and procedures for problem reporting and corrective action. b) Software configuration management including historical records of software and control of software changes. c) Verification and validation including requirements for reviewer independence.</p>	<p>Inspection will be performed of the process used to design, test, install, and maintain the PMS software.</p>	<p>A report exists and concludes that the process establishes a method for classifying the PMS software elements according to their relative importance to safety and specifies requirements for software assigned to each safety classification. The report also concludes that requirements are provided for the following software development functions: a) Software management including documentation requirements, standards, review requirements, and procedures for problem reporting and corrective action. Software management requirements may be documented in the software quality assurance plan, software management plan, software development plan, software safety plan, and software operation and maintenance plan; or these requirements may be combined into a single software management plan. b) Software configuration management including historical records of software and control of</p>



		<p>software changes. Software configuration management requirements are provided in the software configuration management plan. c) Verification and validation including requirements for reviewer independence. Verification and validation requirements are provided in the verification and validation plan.</p>
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In order to provide documentation of inspection activities associated with Inspection, Tests, Analysis, and Acceptance Criteria (ITAAC) under each affected docket, the following information was provided for inclusion in the V.C. Summer Unit 2 and 3 dockets.

Section 1 of NRC vendor inspection report 99900404/2014-202 (ML14112A168) documented an inspection of ITAAC 2.5.02.12 for software configuration management. The vendor report referenced and followed-up a previous inspection report for the protection and monitoring system (PMS) Requirements/Definition Phase for Vogtle Units 3 and 4 and concluded that the software supplier implemented its policies and procedures in accordance with Appendix B of 10 CFR Part 50. The vendor report further concluded that the activities and documentation for the Requirements/Definition phase for the PMS software life cycle for V.C. Summer Units 2 and 3 were the same as previously inspected for Vogtle Units 3 and 4. Thus, no additional site-specific inspection of the PMS Requirements/Definition Phase for V.C. Summer was warranted.

b. Findings

No findings were identified.

.4 (Unit 3) ITAAC Number 2.5.02.12 (551) / Family 10F

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 2.5.02.12 (551).

In order to provide documentation of inspection activities associated with ITAAC under each affected docket, the following information was provided for inclusion in the V.C. Summer Unit 2 and 3 dockets.

Section 1 of NRC vendor inspection report 99900404/2014-202 (ML14112A168) documented an inspection of ITAAC 2.5.02.12 for software configuration management. The vendor report referenced and followed-up a previous inspection report for the PMS Requirements/Definition Phase for Vogtle Units 3 and 4 and concluded that the software supplier implemented its policies and procedures in accordance with Appendix B of 10 CFR Part 50. The vendor report further concluded that the activities and documentation

for the Requirements/Definition phase for the PMS software life cycle for V.C. Summer Units 2 and 3 were the same as previously inspected for Vogtle Units 3 and 4. Thus, no additional site-specific inspection of the PMS Requirements/Definition Phase for VC Summer was warranted.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

.1 Exit Meeting Summary

On April 13, 2015, the inspectors presented the inspection results to Mr. R. Jones, Vice President of New Nuclear Operations, along with other licensee and consortium staff members. The inspectors stated that no proprietary information would be included in the inspection report.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licenses and Contractor Personnel**

K. Brown, Preventive Maintenance Manager  
S. DiTommaso, Manager ITAAC & Inspections, Westinghouse  
S. Dlugolenski, Principal Engineer, Westinghouse  
N. Hamm, Deputy Field Materials Manager  
J. Findlay Salter, Licensing, SCANA  
G. Sanders, Licensing, SCANA  
C. Ward, Deputy Preventive Maintenance Manager  
I. Watkins, Field Materials Manager

### **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

<u>Item Number</u>	<u>Type</u>	<u>Status</u>	<u>Description</u>
05200027/2015001-01	NCV	Open/Closed	Unit 2 Auxiliary Building Internal Structures (Section 1A11)
05200027/2014003-001	NCV	Closed	Inadequate Quality-Related Records Regarding Accumulator Tank Volume Calculation (Section 4OA5.1)

## LIST OF DOCUMENTS REVIEWED

### Section 1A01:

IHI/JFE CMTRs: 6341-7, 6353-2, 6341-1, 6354-1, 6341-11

IHI Certificate of Conformances: QA-COC-004-014-1, QA-COC-004-014-2, QA-COC-004-014-1, QA-COC-004-014-1, QA-COC-004-014-1

CB&I receipt inspection reports: U2-S9-001, U2-S10-001, U2-S9-001, U2-S11-001, U2-S9-001

### Section 1A02:

CB&I welding procedure: ENi4/OK10.72 Rev. 7

CB&I procedure qualification record: 13087

CB&I/Lincoln Electric Filler metal CMTRs lots 1075G, 1129C

CB&I NDE reports: VCS-U2-2014-RT-018, VCS-US-2014-RT-024, VCS-US-2014-RT-066, VCS-US-2014-RT-021

CB&I Welding Procedure: E91TG-H4 Rev. 11

CB&I Procedure qualification records: 12690, 12691, 12723, 12757

CB&I welder qualification records IDs: 838, 921, 560, 529,

CB&I weld travelers: B2E-S9-B, B2E-S9-D, B2D-S11-G, B2E-S9-K

### Section 1A03:

IHI/JFE CMTRs: 6341-7, 6353-2, 6341-1, 6354-1, 6341-11

### Section 1A04:

#### Commercial Grade Services

APP-GW-GLR-616, "AP1000 Design Certification ITAAC 2.5.02.13: The Process Used in the Commercial Grade Dedication of PMS Components Technical Report," Revision 0, Dated December 2014

CDI-4056, "Services Associated with Build to Print Fabricated Parts & Assemblies," Rev. 9

CDI-4057, "Services associated with Build to Print Electro-mechanical Parts & Assemblies," Rev. 11

QSP-218, "Quality Specification for Procurement Services Associated with Build to Print Electro-mechanical Parts and Assemblies," Rev. 9

QSP-219, "Quality Specification for Procurement Services Associated with Build to Print Fabricated Parts & Assemblies" Rev. 13

NA 7.4, "Preparation of Commercial Dedication Instructions (CDIs)," Rev. 5

WEC-7.2 "Dedication of Commercial Grade Items," Rev. 2.0

WEC 7.3, "Commercial Grade Surveys," Rev. 1.0

WES-2012-395-R, "Audit Package – CMC - Cygnus Manufacturing Company," dated 1/13/2013

WES-2013-126, "Audit Package – CBT Technology, Inc.," dated 11/8/2013

3D91746, "Standard Safety Power Supply Panels & Brackets Details; Sheet 1 of 5" Rev. 10

410097D48, "VC Summer Unit 2 AP1000 PMS ILC Division D Cabinet Configuration," Sheet 1 of 5, Rev. 1

10096D29, VC Summer AP1000 PMS A1687 Termination Unit Configuration," Sheet 1 of 5, Rev. 0

### AC160 Nuclear Critical Components

APP-GW-GLR-616, "AP1000 Design Certification ITAAC 2.5.02.13: The Process Used in the Commercial Grade Dedication of PMS Components Technical Report," Revision 0, Dated December 2014

CDI-2625, "AC160 Nuclear Critical Components," Revision 21, Dated 09/24/2014

2C48361, "AC160 HARDWARE PROCUREMENT," Revision 25

HTS-AC160-0001, "Inspection Procedure: Visual Inspection of AC160 Hardware," Revision 22, Dated October 2014

WES-2012-302-R, "Supplier Commercial Grade Survey Report, Supplier: ABB AB Control Technologies," Dated 08/27/2012

WNA-TR-02497-GEN, "Analysis of Sample Relay Testing of ABB Modules," Revision 2, Dated September 2011

### Acceptance Based on Equipment Qualification

APP-GW-G1-002, "AP1000 Equipment Qualification Methodology", Revision 4

APP-GW-GLR-616, "AP1000 Design Certification of ITAAC 2.5.02.13: The process used in the Commercial Grade Dedication of PMS Components Technical Report," Revision 0.

CDI-2625, AC160 nuclear critical components, Revision 21

CDI-4064, commercial grade survey of supplier Keystone Services

NA 4.38, "I&C Equipment Design / Equipment Qualification Process," Revision 2

NA 7.4, "Preparation of Commercial Dedication Instructions," Revision 5

NA 7.6, "Certificates on Conformance," Revision 1

WEC 3.3.3, "Design Verification," Revision 1

WEC 3.4.2, "Part Change Evaluation," Revision 0.1

WEC 7.2, "Dedication of Commercial Grade Items," Revision 2.0

WEC 7.3, "Commercial Grade Surveys," Revision 1.0

### Acceptance Based on Software Validation in the Integrated System

APP-GW-GLR-616, "AP1000 Design Certification ITAAC 2.5.02.13: The Process Used in the Commercial Grade Dedication of PMS Components Technical Report," Revision 0

WCAP-16096, "Software Program Manual for Common Q Systems," Revision 4,

WCAP-16097, "Common Qualified Platform Topical Report," Revision 3

WNA-PV-00054-WAPP, "AP1000 Protection and Safety Monitoring System Software Verification and Validation Plan," Revision 4

APP-PMS-T5-001, "AP1000 Protection and Safety Monitoring System Test Plan," Revision 4

WNA-PT-00058-GEN, "Nuclear Automation Independent Verification and Validation Testing Process for Common Q Safety Systems," Revision 5

WNA-PV-00009-GEN, "Automation and Field Services Independent Verification and Validation Software Verification & Validation Process for the Common Q Safety Systems," Revision 10

WNA-WI-00433-GEN, "Automation and Field Services Independent Verification & Validation Instructions for Updating IV&V Fulfillment Methods," Revision 0

CDI-3389, "ABB AC160 and AMPL Control Configuration Advanced Software and Media," Revision 7

CDI-3806, "QNX 4.25G Software for Generic Flat Panel Display Systems," Revision 4

### **Section 1A05:**

#### Welding Records

V2-15-W-U-0338, Phased Array Ultrasonic Examination Report for Weld number VS2-CA01-VWK-131-FW-1927-03, 3/16/15

V2-15-W-M-0273, Magnetic Particle Examination Report for weld number VS2-CA01-VWK-044-FW-1927-02-RW1, 2/11/2015  
V2-15-W-M-0275, Magnetic Particle Examination Report for weld number VS2-CA01-VWK-044-FW-1927-02-RW1, 2/16/2015  
V2-15-W-M-0465, Magnetic Particle Examination Report for weld number VS2-CA01-VWK-145-FW-0504-03-RW1, 2/19/2015  
V2-15-W-M-0291, Magnetic Particle Examination Report for weld number VS2-CA01-VWK-044-FW-1927-01; -03;-04, 2/5/2015  
V2-15-W-U-0181, Ultrasonic Examination Report for Weld number VS2-CA01-VWK-044-FW-1927-01;-02;-04, 3/16/2015  
V2-15-W-U-0269, Ultrasonic Examination Report for weld number VS2-CA01-VWK-145-FW-0504-03-RW1, 3/17/2015  
V2-15-W-M-0486, Magnetic Particle Examination Report for Weld Number VS2-CA01-VWK-145-FW-0504-03-RW1, 2/24/2015  
141366, Weld Record for Welds VS2-CA01-VWK-044-FW-1927-01;-02;-03;-04, Rev. 0  
141702, Weld Record for Weld VS2-CA01-VWK-145-FW-0504-03, Rev. 2  
N&D  
VS2-CA01-GNR-000220, CA01\_05/04 Vertical Weld Seam – Excessive Root Gap, Rev. 0  
Procedures  
WPS2-1.1T71, GTAW of AWS D1.1 Groups I, II, & A572 Gr. 60 materials, ER80S-Ni1, As welded with impacts, Rev. 4  
WPS5-8.10T70, Austenitic Stainless steels to A240 UNS S32101, Manual, Semi-automatic, and machine GTAW, ER309L, As welded, Rev.11 (this procedure used only for verification purposes).  
F-S561-001, Structural Welding inspection Visual-AWS D1.1 & AWS D1.6, Rev. 4  
100-MT-302, CB&I Review of Mistras MT Procedure, Rev. 3

#### **Section 1A06:**

##### Drawings

VS2-CA01-VWK-222, Seam 2930 Weld Map, Rev. A

##### Welding Procedure Specifications (WPSs)

WPS2-1.1M72, Rev. 6

##### Welding Procedure Qualification Records (PQRs)

SP124, Revision 1

SP427, Revision 0

#### **Section 1A07:**

##### Drawings

VS2-1208-V0-850014-R2, AP1000 Shield Building Panel Group 41 Assembly  
VS2-1208-V0-850015-R2, AP1000 Shield Building Panel Group 41 Assembly  
VS2-1208-V0-850016-R2, AP1000 Shield Building Panel Group 41 Assembly  
VS2-1208-V0-850003-R3, AP1000 Shield Building Panel Group 25 Assembly  
VS2-1208-V0-850328-R1, AP1000 Shield Building Panel Group 25 Assembly  
VS2-1208-V0-850004-R3, AP1000 Shield Building Panel Group 25 Assembly  
VS2-1208-V0-850005-R3, AP1000 Shield Building Panel Group 25 Assembly  
VS2-1208-V0-850047-R2, AP1000 Shield Building Panel Group 27 Assembly  
VS2-1208-V0-850048-R3, AP1000 Shield Building Panel Group 27 Assembly

VS2-1208-V0-850049-R3, AP1000 Shield Building Panel Group 27 Assembly  
VS2-1208-V0-850050-R3, AP1000 Shield Building Panel Group 27 Assembly  
VS2-1208-V0-850051-R3, AP1000 Shield Building Panel Group 27 Assembly  
VS2-1208-V0-850140-R2, AP1000 Shield Building Panel Group 27 Assembly  
VS2-1208-V0-850052-R3, AP1000 Shield Building Panel Group 27 Assembly

Quality Assurance Inspection Reports

Q445-14-0483  
Q445-14-02313  
Q445-14-0703  
Q445-15-10036

Engineering and Design Coordination Reports (E&DCRs)

APP-1208-GEF-188, Flatness, Curvature, and Peaking Requirements at Field Weld Seams, Rev. 0  
APP-1208-GEF-191, Shield Building Welding to ASME IX, Rev. 0  
APP-1208-GEF-195, Tie Bar Removal/Replacement for Panel Fit-Up, Rev. 0.  
APP-1208-GEF-197, Change SB Panel Monitoring Requirements, Rev. 0  
VSG-1238-GEF-000001, Concrete Cover for SB Horizontal Support PC, Rev. 0

Nonconformance & Disposition Reports (N&Ds)

VS2-1238-GNR-000002, U2 SB Course 01 Fit Up - Width of 2" Support Plate - Additional Locations, Rev. 0

Condition Reports (CRs)

10022588

**Section 1A09:**

Drawings

VS2-1200-CR-931, Rev. 7  
VS2-1210-CR-931, Rev. 7  
VS2-1220-CR-931, Rev. 7

E&DCR

APP-0000-GEF-056, Rev. 0

Nonconformance and Disposition

VS2-CR01-GNR-000243, Rev. 0

**Section 1A10:**

E&DCR No. VSG-SS01-GEF-000027, "Area 1 and 2 Deck Fasteners," Revision 0  
APP-0000-S9-001, "AP1000 Structural Steel General Notes," Revision 5  
APP-1220-SS-122, "Auxiliary Building Areas 1&2 Steel Framing Plan View EL 82'-6"," Revision 6  
APP-1220-CD-201, "Auxiliary Building Metal Deck Plan Area 2 @ EL 82'-6" Between Columns I Thru K," Revision 3  
APP-1200-CD-001, "Auxiliary Building Metal Deck Details Sheet 1," Revision 7  
APP-1200-SS-902, "Auxiliary Building Steel Details Beam and Deck/Panel Seats Sheet 2," Revision 13

APP-1200-SS-904, "Auxiliary Building Steel Details Beam and Deck/Panel Seats Sheet 4,"  
Revision 5  
APP-1222-CR-202, "Auxiliary Building Area 2 Concrete Reinforcement Floor EL 82'-6" Plan,"  
Revision 1  
APP-1200-CR-912, "Auxiliary Building Area 2 Concrete Reinforcement Walls J & K Elevations,"  
Revision 16  
APP-1220-CR-918, "Auxiliary Building Area 2 Concrete Reinforcement Wall K Sections &  
Details EL 82'-6"," Revision 4  
APP-1200-CR-992, "Auxiliary Building Concrete Reinforcement Typical Detail Opening (Sheet  
2)," Revision 7  
VS2-SS01-CD-870015, Revision 0  
VS2-SS01-CD-870016, Revision 3  
VS2-SS01-CD-870004, Revision 6  
VS2-SS01-CD-870007, Revision 3  
VS2-SS01-870034, "AP1000 Standard Erection Drawing," Revision 4  
VS2-SS01-870035, "AP1000 Standard Erection Drawing," Revision 5  
VS2-SS01-870036, "AP1000 Standard Erection Drawing," Revision 1  
VS2-SS01-870015, "AP1000 Standard Beam Fabrication Drawing," Revision 2  
VS2-SS01-870016, "AP1000 Standard Beam Fabrication Drawing," Revision 2  
VS2-SS01-870018, "AP1000 Standard Beam Fabrication Drawing," Revision 3  
VS2-SS01-870029, "AP1000 Standard Misc Seat Fabrication Drawing," Revision 3

#### **Section 1A11:**

##### Drawings

VS2-1200-CR-951, Rev.6  
VS2-1220-CR-951, Rev. 3  
VS2-1200-CR-900, Rev. 1

##### E&DCRs

APP-1010-GEF-039, Rev. 0  
APP-CR01-GEF-037, Rev. 0

##### Procedures

WEC 3.2.6, Rev. 1.0

##### Calculations

APP-1200-CCC-104, Rev. 1  
APP-1200-S3C-104, Rev. 0  
APP-1200-GEO-003, Rev. 0

##### N&Ds

VS2-CR01-GNR-000281, Rev. 0

#### **Section 1A12:**

##### Drawings

VS2-1200-CR-950, Rev. 6  
VS2-1220-CR-950, Rev. 3



**Section 1A13:**

VS2 – 1220 – CCW – 001 – ITAAC, "Concrete for all walls on elev. 82'-6" in U2 NI" Rev. 0

**Section 1A14:**

Procedures

NCSP 03-24, Rev. 2-A, Field Surveying

CSI 03-24, Rev. 6, Site-Specific Field Surveying Instructions

Drawings

VS2-CA04-S4-105 Rev. 1, Containment Building Areas 1, 2, 3, & 4 Structural Outline Datum Point Locations

VS2-CB65-S5-011 Rev. 1, Containment Building Areas 2 & 3 Assembled CB65 Structural Outline Datum Point Locations

VS2-CA04-S4X-001 Rev. 1, Containment Building Areas 1, 2, 3, & 4 Module CA04 Index I

VS2-CA04-S4-100 Rev. 1, Containment Building Areas 1, 2, 3, & 4 Module CA04 Structural Outline Plan View

VS2-CA04-S4-102 Rev. 0, Containment Building Areas 1, 2, 3, & 4 Module CA04 Structural Outline Vertical View Looking East

VS2-1100-CC-901 Rev. 6, "Containment / Shield Buildings Section A-A"

VS2-1110-CC-340 Rev. 4, "Containment / Shield Buildings Concrete Floor @ El. 71'6" Areas 3 & 4"

**Section 1A15:**

Kobe Steel, CMTR PNQS-12-201, Heat/Lot-No. KC6742/4102101 for S5 plate B3-E1 weld G

Kobe Steel, CMTR PNQS-12-202, Heat/Lot-No. KB6739/4182471 for S5 plate B3-E2 weld J

Kobe Steel, CMTR PNQS-12-203, Heat/Lot-No. KB6740/4183021 for S5 plate B3-E3 weld J

Kobe Steel, CMTR PNQS-12-204, Heat/Lot-No. KB6740/4183111 for S5 plate B3-E4 weld B

Kobe Steel, CMTR PNQS-12-205, Heat/Lot-No. KA1771/4102021 for S5 plate B3-E5 weld G

Kobe Steel, CMTR PNQS-12-209, Heat/Lot-No. KB6739/4182631 for S5 plate B3-E9 weld B

Kobe Steel, CMTR PNQS-12-215, Heat/Lot-No. KB7218/4402461 for S6 plate B3-C15 weld F

Kobe Steel, CMTR PNQS-12-219, Heat/Lot-No. KC8087/4377751 for S6 plate B3-C19 weld K

Kobe Steel, CMTRs PNQS-12-223, Heat/Lot-No. KC8087/4377961 for S6 plate B3-C23 weld K

Kobe Steel, CMTRs PNQS-12-224, Heat/Lot-No. KC8087/4377721 for S6 plate B3-C24 weld F

**Section 1A16:**

IHI/Kobe Steel CMTRs: PNQS-12-171, PNQS-12-109, PNQS-12-167, PNQS-12-111, PNQS-12-165

IHI Certificate of Conformances: QA-COC-004-108-2, QA-COC-004-106, QA-COC-004-108-2, QA-COC-004-106, QA-COC-004-108-2

CB&I receipt inspection reports: U3-S4-001, U3-S1-007, U3-S4-001, U3-S1-009, U3-S4-001

Lincoln Electric CMTRs for Lots 1129C and 1075G

ESAB CMTRs for lots 2F219P07, 2S306T06,

IHI/Kobe Steel CMTR KN-1466

IHI CMTRs RINJQ-229-3-4, RINJQ-229-3-8, RINJQ-229-3-2

**Section 1A17:**

CB&I weld travelers for five CV welds B3E-S5-B, -G, and -J, and B3C-S6-F and -K  
CB&I WPS E9018M H4R, Rev. 9, Welding Procedure Specification for E9018M H4R for SMAW  
CB&I WPS E91TG-H4, Rev. 11, Welding Procedure Specification for E91TG-H4 for FCAW  
Lincoln Electric CMTR for Lot-No. 1129C for 1.2mm diameter Outershield 91K2-HSR, dated 7/2013  
ESAB CMTR 2-52857-00-0-A for Lot-No. NNN083, 5/32" diameter E9018M-H4R, dated 7/26/2012  
ESAB CMTR 2-54473-00-0-A for Lot-No. 000017, 1/8" diameter E9018M-H4R, dated 10/04/2013  
CB&I Welder or Welding Operator Performance Qualification (WPQ) for Stamp-Nos. 345, 529, 560, 629, 838, and 921  
CB&I Radiographic Examination Reports VCS-U3-2014-RT-143 (weld S5-B), -137 (weld S5-G), -146 (weld S5-J), -188 (weld S6-F), and -192 (weld S6-K)

**Section 1A18:**

CB&I NDE reports: VCS-U3-2014-PT-009, VCS-U3-2014-RT-050, VCS-U3-2014-RT-157, VCS-U3-2014-RT-014, VCS-U3-2014-PT-006, VCS-U3-2014-RT-149, VCS-U3-2014-RT-019, VCS-U3-2014-PT-005, VCS-U3-2014-RT-160,  
CB&I welding procedures: E9018M H4 R Rev. 9, E91TG-H4 Rev. 11  
CB&I welding procedure qualification records: 12676, 12677, 12749, 12750, 12690, 12691, 12723, 12757  
CB&I welder qualification records: 921, 720, 727, 029, 560, 628, 629, 097  
CB&I weld travelers: B3A-S1-G, B3D-S4-G, B3A-S1-M, B3D-S4-K, B3A-S1-R-B3-A13  
  
IHI NDE reports: IHI RT-004-WB3-B1-C, MT-004-BPT-WB3-B1-C, MT-004-AWT-WB3-B1-A~C  
IHI welding procedure I-11R3G R4  
IHI welding procedure qualification record: I-11Q7G  
IHI welder qualification records: 0430, 2431, 2535  
IHI weld list: IHI weld list WL-004-WB3-B1~B14 (2/7)  
  
Lincoln Electric CMTRs for lots 1075G, 1129C  
ESAB CMTRs for lots: 2S306T06, 2F220T04,

**Section 1A19:**

Ten Kobe Steel CMTRs for the middle ring shell plates of five welds B, G, and J on course S5, and welds F and K on course S6;  
One Lincoln Electric CMTR for FCAW Outershield 91K2-HSR Lot-No. 1129C;  
Two ESAB CMTRs for SMAW E9018M-H4R Lot-Nos. NNN083 and 000017.

**Section 1A20:**

IHI / SEO Koatsu Kogyo Co CMTR G26649-006CM  
IHI / Kobe Steel CMTR PNQS-11-103

## **Section 1A21:**

### Commercial Grade Services

APP-GW-GLR-616, "AP1000 Design Certification ITAAC 2.5.02.13: The Process Used in the Commercial Grade Dedication of PMS Components Technical Report," Revision 0, Dated December 2014

CDI-4056, "Services Associated with Build to Print Fabricated Parts & Assemblies," Rev. 9

CDI-4057, "Services associated with Build to Print Electro-mechanical Parts & Assemblies," Rev. 11

QSP-218, "Quality Specification for Procurement Services Associated with Build to Print Electro-mechanical Parts and Assemblies," Rev. 9

QSP-219, "Quality Specification for Procurement Services Associated with Build to Print Fabricated Parts & Assemblies" Rev. 13

NA 7.4, "Preparation of Commercial Dedication Instructions (CDIs)," Rev. 5

WEC-7.2 "Dedication of Commercial Grade Items," Rev. 2.0

WEC 7.3, "Commercial Grade Surveys," Rev. 1.0

WES-2012-395-R, "Audit Package – CMC - Cygnus Manufacturing Company," dated 1/13/2013

WES-2013-126, "Audit Package – CBT Technology, Inc.," dated 11/8/2013

3D91746, "Standard Safety Power Supply Panels & Brackets Details; Sheet 1 of 5" Rev. 10

410097D48, "VC Summer Unit 2 AP1000 PMS ILC Division D Cabinet Configuration," Sheet 1 of 5, Rev. 1

10096D29, "VC Summer AP1000 PMS A1687 Termination Unit Configuration," Sheet 1 of 5, Rev. 0

### AC160 Nuclear Critical Components

APP-GW-GLR-616, "AP1000 Design Certification ITAAC 2.5.02.13: The Process Used in the Commercial Grade Dedication of PMS Components Technical Report," Revision 0, Dated December 2014

CDI-2625, "AC160 Nuclear Critical Components," Revision 21, Dated 09/24/2014

2C48361, "AC160 HARDWARE PROCUREMENT," Revision 25

HTS-AC160-0001, "Inspection Procedure: Visual Inspection of AC160 Hardware," Revision 22, Dated October 2014

WES-2012-302-R, "Supplier Commercial Grade Survey Report, Supplier: ABB AB Control Technologies," Dated 08/27/2012

WNA-TR-02497-GEN, "Analysis of Sample Relay Testing of ABB Modules," Revision 2, Dated September 2011

### Acceptance Based on Equipment Qualification

APP-GW-G1-002, "AP1000 Equipment Qualification Methodology", Revision 4

APP-GW-GLR-616, "AP1000 Design Certification of ITAAC 2.5.02.13: The process used in the Commercial Grade Dedication of PMS Components Technical Report," Revision 0.

CDI-2625, AC160 nuclear critical components, Revision 21

CDI-4064, commercial grade survey of supplier Keystone Services

NA 4.38, "I&C Equipment Design / Equipment Qualification Process," Revision 2

NA 7.4, "Preparation of Commercial Dedication Instructions," Revision 5

NA 7.6, "Certificates on Conformance," Revision 1

WEC 3.3.3, "Design Verification," Revision 1

WEC 3.4.2, "Part Change Evaluation," Revision 0.1

WEC 7.2, "Dedication of Commercial Grade Items," Revision 2.0

WEC 7.3, "Commercial Grade Surveys," Revision 1.0

Acceptance Based on Software Validation in the Integrated System

APP-GW-GLR-616, "AP1000 Design Certification ITAAC 2.5.02.13: The Process Used in the Commercial Grade Dedication of PMS Components Technical Report," Revision 0  
WCAP-16096, "Software Program Manual for Common Q Systems," Revision 4,  
WCAP-16097, "Common Qualified Platform Topical Report," Revision 3  
WNA-PV-00054-WAPP, "AP1000 Protection and Safety Monitoring System Software Verification and Validation Plan," Revision 4  
APP-PMS-T5-001, "AP1000 Protection and Safety Monitoring System Test Plan," Revision 4  
WNA-PT-00058-GEN, "Nuclear Automation Independent Verification and Validation Testing Process for Common Q Safety Systems," Revision 5  
WNA-PV-00009-GEN, "Automation and Field Services Independent Verification and Validation Software Verification & Validation Process for the Common Q Safety Systems," Revision 10  
WNA-WI-00433-GEN, "Automation and Field Services Independent Verification & Validation Instructions for Updating IV&V Fulfillment Methods," Revision 0  
CDI-3389, "ABB AC160 and AMPL Control Configuration Advanced Software and Media," Revision 7  
CDI-3806, "QNX 4.25G Software for Generic Flat Panel Display Systems," Revision 4

**Section 1A22:**

APP-000-C9-001, "AP1000 Concrete General Notes," Revision 8  
APP-1000-CR-005, "Nuclear island Basemat Reinforcement Development View," Revision 12  
APP-1010-CR-003, "Nuclear Island Basemat Dowel Plan at EL 66'-6" Shield Building South-West Quadrant," Revision 3

**Section 1A24:**

Drawings

APP-1200-CR-912, Rev. 16  
APP-1210-CR-918, Rev. 5  
APP-1220-CR-918, Rev. 4  
APP-1210-CR-993, Rev. 4  
APP-1200-CR-993, Rev. 5

E&DCR

VSG-CC01-GEF-000183, Rev. 0

**Section 1A25:**

Procedures

NCSP 03-24, Rev. 2-A, Field Surveying  
CSI 03-24, Rev. 6, Site-Specific Field Surveying Instructions

Drawings

VS3-KQ11-MTK-001 Rev. B, Verification for Unit 3 Module 1110-KQ-11 WLS Sump Pump Structural Interfaces

**Section 1P01:**

Drawing

VS2-1220-CR-951, Rev. 3

Inspection Plan

C-112-003, Rev, 11

Condition Report

CR-NND-15-00250

**Section 1P02:**

V.C. Summer Units 2 and 3 Quality Assurance Program Description, Rev. 4

Nuclear Procurement Procedure NPP 10-01, Rev. 04, Material Receipt, Storage, and Control  
Nuclear Construction and Startup Procedure NCSP 03-16-2, Preventive Maintenance (PM)  
Program

Nuclear Construction and Startup Procedure NCSP-PCN-03-16-2-A, Preventive Maintenance  
(PM) Program

Nuclear Construction and Startup Procedure NCSP-03-10-4, Measuring and Test Equipment  
Control

Nuclear Construction and Startup Procedure NCSP-04-45-1, Insulation Resistance Testing

Nuclear Construction and Startup Procedure NCSP-02-08-1, Nonconformance Reporting and  
Control

Nuclear Construction and Startup Procedure NCSP-PCN-02-08-1-A, Nonconformance  
Reporting and Control

Nuclear Construction and Startup Procedure NCSP-PCN-02-08-1-B, Nonconformance  
Reporting and Control

Nuclear Construction and Startup Procedure NCSP-02-09-2, Construction Materials  
Management

Nuclear Construction and Startup Procedure NCSP-02-16-3, Construction Documents, Records  
Management and Control

Nuclear Quality Standard QS 13.01 Rev. 2, Rigging, Lifting and Transportation

Nuclear Quality Standard QS 13.11 Rev. 1, Material, Equipment Storage

Nuclear Quality Standard QS 13.13 Rev. 0, Material and Equipment Handling

Nuclear Quality Standard QS 13.14 Rev. 1, Packaging and Shipping of Equipment and  
Materials

VSG-VH01-VHH-001, Steam Generator Offload – Critical (ARFD and Manitowoc 18000)

VSG-VH01-VHH-002, Steam Generator Handling with AFRD – Critical

VSG-MS40-VHH-001, Diesel Generator Unit Offload

VSG-MS40-VHH-002, Diesel Generator Unit Transport Plan

VSG-MV20-VEH-001, Offloading AP1000 Pressurizer

VSG-MT01-VHH-001, Core Makeup Tank Offload – Critical Lift Plan

VSG-MT01-VHH-002, Core Makeup Tank Upending & Handling – Critical Lift Plan

Q445-15-10191, Receipt Inspection – Embed Plates & Anchor Bolts

VS2-KB16-GNR-000002 Rev. 2, KB16 WLS Piping and Component Design Parameter  
Discrepancy

**Section 1P03:**

CB&I

CAR 2014-2467

CAR 2014-2439

CAR 2014-1900

CAR 2014-1716

SCE&G

CR-NND-14-00013

CR-NND-14-00193

CR-NND-14-00251

CR-NND-14-00306

## LIST OF ACRONYMS

ACI	American Concrete Institute
ASME	American Society of Mechanical Engineers
AWS	American Welding Society
CB&I	Chicago Bridge and Iron
CDI	Commercial Dedication Instructions
CFR	Code of Federal Regulations
CMTR	Certified Material Test Report
E&DCR	Engineering and Design Coordination Report
EPC	Engineering and Procurement
EQ	Environmental Qualification
IEEE	Institute of Electrical and Electronics Engineers
IMC	Inspection Manual Chapter
ITAAC	Inspections, Tests, Analysis, and Acceptance Criteria
IV&V	Independent Verification and Validation
MT	Magnetic Particle Testing
N&D	Nonconformance and Disposition
NCV	Noncited Violation
NDE	Nondestructive Evaluation
NRC	Nuclear Regulatory Commission
PCD	Principal Closure Document
PMS	Protection and Monitoring System
PQR	Procedure Qualification Record
QA	Quality Assurance
QAPD	Quality Assurance Program Document
QC	Quality Control
SPM	Software Program Manual
SSC	Structure, System, and Component
STP	System Test Plan
SVVP	Software Verification and Validation Plan
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic
WPS	Welding Procedure Specification