



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

February 6, 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 05200027/2014005,  
05200028/2014005**

Dear Mr. Jones:

On December 31, 2014, 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 January 13, 2015, with you and other members of your staff.

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

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

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

If you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector office at the Virgil C. Summer Nuclear Station 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 made available electronically for public inspection

in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system Agencywide Document Access and Management System (ADAMS). ADAMS is Accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

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

Sincerely,

**/RA by George Khouri Acting for/**

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

Docket Nos.: 05200027, 05200028

License Nos.: NPF-93, NPF-94

Enclosure: Inspection Report 05200027/2014005  
and 05200028/2014005  
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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cc w/encl: (See page 3)

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  NON-PUBLICLY AVAILABLE     
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DATE	01/29/2015	1/29/2015	01/29/2015	01/28/2015	02/02/2015	01/29/2015	01/30/2015
E-MAIL COPY?	YES NO						

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NAME	C. Smith	J. Vasquez	T. Fredette	P. Patel			
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Letter to R. Jones from Michael E. Ernstes dated February 6, 2015

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION UNITS 2 AND 3 – NRC  
INTEGRATED INSPECTION REPORTS 05200027/2014005,  
05200028/2014005

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PUBLIC

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

Docket Numbers: 5200027  
5200028

License Numbers: NPF-93  
NPF-94

Report Numbers: 05200027/2014005  
05200028/2014005

Licensee: South Carolina Electric & Gas

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

Location: Jenkinsville, SC

Inspection Dates: October 1, 2014 through December 30, 2014

Inspectors: C. Abbott, Resident Inspector, DCP  
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Approved by: Michael Ernstes  
Branch Chief  
Construction Projects Branch 4  
Division of Construction Projects

Enclosure

## SUMMARY OF FINDINGS

Inspection Report (IR) 05200027/2014005, 05200028/2014005; 10/01/2014 through 12/30/2014; Virgil C. Summer Nuclear Station Unit 2, Virgil C. Summer Nuclear Station Unit 3, routine integrated inspection report.

This report covers a three-month period of inspection by resident inspectors, and announced Inspections, Tests, Analysis, and Inspection Criteria (ITAAC) inspections by regional and resident inspectors. Two green non-cited violations associated with Title 10 of the Code of Federal Regulations (CFR) Part 50, Appendix B, Criterion III, "Design Control" were 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 correctly translate design basis into specifications, drawings, procedures, and instructions. The licensee entered this issue into their corrective action program as CR-NND-14-01411.

The finding was associated with the Design/Engineering cornerstone. The inspectors determined the performance deficiency was more than minor because it represented a substantive non-conservative error in a design document that defines the technical requirements for the structural modules in 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. The inspectors screened the finding for a possible construction cross-cutting aspect (CCA) and determined that it was not related to any of the CCA discussed in IMC 0613. (Section 1A14)

**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 the licensee's failure, through their contractor Westinghouse, to correctly translate design basis requirements into specifications, drawings, procedures, and instructions. The licensee entered the issue in their corrective action program as CR-NND-14-01659.

The finding was associated with the Design/Engineering cornerstone. The inspectors determined the performance deficiency was more than minor because it represented a substantive non-conservative error in a design document that defined the technical requirements for the Vertical Reinforcement inside of the containment vessel bottom head. The inspectors evaluated the finding using the construction significance determination process and determined the finding was of very low safety significance (Green) because the licensee was able to demonstrate with reasonable assurance that the design function of the applicable structure would not be impaired by the deficiency. The finding was determined to be an ITAAC finding because it was material to the acceptance criteria of Unit 3 ITAAC 760 (3.3.00.02a.i.a). The acceptance criteria of this ITAAC requires 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, because WEC issued for construction design drawings contained deviations, which did not meet ACI 349-01, which is a Tier 2\* licensing commitment for Seismic Category I structures. This finding has a cross-cutting aspect in the area of Baseline Inspection, Problem Identification and Resolution, because the licensee failed to implement construction experience to ensure construction quality. [P.5] (Section 1A20)

**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. The second layer of concrete was poured inside the containment vessel bottom head (CVBH) followed by the installation of wall module CA05 for Unit 2 and the first layer of concrete inside the CVBH for Unit 3. Finally, progress was made on the fabrication of CA01, the module that will make up the steam generator rooms, pressurizer room and fuel transfer canal.

#### 1. CONSTRUCTION REACTOR SAFETY

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

#### IMC 2503, Construction Inspection Program: Inspections of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)-Related Work

##### 1A01 (Unit 2) ITAAC Number 3.3.00.02a.i.a (760) / 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
2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	i) An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed for the design basis loads.	i.a) A report exists which reconciles deviations during construction and concludes that the as-built containment internal structures, including the critical sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions.

The inspectors used the following NRC inspection procedures (IP)/sections to perform this inspection:

- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.01-02.05 - Steel Structures
- 65001.01-02.06 - Records
- 65001.01-02.07 - Identification and Resolution of Problem
- 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.B-02.05-Inspection
- 65001.B-02.06-Records
- 65001.16-02.03 - Design Documents

The inspectors performed an independent visual inspection of the fit-up and final vertical weld between submodules CA05-01 and CA05-02 (ref. weld VS2-CA05-VWK-021-FW-0102-01). During this inspection, the inspectors determined whether the weld conformed to approved engineered design changes as well as the following design drawings:

- VS2-CA05-S5-01003, Rev. 1, Containment Building Area 3 Module CA05 Submodule CA05\_01 Structural Outline – Vertical Sections
- VS2-CA05-S5-02003, Rev. 0, Containment Building Area 3 Module CA05 Submodule CA05\_02 Structural Outline – Vertical Sections
- VS2-CA05-VWK-021, CA05 weld map

The inspectors performed independent measurements on the following structural submodules for the proposed Unit 2 containment internal structures:

- East-West Wall South of CVS Room (Submodules CA05-01, CA05-02 and CA05-07)

Specifically, the inspectors measured the following sub-module components:

- headed stud spacing and dimensions
- module plate dimensions
- plate spacing

The inspectors reviewed the applicable welding procedure specifications (WPSs) to determine whether the WPSs were qualified in accordance with American Welding Society (AWS) D1.1: 2000, Structural Welding Code – Steel. The inspectors also reviewed the associated procedure qualification records (PQRs) to determine whether the essential variables were specified as required by the aforementioned Code.

The inspectors reviewed the completed ultrasonic testing (UT) and magnetic particle testing (MT) reports for this weld to determine whether the nondestructive testing (NDE) was performed in accordance with work package VS2-CA05-S4W-00001, Unit 2 CA05 Sub-Module Assembly, and AWS D1.1: 2000, Structural Welding Code. The inspectors also reviewed the qualification records for the individuals who performed the welding and NDE, to determine whether the individuals were qualified to perform the welding activities and respective nondestructive examinations on the dates recorded.

b. Findings

No findings were identified.

1A02 (Unit 2) ITAAC Number 3.3.00.02a.i.a (760) / Family 01Fa. 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 procedures (IP)/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.B-02.02 - Welding Procedure Qualification
- 65001.B-02.03 - Welder Qualification
- 65001.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors performed a direct inspection of construction activities associated with the assembly of CA01. The inspectors observed fit up and welding for the seam weld joining the following submodules:

- CA01-21 and CA01-22, weld number VS2-CA01-VWK-050-FW-2221-06, which forms part of the west refueling cavity N-S wall from elevation 98'-0" to 135'-3"
- CA01-11 and CA01-04, weld number VS2-CA01-VWK-128-FW-1104-06, which forms part of the east refueling cavity N-S wall from elevation 98'-0" to 135'-3"
- CA01-04 and CA01-03, weld number VS2-CA01-VWK-144-FW-0403-08, which forms part of the east refueling cavity N-S wall from elevation 98'-0" to 135'-3"

The inspectors reviewed the drawings, weld procedures (WPS), and supporting procedure qualification records (PQRs) to determine whether the welding activities were performed in accordance with the design specifications, design drawings, and American Welding Society (AWS) D1.6, Structural Welding Code - Stainless Steel. Specifically, the inspectors reviewed:

- Welder qualification records to determine whether the welders performing the activities were qualified in accordance with the applicable AWS D1.6 requirements.
- Weld travelers to verify the traceability of each welder and the filler material used to the weld observed.
- CMTRs for the weld filler material used to determine whether the material was in accordance with the procurement specification.

In addition, the inspectors observed in-process welding to determine if the requirements of the applicable WPS were being met including:

- Wire speed
- Travel speed
- Voltage
- Amperage

- Shielding gas
- Preheat and interpass temperatures

Finally, the inspectors performed a direct inspection of a CB&I QC inspector performing visual examinations of welds on submodule CA01-16, which makes up part of the north and west refueling cavity walls from elevation 98'-0" to 135'-3". The visual inspection was of reworked non-conformances documented in inspection report S561-14-00253 and the rework was performed in accordance with weld map VS2-VWK-583. The inspectors verified that the QC inspector ensured the size, length and location of welds conformed with the design requirements, that the acceptance criteria for completed welds was in accordance with AWS D1.6 and the weld profiles were measured with suitable gages in accordance with procedure QS 09.04, Visual Examination - Structural Welding AP1000 Modules.

b. Findings

No findings were identified.

1A03 (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 procedures (IP)/sections to perform this inspection:

- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.B-02.02 - Welding Procedure Qualification
- 65001.B-02.03 - Welder Qualification
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors performed a direct inspection of construction activities associated with the assembly of CA01. The inspectors observed fit up and welding for the seam weld joining submodules CA01-01 and CA01-02, weld number VS2-CA01-VWK-077-FW-0201-06. These sub-modules form part of the east refueling cavity wall (N-S wall, parallel with column line N) from elevation 98'-0" to 135'-3". The inspectors reviewed the drawings, weld procedures (WPS), and supporting procedure qualification records (PQRs) to determine whether the welding activities were performed in accordance with the design specifications, design drawings, and American Welding Society (AWS) D1.1, Structural Steel Welding Code. The inspectors also reviewed the welder qualification records to determine whether the welders performing the activities were qualified in accordance with the applicable AWS D1.1 requirements. The inspectors reviewed the weld travelers to verify the traceability of each welder and the filler material used to the weld observed. The inspectors also reviewed the CMTRs for the weld filler material used to determine whether the material was in accordance with the WPS.

In addition, the inspectors reviewed construction documentation and verified dimensions for submodules CA01-11 and CA01-12, which form part of the east reactor cavity wall

from elevation 83'-0" to 98'-0". The inspectors also reviewed construction documentation and verified dimensions for CA01-41, which forms part of the west pressurizer compartment wall. The inspectors reviewed construction documentation and verified dimensions for submodules CA05-01 and CA05-02, which form part of the passive core cooling system valve/equipment room B. Specifically, the inspectors measured the stud spacing and dimensions and plate thickness, and verified the proper angle and channel spacing. The inspectors reviewed various documents, such as submodule design drawings and specifications, to verify the shape, size, dimensions and material conformed to the the approved specifications and critical attributes of the as-built SSC conformed to the design.

The inspectors also performed a direct inspection of the containment vessel bottom head rebar, up to the 88'-0" elevation, including installation of mechanical couplers. The inspectors performed field observations of construction activities to determine whether the installation of reinforcing steel was performed in accordance with the applicable drawings and procedures. The inspectors independently measured horizontal and vertical lap splices to determine whether field conditions conformed to American Concrete Institute (ACI) 349-01. The inspectors reviewed training and equipment calibration records to verify that personnel installing rebar terminators were qualified in accordance with project requirements and the equipment being used for this work was properly calibrated.

b. Findings

No findings were identified.

1A04 (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 procedures (IP)/sections to perform this inspection:

- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.F-02.02-Fabrication Records Review
- 65001.02-02.06 - Record Review
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors performed direct inspection on fabricated submodules prior to assembly. Specifically, the inspectors reviewed documentation and verified physical attributes to design and code requirements for submodules CA01-27, which forms part of the south wall of the west steam generator compartment from elevation 94'-0" to 153'-0", and CA01-10, which forms part of the north wall of the east steam generator compartment from elevation 87'-6" to 153'-0".

The inspectors observed the location, arrangement, and attachment of the following structural components to determine whether the aforementioned CA01 submodules were fabricated in accordance with the construction drawings, AISC N690-1994, AWS

D1.1 2000, AWS D1.6 1999 and applicable regulatory requirements:

- angles
- channels
- shear studs
- carbon and stainless steel faceplates
- mechanical couplers and
- reinforcing bar

In addition, the inspectors independently measured critical attributes of as-built submodules to determine if they conformed to the design drawings, including wall and plate thickness. The inspectors observed the receipt inspection of submodule CA01-27 and reviewed the inspection report to determine if the record generated reflected the as-built component and furnished documentary evidence that the applicable quality and technical requirements were met.

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). The inspectors used the following NRC inspection procedures (IP)/sections to perform this inspection:

- 65001.F-02.03 - Observation of Fabrication Activities
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.A.02.01 - Observation of in-Process Installation Activities

The inspectors performed an inspection of the vertical and horizontal reinforcement for the Unit 2 containment vessel bottom head starting at EL. 76'-6" through 80'-6". 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 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;
- nonconforming items were clearly identified, segregated, and dispositioned;
- any design changes or field modifications relevant to the work observed were properly controlled and processed in accordance with quality and technical requirements; and
- the steel reinforcement was assembled in accordance with the latest approved-for-construction drawings, manufacturer's instructions, and procedures.

The inspectors also observed concrete placement activities inside the Unit 2 containment vessel bottom head, up to elevation 80'-6", to determine whether:

- accepted procedures and specifications were followed throughout the concrete placement;
- the equipment used was suitable and sized for the work;
- placement drop distances did not exceed specification requirements and did not result in segregation; and
- inspection during placement was performed as required.

The inspectors also observed testing of the concrete to determine whether the testing was completed in accordance with specification VS2-CC01-Z0-026, "Safety Related Concrete Testing Services, Westinghouse Seismic Category 1, Safety Class C 'Nuclear Safety'," and specification VS2-CC01- Z0-027, "Safety Related Mixing and Delivering Concrete, Westinghouse Seismic Category 1, Safety Class C 'Nuclear Safety,'". Specifically, the inspector observed the following parameters for the sample batch identified as 37684:

- verification of appropriate mix design, transport time, and placement location;
- if any amount of water was added at the truck delivery point

The inspectors also observed in-process concrete testing activities to determine whether:

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

b. Findings

No findings were identified.

1A06 (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
2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	i) An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed for the design basis loads.	i.b) A report exists which reconciles deviations during construction and concludes that the as-built shield building structures, including the critical sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions.

The inspectors used the following NRC inspection procedures (IP)/sections to perform this inspection:

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.A - As-Built Attributes for SSCs associated with ITAAC
- 65001.A.02.01 - Observation of in-Process Installation Activities

The inspectors observed the concrete placement for Shield Building walls from elevation 82' 6" to 91' 6". The inspectors reviewed the final form work and reinforcement for cleanliness to ensure there was no deleterious material within the placement. In addition, the inspectors observed in-process concrete testing to verify if the concrete temperature, slump, air content, and unit weight were determined at the proper location and frequency as required in the design specifications. The inspectors reviewed concrete batch ticket No. 37239 to verify if the proper mix was batched and the constituents used were in accordance with design requirements. The inspectors verified that concrete was properly vibrated to ensure adequate consolidation of the placement. The inspectors also reviewed the respective Work Package to determine if the pre-placement quality control inspections had been completed and documented.

b. Findings

No findings were identified.

1A07 (Unit 2) ITAAC Number 3.3.00.02a.i.b (761) / Family 01F

a. Inspection Scope

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

- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.A - As-Built Attributes for SSCs associated with ITAAC

The inspectors performed an inspection of the vertical and horizontal reinforcement for the east lower annulus portion of the shield building from elevation 82' 6" to 90' 6". The inspectors independently measured horizontal and vertical lap splices, reinforcing steel spacing, and clear cover dimensions to determine whether field conditions conform to ACI 349-01. In addition, the inspectors reviewed documentation of equipment used during steel reinforcement installation to determine if the equipment was properly maintained and calibrated. While in the inspection area, the inspectors were able to determine if:

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

b. Findings

No findings were identified.

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 procedures (IP)/sections to perform this inspection:

- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.02-02.01 - Inspection of Concrete Placement

The inspectors observed concrete placement activities for the Unit 2 east lower annulus portion of the shield building from elevation 82'-6" to 90' 6", to determine whether:

- accepted procedures and specifications were followed throughout the concrete placement;
- the equipment used was suitable and sized for the work;
- placement drop distances did not exceed specification requirements and did not result in segregation; and
- inspection during placement was performed as required.

The inspectors also observed testing of the concrete to determine whether the testing was completed in accordance with specification VS2-CC01-Z0-026, "Safety Related Concrete Testing Services, Westinghouse Seismic Category 1, Safety Class C 'Nuclear Safety'," and specification VS2-CC01- Z0-027, "Safety Related Mixing and Delivering Concrete, Westinghouse Seismic Category 1, Safety Class C 'Nuclear Safety'";

Specifically, inspectors observed the following parameters for the sample batch identified as 38310:

- verification of appropriate mix design, transport time, and placement location;
- if any amount of water was added at the truck delivery point

The inspectors also observed in-process concrete testing activities to determine whether:

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

b. Findings

No findings were identified.

1A09 (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 procedures (IP)/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement

The inspectors observed concrete placement in 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 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 pre-placement, placement, and post-placement activities and in-process testing to verify the following:

- pre-placement planning and training had been completed as required to assure good quality construction and to protect against unplanned construction joints;
- pre-placement inspection was completed by the quality control organization as required by construction procedures and specifications before any concrete was placed;
- the equipment used to deliver concrete to the placement location was suitable and sized for the work;
- the forms and sub-modules were clean and free of deleterious material prior to concrete placement;
- batch tickets were reviewed for proper mix, transfer time, and placement location;
- vibrators were approved and used properly by trained personnel;
- concrete was consolidated in accordance with construction specifications;
- appropriate measures were taken and attention given to areas of high reinforcement congestion and/or complicated module configuration to preclude voids and honeycombing;
- inspection during placement was performed as required to include observation of concrete escape through vent holes and ports;
- concrete temperature, slump, air content, and unit weight were determined at the proper location and frequency as required in the design specifications;
- sample collection and testing techniques conformed to the procedures specified in the appropriate ASTM standards referenced in the construction specifications;
- test specimen samples, for concrete strength determination, were sampled at the required location and frequency; and
- personnel performing sampling and testing were trained and qualified.

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):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	i) An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed for the design basis loads.	i.c) A report exists which reconciles deviations during construction and concludes that the as-built structures in the non-radiologically controlled area of the auxiliary building, including the critical sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions.

The inspectors used the following NRC inspection procedures (IP)/sections to perform this inspection:

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors performed a field inspection of internal reinforcing steel from elevation 66'-6" to 82"-6" in the wall along column line 9.3 from column lines L to P in the non-radiologically controlled area of the auxiliary building. The inspectors conducted inspections of concrete reinforcement steel placement, reviewed applicable design drawings and specifications, and interviewed licensee personnel to determine whether structural concrete work and related licensee quality control activities were being performed in accordance with design specifications and approved procedures. Specifically, the inspectors verified whether:

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

b. Findings

No findings were identified.

1A11 (Unit 2) ITAAC Number 3.3.00.02a.i.c (762) / Family 01Fa. 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 procedures (IP)/sections to perform this inspection:

- 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 for the wall on column line I between column lines 7.3 and 11 within the non-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, free of excessive rust, and the forms were free of concrete. 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, manufacturer's instructions, and procedures.

b. Findings

No findings were identified.

1A12 (Unit 2) ITAAC Number 3.3.00.02a.i.c (762) / Family 01Fa. 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 procedures (IP)/sections to perform this inspection:

- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 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 11 between column lines L and Q within the non-radiologically

controlled area of the auxiliary building from elevation 82' 6" to 100'. The inspectors independently measured horizontal and vertical lap splices, reinforcing 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, free of excessive rust, and the forms were free of concrete. 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, manufacturer's instructions, and procedures.

b. Findings

No findings were identified.

1A13 (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 procedures (IP)/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.A.02.01 - Observation of in-Process Installation Activities

The inspectors observed concrete placement activities associated with the wall on column line I between column lines 7.3 and column line 11 from elevation 82'6" to 100'. The inspectors reviewed the final form work and reinforcement for cleanliness to ensure there was no deleterious material within the placement. In addition, the inspectors observed in-process concrete testing to verify if the concrete temperature, slump, air content, and unit weight were determined at the proper location and frequency as required in the design specifications. The inspectors reviewed the concrete batch ticket No. 37013 to verify if the specified concrete mix was batched and the constituents used were in accordance with the design requirements. The inspectors verified that concrete was properly vibrated to ensure adequate consolidation of the placement. The inspectors also reviewed work package VS2-1220-CCW-001, Rev. 0 to determine if the pre-placement quality control inspections had been completed and documented.

b. Findings

No findings were identified.

1A14 (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
2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	i) An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed for the design basis loads.	i.d) A report exists which reconciles deviations during construction and concludes that the as-built structures in the radiologically controlled area of the auxiliary building, including the critical sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions.

The inspectors used the following NRC inspection procedures (IP)/sections to perform this inspection:

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

The inspectors performed a direct inspection of construction activities associated with the attachment of the CA20 module to the Nuclear Island (NI) basemat. The inspectors observed on-going work associated with drilling and tapping of threaded holes in embed plates for connection of steel attachment brackets to the NI basemat and welding of the attachment brackets to the faceplates of the CA20 module. The inspectors reviewed design calculations and drawings, weld procedure specifications (WPS), and supporting procedure qualification records (PQRs) to determine whether the welding activities were performed in accordance with the design drawings, construction specifications, and American Welding Society (AWS) D1.1, Structural Steel Welding Code. The inspectors verified in-process welding variables were in accordance with the WPS and reviewed welder qualification records to determine whether the welders performing the work were qualified in accordance with the applicable AWS D1.1 requirements. The inspectors also verified that welding material being used met the requirements of the WPS.

b. Findings

.1 Failure to Correctly Translate CA20 Module to Basemat Connection Requirements into Design Documents

Introduction.

An ITAAC finding of very low safety significance (Green) and a violation of 10 CFR 50, Appendix B, Criterion III, "Design Control" was identified by the inspectors for SCE&G's failure, through their contractor Westinghouse, to correctly translate regulatory requirements into specifications, drawings, procedures, and instructions.

Description.

During an inspection of the connections between the CA20 module and the Nuclear Island (NI) basemat, the inspectors observed that the design did not conform to the requirements of ANSI/AISC N690-94, "American National Standard Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities," a Tier 2\* licensing commitment for Seismic Category I structures. Specifically, loose "shim" or "filler" plates greater than ¼ inch thickness were installed between the connection brackets and embed plates in the NI basemat. For bolted construction, ANSI/AISC N690-94 Section Q1.15.6, "Fillers" requires that when fillers thicker than ¼ inch are used in bearing connections, the filler be rigidly attached to one of the connecting elements to preclude inducing bending in the bolts due to the eccentricity between connecting elements.

At 16 locations, loose shim plates having a nominal thickness of ½ inch were installed to facilitate setting the CA20 module in the NI. As specified on design drawing APP-CA20-S4-520, "Auxiliary Building Areas 5 & 6 CA20 Module Basemat Attachment Bracket Installation Details," Rev. 1, the shim plates were to be partially removed after setting CA20 to allow direct contact between the attachment brackets and embed plates - the connecting elements between the CA 20 module and the NI basemat. The inspectors reviewed Engineering and Design Coordination Report (E&DCR) AP-CA20-GEF-1150, "CA20 Landing Shim Modification," Rev. 0. This E&DCR revised the design of the connections between the CA20 module and the NI basemat to allow the shim plates to be left in place instead of being partially removed. As a result, the shim plates would be "sandwiched" between the connection brackets and embed plates. The inspectors determined the revised design was not in conformance with Section Q1.15.6 of ANSI/AISC N690-94.

Analysis.

The licensee's failure to assure that applicable regulatory requirements were correctly translated into design specifications, drawings, procedures, and instructions as required by Criterion III of 10 CFR 50, Appendix B, was a performance deficiency. The inspectors determined the performance deficiency was more than minor because it represented a substantive non-conservative error in a design document that defines the technical requirements for the connections between the CA20 module and the NI basemat.

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.

The finding was associated with the Design/Engineering cornerstone. The inspectors evaluated the finding using the construction significance determination process (SDP) and determined the finding was of 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 inspectors screened the finding for a possible construction safety focus component aspect in accordance with Appendix F, "Construction Cross-Cutting Components and Aspects" of IMC 0613, "Power Reactor Construction Inspection Reports." The inspectors determined that this finding was not related to any of the cross-cutting aspects discussed in IMC 0613.

#### Enforcement.

10 CFR 50 Appendix B, Criterion III, "Design Control" Requires, in part, that measures shall be established to assure that applicable regulatory requirements are correctly translated into specifications, drawings, procedures, and instructions.

UFSAR Section 3.8.4.4.1 requires, in part, that the design and analysis procedures for Seismic Category I structures are in accordance with AISC N690-94 for steel structures.

For bolted construction, ANSI/AISC N690-94 Section Q1.15.6, "Fillers" requires that when fillers thicker than ¼ inch are used in bearing connections, the filler be rigidly attached to one of the connecting elements to preclude inducing bending in the bolts due to the eccentricity between connecting elements.

Contrary to the above, on or before October 9, 2014, the licensee failed to correctly translate regulatory requirements into design specifications, drawings, procedures, and instructions as required by 10 CFR Appendix B, Criterion III. Specifically, the design change documented and released for use in E&DCR APP-CA20-GEF-1150 did not comply with Section Q1.15.6 of AISC N690-94, as required by the UFSAR. This E&DCR revised the design of the connections between the CA20 module and the NI basemat to allow loose shim plates having a thickness greater than ¼ inch to be left in place between the CA20 connection brackets and embed plates in the NI basemat. As a result, the revised design was not in conformance with Section Q1.15.6 of ANSI/AISC N690-94.

This violation is associated with a Green SDP finding and is being treated as a non-cited violation (NCV 05200027/2014005-001), "Failure to Correctly Translate CA20 Module to Basemat Connection Requirements into Design Documents" consistent with Section 2.3.2 of the Enforcement Policy.

The inspectors reviewed SCE&G Condition Report CR-NND-14-01411 and WEC Issue ID 100051520 to verify the issue was entered into the licensee's corrective action program. The inspectors also reviewed E&DCR No. APP-CA20-GEF-1362, Rev. 0 and N&D No. VS-CA20-GNR-000447, Rev. 0 to determine whether appropriate action was taken to address the affected design documents and non-conforming conditions, respectively. The inspectors determined the non-conforming conditions were corrected

and no longer impact the ITAAC acceptance criteria. No additional findings were identified. NCV 05200027/2014005-01 is closed.

1A15 (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 procedures (IP)/sections to perform this inspection:

- 65001.F-02.03-Observation of Fabrication Activities
- 65001.02-02.01 - Inspection of Concrete Placement

The inspectors observed concrete placement activities associated with the wall on column line J-1 between column line 4 and the Shield Building from elevation 66'-6" to 82'-6". The inspectors reviewed the final form work and reinforcement for cleanliness to ensure there was no deleterious material within the placement. In addition, the inspectors observed in-process concrete testing to verify if the concrete temperature, slump, air content, and unit weight were determined at the proper location and frequency as required in the design specifications. The inspectors reviewed the concrete batch ticket No. 37223 to verify if the specified concrete mix was batched and the constituents used were in accordance with the design requirements. The inspectors observed the the concrete placement and consolidation to verify that the activities were completed in accordance with project specifications and design requirements. The inspectors also reviewed work package VS2-1220-C0W-002, Rev. 0 to determine if the pre-placement quality control inspections had been completed and documented adequately.

b. Findings

No findings were identified.

1A16 (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 procedures (IP)/sections to perform this inspection:

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.01-02.03 - Key Site Parameters
- 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.F-02.04 - General QA Review
- 65001.B-02.01 - Program and Procedures Review
- 65001.B-02.02 - Welding Procedure Qualification

- 65001.B-02.06 - Records
- 65001.A - As-Built Attributes for SSCs associated with ITAAC
- 65001.A.02.02 - Installation Records Review
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors observed and reviewed the installation of reinforcing steel for reinforced concrete walls located along column line (CL) I from CL 1 to 2 and along CL 1 from CL I to CL J-1, from elevation (EL.) 82'-6" to 100'-0" in the radiological controlled area of the proposed auxiliary building. The inspectors also observed and reviewed module assembly and a sample of completed welds of the spent fuel pool area of the radiological controlled area (module CA-20) of the auxiliary building along CL 2, from CL K2 to L2, EL. 92'-1" to 135'-3"; along CL K-2 from CL 2 to 3, EL. 92'-1" to 135'-3"; and along CL L-2 from CL 2 to 3, EL. 92'-1" to 135'-3".

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 verified whether:

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

For the module assembly and welding, the inspectors completed visual inspection of three different vertical weld seams inside the proposed spent fuel pool area of the radiological controlled area module of the auxiliary building. Specifically, the inspectors observed and reviewed documentation for vertical seam welds FW-1823-06, 10; FW-1918-06, 10; and FW-2728-06, 10.

Specifically, inspectors observed completed welds and reviewed weld data sheets, applicable design drawings, work packages, welding procedure specifications (WPS), procedure qualification records (PQR), and specifications to verify construction activities, were being conducted in accordance with design documents and applicable codes, processes and procedures. The inspectors reviewed the completed welds and documentation, to verify:

- 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;
- Welding Procedure Specifications (WPS) were qualified in conformance to American Welding Society (AWS) D1.6 Structural Welding Code - Stainless Steel.
- WPSs were available, up to date and accurate.
- welding positions qualified for a WPS are in accordance with AWS D1.6 Structural Welding Code - Stainless Steel.
- the WPS specifies all the applicable essential, nonessential supplementary variables referenced in AWS D1.6 Structural Welding Code - Stainless Steel.
- work was conducted in accordance with a weld data record or similar document which coordinated and sequences all operations, referenced procedures and instructions, established hold points, and provided for production welding and inspection signoffs;
- welding variables for welding activities were routinely verified;
- acceptance criteria for completed welds were in accordance with AWS D1.6 Structural Welding Code - Stainless Steel; and
- weld profile tolerances were suitable and met code requirements.

b. Findings

No findings were identified.

1A17 (Unit 2) ITAAC Number 3.3.00.02a.ii.c (766) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.ii.c (766):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	ii) An inspection of the as-built concrete thickness will be performed.	ii.c) A report exists that concludes that as-built concrete thicknesses of the non-radiologically controlled area of the auxiliary building sections conform to the building sections defined in Table 3.3-1.

The inspectors used the following NRC inspection procedures (IP)/sections to perform this inspection:

- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors performed a walk-down of the Unit 2 nuclear island and took wall thickness measurements at various locations on the auxiliary building exterior walls. The inspectors reviewed the as-built condition of the non-radiological controlled auxiliary building walls to verify they conformed to the as-built thickness requirements as specified in the COL Appendix C, Table 3.3-1. Specifically, the inspectors verified the as-built thickness of the following walls:

- Column Line Q wall between the shield building and Column Line 11 from elevation 82'-6" to 100'-0"
- Column Line 11 wall between Column Line L and Column Line Q from elevation 82'-6" to 100'-0"

b. Findings

No findings were identified.

1A18 (Unit 2) ITAAC Number 3.3.00.02a.ii.c (766) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.ii.c (766). The inspectors used the following NRC inspection procedures (IP)/sections to perform this inspection:

- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors performed a walk-down of the Unit 2 nuclear island and took wall thickness measurements at various locations on the auxiliary building exterior walls. The inspectors reviewed the as-built condition of the non-radiological controlled auxiliary building walls to verify they conformed to the as-built thickness requirements as specified in the COL Appendix C, Table 3.3-1. Specifically, the inspectors verified the as-built thickness of the following walls:

- Column Line I wall between Column Line 7.3 and Column Line 11 from elevation 82'-6" to 100'-0"
- Column Line 11 wall between Column Line I and Column Line L from elevation 82'-6" to 100'-0"

b. Findings

No findings were identified.

1A19 (Unit 2) ITAAC Number 3.3.00.02f (774) / Family 01Aa. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02f (774):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
2.f) The key dimensions of nuclear island structures are defined on Table 3.3-5.	An inspection will be performed of the as-built configuration of the nuclear island structures.	A report exists and concludes that the key dimensions of the as-built nuclear island structures are consistent with the dimensions defined on Table 3.3-5.

The inspectors used the following NRC inspection procedures (IP)/sections to perform this inspection:

- 65001.01-02.01 - Procedures
- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.01-02.06 - Records
- 65001.A.02.02 - Installation Records Review

The inspectors reviewed the licensee's completed survey data for the V.C. Summer Unit 2 nuclear island (NI) to verify that the key dimensions listed in the COL were met at the 66'6" elevation. The inspectors verified that the following key dimensions are in accordance with COL Appendix C, Table 3.3-5 "Key Dimensions of Nuclear Island Building Features":

- X1 – Distance between Outside Surface of walls at Column Line I & N when Measured at Column Line 1
- X2 – Distance from Outside Surface of wall at Column Line 1 to Column Line 7 when Measured at Column Line I
- X3 – Distance from Outside Surface of wall at Column Line 11 to Column Line 7 when Measured at Column Line I
- X4 – Distance between Outside Surface of walls at Column Line I & Q when Measured at Column Line 11
- X5 – Distance from Outside Surface of wall at Column Line Q to Column Line N when Measured at Column Line 11
- X6 – Distance between Outside Surface of shield building wall to shield building centerline when Measured on West Edge of Shield Building

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.

In addition, the inspectors performed a walk-down of the Unit 2 NI and conducted an independent, direct measurement of the X2 and X3 dimensions at elevation 66'6" to verify that values recorded in the survey data matched the as-built structure. Using the survey data, the inspectors performed independent calculations to verify the other key dimensions of the NI are in accordance with COL Appendix C, Table 3.3-5. The inspectors verified that the survey data was approved by appropriate personnel.

b. Findings

No findings were identified.

1A20 (Unit 3) ITAAC Number 3.3.00.02a.i.a (760) / Family 01F

a. Inspection Scope

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

- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.A - As-Built Attributes for SSCs associated with ITAAC

The inspectors performed an inspection of the vertical and horizontal reinforcement for the Unit 3 containment internal structures starting at EL. 66'-6" through 71'-6". 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 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;
- nonconforming items were clearly identified, segregated, and dispositioned;
- any design changes or field modifications relevant to the work observed were properly controlled and processed in accordance with quality and technical requirements; and
- the steel reinforcement was assembled in accordance with the latest approved-for-construction drawings, manufacturer's instructions, and procedures.

b. Findings

.1 Failure to Correctly Translate ACI 349-01 Development Length Requirements into Design Drawings

Introduction.

An ITAAC finding of very low safety significance (Green) and associated non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was identified by the inspectors for the failure to translate design basis into as-built drawings.

Description.

On November 20, 2014, the inspectors identified that the licensee installed safety-related reinforcing steel in the VC Summer Unit 3 containment internal structures basemat that was not compliant with the design basis requirements established by American Concrete Institute (ACI), 349-01, "Code Requirements for Nuclear Safety Related Concrete Structures;" and design calculation APP-1100-CCC-003, "Design Calculation, Containment Mass Concrete Reinforcement, Elevation 66'-6" to 71'-6", Rev. 0. Specifically, hooked bars with extended tails were installed at an embedment depth less than that required for a standard hook. The inspectors reviewed design drawing VS3-1110-CR-504, "Containment Concrete Reinforcement thru EL 71'-6" Vertical Dowel Layout," Rev. 5 and determined the drawing allowed the use of a hooked bar without specifying an embedment depth or bend angle.

ACI 349-01, Section 12.1, "Development of Reinforcement: General," requires, in part, that each section of structural concrete members shall be developed on each side of that section by embedment length, hook or mechanical device, or a combination thereof. Calculation APP-1100-CCC-003, "Design Calculation, Containment Mass Concrete Reinforcement, Elevation 66'-6" to 71'-6", Rev. 0, Section 5.1.4.2, states, in part, that all of the structural reinforcement that is required per analysis must be fully developed on each side of the section per ACI 349-01 Section 12.1.

The licensee had failed to adequately translate the design basis into design drawings. Specifically, a drawing allowed the installation of vertical reinforcement in areas where the embedment depth was insufficient to fully develop the bar in accordance with code and design calculation requirements. In order to resolve this nonconformance, prior to concrete being placed, the licensee removed the nonconforming reinforcement; generated corrective action report 2014-2481; and re-installed the vertical reinforcement in accordance with the design requirements. As a result of the corrective actions, the inspectors determined that the changes were compliant with the ACI 349-01 Code and the licensee's quality assurance program requirements.

Analysis.

The inspectors determined that the failure to correctly translate the design basis into design drawings as required by 10 CFR Part 50, Appendix B, Criterion III, was a performance deficiency. The performance deficiency was more than minor following the guidance in IMC 0613, "Power Reactor Construction Inspection Reports," Appendix E, Example 2. Specifically, the licensee failed to adequately translate the approved design into appropriate drawings that resulted in a less conservative analysis.

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," Appendix A, "AP 1000 Construction Significance Determination Process" and determined that finding was of very low safety significance (Green) because the SSC would have been able to meet its design function and was assigned to Row 1 of the risk importance table. (i) This finding has a cross-cutting aspect in the area of Problem Identification and Resolution because the licensee did not implement construction experience to ensure construction quality.

Specifically, design drawings allowing hooked rebar to be installed where embedment depth was insufficient was previously identified at the Vogtle construction site but this Con E was inadequately incorporated into design drawings at the VC Summer site. [P.5]

Enforcement.

10 CFR Part 50, Appendix B, Criterion III, "Design Control" 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 November 20, 2014, the licensee failed to correctly specify reinforcement development requirements into design drawings. Specifically, Unit 3 design drawings allowing hooked rebar to be installed where embedment depth was insufficient were released for construction in violation of the design requirements of ACI 349-01 and the acceptance criteria of ITAAC 760.

Because this violation was of very low safety significance (Green) and it was entered into the licensee's corrective action program as CR 14-01659, this violation is being treated as a non-cited violation (NCV 05200028/2014005-02), Unit 3 Containment Internal Structures, consistent with Section 2.3 of the NRC Enforcement Policy and EGM 11-006.

1A21 (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 procedures (IP)/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement

The inspectors observed concrete placement in 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 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 pre-placement, placement, and post-placement activities and in-process testing to verify the following:

- pre-placement planning and training had been completed as required to assure good quality construction and to protect against unplanned construction joints;
- pre-placement inspection was completed by the quality control organization as required by construction procedures and specifications before any concrete was placed;
- the equipment used to deliver concrete to the placement location was suitable and sized for the work;
- the forms and sub-modules were clean and free of deleterious material prior to concrete placement;
- batch tickets were reviewed for proper mix, transfer time, and placement location;
- vibrators were approved and used properly by trained personnel;
- concrete was consolidated in accordance with construction specifications;
- appropriate measures were taken and attention given to areas of high reinforcement congestion and/or complicated module configuration to preclude voids and honeycombing;
- inspection during placement was performed as required to include observation of concrete escape through vent holes and ports;
- concrete temperature, slump, air content, and unit weight were determined at the proper location and frequency as required in the design specifications;
- sample collection and testing techniques conformed to the procedures specified in the appropriate ASTM standards referenced in the construction specifications;
- test specimen samples, for concrete strength determination, were sampled at the required location and frequency; and
- personnel performing sampling and testing were trained and qualified.

b. Findings

No findings were identified.

1A22 (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 procedures (IP)/sections to perform this inspection:

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors performed a field inspection of internal reinforcing steel in the non-radiologically controlled area of the auxiliary building. Specifically they reviewed reinforcement from elevation 66'-6" to 82'-6" in the wall along column line 7.3 from

column line I to the shield building wall. The inspectors conducted inspections of concrete reinforcement steel placement, reviewed applicable design drawings and specifications, and interviewed licensee personnel to determine whether structural concrete work and related licensee quality control activities were being performed in accordance with design specifications and approved procedures. Specifically, the inspectors verified whether:

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

b. Findings

No findings were identified.

1A23 (Unit 3) ITAAC Number 3.3.00.02f (774) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02f (774). The inspectors used the following NRC inspection procedures (IP)/sections to perform this inspection:

- 65001.01-02.01 - Procedures
- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.01-02.06 - Records
- 65001.A.02.02 - Installation Records Review

The inspectors reviewed the licensee's completed survey data for the V.C. Summer Unit 3 nuclear island (NI) to verify that the key dimensions listed in the COL were met at the 66'6" elevation. The inspectors verified that the following key dimensions are in accordance with COL Appendix C, Table 3.3-5 "Key Dimensions of Nuclear Island Building Features":

- X1 – Distance between Outside Surface of walls at Column Line I & N when Measured at Column Line 1
- X2 – Distance from Outside Surface of wall at Column Line 1 to Column Line 7 when Measured at Column Line I
- X3 – Distance from Outside Surface of wall at Column Line 11 to Column Line 7 when Measured at Column Line I

- X4 – Distance between Outside Surface of walls at Column Line I & Q when Measured at Column Line 11
- X5 – Distance from Outside Surface of wall at Column Line Q to Column Line N when Measured at Column Line 11

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.

In addition, the inspectors performed a walk-down of the Unit 3 NI and conducted an independent, direct measurement of the X1 and X4 dimensions at elevation 66'6" to verify that values recorded in the survey data matched the as-built structure. Using the survey data, the inspectors performed independent calculations to verify the other key dimensions of the NI are in accordance with COL Appendix C, Table 3.3-5. The inspectors verified that the survey data was approved by appropriate personnel.

b. Findings

No findings were identified.

1A24 (Unit 3) ITAAC Number 3.3.00.02f (774) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02f (774). The inspectors used the following NRC inspection procedures (IP)/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 following key dimension in the V.C. Summer Unit 3 nuclear island (NI) is in accordance with the COL 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 performed a walk-down of the Unit 3 NI and conducted an independent, direct measurement of the dimension between the bottom of module KQ11, reactor cavity sump, and the top surface of the containment vessel bottom head prior to concrete placement.

The inspectors also reviewed the licensee's completed survey data as listed in VS3-KQ11-MTK-001 Rev. A, "Verification for Unit 3 Module 1110-KQ-11 WLS Sump Pump

Structural Interfaces,” to verify that the key dimension listed above was met prior to concrete placement. The inspectors reviewed the approved licensee procedures for performing field surveying activities and 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.

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
9. 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 procedures (IP)/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 following key dimension in the V.C. Summer Unit 3 nuclear island (NI) is in accordance with the COL 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 performed a walk-down of the Unit 3 NI and conducted an independent, direct measurement of the dimension between the bottom of module KQ11, reactor cavity sump, and the top surface of the containment vessel bottom head prior to concrete placement.

The inspectors also reviewed the licensee's completed survey data as listed in VS3-KQ11-MTK-001 Rev. A, "Verification for Unit 3 Module 1110-KQ-11 WLS Sump Pump Structural Interfaces," to verify that the key dimension listed above was met prior to concrete placement. The inspectors reviewed the approved licensee procedures for performing field surveying activities and 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.

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

1P01 Quality Assurance Implementation, Appendix 13, Inspection of Criterion XIII – Handling, Storage and Shipping (IP 35007)

a. Inspection Scope

During the week of November 10, 2014, the inspectors toured Level D safety-related storage areas, adjacent to VC Summer Unit 2 nuclear island. The inspectors performed this inspection to determine if safety-related items were stored in accordance with licensee procedures as well as NQA-1-1994. During this walk-down, the inspectors assessed the storage of reinforcing steel and embed plates to determine whether:

- Level D items were stored in an area marked and designated for storage;
- designated storage areas were well drained (e.g. gravel-covered or paved);
- storage areas were reasonably removed from the actual construction area and traffic to prevent the possibility of damage from construction equipment; and
- items were stored on cribbing or equivalent to avoid trapping of water.

b. Findings

No findings were identified.

1P02 Quality Assurance Implementation, Appendix 16, Inspection of Criterion XVI – Corrective Action (IP 35007)

a. Inspection Scope

Daily Corrective Action Program Review

As part of the various inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during inspection activities and plant status reviews to verify they were being entered into the licensee's corrective action program at an appropriate threshold. The inspectors verified that adequate attention was being given to timely corrective actions and any adverse trends were identified and addressed. The inspectors reviewed corrective action program procedures and

evaluated implementation of these procedures to determine whether the procedures contained guidance for the following attributes:

- classification, prioritization, and evaluation for reportability (i.e., 10 CFR 50.55(e)) of conditions adverse to quality;
- complete and accurate identification of the problem in a timely manner commensurate with its significance and ease of discovery;
- 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.

#### Routine Review of Items Entered into the Corrective Action Program

On a routine basis, the inspectors screened a sample of issues entered into the licensee and the 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.

#### Selected Issues for Follow-Up Inspection

Based on the inspectors' routine screening of corrective action records, the inspectors selected a sample of issues entered in the corrective action programs to determine if the handling of these issues was consistent with the applicable quality assurance program requirements and 10 CFR Part 50, Appendix B. Specifically, the inspectors reviewed the corrective action records listed in the 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 ACTIVITIES (OA)**

4OA6 Meetings, Including Exit

.1 Exit Meeting

On January 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**

#### Licensees and Contractor Personnel

Ron Jones, SCE&G Vice President, New Nuclear Operations  
Alan Torres, SCE&G General Manager, Nuclear Plant Construction  
Robert (Brad) Stokes, SCE&G General Engineering Manager, NND Design Engineering  
April Rice, SCE&G Nuclear Licensing Manager  
Ken Hollenbach, CB&I Senior Vice President & Project Director  
Bill Wood, CB&I Site Director  
Chris Levesque, Westinghouse Vice President, Consortium Project Director  
Findlay Salter, SCE&G Licensing  
Brian Koons, Westinghouse, Site Design Engineering  
Mark Porter, SCE&G, Unit 3 Survey Superintendent

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

<u>Item Number</u>	<u>Type</u>	<u>Status</u>	<u>Description</u>
05200027/2014005-01	NCV	Open/Closed	Failure to Correctly Translate CA20 Module to Basemat Connection Requirements into Design Documents (Section 1A14)
05200028/2014005-02	NCV	Open	Failure to Correctly Translate ACI 349-01 Development Length Requirements into Design Drawings (Section 1A20)

### **LIST OF DOCUMENTS REVIEWED**

#### **Section 1A01:**

##### Procedures

WPS2-1.1M72, Rev. 2, AWS Welding Procedure Specification – Machine GMAW of AWS Group I, II, and A572-60 Groove Fillet, no PWHT  
AWS-PQR-SP124, Rev. 0, AWS – Procedure Qualification – without PWHT, with Impacts  
AWS-PQR-SP125, Rev. 0, AWS – Procedure Qualification – without PWHT, with Impacts  
AWS-PQR-SP144, Rev. 0, AWS – Procedure Qualification – without PWHT, with Impacts  
WPS2-1.1T72, Rev. 0, AWS Welding Procedure Specification – GTAW of AWS Group I materials for welder qualification only Groove Fillet, no PWHT  
AWS-PQR-SP143, Rev. 0, AWS – Procedure Qualification – without PWHT  
GWS-2, Rev. 2, AWS D1.1 – Structural Steel General Welding Specification  
100-UT-310, UT of Welds per AWS Structural Welding Code D1.1

##### Drawings

VS2-CA05-S5-01003, Rev. 1, Containment Building Area 3 Module CA05 Submodule CA05\_01 Structural Outline – Vertical Sections  
VS2-CA05-S5-02003, Rev. 0, Containment Building Area 3 Module CA05 Submodule CA05\_02 Structural Outline – Vertical Sections

VS2-CA05-VWK-021, CA05 weld map  
 APP-CA05-S4-104 "Module CA05 Structural Outline," Rev. 3  
 APP-CA05-S5-01001 "Submodule CA05-01 Isometrics," Rev. 3  
 APP-CA05-S5-01004 "Submodule CA05-01 Structural Outline- Horizontal View Details," Rev. 2

#### NDE Reports

V2-14-W-M-1489  
 V2-14-W-U-0796  
 V2-14-W-U-0805 "CA05-01 to CA05-02 Seam Weld Ultrasonic Examination Report"  
 V2-14-W-M-1489 "CA05-01 to CA05-02 Seam Weld Magnetic Particle Examination Report"

#### Miscellaneous

AWS D1.1: 2000, Structural Welding Code – Steel  
 Work Package VS2-CA05-S4W-00001, Unit 2 CA05 Sub-Module Assembly  
 APP-CA05-GEF-046, Adding C6 Channel trusses to CA05-SM-\_01, SM\_02, and stiff to SM\_06  
 APP-CA05-GEF-058, Addition of Studs to Wall Module CA05  
 APP-CA05-GEF-079, Addition of Backup Plates in CA05 Wall with Discontinuity  
 APP-CA05-GEF-033, Addition of Studs to Wall Module CA05

#### N&Ds

VS2-CA05-GNR-000005 "CA05-07 Baffle Plate Studs," Rev. 0

### **Section 1A02:**

#### Codes and Standards

American Welding Society D1.6, Structural Welding Code - Stainless Steel, 1999  
 DMD-M-NS-592209GMAW-01, Welding Filler Material Procurement Specification ER2209,  
 Duplex Stainless Steel Bare Wire/Rods

#### Procedures

WPS5-10H-10HM70, ASTM 240 S32101 to ASTM A240 S32101; Semi-Automatic and Machine  
 GMAW, Rev 8  
 WPS5-10H-10HT70, AWS Welding Procedure Specification - GTAW of A240 UNS 532101  
 Duplex SS Materials, Rev 4  
 AWS-PQR-SP394, ASTM A240 UNS S32101 to ASTM UNS S32101, GTAW, ER2209, Rev 0  
 AWS-PQR-SP297, ASTM A240 UNS S32101 to ASTM UNS S32101, GMAW, ER2209, Rev 0  
 AWS-PQR-SP298, ASTM A240 UNS S32101 to ASTM UNS S32101, GMAW, ER2209, Rev 0  
 QS 09.04, Visual Examination-Structural Welding - AP1000 Modules - Safety Related, Rev 1

#### CMTRs

132177-FPR13-01903, Lot 1085L, 3/20/2014

#### WPQRs

Record of Welder Performance Qualification Test - AWS D1.6 Groove Weld, Test 5SS-03,  
 Welder ID JHC4970  
 Record of Welder Performance Qualification Test - AWS D1.6 Groove Weld, Test 5SS-03,  
 Welder ID BJS8398  
 Record of Welder Performance Qualification Test - AWS D1.6 Groove Weld, Test 5SS06,  
 Welder ID DDL9850

Drawings

VS2-CA01-VWK-050, Leak Chase No.#18 Seam 2221 Weld Map, Rev E  
 VS2-CA01-VWK-583, CA01\_16 Structural Repair and Rework per IR S561-14-00253 Part 7,  
 Rev A  
 VS2-CA01-VWK-128, Leak Chase #5 Seam 1104 Weld Map, Rev E  
 VS2-CA01-VWK-144, Leak Chase #4 Seam 0403 Weld Map, Rev C

**Section 1A03:**Specifications

APP-CR01-Z0-010, Specification for Supply and Installation of Mechanical Splices for  
 Reinforcing Steel, Rev. 7  
 VS2-CC01-Z0-031, Safety Related Placing Concrete and Reinforcing Steel, Rev. 5

Weld Procedure Specifications (WPS) and Procedure Qualification Records (PQR):

WPS5-10H.10HM70, Rev. 6  
 PQR SP297  
 PQR SP298

Nonconformance & Disposition (N&D) Reports and Engineering & Design Coordination (E&DCR) Reports:

N&D VS2-CA05-GNR-000014, CA05\_01 Stainless WT Beam Deformation  
 E&DCR APP-CA01-GEF-336, CA01 – Studs on Horizontal Weld Seams Clarification  
 E&DCR APP-CA01-GEF-268, CA01-12 Fabrication  
 E&DCR APP-CA01-GEF-255, SWD-27 Studs Removed from Detail

Drawings:

APP-CA01-S5-41004, Containment Building Area 2 Module CA01 Submodule CA01-41  
 Structural Outline – Horizontal Sections / Views, Rev. 7  
 APP-CA01-S5-41003, Containment Building Area 2 Module CA01 Submodule CA01-41  
 Structural Outline – Horizontal Sections / Views, Rev. 7  
 APP-CA05-S5-01001, Containment Building Area 3 Module CA05 Submodule CA05-01  
 Isometric Views, Rev. 3  
 APP-CA05-S5-01004, Containment Building Area 3 Module CA05 Submodule CA05-01  
 Structural Outline – Horizontal Sections / Views, Rev. 2  
 APP-CA05-S5-01003, Containment Building Area 3 Module CA05 Submodule CA05-01  
 Structural Outline – Vertical Sections / Views I, Rev. 3  
 APP-CA05-S5-02001, Containment Building Area 3 Module CA05 Submodule CA05-02  
 Isometric Views, Rev. 3  
 APP-CA05-S5-02005, Containment Building Area 3 Module CA05 Submodule CA05-02  
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99686, Temperature Probe, Calibration Due 4/23/2015  
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No. 37239

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QC25593-3, Concrete Truck H2O Meter, Serial No. MR-1000617-15

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Batch Ticket

38310

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VS2-1210-CR-990-R2, Auxiliary Building Concrete Reinforcement Secondary Walls Elevation  
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VS2-1210-CR-993-R3, Auxiliary Building Concrete Reinforcement Secondary Walls Sections &  
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Heat/Batch 5609540703

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Batch Ticket

37013

Temperature Log

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Logger # QC25247

Logger # QC25250  
 Logger # 100816

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 VS2-1215-CE-005-R3, "Auxiliary Building Area EI 66'-6" CA20 Basemat Interface Embedment and Recess Locations"  
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37223

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 131562  
 140196

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 APP-VW20-Z0-023, "Welding Specification for ASTM A240 UNS S32101 Duplex Stainless Steel  
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 APP-CA20-GEF-1146, "CA20\_20 to CA20\_21 Leak Chase Details," Revision 0  
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 Project or J.O. No.: 132177  
 Description U2 CA20 Assembly Relocation to NI

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 S561-14-00297, "Enhanced Inspection – Structural Welding of Module Reinforcing Steel – AWS D1.4," Revision 02

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S561-14-0055, "CA20\_26 BASE METAL DAMAGE," Revision: N/A  
 S561-14-0108, "Module CA20-30 to CA20-29 Gouge in wall on CA20-30 Need base metal repair," Revision: N/A  
 S561-14-0072, "Unit 2 CA20\_25 Arc Strike-VS2-CA20-GNR-000311," Revision: N/A  
 S561-14-0071, "Concrete Pre-Placement – Module CA20\_29 N&D VS2-CA20-GNR-000208 Rework," Revision: N/A  
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VS2-1010-CCK-004, Rev. A, Unit 2 Nuclear Island As-Built Layer A Concrete Outside Containment X6 Key Dimension

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APP-1000-ITH-003, Rev. 2, Standard Plant ITAAC 3.3.00.02f Performance and Documentation Plan

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## LIST OF ACRONYMS

ACI	American Concrete Institute
ADAMS	Agencywide Document Access and Management System
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
CB&I	Chicago Bridge and Iron
CCA	Cross Cutting Aspect
CFR	Code of Federal Regulations
CL	Column Line
CMTR	Certified Material Test Report
COL	Combined Operating License
CVBH	Containment Vessel Bottom Head
E&DCR	Engineering and Design Coordination Reports
EPC	Engineering, Procurement, and Construction
GMAW	Gas Metal Arc Welding
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
ITAAC	Inspections, Tests, Analyses, and Acceptance Criteria
MT	Magnetic Particle Examination
N&D	Nonconformance and Disposition Reports
NCV	Non Cited Violation
NDE	Nondestructive Examination
NI	Nuclear Island
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
PQR	Procedure Qualification Record
QA	Quality Assurance
QC	Quality Control
SCE&G	South Carolina Electric and Gas
SSC	Structure, System, or Component
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Examination
WEC	Westinghouse Electric Company
WPS	Welding Procedure Specification