

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

August 11, 2015

Michael Yox
Regulatory Affairs Director
Southern Nuclear Operating Company
7835 River Road, Bldg. 140, Vogtle 3&4
Waynesboro, GA 30830

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT UNITS 3 AND 4 – NRC
INTEGRATED INSPECTION REPORTS 05200025/2015002, and
05200026/2015002

Dear Mr. Yox:

On June 30, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Vogtle Electric Generating Plant (VEGP) Units 3 and 4. The enclosed inspection report documents the inspection results, which the inspectors discussed on July 1, 2015, with you and other members of your staff.

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

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 (NCV) in accordance with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest either NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector office at the VEGP Units 3 and 4.

If you disagree with the cross-cutting aspect assigned to either finding, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector office at the VEGP Units 3 and 4.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

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

Sincerely,

/RA/

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

Docket Nos.: 5200025, 5200026

License Nos: NPF-91, NPF-92

Enclosure: NRC Inspection Report 05200025/2015002
and 05200026/2015002
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

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cc w/encl: (See page 3)

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DATE	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/04/2015	08/04/2015
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Letter to M. Yox from Michael E. Ernstes dated August 11, 2015

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT UNITS 3 AND 4 – NRC
INTEGRATED INSPECTION REPORTS 05200025/2015002, and
05200026/2015002

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

Docket Numbers: 5200025
5200026

License Numbers: NPF-91
NPF-92

Report Numbers: 05200025/2015002
05200026/2015002

Licensee: Southern Nuclear Operating Company, Inc.

Facility: Vogtle Unit 3 Combined License
Vogtle Unit 4 Combined License

Location: Waynesboro, GA

Inspection Dates: April 1, 2015 through June 30, 2015

Inspectors: C. Abbott, Resident Inspector, DCP
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T. Chandler, Resident Inspector, DCP
B. Davis, Senior Construction Inspector, DCI
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Accompanying Personnel:

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

Enclosure

SUMMARY

Inspection Report (IR) 05200025/2015002, 05200026/2015002; 04/01/2015 through 06/30/2015; Vogtle Electric Generating Plant (VEGP) Unit 3, VEGP Unit 4, routine integrated inspection report.

This report covers a three month period of inspection by resident and regional inspectors, and announced Inspections, Tests, Analysis, and Inspection Criteria (ITAAC) inspections by regional inspectors. Two green non-cited violations associated with the Construction/Installation cornerstone 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 Title 10 Code of Federal Regulations (CFR) Part 50, Appendix B, Criterion III, "Design Control." Southern Nuclear Operating Company (SNC), failed through their contractor Westinghouse Electric Corporation (WEC), to correctly translate design basis into specifications, drawings, procedures, and instructions to correctly translate the design basis for welded structural connections into specifications, drawings, procedures, and instructions. The licensee entered this finding in their corrective action program as condition report (CR) 10060139, Corrective Action, Prevention and Learnings (CAPAL) 100224197, and corrective action report (CAR) 2015-1597.

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 structural welds that are important to safety. 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 affected components 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 Units 3 and 4 ITAACs 760, 761, 762, and 763. The acceptance criteria of these ITAAC require that reconciliation reports, concluding the "as-built" construction conforms to the approved design, are completed for the areas associated with each 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 had a cross-cutting aspect in the area Human Performance (Conservative Bias) because the licensee's contractor, WEC, failed to use decision making-practices that emphasized prudent choices over those that were simply allowable [H.14]. (Section 1A04)

Cornerstone: Construction/Installation

- Green. The inspectors identified an ITAAC finding of very low safety significance (Green) and associated non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure, through their contractor Chicago Bridge and Iron (CB&I), to perform repair activities of the VEGP Unit 3 Spent Fuel Pool Wall according to an approved engineering disposition or procedure. The licensee entered this finding in their corrective action program as condition report (CR) 10062982, corrective action report (CAR) 2015-1585, and Nonconformance and Disposition report (N&D) SV3-CA20-GNR-000577.

The finding was associated with the Construction / Installation Cornerstone. The inspectors determined the performance deficiency was more than minor since it represented a substantive failure to establish an adequate procedure for the mechanical straightening of duplex stainless steel materials. The finding was determined to represent an ITAAC finding because it was material to the acceptance criteria of VEGP Unit 3 ITAAC 763, in that, if left uncorrected, the licensee could not show that the acceptance criteria of this ITAAC was met. The inspectors determined that the failure to repair the spent fuel pool wall according to an approved procedure represented a deviation from the design that would not have been properly reconciled by the licensee.

The inspectors determined that the finding was of very low safety significance (Green) because the licensee developed an adequate repair procedure that would correct the out of tolerance condition, and through supplemental testing, verify that the mechanical properties of the duplex stainless steel material were not adversely affected (i.e., the design function of the applicable structure or system would not have been impaired by the deficiency).

This finding had a cross-cutting aspect in the area Human Performance (Resources) because the licensee failed to ensure that procedures were available and adequate to support nuclear safety. Specifically, the licensee had established the requirement that all fabrication processes for duplex stainless steel material are in accordance with appropriate procedures, but failed to develop and obtain engineering approval for mechanical straightening activities (a fabrication process) to ensure that the integrity of the spent fuel pool wall would be maintained [H.1] (Section 1A12)

REPORT DETAILS

Summary of Plant Construction Status

During this inspection period, for Unit 3, construction continued on the auxiliary building walls and floors from elevations 66'6" to 100'0", concrete pours inside and outside of the containment vessel (CV), the assembly of modules CA01, and CA03, and the assembly and preparation of the CV middle, and upper rings. For Unit 4, construction continued on the auxiliary building walls and floors from elevations 66'6" to 100'0", and of the CV lower ring.

1. CONSTRUCTION REACTOR SAFETY

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

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

1A01 (Unit 3) ITAAC Number 2.2.01.02a (91) / Family 06F

a. Inspection Scope

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

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

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

- 65001.11-02.07 - Offsite Fabrication of Assemblies

The inspectors selected five plates from the upper ring of containment [C42, C46, D26, D35, & E18] for inspection. For each of the selected plates the inspectors reviewed the associated certified material test report to verify that the physical and chemical properties met the requirements of The American Society of Mechanical Engineers (ASME) Code Sections II and III Subsection NE, Metal Containment.

b. Findings

No findings were identified.

1A02 (Unit 3) ITAAC Number 2.2.01.03a (93) / Family 06B

a. Inspection Scope

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

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

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

- 65001.B-02.02 - Welding Procedure Qualification
- 65001.B-02.03 - Welder Qualification
- 65001.B-02.04 - Production Controls
- 65001.B-02.05 –Inspection
- 65001.F-02.02 - Fabrication Records Review

The inspectors reviewed a sample of records for three vertical butt joint seam welds consisting of two welds from the S10 course and one weld from the S11 course for the Unit 3 containment vessel upper ring shell plates to verify compliance with the applicable requirements of ASME Section III, Division 1, Subsection NE, Class MC Components. Specifically, the inspectors reviewed:

- Receiving Inspection Reports (RIR) for rolled shell plates;
- Certified Material Test Reports (CMTRs) for shell plates and weld filler metals;
- IHI Records of Dimension Measurement for shell plates;
- IHI Reports of acceptable straight-beam ultrasonic (UT) examination for shell plates;
- weld travelers with completed hold points for three vertical seam welds;
- Welder/Operator Performance Qualification Records;
- magnetic particle (MT) examination reports after removal of temporary fit-up tool attachments adjacent to vertical seam welds; and
- final butt joint seam weld radiographic examination (RT) reports.

The inspectors reviewed IHI CMTRs of shell plates C38, C39, C40, D35, and D36 to determine whether the applicable dimensions, basic oxygen furnace degassing process, grain size, chemical compositions, mechanical properties (tensile and yield strength, minimum percent elongation and reduction of area, carbon equivalency, and Brinell hardness), heat treatment, and nondestructive examination (NDE) were in accordance with the requirements of ASME Section III, Subsection NE (including Subarticle NCA-3800, Metallic Material Organization's Quality System Program).

The inspectors reviewed a Lincoln Electric CMTR with traceable lot number 1115G for weld filler metal used to weld vertical seams to determine whether the chemical analysis and mechanical properties in the as-welded condition were in accordance with the requirements of ASME Section II, Part C, SFA-5.29 for flux-cored E91T1-GM-H4, and ASME Section III, Subsection NE (including Subarticle NCA-3800, Metallic Material Organization's Quality System Program), and CB&I CMS-830-15-SP-12049, Welding Material Specification for Low-Alloy Steel Flux Cored Electrode (Outershield 91K2-HSR).

The inspectors reviewed an ESAB CMTR with traceable lot number 2H005T01 for weld filler metal used to weld vertical seams to determine whether the chemical analysis and mechanical properties in the as-welded condition were in accordance with the requirements of ASME Section II, Part C, SFA-5.5 for E9018M-H4R electrodes, and ASME Section III, Subsection NE (including Subarticle NCA-3800, Metallic Material Organization's Quality System Program), and CB&I CMS-830-15-SP-12043, Welding Material Specification for Low-Alloy Steel Covered Electrode (AA9018).

The inspectors reviewed seven CB&I welder qualification records and five welding operator qualification records for welding shell plate vertical seams to determine whether these individuals were qualified and certified in accordance with the essential variables and testing requirements of ASME Section IX for the manual SMAW and semi-automatic and machine flux core arc welding (FCAW) processes. Specifically, the inspectors reviewed the welder qualifications to verify (1) the welders were assigned unique identification numbers, (2) the welders demonstrated their skills by performing specific performance qualification tests, (3) the qualification testing conditions and limits were properly documented, and (4) the appropriate number of test specimens and acceptable test results were achieved.

The inspectors reviewed the certification records of two CB&I quality control (QC) Inspector NDE Level II with ID numbers 1256112 and 165833 for radiographic, magnetic particle, liquid penetrant, visual, and solution film testing along with their current visual acuity and color differentiation records (administered in July 2014) to determine whether they were qualified in accordance with CB&I's written practice, NDE Personnel Training Qualification and Certification Program, and ASNT SNT-TC-1A, 1992 Edition.

The inspectors reviewed acceptable test results of three CB&I magnetic particle examination (MT) reports for temporary fit-up tool attachment removal areas on each side of the vertical seams to determine whether final nondestructive examinations were performed in accordance with the requirements and acceptance criteria of ASME Section III, Subsection NE, and ASME Section V, Article 7, Magnetic Particle Examination. Specifically, the inspectors reviewed acceptable results of final MT reports to determine whether verification of the yoke lifting power, visible light source, and surface temperature were performed and evaluated by the proper certification level of NDE personnel.

The inspectors reviewed acceptable test results of three CB&I radiographic examination reports for vertical seam groove welds to determine whether final NDE were performed in accordance with the requirements and acceptance criteria of ASME Section III, Subsection NE, and ASME Section V, Article 2, Radiographic Examination. Specifically, the inspectors reviewed acceptable results of final RT reports to determine whether verification of the radiographic technique, source side Image Quality Indicator (IQI) wire

selection, and geometric unsharpness limitations were performed and evaluated by the proper certification level of NDE personnel.

b. Findings

No findings were identified.

1A03 (Unit 3) ITAAC Number 2.2.01.04a.ii (96) / Family 06F

a. Inspection Scope

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

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

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

- 65001.F-02.02-Fabrication Records Review

The inspectors reviewed four base metal CMTRs consisting of two for the S10 course shell plates C39 and C40 and two for the S11 course shell plates D35 and D36 fabricated for the Unit 3 containment vessel upper ring to determine whether the Charpy V-notch impact testing of pressure retaining materials were performed in accordance with the fracture toughness requirements of ASME Section III, Subsection NE, and Westinghouse Electric Company (WEC) CV design specification APP-MV50-Z0-001.

b. Findings

No findings were identified.

1A04 (Unit 3) ITAAC Number 3.3.00.02a.i.a (760) / Family 01F
(Unit 3) ITAAC Number 3.3.00.02a.i.b (761) / Family 01F
(Unit 3) ITAAC Number 3.3.00.02a.i.c (762) / Family 01F
(Unit 3) ITAAC Number 3.3.00.02a.i.d (763) / Family 01F
(Unit 4) ITAAC Number 3.3.00.02a.i.a (760) / Family 01F
(Unit 4) ITAAC Number 3.3.00.02a.i.b (761) / Family 01F
(Unit 4) ITAAC Number 3.3.00.02a.i.c (762) / Family 01F
(Unit 4) 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.a (760), 3.3.00.02a.i.b (761), 3.3.00.02a.i.c (762), and 3.3.00.02a.i.d (763) for both Units 3 & 4

ITAAC 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.

See Section 1A07 for description of ITAAC 761, 1A10 for ITAAC 762, and 1A12 for 763.

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

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.01-02.03 - Key Site Parameters
- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.02-02.03 - Special Considerations
- 65001.02-02.07 - Problem Identification and Resolution
- 65001.A - As-Built Attributes for SSCs associated with ITAAC
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance
- 65001.F-02.01 - Design Document Review

The inspectors performed a direct inspection of the structural reinforcement associated with the Unit 3 containment internal structures basemat. Specifically, the inspectors observed the structural reinforcement for the following rooms at elevations 83'-0" and 84'-6":

- 11202 (Steam Generator (SG) Compartment 2 – elevation 83'-0");
- 11206 (Passive Core Cooling System (PXS) Valve/Accumulator Room A – elevation 84'-6");
- 11207 (PXS Valve/Accumulator Room B – elevation 84'-6"); and

- 11209 (Chemical Volume and Control System (CVS) Room – elevation 83'-0").

The inspectors reviewed structural reinforcement for the PXS A/B Compartments (rooms 11206 and 11207) floor slabs at elevation 84'-6". During this inspection, the inspectors independently measured the development lengths for the horizontal reinforcement, as well as the installation of the t-headed shear reinforcement to determine whether the as-installed structural reinforcement was in accordance with the following design drawings:

- SV3-1110-CR-521, "Containment Concrete Reinforcement EL 71'-6" Up To 83'-0"/84'-6" PLAN AT EL 83'-0"/84'-6", Rev. 2 and
- SV3-1120-CR-547, "Containment Concrete Reinforcement EL 71'-6" Up To 83'-0"/84'-6" SECTIONS," Rev. 2.

The inspectors also observed the as-built vertical shear friction reinforcement for SG Compartment 2 (room number 11202) and CVS Room (room number 11209), to determine whether the reinforcement was installed in accordance with WEC design drawings and WEC calculation number APP-1100-CCC-005, "Design Calculation Mass Concrete Reinforcement, Elevation 71'-6" to 83'-0"/84'-6", Rev. 0. The inspectors reviewed this calculation to determine whether the design assumptions were correctly translated into design drawings. During this inspection the inspectors also independently verified whether the correct size and amount of shear friction reinforcement was installed in these areas. Additionally, the inspectors performed independent measurements of the shear friction reinforcement to verify whether the as-installed configuration met the development length requirements.

In addition to the direct structural reinforcement inspections, the inspectors also verified whether the correct size, type, thickness and number of embed plates were installed for setting the CB11 and CB12 modules, located in rooms 11207 and 11206, respectively. Prior to the 83'-0"/84'-6" concrete placement, the inspectors reviewed as-built survey data of the embed plates and independently evaluated the anchorage of the embed plates to verify the anchorage was the correct diameter, type and length. The inspectors reviewed the following embed plates:

- APP-11206-CE-PF374;
- APP-11206-CE-PF375;
- APP-11206-CE-PF376;
- APP-11206-CE-PF377;
- APP-11207-CE-PF382;
- APP-11207-CE-PF383;
- APP-11207-CE-PF384; and
- APP-11207-CE-PF385.

On April 23, 2015, the inspectors observed the 83'-0"/84'-6" concrete placement activities to determine whether:

- accepted procedures and specifications were followed throughout the concrete placement;
- the equipment used was suitable and sized for the work;
- 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 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 American Society for Testing and Materials (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

Introduction

The inspectors identified an ITAAC finding of very low safety significance (Green) and associated non-cited violation (NCV) of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix B, Criterion III, "Design Control" for Southern Nuclear Operating Company's (SNC) failure, through their contractor WEC, to correctly translate the design basis for the design of welded connections between structural steel plates and mechanical couplers, used for the attachment of concrete anchors to the plates, into specifications, drawings, procedures, and instructions. The licensee entered this finding in their corrective action program as condition report (CR) 10060139, CAPAL 100224197, and CAR 2015-1597.

Description

During the week of April 20, 2015, the inspectors determined that the welded connections between structural steel plates and mechanical couplers, used for the attachment of concrete anchors to the plates, did not meet the commitments established by the Vogtle Electric Generating Plant (VEGP) Units 3 & 4 USFAR. Specifically, the allowable stresses on the combination partial joint penetration (PJP) groove welds and fillet welds connecting the couplers to the plates did not meet the requirements of Section Q1.5.3, "Welds" of American Institute of Steel Construction (AISC), "Specification for the Design, Fabrication and Erection of Steel Safety Related Structures for Nuclear Facilities," (AISC N690-94).

The inspectors noted that the Updated Final Safety Analysis Report (UFSAR) Sections 3.8.3, "Concrete and Steel Internal Structures of Steel Containment," and 3.8.4, "Other Category I Structures," establish that the analysis and design of concrete conform to American Concrete Institute (ACI) 349-01 and the analysis and design of structural steel conform to AISC N690-94. Additionally, UFSAR Section 3.8.3.2, "Applicable Codes, Standards, and Specifications," states that welding for seismic Category I structural steel meets the requirements of AISC N690-94. As a result, the inspectors determined that the design of the welded connections between the structural steel plates and mechanical couplers, used for the attachment of concrete anchors to the plates, are required to meet the applicable provisions of ACI 349-01 and AISC N690-94.

To provide ductility in the design, ACI 349-01 Section 12.14.3.3 requires that a fully welded splice develop at least 125% of the yield strength of the bar. Moreover, the inspectors noted that AISC N690-94 Section Q1.5.3, "Welds," requires that welds be proportioned to meet the stress requirements of AISC N690-94 Table Q1.5.3, "Allowable Stresses on Welds." To meet ACI and AISC requirements, the stresses on the coupler to plate welds resulting from the ACI design load - 125% of bar yield strength - must be less than the AISC allowable stresses.

The inspectors identified that provisions of American Welding Society (AWS), "Structural Welding Code – Steel, AWS D1.1:2000 that allow the direction of loading to be taken into account for calculating the allowable stresses on fillet welds were incorrectly applied in calculation APP-CA00-SUC-003, "Calculation of Coupler Welds for CA Modules," Rev 0. In this calculation, AWS D1.1:2000 Section 2.14.4 was inappropriately used to increase the allowable stress on combined PJP groove and fillet welds above that allowed in AISC N690-94 Table Q1.5.3. As a result, some welds were undersized.

The inappropriate use of AWS D1.1:2000 Section 2.14.4 resulted in a less conservative design than allowed by AISC N690-94. The impacted design calculation was associated with multiple seismic category I structures, and was also associated with the following critical sections as described in Table 3.3-7, "Nuclear Island Critical Structural Sections," of Appendix C of the VEGP Units 3 and 4 license:

- southwest wall of the refueling cavity;
- south wall of the west steam generator compartment;
- northeast wall of the in-containment refueling water storage tank;
- in-containment refueling water storage tank steel wall;
- divider wall between the spent fuel pool and the fuel transfer canal;
- shield building SC cylinder; and
- shield building reinforced concrete (RC)/steel concrete composite (SC) connection.

The inspectors also noted that some impacted welds had already been installed and in some cases were encased in concrete. Based on an extent of condition review, it was determined that similar errors existed in the design of other welded connections, including plate to plate connections using combined PJP and fillet welds and connections using circular fillet welds.

In order to resolve this nonconformance, the licensee performed a re-evaluation of the structural design and subsequently revised the calculation on the welds as required by code and updated the aforementioned calculation. Furthermore, in order to provide reasonable assurance that the as-installed structure would perform its intended safety function, the licensee has performed or intends to perform the following:

- destructive testing of mechanical coupler, weld and reinforcing bar system (static and cyclic);
- destructive testing of coupler to plate weld;
- hand calculations; and
- benchmarked finite element analysis of circular fillet weld groups.

Analysis

The inspectors determined that the failure to correctly translate the design basis for the design of attachment welds between mechanical couplers and steel structural plates into specifications, drawings, procedures, and instructions was contrary to the requirements of 10 CFR Part 50, Appendix B, Criterion III, and was a performance deficiency.

The finding was considered to be more than minor because the performance deficiency represented a substantive non-conservative error in a design document that defined the technical requirements for structural welds, some of which are associated with critical sections of the facility as described in VEGP Units 3 and 4 COL.

The inspectors determined the finding represented an ITAAC finding because it was material to the acceptance criteria of VEGP Unit 3 and 4 ITAACs 760, 761, 762, and 763, in that, if left uncorrected, the licensee would not have been able to show that the acceptance criteria of these ITAAC would have been met. The acceptance criteria of these ITAAC require that all deviations between the as-built structures and the approved designs be reconciled to verify that the as-built structures will withstand the design basis loads without a loss of structural integrity or other safety-related functions. The inspectors determined that the failure to meet AISC N690-94 allowable stress criteria on welds represented a deviation from the approved design that would not have been properly reconciled by the licensee.

The inspectors concluded that this finding was associated with the Design / Engineering Cornerstone. The inspectors utilized IMC 2519, "Construction Significance Determination Process," to evaluate the finding and determined that the finding was of very low safety significance (Green). The inspectors determined that the finding was associated with the structural sections listed Table 3.3-7, "Nuclear Island Critical Structural Sections," of Appendix C of the VEGP Units 3 and 4 Combined License (high risk), and the licensee was able to demonstrate with reasonable assurance that the design function of these structures would not be impaired by the deficiency.

The inspectors screened the finding for a possible construction cross-cutting aspect in accordance with Appendix F, "Construction Cross-Cutting Components and Aspects," of IMC 0613. The finding has a cross-cutting aspect in the area Human Performance (Conservative Bias) because the licensee's contractor, WEC, failed to use decision making-practices that emphasized prudent choices over those that were simply allowable. Specifically, the inspectors noted that the root cause evaluation for this issue identified that the responsible engineer incorrectly assumed that the AISC N690-94 Code allowed the use of the directionality equation because it did not explicitly prohibit directionality. (H.14)

Enforcement

10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires that measures be established to assure that the design basis is correctly translated into specifications, drawings, procedures, and instructions.

UFSAR Sections 3.8.3, "Concrete and Steel Internal Structures of Steel Containment," and 3.8.4, "Other Category I Structures," establish that the design, materials, fabrication, construction, inspection or testing for the steel portion of the nuclear island structures

are based on the requirements in American Institute of Steel Construction (AISC), "Specification for the Design, Fabrication and Erection of Steel Safety Related Structures for Nuclear Facilities," AISC N690-94.

Section Q1.5.3, "Welds," and Table Q1.5.3, "Allowable Stresses on Welds," of AISC N690-94 establish the requirements for the calculation of the allowable stress on welds. Additionally, UFSAR Section 3.8.3.2, "Applicable Codes, Standards, and Specifications," states that welding for seismic Category I structural steel meets the requirements of AISC N690-94.

Contrary to the above, the licensee, through its contractor Westinghouse, failed to correctly translate the design basis for the design of attachment welds between mechanical couplers and steel structural plates into specifications, drawings, procedures, and instructions. Specifically, in calculation APP-CA00-SUC-003, "Calculation of Coupler Welds for CA Modules," Rev. 0, the allowable stresses on the combination partial joint penetration (PJP) groove welds and fillet welds connecting the couplers to the plates did not meet the requirements of Section Q1.5.3 of AISC N690-94. In this calculation, AWS D1.1:2000 Section 2.14.4 was inappropriately used to increase the allowable stress on combined PJP groove and fillet welds, resulting in a less conservative design than allowed in the current licensing basis (AISC N690-94).

Because this violation was of very low safety significance (Green) and was entered into the licensee's corrective action program as condition report (CR) 10060139, CAPAL 100224197, and CAR 2015-1597, this violation is being treated as a non-cited violation (NCV 05200025/2015002-01 and 05200026/2015002-01, Weld Allowable Stress Calculation Not in Compliance with Current Licensing Basis), which is consistent with Section 2.3.2 of the NRC Enforcement Policy and EGM 11-006.

Upon identification of this issue, the licensee took the following actions:

- stopped the installation of impacted items, and initiated corrective action reports;
- immediately performed an extent of condition analysis and root cause evaluation to identify and resolve the root and contributing causes of this issue;
- submitted License Amendment Request (LAR)-15-009, "Use of AWS D1.1:2000 Criteria for Structural Welds," on May 26, 2015, and subsequent revision (LAR-15-009R1) on June 9, 2015, to address the use of directionality on the design of structural fillet welds; and
- initiated a second LAR to accept already installed partial joint penetration welds.

Since the corrective actions have not been fully implemented, this NCV will remain open until the NRC can review the license amendment request and verify that the issue would no longer impact the acceptance criteria of ITAACs 760, 761, 762, and 763.

1A05 (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/sections to perform this inspection:

- 65001.01-02.05 - Steel Structures
- 65001.B-02.02 - Welding Procedure Qualification
- 65001.B-02.03 - Welder Qualification
- 65001.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection

The inspectors performed a direct inspection of various stages of fit-up and welding activities associated with the west wall of the in-containment refueling water storage tank (IRWST - CA03 module) for field welds FW-07 and FW-A07 joining wall panels 6 to 7, FW-08 joining wall panels 7 to 8, and FW-09 joining submodules CA03-08 to CA03-09 to determine whether fabrication was performed in accordance with the requirements of AISC N690-1994 and AWS D1.6-1999. Additionally, inspectors reviewed welding procedure specifications (WPS) and supporting procedure qualification records to verify that they were up to date and accurate in accordance with the requirements of AWS D1.6. Inspectors observed in-process welding to verify that the following requirements were met:

- weld travelers were being followed with proper QC hold points signed-off;
- weld surfaces were smooth and free of surface discontinuities;
- weld shielding gas mixture and flow rate;
- base metal preheat;
- welding parameters (volts and wire feed speed);
- backstep sequence welding was used to control distortion; and
- welding consumables were utilized in compliance with the WPS.

The inspectors observed nondestructive liquid penetrant testing for portions of FW-09 (weld seam between CA-03-08 to CA-03-09) and FW-10 to determine whether inspection methods, techniques, and acceptance criteria were in accordance with the requirements of current procedures and AWS D1.6-1999.

b. Findings

No findings were identified.

1A06 (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/sections to perform this inspection:

- 65001.F-02.03 - Observation of Fabrication Activities
- 65001.B-02.02 - Welding Procedure Qualification
- 65001.B-02.03 - Welder Qualification

- 65001.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection

The inspectors observed liquid penetrant examination of weld CV3282-08 on the west wall of the in-containment refueling water storage tank (module CA03) to determine if NDE performed on the module met the applicable code and procedural requirements. The inspectors checked to see if the procedure, 100-PT-304 Rev. 6, was available, the temperature of the parts were within the allowed range, the temperature was checked by a calibrated meter, dwell and hold times met the procedural minimums, and the cleaner and developer materials were as listed in the procedure and not expired. Additionally the inspectors reviewed the qualification records for the technician to verify if he was qualified to perform liquid penetrant examinations in accordance with the written practice and that his eye exams were current.

The inspectors also observed in-process welding of weld number S4KCV3304-FW1 to determine if it was made in accordance with site procedures and the AWS Code. The inspectors checked to verify if the weld technique was sufficient to create a sound weld and if the welding procedure being followed with respect to filler metal type and size, interpass temperature, and cleanliness. The inspectors reviewed the welding procedure and associated procedure qualification record to determine if it was written and qualified in accordance with the AWS Code. The inspectors noted the lot of filler metal being used and checked to verify if it was traceable to a unique CMTR which met the physical and chemical testing requirements of the ASME Section II Code. Lastly, the inspectors reviewed the qualification records to verify if the welder had a unique identification stamp and he had been qualified to make the weld in accordance with the requirements of the AWS Code.

The inspectors also reviewed two nonconformance and disposition reports to verify that nonconforming conditions were identified, documented and resolved in accordance with the requirements of the quality program and procedures and with adequate technical justifications as needed.

b. Findings

No findings were identified.

1A07 (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):

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	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	i.b) A report exists which reconciles deviations during construction and concludes that the as-built shield building structures, including the critical

to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	basis loads.	sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions.
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The inspectors used the following NRC inspection procedures/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.02-02.03 - Special Considerations
- 65001.A - As-Built Attributes for SSCs associated with ITAAC
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors completed a review of the enhanced shield building construction mockup program. The intent of this review was to:

- verify that the licensee had established and was implementing a construction mockup program as described in Section 3.8.4.8 of the UFSAR;
- verify that the proposed construction means and methods are capable of producing a completed structure that meets design and licensing requirements;
- verify that, if adequately implemented, the planned quality assurance measures are sufficient to provide reasonable assurance that the completed structure has been constructed in accordance with design and licensing requirements;
- verify that lessons learned from the construction mockup program are being appropriately incorporated into planned quality assurance measures, inspection techniques, and construction means and methods; and
- support future NRC inspection activities by providing insights into and familiarization with planned quality assurance measures and construction means and methods associated with construction of the AP1000 enhanced shield building.

The inspectors reviewed the final report documenting the enhanced shield building construction mockup program including lessons learned from concrete placement, evaluation of non-destructive examination methods, and conclusions based on destructive examination of the mockups. This review supplemented direct observations that were previously conducted in 2013 and 2014. Specifically, the inspectors observed the following construction mockup program activities:

- concrete placement in full-scale mockups of the RC/SC horizontal and vertical connections and steel tension ring conducted on October 4, 2013, September 30, 2013, and October 8, 2013, respectively;
- nondestructive examination of full-scale mockups of RC/SC vertical connection and steel tension ring using the impact echo method conducted on October 26, 2013 and October 16, 2013, respectively; and

- visual observations of the interiors of full-scale mockups of RC/SC horizontal and vertical connections and steel tension ring conducted at various dates in 2014 after mockups were demolished in a controlled manner for examination.

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.

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

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

b. Findings

No findings were identified.

1A08 (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/sections to perform this inspection:

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.A.02.04 - Review As-built Deviations/Nonconformance
- 65001.F-02.01 - Design Document Review

The inspectors reviewed quality records and performed direct inspection of construction activities associated with the shield building basemat for Unit 3. Specifically, the inspectors observed construction activities associated with the reinforced concrete wall section along the east side (lower annulus) of the shield building basemat perimeter walls between elevations 82'-6" and 100'-0".

For the wall section listed above, the inspectors reviewed a sample of design calculations, drawings, and specifications to determine whether:

- design outputs were translated into drawings;
- design documentation demonstrated adequacy of design by reference to analyses, calculations, bounding condition checks, functional assessments, and/or engineering evaluations;
- the documents adequately defined the final design and arrangement of these SSCs;
- critical attributes associated with the ITAAC were correctly identified and documented for review and approval by responsible engineering personnel; and
- the documents were consistent with the design commitments and requirements of the technical specifications, the UFSAR, and code commitments.

The inspectors observed installation activities for the wall section along the perimeter of the shield building basemat associated with embedments, and steel reinforcement, including horizontal and vertical reinforcing steel bars, shear reinforcement, and bar splices, to determine whether:

- the installation activities met applicable quality and technical requirements established by approved procedures, specifications, and drawings;
- piping, penetrations, reinforcing steel, and embedments were located properly in the structure, were sized as specified in drawings and calculations, and had proper clearances; and
- reinforcing steel and embedments were secured and free of concrete or excessive rust.

For the wall section along the perimeter of the shield building basemat, the inspectors performed independent inspection and measurements to determine whether the steel reinforcement, embedments, and formwork conformed to the design specifications. The inspectors performed independent inspection and measurements to determine whether the as-built concrete thickness of completed wall sections were in accordance with the final design, the ITAAC, and UFSAR.

The inspectors also reviewed in-process structural reinforcement installation activities associated with the massive concrete wall (west side) up to elevation 100'. During this inspection, the inspectors verified that:

- vertical dowels were the correct type and size;
- vertical mechanical couplers were the correct type and size;
- horizontal ties were installed as required; and
- the rebar cage configuration between elevation 87'-6" to 100'-0" met design requirements.

b. Findings

No findings were identified.

1A09 (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/sections to perform this inspection:

- 65001.01-02.05 - Steel Structures
- 65001.01-02.06 - Records
- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.02 - Fabrication Records Review
- 65001.02-02.02 - Laboratory Testing
- 65001.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection
- 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
- 65001.F-02.01 - Design Document Review

The inspectors performed a field inspection of construction activities associated with the shield building sub-modules for Unit 3. The sub-modules inspected included:

- reinforced concrete to steel concrete composite vertical transition sub-modules 01H, and 01Q between elevation (el.) 103'-6" and 123'-6";
- reinforced concrete to steel concrete composite vertical transition sub-module 01G between el. 123'-6" and 149'-6";
- reinforced concrete to steel concrete composite horizontal transition sub-modules 01J & 01L between el. 100'-0" and 103'-6"; and

- steel concrete composite sub-modules 07H, 08K, 09C, 10A, 11G between el. 149'-6" and 199'-6".

The inspectors conducted field measurements to verify material dimensions, material location, headed stud spacing, plate thickness, gusset plate dimensions, tie bar spacing, and weld size and location. The inspectors also reviewed documents, and interviewed licensee personnel to assess the implementation of the portion of the quality assurance (QA) program specific to design and fabrication activities. Various documents, such as design drawings, non-conformance and deviation reports, specifications, certified material tests reports, and receipt inspection documents were reviewed by the inspectors to verify:

- design and fabrication was completed in accordance with applicable specifications, drawings, and approved procedures;
- key building critical dimensions and materials satisfied design specifications and requirements;
- the licensee confirmed that components inspected conformed to design drawings and that deviations were being addressed in accordance with procedure requirements;
- nonconforming conditions identified by the licensee were being appropriately resolved;
- the shape, size, dimensions, type, and grade of material conformed to the approved specifications and design drawings;
- design documents associated adequately defined the design and arrangement of the sub-module fabrication;
- fit-up tolerances for length, depth, and straightness of structural members were as specified; and
- critical attributes of as-built SSC conform to the design.

b. Findings

No findings were identified.

1A10 (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):

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,	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

without loss of structural integrity and the safety-related functions.		the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions.
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The inspectors used the following NRC inspection procedures/sections to perform this inspection:

- 65001.01-02.01 - Procedures
- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.01 - Design Document Review
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors performed a direct inspection of the structural reinforcement required for the unit 3 nuclear island auxiliary building cast-in-place concrete on metal deck composite floor at elevation 82'-6". During this inspection, the inspectors reviewed quality records and performed direct inspections of construction activities associated with the structural reinforcement located in room 12212 (Division B RCP trip switchgear room) this room is located in the non-radiologically controlled portion of the auxiliary building.

The inspectors verified that the structural reinforcement near the interior walls and shield building, was installed in accordance with the applicable WEC design drawings and applicable engineering design changes. The inspectors also performed inspections around the floor openings to determine whether these areas were adequately reinforced and the penetrations were the correct type and size.

In addition, for the composite floor listed above, the inspectors reviewed a sample of Westinghouse issued for construction design calculations and design drawings to determine whether:

- activities were completed in accordance with applicable specifications, drawings, and approved procedures;
- design inputs were correctly identified and documented, and that their selection was reviewed and approved by the responsible engineering group;
- design outputs were translated into drawings;
- design documentation demonstrated adequacy of design by reference to analyses, calculations, and engineering evaluations; and
- the documents were consistent with the design commitments and requirements of the UFSAR and code commitments.

Prior to concrete placement activities, NRC inspectors performed independent field measurements to determine whether the steel reinforcement, steel embedments, and metal decking conformed to the design drawings and specifications. The inspectors performed this pre-placement inspection to determine whether the as-built conditions

would meet the design requirements as specified in the UFSAR and WEC design documents. NRC inspectors also observed CB&I QC inspectors perform field inspections. During this observation, NRC inspectors reviewed CB&I QC inspection plan F-C112-002, "Pre placement: Nuclear Island Concrete," Rev. 15, to determine whether the plan addressed the appropriate inspection attributes during construction to demonstrate that the rebar configuration, will perform satisfactorily in service. The following attributes were inspected:

- inspection plan included the requirements and acceptance limits contained in applicable design documents;
- methods used to perform inspections and document results were adequate;
- inspection notification points, routine points and hold points were defined; and
- applicable code and specifications were referenced in the plan.

Lastly, prior to concrete placement activities, the inspectors reviewed a sample of in-process work packages associated with the construction activities for the cast-in-place concrete on metal deck composite floor. During this inspection, the inspectors reviewed these packages to determine whether:

- the latest approved procedures, drawings, and other work instructions were available at the installation area;
- the installation and inspection sequences were maintained; and
- design changes, field modifications, and nonconformances associated with the work observed were properly controlled and processed in accordance with the approved QA program.

b. Findings

No findings were identified.

1A11 (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/sections to perform this inspection:

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.01-02.01 - Procedures
- 65001.01-02.03 - Key Site Parameters
- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.01-02.06 - Records
- 65001.F- Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.01 - Design Document Review
- 65001.F-02.02 - Fabrication Records Review
- 65001.F-02.04 - General QA Review
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors reviewed quality records and performed direct inspection of construction activities associated with the non-radiologically controlled area of the auxiliary building for Vogtle Unit 3. Specifically, the inspectors observed construction activities associated with the wall section along column line 11 between column lines I and J-2 between elevation 82'-6" and 100'-0".

For the wall section listed above, the inspectors reviewed a sample of design calculations, drawings included in the work packages, and specifications to determine whether:

- design outputs were translated into drawings;
- design documentation demonstrated adequacy of design by reference to analyses, calculations, bounding condition checks, functional assessments, and/or engineering evaluations;
- the documents adequately defined the final design and arrangement of these SSCs;
- critical attributes associated with the ITAAC were correctly identified and documented for review and approval by responsible engineering personnel; and
- the documents were consistent with the design commitments and requirements of the technical specifications, the UFSAR, and code commitments.

The inspectors observed installation activities for the wall sections listed above associated with embedments, and steel reinforcement, including horizontal and vertical reinforcing steel bars, shear reinforcement, and bar splices, to determine whether:

- the installation activities met applicable quality and technical requirements established by approved procedures, specifications, and drawings included in the work packages;
- piping, penetrations, reinforcing steel, and embedments were located properly in the structure, were sized as specified in drawings and calculations, and had proper clearances; and
- reinforcing steel and embedments were secured and free of concrete or excessive rust.

For the wall sections listed above, the inspectors performed independent inspection and measurements to determine whether the steel reinforcement, and embedments conformed to the final design, the ITAAC, and UFSAR.

b. Findings

No findings were identified.

1A12 (Unit 3) ITAAC Number 3.3.00.02a.i.d (763) / Family 01F

a. Inspection Scope

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

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/sections to perform this inspection:

- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors performed a routine, independent walk-down of the Unit 3 CA20 work activities to determine whether in-process construction activities were performed in accordance with the applicable quality and technical requirements. Specifically, the inspectors performed an independent visual inspection of the module to determine whether any structural deviations existed that had not been identified by the licensee and its contractors. During this inspection, the inspectors observed in-process, mechanical straightening activities on the north wall of the Unit 3 spent fuel pool module (column line 4 from column line K-2 to L-2, from elevation 92'6" to 135').

b. Findings

Introduction

The inspectors identified an ITAAC finding of very low safety significance (Green) and associated non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure, through their contractor Chicago Bridge and Iron (CB&I), to perform repair activities of the Unit 3 Spent Fuel Pool Wall according to an approved engineering disposition or procedure.

Description

On April 15, 2015, the inspectors observed that the north wall of the Unit 3 Spent Fuel Pool (column line 4 from column line K-2 to L-2, from elevation 92'6" to 135') was straightened using a mechanical push-pull system. The inspectors noted that Section 5.5, "Distortion of Members," of the AWS D1.6:1999 code allows duplex stainless steel

to be straightened using mechanical methods approved by the engineer. However, the licensee was unable to provide documented evidence of the engineer's approval for this activity.

The inspectors also identified that the spent fuel pool wall out of tolerance condition had not been properly documented in the licensee's nonconformance and corrective action programs.

Upon identification of this issue, the licensee stopped all straightening activities and initiated condition report (CR) 10062982 to document the issue. Moreover, the licensee's contractor CB&I initiated nonconformance and disposition report (N&D) number SV3-CA20-GNR-000577 and corrective action report (CAR) 2015-1585. The engineering disposition for N&D SV3-CA20-GNR-000577 required that supplemental nondestructive testing (ultrasonic examination) be performed on all adjacent welds after mechanical straightening activities. Additionally, the disposition required that Brinell hardness measurements be taken on the base material to verify that the mechanical properties of the duplex stainless steel were not compromised by the straightening activities.

Analysis

The inspectors determined that the failure to perform repair activities of the Unit 3 Spent Fuel Pool Wall according to an approved engineering disposition or procedure was contrary to Criterion V of 10 CFR Part 50, Appendix B, and was a performance deficiency. The finding was determined to be more than minor because it represented a substantive failure to establish an adequate procedure for the mechanical straightening of duplex stainless steel materials. Mechanical straightening activities were performed without an approved procedure; therefore, the quality of the duplex stainless steel modules was indeterminate pending an engineering evaluation. Moreover, the engineering repair disposition (procedure), which was documented after the NRC identified the issue, required that supplemental nondestructive testing and material hardness measurements be performed after the straightening repair was completed.

The inspectors determined the finding represented an ITAAC finding because it was material to the acceptance criteria of the Unit 3 ITAAC 763, in that, if left uncorrected, the licensee would not have been able to show that the acceptance criteria of this ITAAC was met. The acceptance criteria of Vogtle's Unit 3 ITAAC 763 requires that all deviations between the as-built structures in the radiologically controlled areas of the auxiliary building and the approved design be reconciled such that the as-built structure would withstand the design basis loads without a loss of structural integrity or other safety-related functions. The inspectors determined that the failure to repair the spent fuel pool wall according to an approved engineering disposition represented a deviation from the design that would not have been properly reconciled by the licensee.

The inspectors concluded this finding was associated with the Construction / Installation Cornerstone. The inspectors utilized IMC 2519, "Construction Significance Determination Process," to evaluate the finding. They determined that the finding was of very low safety significance (Green). The inspectors determined that the finding was associated with auxiliary building structure (intermediate risk). They also determined that the licensee developed an adequate repair procedure that would correct the out of tolerance condition, and through supplemental testing, verify that the mechanical

properties of the duplex stainless steel materials were not adversely affected (i.e., the design function of the applicable structure or system would not have been impaired by the deficiency).

The inspectors screened the finding for a possible construction cross-cutting aspect in accordance with Appendix F, "Construction Cross-Cutting Components and Aspects" of IMC 0613. This finding has a cross-cutting aspect in the area of Human Performance (Resources) because the licensee failed to ensure that procedures were available and adequate to support nuclear safety. Specifically, the licensee had established the requirement that all fabrication processes for duplex stainless steel material is in accordance appropriate procedures, but failed to develop and obtain engineering approval for mechanical straightening activities (a fabrication process) to ensure that the integrity of the spent fuel pool wall would be maintained. [H.1]

Enforcement

Criterion V, "Instructions, Procedures, and Drawings," of 10 CFR Part 50, Appendix B requires in part that, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings." Section 5.5, "Distortion of Members," of American Welding Society (AWS) D1.6:1999, "Structural Welding Code - Stainless Steel," requires in part that, "Members distorted by welding may be straightened by mechanical straightening methods specified and approved by the engineer."

Section 11.9 of SV3-CA20-S5Y-00005, "Auxiliary Building Areas 5 & 6 Module CA20 Submodules General Notes - V," revision 1, states in part that, "For A240 S32101 Duplex SS [stainless steel] material all machining, forming, and other fabrication processes such as cutting, drilling, welding, heat treating or surface grinding shall be in accordance with the proper manufacturer recommendations...The fabrication procedure shall be reviewed by purchaser or purchaser's designee."

Contrary to the above, on April 15, 2015, the licensee, through its contractor CB&I, performed repair activities (i.e., an activity affecting quality) on a seismic category I structural module without documented instructions or procedures. Specifically, CB&I had started to repair the north wall of the Unit 3 Spent Fuel Pool (column line 4 from column line K-2 to L-2), which had been distorted during previous welding operations, without an approved engineering repair disposition or procedure. Because this violation was of very low safety significance (Green) and it was entered into the licensee's corrective action program as CR 10062982, CAR 2015-1585, and N&D SV3-CA20-GNR-000577, this violation is being treated as a non-cited violation (NCV 05200025/2015002-02, Spent Fuel Pool Wall Repair Without an Approved Procedure), consistent with Section 2.3 of the NRC Enforcement Policy and EGM 11-006.

Upon identification of this issue, the licensee stopped all in-process mechanical straightening activities, initiated a nonconformance report, and developed an engineering approved straightening procedure. The inspectors reviewed the corrective actions that were developed for this issue. However, the corrective actions have not been fully implemented; therefore, this NCV will remain open until the NRC can review the final condition of the module wall and verify that the issue would no longer impact the acceptance criteria of ITAAC 763.

1A13 (Unit 3) ITAAC Number 3.3.00.02a.i.d (763) / Family 01Fa. 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/sections to perform this inspection:

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

The inspectors reviewed quality records and performed direct inspection of construction activities associated with the radiologically controlled area of the auxiliary building for Unit 3. Specifically, the inspectors observed construction activities associated with the following wall sections between elevation 82'-6" and 100'-0":

- wall section along column line 1 between column lines I and J-2 and
- wall section along column line I near the intersection with column line 1.

For the wall section listed above, the inspectors reviewed a sample of design calculations, drawings included in the work packages, and specifications to determine whether:

- design outputs were translated into drawings;
- design documentation demonstrated adequacy of design by reference to analyses, calculations, bounding condition checks, functional assessments, and/or engineering evaluations;
- the documents adequately defined the final design and arrangement of these SSCs;
- critical attributes associated with the ITAAC were correctly identified and documented for review and approval by responsible engineering personnel; and
- the documents were consistent with the design commitments and requirements of the technical specifications, the UFSAR, and code commitments.

The inspectors observed installation activities for the wall sections listed above associated with embedments, and steel reinforcement, including horizontal and vertical reinforcing steel bars, shear reinforcement, and bar splices, to determine whether:

- the installation activities met applicable quality and technical requirements established by approved procedures, specifications, and drawings included in the work packages;
- piping, penetrations, reinforcing steel, and embedments were located properly in the structure, were sized as specified in drawings and calculations, and had proper clearances; and

- reinforcing steel and embedments were secured and free of concrete or excessive rust.

For the wall section listed above, the inspectors performed independent inspection and measurements to determine whether the steel reinforcement, embedments, and formwork conformed to the design specifications. The inspectors performed independent inspection and measurements to determine whether the as-built concrete thickness of completed wall sections were in accordance with the final design, the ITAAC, and UFSAR.

b. Findings

No findings were identified.

1A14 (Unit 3) ITAAC Number 3.3.00.02a.i.d (763) / Family 01F

a. Inspection Scope

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

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

- 65001.01-02.06 - Records
- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.F-02.01 - Design Document Review
- 65001.B-02.02 - Welding Procedure Qualification
- 65001.B-02.04 - Production Controls
- 65001.B-02.06 - Records
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors reviewed quality records and performed direct inspection of construction activities associated with the radiologically controlled area of the auxiliary building Unit 3. Specifically, the inspectors observed construction activities and the as-built condition for structural module CA20 to include the following welds associated with the installation of the spent fuel pool floor submodules CA20-49 and CA20-50 between column lines 3, 4, K-2, and L-2 at elevation 92'-8.5":

- Field Weld 5, Weld No. CV1428-5 (CA20-49 to CA20-50);
- Field Weld 15, Weld No. SV3-CA20-S4K-CV2678-15 (floor to ledger angle, at column line L-2);
- Field Weld 16, Weld No. SV3-CA20-S4K-CV2678-16 (floor to ledger angle, at column line 4);
- Field Weld 17, Weld No. SV3-CA20-S4K-CV2678-17 (floor to ledger angle, at column line K-2);
- Field Weld 20, Weld No. SV3-CA20-S4K-CV2678-20 (floor to west wall, at column line 3);
- Beam Seat 4, Weld No. SV3-CA20-S4K-CV2678-4B (ledger angle to north wall, at column line L-2);

- Beam Seat 5, Weld No. SV3-CA20-S4K-CV2678-5B (ledger angle to east wall, at column line 4); and
- Beam Seat 6, Weld No. SV3-CA20-S4K-CV2678-6B (ledger angle to south wall, at column line K-2).

For the welds listed above, the inspectors reviewed the associated work package and a sample of included drawings, design calculations, and design changes to determine whether:

- design activities were completed in accordance with applicable specifications, drawings, and approved procedures;
- design inputs were correctly identified and documented, and that their selection was reviewed and approved by the responsible engineering group;
- design outputs were translated into drawings;
- critical attributes associated with the ITAAC were correctly identified and documented for review and approval by responsible engineering personnel; and
- the documents were consistent with the design commitments and requirements of the technical specifications, the UFSAR, and code commitments.

The inspectors also reviewed the weld data sheets from the associated work package for each weld listed above to determine whether the correct WPS, base material, filler material, and joint type were selected, as well as whether the established hold points were appropriately signed off by construction and QC inspectors. Specifically, the inspectors reviewed the hold point signatures for fit-up, final visual inspection, magnetic particle examination, and ultrasonic examination, as well as the signatures for completion of repair/rework if any of the hold points were deemed unsatisfactory. As specified on the weld data sheets, the inspectors reviewed four WPSs to verify they were available, up to date, and in conformance with the requirements of AWS D1.1:2000.

The inspectors reviewed a sample of nonconformances associated with CA20-49 and CA20-50 to verify:

- the licensee identified problems at an appropriate threshold and entered them into the corrective action program;
- any differences between the as-built and as-designed SSCs were documented and dispositioned in accordance with approved modification or change procedures;
- the nonconformances were resolved and their dispositions had adequate technical bases; and
- reportability screenings and evaluations under 10 CFR Part 21 and 10 CFR 50.55(e) were performed.

b. Findings

No findings were identified.

1A15 (Unit 3) ITAAC Number 3.3.00.02a.i.d (763) / Family 01F

a. Inspection Scope

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

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

- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors performed a routine, independent walk-down of Unit 3 CA20 work activities to determine whether in-process construction activities were performed in accordance with the applicable quality and technical requirements. Specifically, the inspectors performed an independent visual inspection of the module to determine whether any structural deviations existed that had not been identified by the licensee and its contractors. During this inspection, the inspectors observed in-process overlay plate (OLP) removal activities. After the OLPs were removed from the CA20 walls, the inspectors performed a visual inspection of the holes that had been drilled in the CA20 walls to verify that previous drilling activities had not damaged any of the seismic category I steel members that had been previously welded to the inside of the module walls.

b. Findings

No findings were identified.

1A16 (Unit 3) ITAAC Number 3.3.00.02a.ii.a (764) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.ii.a (764):

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.a) A report exists that concludes that the containment internal structures as-built concrete thicknesses conform to the building sections defined in Table 3.3-1.

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

- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.A.02.04 - Review As-built Deviations/Nonconformance
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

Prior to the 83'-0"/84'-6" concrete placement inside of the unit 3 containment vessel, the inspectors independently measured the shield wall between the reactor vessel and reactor coolant drain tank room. This shield wall is the East-West wall parallel with column line 7 from elevation 71'-6" to 83'-0" as stated in the Unit 4 COL, Appendix C, Table 3.3-1 "Definition of Wall Thicknesses for Nuclear Island Buildings, Turbine Building, and Annex Building." During this inspection, the inspectors performed independent measurements to verify that the wall thickness was in accordance with the aforementioned table. Prior to concrete being placed, the inspectors also observed the construction joint to determine whether the surface of the concrete joint was intentionally roughened in accordance with ACI 349-01, and whether the surface was clean and free of laitance.

b. Findings

No findings were identified.

1A17 (Unit 3) ITAAC Number 3.3.00.02a.ii.a (764) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.ii.a (764).

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

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

The inspectors independently measured the thickness of two submodules associated with structural module CA02, the north-east wall of the in-containment refueling water storage tank (IRWST), prior to it being assembled on-site. Specifically, the inspectors sampled CA02-02 and CA02-03 to verify the concrete thickness met the acceptance criteria listed in Table 3.3-1, "Definition of Wall Thicknesses for Nuclear Island Buildings, Turbine Building, and Annex Building," of Appendix C of the VEGP Unit 3 COL.

b. Findings

No findings were identified.

1A18 (Unit 3) ITAAC Number 3.3.00.02a.ii.b (765) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.ii.b (765):

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.b) A report exists that concludes that the as-built concrete thicknesses of the shield building sections conform to the building sections defined in Table 3.3-1.

The inspectors used the following NRC inspection procedures/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
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors reviewed quality records and performed direct inspection of construction activities associated with the shield building basemat for Unit 3. Specifically, the inspectors observed construction activities associated with the reinforced concrete shield building basemat at elevation 82'6".

The inspectors reviewed measuring and surveying records associated with the shield building basemat to determine whether they were complete, accurate, and documented that the as-built configuration met the design specifications and the acceptance criteria listed in Table 3.3-1, "Definition of Wall Thicknesses for Nuclear Island Buildings, Turbine Building, and Annex Building," of Appendix C of the VEGP Unit 3 COL.

b. Findings

No findings were identified.

1A19 (Unit 3) ITAAC Number 3.3.00.02a.ii.d (767) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.ii.d (767):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
2.a) The nuclear island	ii) An inspection of the as-	ii.d) A report exists that

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.	built concrete thickness will be performed.	concludes that the as-built concrete thicknesses of the radiologically controlled area of the auxiliary building sections conform to the building sections defined in Table 3.3-1.
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The inspectors used the following NRC inspection procedures/sections to perform this inspection:

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

The inspectors performed a concrete thickness inspection of the radiologically control portion of the auxiliary building. The inspectors sampled the following wall segments from elevation 82'-6" to 100'-0":

- wall section along column line I from column line 1 to 2;
- wall section along column line 1 from column line I to N; and
- wall section along column line 1 between column lines I and J-2

During this inspection, the inspectors independently measured the exterior walls to determine whether the pre-placement concrete thickness was as specified by Westinghouse concrete drawings and VEGP Unit 3 COL, Appendix C, Table 3.3-1, "Definition of Wall Thicknesses for Nuclear Island Buildings, Turbine Building, and Annex Building." The inspectors also performed independent surveillances of the already poured segments of the walls and portions of the concrete formwork prior to placement to determine whether:

- clear cover dimensions were in accordance with the applicable WEC concrete drawings;
- formwork was clean and secure;
- embed plates were flush to the face of formwork and;
- width of the formwork along wall segments were in place to provide the wall thickness as specified on WEC concrete drawings.

Prior to concrete being placed, the inspectors also inspected the construction joint to determine whether the surface of the concrete joint was intentionally roughened in accordance with ACI 349-01, and whether the surface was clean and free of laitance.

b. Findings

No findings were identified.

1A20 (Unit 4) ITAAC Number 2.2.01.03a (93) / Family 06Ba. Inspection Scope

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

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

- 65001.06-02.02 - Component Welding
- 65001.06-02.04 - Testing and Verification
- 65001.B-02.01 - Program and Procedures Review
- 65001.B-02.02 - Welding Procedure Qualification
- 65001.B-02.03 - Welder Qualification
- 65001.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection
- 65001.B-02.06 - Records
- 65001.11-02.03 - Installation and Welding
- 65001.11-02.05 - Nondestructive Examination

The inspectors observed in-process welding, quality control inspection, and nondestructive examination of the following pressure boundary welds associated with the middle shell assembly of Unit 4:

- U4-S5/S6 (girth seam between ring 5 and ring 6);
- U4-S5-E9/E10 (vertical seam in ring 5);
- U4-S5-E12/E1 (vertical seam in ring 5);
- U4-S6-C18/C19 (vertical seam in ring 6); and
- U4-S6-C21/C22 (vertical seam in ring 6).

Specifically, the inspectors observed in-process machine welding of the girth seam and manual welding of repairs associated with the vertical seams to verify the amperage, voltage, preheat and interpass temperatures, and travel speed/burn-off rate were within the qualified ranges listed on the WPS. The inspectors reviewed CB&I's visual inspection procedure and witnessed QC's inspection of the welds to verify the appropriate measuring equipment was used, the surfaces were properly cleaned, the lighting and accessibility was adequate, and the welds were free of visible porosity, cracks, lack of fusion, and arc strikes. The inspectors also took independent measurements to verify adequacy of size, concavity, convexity, reinforcement, misalignment, and length. The inspectors reviewed CB&I's magnetic particle examination procedure and observed magnetic particle examination of the repair welds to verify the requirements for cleanliness, lighting, lifting power, type of yoke, and acceptance criteria were met. The inspectors also reviewed the measuring and test equipment used by the QC inspectors and NDE examiners to verify adequate calibration and traceability.

Additionally, for the observed welds, the inspectors reviewed a sample of the following associated CB&I records:

- weld travelers to determine if work flow was controlled and necessary steps were signed off when completed;
- welding procedures and qualification records to determine if they were written and qualified in accordance with ASME Code Sections IX and Section III, Subsection NE;
- welder qualification records to verify the welders were qualified in accordance with ASME Code Sections IX and Section III, Subsection NE;
- certificates of qualification for QC inspectors to verify they were properly trained and certified to inspect the welds; and
- the final RT film to determine if the welds were free of rejectable defects.

b. Findings

No findings were identified.

1A21 (Unit 4) 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/sections to perform this inspection:

- 65001.01-02.05 - Steel Structures
- 65001.F-02.02 - Fabrication Records Review
- 65001.B-02.06 - Records
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors reviewed a sample of fabrication records for Unit 4 reactor vessel cavity wall (CA04-02 submodule), which is a Seismic Category I steel structure, to verify that fabrication activities were in compliance with applicable codes, standards, regulations, quality and technical requirements.

The inspectors reviewed purchase order number 132176-D100.CA012 to verify that the applicable quality and technical requirements for Unit 4 CA04-02 submodule were properly specified. For a sample of the structural steel shapes specified by the CA04-02 design drawings, the inspectors verified that the steel used to fabricate this submodule was of the proper shape, size, dimension, type, and grade.

The inspectors reviewed a sample of fabrication records for Unit 4 CA04-02 submodule. The inspectors reviewed welding and inspection records to verify that they were adequate to furnish evidence of activities affecting quality and that the submodule conformed to the applicable quality and technical requirements. Specifically, the inspectors reviewed these records for conformance to the following requirements:

- 10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants";

- ASME NQA-1-1994, "Quality Assurance Requirements for Nuclear Facility Applications";
- ANSI/AISC N690, "American National Standard Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities," 1994 Edition; and
- American Welding Society (AWS) D1.1, "Structural Welding Code," 2000 edition.

The inspectors reviewed welding and inspection records for three welds that were completed at the manufacturing facility. Specifically, the inspectors reviewed the welding and inspection records for weld numbers 47B, 47D, 48A/B-A, and 48A/B-B.

The inspectors reviewed these weld records to determine whether:

- the welding activity was properly documented in the work traveler;
- records provided adequate traceability to all aspects of the welding activity, including traceability to the welder who performed the work;
- the records adequately documented the following attributes: reference to procedure and welder qualifications, inspector qualifications, weld material certifications and receipt inspection reports, weld data or process records (travelers), weld maps, weld inspection records, nondestructive examination records;
- the records were appropriately retained and stored in accordance with QA program requirement;
- required inspections were identified in the traveler withhold points, as appropriate; and
- accepted, rejected, and repaired items were documented in written reports.

Additionally, the inspectors performed a direct visual inspection of a sample of fillet welds to determine whether the final welds satisfied the requirements of Table 6.1, "Visual Weld Acceptance Criteria," of AWS D1.1:2000. The inspectors also verified that the profile of these welds met the requirements of AWS D1.1:2000.

The inspectors performed a general visual inspection of this submodule to verify that that the as-built steel structure conformed to final design. Specifically, the inspectors verified that the plate material was the proper thickness and that the correct number of nelson studs were installed on the steel plate.

The inspectors reviewed a sample of certified material test reports (CMTRs) for the structural steel plates used to fabricate the CA04-02 submodule. The inspectors verified that these plates met the requirements of ASTM A36, "Standard Specification for Carbon Structural Steel," 2014 edition.

The inspectors reviewed the certificate of conformance and related fabrication records for the Unit 4 CA04-02 submodule. The inspectors reviewed a sample of nonconformance and disposition reports (N&Ds) that were listed on the certificate of conformance to determine whether the disposition of the nonconformance was compliant with the applicable codes, standards, regulations, quality and technical requirements. The inspectors reviewed two N&Ds that were reported as closed and two that were reported as open on the certificate of conformance. The inspectors verified that the N&Ds that were listed as open on the certificate of conformance at the time of shipment

had been appropriately corrected at the VEGP Units 3&4. Regarding the two repair N&Ds, the inspectors reviewed the related weld and inspection records to verify that the repair work was performed according to the direction provided in the N&D disposition.

b. Findings

No findings were identified.

1A22 (Unit 4) 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/sections to perform this inspection:

- 65001.01-02.05 - Steel Structures
- 65001.F-02.02 - Fabrication Records Review
- 65001.F-02.03 - Observation of Fabrication Activities
- 65001.B-02.04 - Production Controls
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors observed in-process fit-up and tack activities in different stages of production for all single-V groove vertical seam welds (using backing bars) and several stiffener plates with fillet welds for the CA04 (reactor cavity) module. This included reviewing CB&I work package SV4-CA04-S4W-CV2328 and drawing SV4-CA04-S4K-CV3627, Rev. 5, for FW-2 to verify that assembly activities were in accordance with the requirements of AISC N690-1994, AWS D1.1-2000, and CB&I welding procedures for weld shielding gas and tolerances of root opening, bevel angles, and alignment of faying surfaces. In addition, the inspectors interviewed welders and a foreman to determine whether craft personnel were consistent with understanding fit-up and tack requirements for tolerances described in CB&I procedures.

The inspectors observed the in-process welding of Unit 4 CA04 module to determine if the welding was performed within the ranges allowed by welding procedure specification number WPS2-1.1F01, and the requirements of the American Welding Society (AWS) D1.1:2000, "Structural Welding Code - Steel." Specifically, the inspectors observed the in-process fit-up and tack welding of weld numbers CV3626 FW1 and CV3627-39 through -47. The inspectors verified that the following welding parameters were within the ranges allowed by the WPS: filler metal size and classification, voltage, travel speed, wire feed speed, shielding gas composition, and shielding gas flow rate. The inspectors verified that the welding procedures used were the latest approved versions and that they were readily available to the welder.

Additionally, the inspectors verified the following:

- work was conducted in accordance with a "traveler," weld data record or similar document which coordinated and sequenced the welding and inspection operations;
- the weld joint was sufficiently protected from inclement conditions;
- surfaces to be welded were smooth, uniform, and free from surface discontinuities such as cracks or seams, and free from paint, oil, rust, scale, slag, grease, moisture or other harmful foreign materials that could be detrimental to welding for at least 2 inches from the weld joint;
- weld joint geometry, including root opening and fit-up tolerances were as specified by the WPS;
- the temperature of the base material at the joint, prior to welding, met the preheat requirements of the WPS;
- the interpass temperatures did not exceed the maximum value specified in the WPS; and
- the weld joint was traceable to the welders.

The inspectors performed an independent visual inspection of weld CV3626-FW11, to determine whether the final weld satisfied the requirements of Table 6.1, "Visual Inspection Acceptance Criteria," of AWS D1.1:2000.

b. Findings

No findings were identified.

1A23 (Unit 4) 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/sections to perform this inspection:

- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.02-02.03 - Special Considerations
- 65001.A - As-Built Attributes for SSCs associated with ITAAC
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors completed a review of the enhanced shield building construction mockup program. The intent of this review was to:

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

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

The inspectors reviewed the final report documenting the enhanced shield building construction mockup program including lessons learned from concrete placement, evaluation of non-destructive examination methods, and conclusions based on destructive examination of the mockups. This review supplemented direct observations that were previously conducted in 2013 and 2014. Specifically, the inspectors observed the following construction mockup program activities:

- concrete placement in full-scale mockups of the reinforced concrete (RC)/steel concrete composite (SC) horizontal and vertical connections and steel tension ring conducted on October 4, 2013, September 30, 2013, and October 8, 2013, respectively;
- nondestructive examination of full-scale mockups of RC/SC vertical connection and steel tension ring using the impact echo method conducted on October 26, 2013 and October 16, 2013, respectively; and
- visual observations of the interiors of full-scale mockups of RC/SC horizontal and vertical connections and steel tension ring conducted at various dates in 2014 after mockups were demolished in a controlled manner for examination.

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.

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

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

b. Findings

No findings were identified.

1A24 (Unit 4) 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/sections to perform this inspection:

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.01-02.01 - Procedures
- 65001.01-02.03 - Key Site Parameters
- 65001.F- Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.02-Fabrication Records Review
- 65001.F-02.03-Observation of Fabrication Activities
- 65001.A- As-Built Attributes for SSCs associated with ITAAC
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors reviewed quality records and performed direct inspection of construction activities associated with the shield building basemat for Unit 4. Specifically, the inspectors observed construction activities associated with the following reinforced concrete sections:

- wall section along the entire shield building basemat perimeter walls between elevations 66'-6" and 82'-6";

- wall section along the east side of the shield building basemat perimeter walls between elevations 82'-6" and 100'-0"; and
- sections of shield building basemat as well as the annulus tunnel walls and floors on the east side of the shield building between elevations 82'-6" and 100'-0".

For the wall section listed above, the inspectors reviewed a sample of design calculations, drawings included in the work packages, and specifications to determine whether:

- design outputs were translated into drawings;
- design documentation demonstrated adequacy of design by reference to analyses, calculations, bounding condition checks, functional assessments, and/or engineering evaluations;
- the documents adequately defined the final design and arrangement of these SSCs;
- critical attributes associated with the ITAAC were correctly identified and documented for review and approval by responsible engineering personnel; and
- the documents were consistent with the design commitments and requirements of the technical specifications, the UFSAR, and code commitments.

The inspectors observed installation activities for the wall section along the perimeter of the shield building basemat associated with embedments, and steel reinforcement, including horizontal and vertical reinforcing steel bars, shear reinforcement, and bar splices, to determine whether:

- the installation activities met applicable quality and technical requirements established by approved procedures, specifications, and drawings included in the work packages;
- piping, penetrations, reinforcing steel, and embedments were located properly in the structure, were sized as specified in drawings and calculations, and had proper clearances; and
- reinforcing steel and embedments were secured and free of concrete or excessive rust.

For the wall section along the perimeter of the shield building basemat, the inspectors performed independent inspection and measurements to determine whether the steel reinforcement, conformed to the final design, the ITAAC, and UFSAR.

b. Findings

No findings were identified.

1A25 (Unit 4) 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/sections to perform this inspection:

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.02-02.01 - Inspection of Concrete Placement
- 65001.02-02.07 - Problem Identification and Resolution
- 65001.A- As-Built Attributes for SSCs associated with ITAAC
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors reviewed quality records and performed direct inspection of construction activities associated with the non-radiologically controlled area of the auxiliary building for Unit 4. Specifically, the inspectors observed construction activities associated with the wall along column line Q between column lines 11 and the shield building between elevation 82'-6" and 100'-0".

The inspectors observed installation associated with formwork, embedments, and steel reinforcement, including horizontal and vertical reinforcing steel bars, shear reinforcement, wall dowel bars extending above 100'-0", wall dowel bars extending from the wall below 82'-6" and bar splices, to determine whether:

- the installation activities met applicable quality and technical requirements established by approved procedures, specifications, and drawings included in the work packages;
- piping, penetrations, reinforcing steel, and embedments were located properly in the structure, were sized as specified in drawings and calculations, and had proper clearances;
- reinforcing steel and embedments were secured and free of concrete or excessive rust; and
- forms were secure, leak tight, and free from debris or excess water.

The inspectors performed independent inspection and measurements to determine whether the steel reinforcement, embedments, and formwork conformed to the design specifications. The inspectors observed the licensee perform independent inspection and measurements to determine whether the as-built concrete thickness of completed wall sections were in accordance with the final design, the ITAAC, and UFSAR.

The inspectors reviewed the final inspection results after form removal and other information related to the placement to determine whether the placement was subjected to an integrated review before acceptance, that the as-built documentation was complete, and that these activities were controlled and accomplished in accordance with the quality assurance program. The inspectors performed independent inspection and measurements of the as-built concrete, including finishes, locations of embedments, and dimensions, to determine whether the as-built configuration met the design specifications.

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

- the latest approved procedures, drawings, and other work instructions were available at the installation area;
- the installation, inspection, and testing sequences were maintained;
- the licensee had verified that the items to be installed met specified requirements;
- the items being installed were not damaged prior to installation;
- materials, tools, and other equipment being used were qualified and approved in accordance with site procedures;
- nonconforming items were clearly identified, segregated if possible, and dispositioned;
- inspection and test reports were current, accurate, and complete; and
- design changes, field modifications, and nonconformances associated with the work observed were properly controlled and processed in accordance with the approved QA program.

The inspectors interviewed licensee and contractor personnel to determine whether:

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

The inspectors reviewed a sample of nonconformances to verify:

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

b. Findings

No findings were identified.

1A26 (Unit 4) 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/sections to perform this inspection:

- 65001.01-02.05 - Steel Structures
- 65001.01-02.06 - Records
- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.01 - Design Document Review
- 65001.F-02.02 - Fabrication Records Review
- 65001.02-02.02 - Laboratory Testing
- 65001.B-02.04 - Production Controls
- 65001.B-02.05 - Inspection
- 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

The inspectors performed a field inspection of construction activities associated with the radiologically controlled area of the auxiliary building. Specifically, the inspectors reviewed the following sub-modules of CA20 for Unit 4:

- CA20-03, which forms a portion of wall J-1 and wall 3 at the intersection of column line J-1 and column line 3;
- CA20-21, which forms a portion of wall K-2 between column lines 3 and 4;
- CA20-24, which forms a portion of wall 3 between column lines K-2 and L-2; and
- CA20-71, which forms a portion of wall N between column lines 2 and 3.

The inspectors conducted field measurements to verify material dimensions, material location, headed stud spacing, and weld size and location. The inspectors also reviewed documents, and interviewed licensee personnel to assess the implementation of the portion of the quality assurance (QA) program specific to design and fabrication activities. Various documents, such as design drawings, non-conformance and deviation reports, specifications, certified material tests reports, and receipt inspection documents were reviewed by the inspectors to verify if:

- design and fabrication was completed in accordance with applicable specifications, drawings, and approved procedures;
- key building critical dimensions and materials satisfied design specifications and requirements;
- the licensee confirmed that components inspected conformed to design drawings and that deviations were being addressed in accordance with procedure requirements;
- nonconforming conditions identified by the licensee were being appropriately resolved;
- the shape, size, dimensions, type, and grade of material conformed to the approved specifications and design drawings;
- design documents adequately defined the design and arrangement of the sub-module fabrication;
- fit-up tolerances for length, depth, and straightness of structural members were as specified; and

- critical attributes of as-built SSC conform to the design.

b. Findings

No findings were identified.

1A27 (Unit 4) 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/sections to perform this inspection:

- 65001.01 - Inspection of ITAAC-Related Foundations & Buildings
- 65001.01-02.01 - Procedures
- 65001.01-02.03 - Key Site Parameters
- 65001.01-02.06 - Records
- 65001.F - Inspection of the ITAAC-Related Design and Fabrication Requirements
- 65001.F-02.01 - Design Document Review
- 65001.F-02.03 - Observation of Fabrication Activities
- 65001.F-02.04 - General QA Review
- 65001.A - As-Built Attributes for SSCs associated with ITAAC
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.A.02.02 - Installation Records Review
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors reviewed quality records and performed direct inspection of construction activities associated with the radiologically controlled area of the auxiliary building for Unit 4. Specifically, the inspectors observed construction activities associated with the following wall sections between elevation 82'-6" and 100'-0":

- wall section along column line 1 between column lines I and J-2;
- wall section along column line I near the intersection with column line 1; and
- wall section connection between column line J-2 and column line 1.

For the wall sections listed above, the inspectors reviewed a sample of design calculations, drawings included in the work packages, and specifications to determine whether:

- design outputs were translated into drawings;
- design documentation demonstrated adequacy of design by reference to analyses, calculations, bounding condition checks, functional assessments, and/or engineering evaluations;
- the documents adequately defined the final design and arrangement of these SSCs;

- critical attributes associated with the ITAAC were correctly identified and documented for review and approval by responsible engineering personnel; and
- the documents were consistent with the design commitments and requirements of the technical specifications, the UFSAR, and code commitments.

The inspectors observed installation activities for the wall sections listed above associated with embedments, and steel reinforcement, including horizontal and vertical reinforcing steel bars, shear reinforcement, and bar splices, to determine whether:

- the installation activities met applicable quality and technical requirements established by approved procedures, specifications, and drawings included in the work packages;
- piping, penetrations, reinforcing steel, and embedments were located properly in the structure, were sized as specified in drawings and calculations, and had proper clearances; and
- reinforcing steel and embedments were secured and free of concrete or excessive rust.

For the wall sections listed above, the inspectors performed independent inspection and measurements to determine whether the steel reinforcement, and embedments conformed to the final design, the ITAAC, and UFSAR.

b. Findings

No findings were identified.

1A28 (Unit 4) 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/sections to perform this inspection:

- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.A- As-Built Attributes for SSCs associated with ITAAC

The inspectors reviewed quality records and performed direct inspection of construction activities associated with the non-radiologically controlled area of the auxiliary building for Unit 4. Specifically, the inspectors observed construction activities associated with the wall along column line Q between column lines 11 and the shield building between elevation 82'-6" and 100'-0".

The inspectors performed independent inspection and measurements to determine whether the steel reinforcement, embedments, and formwork conformed to the design specifications. The inspectors observed the licensee perform independent inspection and measurements to determine whether the as-built concrete thickness of completed wall sections were in accordance with the final design, the ITAAC, and table 3.3-1 of the VEGP Unit 4 COL, Appendix C.

b. Findings

No findings were identified.

1A29 (Unit 4) ITAAC Number 3.3.00.02a.ii.d (767) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.ii.d (767).

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

- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.01-02.06 - Records
- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.A.02.02 - Installation Records Review
- 65001.A.02.04 - Review As-built Deviations/Nonconformance
- 65001.A.02.03 - Independent Assessment/Measurement Inspection
- 65001.A - As-Built Attributes for SSCs associated with ITAAC

The inspectors performed a field inspection of construction activities associated with the radiologically controlled sections of the auxiliary building. This field inspection was to determine whether the as-built thickness of the walls conformed to the final design, the actual dimensions were accurately documented in quality records, and that each section met the wall thickness requirements stated in Appendix C Table 3.3-1 of the VEGP Unit 4 COL. The inspectors independently verified thickness for the following CA-20 sub-modules:

- CA20-02, which forms a portion of wall J-1 between column lines 2 and 3;
- CA20-03, which forms a portion of wall J-1 and wall 3 at the intersection of column line J-1 and column line 3;

- CA20-19, which forms a portion of wall K-2 between column lines 2 and 3;
- CA20-21, which forms a portion of wall K-2 between column lines 3 and 4;
- CA20-20, which forms a portion of wall K-2 and wall 3 at the intersection of column line K-2 and column line 3; and
- CA20-24, which forms a portion of wall 3 between column lines K-2 and L-2.

b. Findings

No findings were identified.

1A30 (Unit 4) ITAAC Number 3.3.00.02a.ii.d (767) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.02a.ii.d (767).

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

- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.A.02.01 - Observation of in-Process Installation Activities
- 65001.A.02.03 - Independent Assessment/Measurement Inspection

The inspectors performed direct inspection of construction activities associated with the radiologically controlled area of the auxiliary building for Unit 4. Specifically, the inspectors observed construction activities associated with the wall section along column line 1 between column lines I and J-2 between elevation 82'-6" and 100'-0".

The inspectors reviewed the dimensions specified in the VEGP Unit 4 COL, Appendix C, Table 3.3-1 for samples listed above. The inspectors assessed the method and controls used by the licensee to verify that the as-built dimensions conformed to the licensing basis to determine whether the methodology used was appropriate and would produce sufficient records to document that completed work met the design specifications and acceptance criteria. The inspectors performed independent inspections and measurements of the formwork to determine whether it was correctly in place to provide the wall thickness specified in the COL.

b. Findings

No findings were identified.

1A31 (Unit 4) ITAAC Number 3.3.00.03d (780) / Family 01A

a. Inspection Scope

The inspectors performed a direct inspection of construction activities associated with ITAAC Number 3.3.00.03d (780):

Design Commitment	Inspections, Tests, Analysis	Acceptance Criteria
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3. Walls and floors of the nuclear island structures as defined on Table 3.3-1 except for designed openings or penetrations provide shielding during normal operations.	Inspection of the as-built nuclear island structures wall and floor thicknesses will be performed.	d) A report exists and concludes that the shield walls and floors of the radiologically controlled area of the auxiliary building as defined in Table 3.3-1 except for designed openings or penetrations are consistent with the concrete wall thicknesses provided in Table 3.3-1.
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The inspectors used the following NRC inspection procedures/sections to perform this inspection:

- 65001.01-02.04 - Key Dimensions and Volumes
- 65001.01-02.06 - Records
- 65001.01-02.07 - Identification and Resolution of Problem
- 65001.A.02.02 - Installation Records Review
- 65001.A.02.04 - Review As-built Deviations/Nonconformance

The inspectors performed a field inspection of construction activities associated with ITAAC 3.3.00.03d for the radiologically controlled sections of the auxiliary building walls from elevation 66'-6" to 82'-6". This field inspection was to determine whether the as-built thickness conformed to the final design, the actual dimensions were accurately documented in quality records, and that each section met the wall thickness requirements stated in Appendix C Table 3.3-1 of the VEGP Unit 4 COL. The inspectors also verified adequate concrete density by reviewing concrete mix design calculations, fresh concrete testing reports taken at the time of placement, compressive strength testing reports, and hardened concrete testing reports. The inspectors independently verified the following two radiation shielding wall segments:

- wall section along Column Line 5 between Column Line I and Shield Building and
- wall section, 10'-6" south of Column Line 7.3 from I to 5'-6" east of J-1.

b. Findings

No findings were identified.

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

1P01 Quality Assurance Implementation, Appendix 3, Inspection of Criterion III – Design Control (IP35007)

.1 Resident Program Inspection

a. Inspection Scope

On June 26, 2015, the inspectors completed the review of a sample of engineering and design coordination reports (E&DCRs) to determine whether these changes were performed in accordance with procedure APP-GW-GAP-420, "Engineering and Design Coordination Report." The inspectors evaluated these design changes for conformance to 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and Supplement 3S-1, "Supplementary Requirements for Design Control," of ASME NQA-1-1994. The inspectors also reviewed the licensing impact determination screening associated with each of these design changes to determine whether each change was properly evaluated against the current licensing basis as described in the VEGP Units 3 and 4 UFSAR and was performed in accordance with procedure APP-GW-GAP-147, "AP1000 Current Licensing Basis Review." Furthermore, the inspectors reviewed these E&DCRs to determine whether each change received the proper level of engineering review and was incorporated into all affected documents.

b. Findings

No findings were identified.

.2 Resident Program Inspection

a. Inspection Scope

On June 30, 2015, the inspectors completed the review of another sample of E&DCRs to determine whether these changes were performed in accordance with procedure APP-GW-GAP-420, "Engineering and Design Coordination Report," for Units 3 and 4. The inspectors evaluated these design changes for conformance to 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and Supplement 3S-1, "Supplementary Requirements for Design Control," of ASME NQA-1-1994. The inspectors also reviewed the licensing impact determination screening associated with each of these design changes to determine whether each change was properly evaluated against the current licensing basis as described in the Units 3 and 4 UFSAR and was performed in accordance with procedure APP-GW-GAP-147, "AP1000 Current Licensing Basis Review." Furthermore, the inspectors reviewed these E&DCRs to determine whether each change received the proper level of engineering review and was incorporated into all affected documents.

b. Findings

No findings were identified.

1P02 Quality Assurance Implementation, Appendix 6, Inspection of Criterion VI – Document Control (IP35007)

a. Inspection Scope

The inspectors reviewed the control of design drawings and engineering specifications to determine if the documents were made available promptly to licensee staff and that all quality-affecting work was being conducted in accordance with current revisions of approved documents. The inspection focused on an examination of the actual controlled documents and the document review records. The inspectors observed control of a sample of the types of documents listed above to verify that the personnel had direct

access to the controlled documents and were implementing the prescribed activities. The inspectors completed this review on a sample of two different work packages.

b. Findings

No findings were identified.

1P03 Quality Assurance Implementation, Appendix 13, Inspection of Criterion XIII – Handling, Storage and Shipping (IP35007)

.1 Resident Program Inspection

a. Inspection Scope

On June 24, 2015, the inspectors completed the review of a sample of QA program implementing documents to ensure that they address the QAPD and UFSAR commitments for the handling, storage, and shipping of safety related and risk significant non-safety related items. The inspectors reviewed the onsite storage of the following of safety related and risk significant non-safety related items:

- Unit 3 and 4 Reactor Vessels;
- Unit 3 and 4 Accumulators;
- Unit 3 Steam Generators;
- Unit 3 Core Makeup Tanks;
- Unit 3 Basin Transfer Pump Motors;
- Unit 3 Turbine Building Roof Exhausters;
- Unit 3 Security Room Air Handlers;
- Unit 3 and 4 Diesel Generators;
- Unit 3 and 4 Feedwater Heaters; and
- Unit 3 Plant Control System (PLS) cabinets.

The inspectors verified that the storage locations for these items met the storage requirements specified in the associated vendor manuals and Nuclear Quality Standard QS 13.11, "Material, Equipment Storage," Rev. 1. The inspectors performed a walk-down of the storage spaces and verified that reasonable cleanliness and good housekeeping practices were being maintained, the area was free of excessive moisture and contaminants, and that the associated cribbing, pallets, and skids were not damaged. The inspectors verified that all access control, temperature, humidity, and nitrogen blanket requirements were being met or those discrepancies had been documented and dispositioned in accordance with Nuclear Construction and Startup Procedure NCSP-02-08-1, Nonconformance Reporting and Control.

The inspectors reviewed the Equipment Preservation History Cards and Equipment Preservation Check Records (EPCR) associated with the safety related and risk significant non-safety related items listed above to verify that the records were being completed and maintained in accordance with Nuclear Construction and Startup Procedure NCSP 03-16-2, Preventive Maintenance (PM) Program. The inspectors observed numerous preventive maintenance activities being conducted on these safety related and risk significant non-safety related items, including performance of moisture checks, insulation resistance testing, verification of electric space heater operation,

motor shaft rotation, and inspection and repair of foreign material exclusion covers. The inspectors verified that these preventive maintenance activities were performed in accordance with the associated EPCR.

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

- Unit 3 Steam Generators;
- Unit 3 Reactor Vessel Upper and Lower Internals;
- Unit 3 Pressurizer; and
- Unit 3 Core Makeup Tanks.

The inspectors reviewed a sample of equipment handling procedures to verify that special handling requirements were properly documented. The inspectors reviewed the following shipping and handling records to verify that Nuclear Quality Standard QS 13.14, "Packaging and Shipping of Equipment and Materials," Rev. 1, was properly implemented:

- shipping and handling records associated with the return of safety-related embed plate Q445-011-15-0007 to the vendor for rework per Returned Material Report RMR15-00076
- shipping and handling records associated with the return of spool piece 8903-40-00090 to the vendor for rework per Returned Material Report RMR14-00155

b. Findings

No findings were identified.

.2 Resident Program Inspection

a. Inspection Scope

On May 21, 2015, the inspectors observed the handling and annual preventative maintenance associated with the Primary Dedicated Safety Panel PC node boxes. The inspectors verified that the licensee was performing work in accordance with procedures. In addition, the inspectors conducted a walkdown of the off-site warehouse facility and laydown yard and verified proper storage existed in accordance with licensee documents and requirements. The inspectors verified that required environmental conditions were maintained and items received were properly staged for receipt inspection. The inspectors examined various elements of the storage of items including the following:

- the storage area was well drained and paved;
- containers, crating and skids were used during storage as necessary;
- storage location met the requirements of the intended storage level classification including adequate environmental, animal/pest damage or infestation, and security protection;
- the storage area was clean and free of loose debris; and
- preventative maintenance activities for equipment in storage were identified and performed.

b. Findings

No findings were identified.

1P04 Quality Assurance Implementation, Appendix 15, Inspection of Criterion XV – Nonconforming Materials, Parts, or Components

a. Inspection Scope

The inspectors reviewed a sample of nonconformance and disposition reports (N&Ds) to determine whether the conditions were adequately reviewed and accepted, rejected, repaired, or reworked in accordance with the QA program implementing documents for the control of nonconforming material, parts, and components. The inspectors compared these N&Ds to Section 15, "Nonconforming Materials, Parts, or Components," of the CB&I quality assurance program (CMS-720-03-PL-00020-A) and CB&I procedure QS 15.01, "Nonconformance & Disposition Report." The inspectors reviewed N&Ds associated with both Units 3 and 4.

The inspectors selected a sample of nonconforming items that the licensee either rejected, repaired, reworked, or accepted through evaluation. The inspectors determined if the N&Ds properly identified the nonconforming items and if the systems for initiating, processing, and closing nonconformances were adhered to. The inspectors specifically determined if:

- reportability screening and evaluations under 10 CFR Part 21 and 10 CFR 50.55(e) were performed;
- the disposition, such as use-as-is, reject, repair, or rework of nonconforming items were properly identified and documented;
- adequate technical justification for the acceptability of a nonconforming item, dispositioned repair, or use-as-is was appropriately documented;
- nonconformances to design requirements dispositioned use-as-is or repair were subjected to design control measures commensurate with those applied to the original design;
- the as-built records properly reflected the accepted deviation, if applicable;
- controls were implemented to preclude the inadvertent use of nonconforming items and that nonconforming items were marked or tagged and segregated; and
- repaired or reworked items were reexamined in accordance with applicable procedures and with the original acceptance criteria unless the disposition had established alternate acceptance criteria.

The inspectors also reviewed risk release number V-RL-15-0086, which was associated with the Unit 4 CA04 Module, to determine whether the risk release was documented and controlled according to CB&I quality procedure number QS 15.03, "Risk Release of UNSAT/Nonconforming Material/Equipment," revision 2.

b. Findings

No findings were identified.

1P05 Quality Assurance Implementation, Appendix 16, Inspection of Criterion XVI – Corrective Action (IP35007)

a. Inspection Scope

Daily Corrective Action Program Review

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

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

Routine Review of Items Entered into the Corrective Action Program

On a routine basis, the inspectors screened a sample of issues entered into the licensee and the Engineering, Procurement, and Construction (EPC) consortium's corrective action programs. The inspectors attended several 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
- potential adverse trends were appropriately identified and corrected by the licensee or their contractors.

Additionally, the inspectors observed the licensee's corrective action review board meeting held on April 14, 2015.

Selected Issues for Follow-Up Inspection

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

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

b. Findings

No findings were identified.

4. OTHER INSPECTION RESULTS

4OA6 Meetings, Including Exit

.1 Exit Meeting.

On July 1, 2015, the inspectors presented the inspection results to Michael Yox, Regulatory Affairs Director VOGTLE 3 & 4, along with other licensee and consortium staff members. The inspectors stated that no proprietary information would be included in the inspection report.

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licenses and Contractor Personnel

P. Albuquerque, ITAAC Manager, SNC
W. Crisler, Consortium QA Director
S. DiTommaso, Manager ITAAC & Inspections, WEC
S. Dlugolenski, Principal Engineer, WEC
E. Dumas, CB&I QC manager
R. Henderson, Licensing, SNC
B. Henley, VEGP 3&4 Vendor Oversight
A. Simpson, CB&I QC
J. Speer, Engineering, WEC
F. Willis, Licensing Supervisor, SNC
M. Yox, Regulatory Affairs Director, SNC

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Item Number</u>	<u>Type</u>	<u>Status</u>	<u>Description</u>
05200025/2015002-01 05200026/2015002-01	NCV	Open	Weld Allowable Stress Calculation Not in Compliance with Current Licensing Basis
05200025/2015002-02	NCV	Open	Spent Fuel Pool Wall Repair Without an Approved Procedure

LIST OF DOCUMENTS REVIEWED

Section 1A01

Certified Material Test Reports:
Heat/lot 5-1466/F3341A JFE Steel CMTR 6190-5
Heat/lot 5-1466/F9465A JFE Steel CMTR 6190-8
Heat/lot 4-2217/GF377A JFE Steel CMTR 6207-6
Heat/lot 6-7247/FX023A JFE Steel CMTR 6207-4
Heat/lot 5-1464/F6385A JFE Steel CMTR 6189-5

Section 1A02

CB&I RIR-No. U3-240 for S10 course shell plate B3-C38, release date 5/6/14
CMTR 6190-2, Heat No. 5-1466, shell plate C38, JFE Steel Corporation, July 25, 2011 (includes IHI straight beam UT report H23-177, dated 7/25/11)
IHI Record of Dimension Measurements (4 pages) shell plate C38, dated 2012.8.12
CB&I Weld Traveler U3-S10-C38/C39 with Authorized Nuclear Inspector (ANI) review date of 7-15-14
CB&I Report of Magnetic Particle Examination No. U3-678 of temporary attachment removals for U3-S10-C38/C39, dated 8/27/14

CB&I Report of Radiographic Examination No. U3-246, seam weld U3-S10-C38/C39, dated 10/23/2014

CB&I RIR-No. U3-241 for S10 course shell plate B3-C39, release date 5/6/14

CMTR 6190-11, Heat No. 4-2217, shell plate C39, JFE Steel Corporation, dated October 18, 2011 (includes IHI straight beam UT report H23-244, dated 10/18/11)

IHI Record of Dimension Measurements (4 pages) shell plate C39, dated 2012.8.16

CB&I RIR-No. U3-242 for S10 course shell plate B3-C40, release date 5/6/14

CMTR 6190-3, Heat No. 5-1466, shell plate C40, JFE Steel Corporation, dated July 25, 2011 (includes IHI straight beam UT report H23-177, dated 7/25/11)

IHI Record of Dimension Measurements (4 pages) shell plate C40, dated 2012.8.6

CB&I Weld Traveler U3-S10-C39/C40 with Authorized Nuclear Inspector (ANI) review date of 7-15-14

CB&I Report of Magnetic Particle Examination No. U3-687 of temporary attachment removals for U3-S10-C39/C40, dated 09/09/14

CB&I Report of Radiographic Examination No. U3-250, seam weld U3-S10-C39/C40, dated 10/23/2014

CB&I RIR-No. U3-261 for S11 course shell plate B3-D35, release date 11/11/13

CMTR 6207-4, Heat No. 6-7247, shell plate D35, JFE Steel Corporation, dated August 25, 2011 (includes IHI straight beam UT report H23-208, dated 8/25/11)

IHI Record of Dimension Measurements (4 pages) shell plate D35, dated 2012.9.4

CB&I RIR-No. U3-262 for S11 course shell plate B3-D36, release date 11/11/13

CMTR 6207-11, Heat No. 4-2217, shell plate D36, JFE Steel Corporation, dated September 14, 2011 (includes IHI straight beam UT report H23-222, dated 9/14/11)

IHI Record of Dimension Measurements (4 pages) shell plate D36, dated 2012.8.30

CB&I Weld Traveler U3-S11-D35/D36 with Authorized Nuclear Inspector (ANI) review date of 1-29-15

CB&I Report of Magnetic Particle Examination No. U3-762 of temporary attachment removals for U3-S11-D35/D36, dated 3/25/15

CB&I Report of Radiographic Examination No. U3-260, seam weld U3-S11-D35/D36, dated 04/07/2015

CB&I CMS-830-15-SP-12049, Welding Material Specification for Low-Alloy Steel Flux Cored Electrode (Outershield 91K2-HSR), Revision 4, dated July 9, 2014

Lincoln Electric CMTR for lot 1115G, FCAW wire E91TGM-H4

CB&I CMS-830-15-SP-12043, Welding Material Specification for Low-Ally Steel Covered Electrode (AA9018), Revision 3, dated September 17, 2010

ESAB CMTR for lot 2H005T01, SMAW electrode E9018M-H4R

CB&I Welder Performance Qualifications for 462 using manual SMAW

CB&I Welder Performance Qualifications for 096, 106, 159, 293, 462, and 940 using semi-automatic FCAW

CB&I Welding Operator Performance Qualifications for 016 (3G and 4G), 106 (3G), 160 (3G), and 221 (3G) using machine FCAW

Section 1A03

CMTR 6190-11, Heat No. 4-2217, shell plate C39, JFE Steel Corporation, dated October 18, 2011

CMTR 6190-3, Heat No. 5-1466, shell plate C40, JFE Steel Corporation, dated July 25, 2011

CMTR 6207-4, Heat No. 6-7247, shell plate D35, JFE Steel Corporation, dated August 25, 2011

CMTR 6207-11, Heat No. 4-2217, shell plate D36, JFE Steel Corporation, dated September 14, 2011

Section 1A04

SV3-1110-CR-521, "Containment Concrete Reinforcement El 71'-6" Up To 83'-0"/84'-6" Plan At El 83'-0"/84'-6"," Rev. 2
 SV3-1120-CR-547, "Containment Concrete Reinforcement El 71'-6" Up To 83'-0"/84'-6" Sections," Rev. 2
 APP-1100-CCC-005, "Design Calculation Mass Concrete Reinforcement, Elevation 71'-6" to 83'-0"/84'-6"," Rev. 0
 SV3-CC01-GEF-000039, "Vogtle 3 CV Concrete Sequence," Rev. 0
 APP-GW-C1-001, "AP1000 Civil/Structural Design Criteria," Revision 3
 APP-GA-G1-001, "AP1000 Structural Modules Design Guidelines," Revision 3
 APP-GW-SUO-001, "Design Methodology for Structural Modules," Revision 4
 APP-CA00-SUC-003, "Calculation for Coupler Welds for CA Modules," Revision 0
 APP-1120-GEF-098, "E&DCR for CA01 Embedment Rebar Options and Structural Module Undefined Embedment Tolerances," Revision 0
 APP-1208-CCC-003, "Design of Enhanced Shield Building Mechanical Connections at Elevations 100'-0", 149'-6", and along Column Lines 'N' and 'Q'", Revision 2
 APP-GW-GLR-602, "AP1000 Shield Building Design Details for Select Wall and RC/SC Connection," Revision 5
 APP-1200-S3R-003, "Design Report for the AP1000 Enhanced Shield Building," Revision 4

Section 1A05Welding Procedure Specifications:

WPS5-10H.10HM70, Rev. 11
 WPS5-10H.10HT70

Procedure Qualification Records:

SP256, Rev. 1
 PQ107-1, Rev. 0
 SP394, Rev. 5

Work Orders:

SV3-CA03-S4W-CV2254
 SV3-CA03-S4K-CV3304
 SV3-CA03-S4K-CV3282
 SV3-CA03-S4K-CV3837-A07

Section 1A06

SV3-CA03-GNR-000024 Rev. 4,
 SV3-CA01-GNR-000526, Rev. 0
 Mistras PT procedure 100-PT-304, Rev. 6
 Qualification records Mistras NDE technician 3042
 Mistras PT reports V-15-PT-304-1113 & V-15-PT-304-1125
 CB&I WPS5-10H.10HM70 Rev. 11,
 CB&I WPS5-10H.10HT70 Rev. 5
 CB&I welding procedure qualification records SP256 & PQ107-1
 Weld data sheets for Weld number CV3282-08
 Lincoln electric CMTR lot 1203A
 Qualification records for CB&I welder CSK8128

Section 1A07Miscellaneous

APP-1208-S3R-001, Shield Building Mockup Program Plan, Rev. 0

Engineering and Design Coordination Report

SV0-SM01-GEF-000003, Attachment to SM01 Program Plan (APP1000 Enhanced Shield Building Concrete Placement Mockups Final Report - Vogtle Units 3 & 4, 3/25/2014), Rev. 0

Section 1A08

SV3-1000-CRW-CV-1465, "Installation of Rebar for Unit 3 Shield Building Cylindrical Wall (AZ 182.25 to 341.25) from EI 66-6 to 100," Rev. 0

SV3-1000-CR-005, "Nuclear Island Basemat Reinforcement Development View," Rev. 4

SV3-1000-CR-902, "Nuclear Island Basemat Reinforcement Section," Rev. 4

SV3-1000-CR-903, "Nuclear Island Basemat Reinforcement Sections," Rev. 4

SV3-1000-CR-905, "Nuclear Island Basemat Reinforcement Annulus Tunnel Wall Details (Sheet 11)," Rev. 3

SV3-1000-CR-906, "Nuclear Island Basemat Reinforcement Annulus Tunnel Wall Details (Sheet 12)," Rev. 5

SV3-1000-CR-908, "Nuclear Island Basemat Reinforcement Annulus Tunnel Wall Details (Sheet 4)," Rev. 1

SV3-1000-CR-908, "Nuclear Island Basemat Reinforcement Annulus Tunnel Wall Details (Sheet 5)," Rev. 2

SV3-1020-CR-001, "Nuclear Island Basemat Concrete Reinforcement Lower Annulus Floor EI 82'6" Plan View," Rev. 3

SV3-1020-CR-002, "Nuclear Island Lower Annulus Concrete Reinforcement Floor EI 92'6" Plan View," Rev. 1

SV3-1020-CR-901, "Nuclear Island Basemat Concrete Reinforcement Lower Annulus Section (Sheet 11)," Rev. 7

SV3-1020-CR-903, "Nuclear Island Basemat Concrete Reinforcement Lower Annulus Details (Sheet 1)," Rev. 7

SV3-1020-CR-904, "Nuclear Island Basemat Concrete Reinforcement Lower Annulus Details (Sheet 2)," Rev. 6

SV3-1020-CR-905, "Nuclear Island Basemat Concrete Reinforcement Lower Annulus Details (Sheet 3)," Rev. 6

SV3-1020-CR-908, "Nuclear Island Basemat Concrete Reinforcement Lower Annulus Details (Sheet 4)," Rev. 0

SV3-1200-CR-959, "Auxiliary Building Area 6 Concrete Reinforcement Wall N Elevation," Rev. 7

SV3-1210-CR-959, "Auxiliary Building Area 6 Concrete Reinforcement Wall N Sections & Details EI 66'-6"," Rev. 3

SV3-1238-CR-903, "Reinforcement Locations Interface Drawing Basemat and Shield Building Elevation 100'-0" Sections & Details," Rev. 3

Section 1A09Drawings:

SV3-1208-SC-241, Shield Building Steel Wall Panels EI. 100'-0" to EI. 248'-6-1/2" Connection Panel Group 24, Rev. 3

SV3-1208-SC-331, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Connection Panel Group 33, Rev. 2
 SV3-1208-SC-281, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Connection Panel Group 28, Rev. 2
 SV3-1208-SC-701, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Connection Panel Group 70, Rev. 2
 SV3-1208-SC-711, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Connection Panel Group 71, Rev. 1
 APP-1208-SC-901, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Typical Details (Sheet 1), Rev. 3
 APP-1208-SC-902, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Typical Details (Sheet 2), Rev. 1
 APP-1208-SC-903, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Typical Details (Sheet 3), Rev. 2
 APP-1208-SC-904, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Typical Details (Sheet 4), Rev. 2
 APP-1208-SC-905, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Typical Details (Sheet 5), Rev. 1
 APP-1208-SC-906, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Typical Details (Sheet 6), Rev. 5
 APP-1208-SC-907, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Typical Details (Sheet 7), Rev. 2
 APP-1208-SC-251, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Connection Panel Group 25, Rev. 2
 APP-1208-SC-261, Shield Building Steel Wall Panels El. 100'-0" to El. 248'-6-1/2" Connection Panel Group 26, Rev. 2

Engineering and Design Coordination Reports:

APP-1208-GEF-073, Shield Building – Gusset Plate Tolerance in Vertical RC/SC Panels, Rev. 0
 APP-1208-GEF-123, Shield Building – D2L Subsurface Fitting Allowance, Rev. 0
 APP-1208-GEF-072, Shield Building – Gusset Plate Tolerance, Rev. 0
 APP-1208-GEF-133, Shield Building – Alternate Weld Joint Configurations, Rev. 0
 APP-1208-GNR-850180, NNI-NCR 851A for SV3-1208-SC-01G, Bevel on Wrong Side of Connection Plate, Rev. 0
 APP-1208-GNR-850019, NCR # 264 Incorrect Cut To Leading Edge of Connector Plate, Rev. 0
 APP-1208-GNR-850050, Welding Ranges for WPS 1007 for Vogtle 3, Rev. 0
 SV3-1208-GNR-000005, Supersede SV3-1208-GNR-000001 & SV3-1208-GNR-000002
 APP-1208-GNR-850182, NNI NCR 853A Misaligned Beveled Holes Drilled on Fab Piece Part 7001A, Rev. 0
 APP-AX01-GEF-875011, Weld Edge Coating Clarification, Rev. 0

Miscellaneous:

Inspection Plan F-Q445-004, Receipt Inspection – Modules – Structural, Rev. 3, Change 1
 Quality Assurance Inspection Report, Q445-004-14-0032, 02/06/2014
 Quality Assurance Inspection Report, Q445-004-14-0164, 09/18/2014
 Quality Assurance Inspection Report, Q445-004-14-0225, 12/11/2014
 Quality Assurance Inspection Report, Q445-004-15-0002, 01/05/2015
 Quality Assurance Inspection Report, Q445-004-14-0165, 09/18/2014

Corrective Action Documents:

CAR-2015-0433, Shield Building Panel 01P, 02/12/2015

Condition Report 10063222- Letter 7340-F#14-011 does not relate to Inspection Report (IR) # Q445-004-14-0032

Section 1A10

F-C112-002, "Pre placement: Nuclear Island Concrete," Rev. 15
 SV3-1222-CR-202, "Auxiliary Building Area 2 Concrete Reinforcement Floor El 82'-6" Plan," Rev. 1
 SV3-1222-CR-222, "Auxiliary Building Area 2 Concrete Reinforcement Floor El 82'-6" Details," Rev. 1
 SV3-1222-CE-009, "Auxiliary Building Area 2 Embedment Plate Locations Room 12212 - Plan At El 82'-6"," Rev. 1
 SV3-1222-M0-202, "Auxiliary Building HVAC Duct Penetration Area 2 Floor El 82'-6"," Rev. 0
 SV3-1222-M0X-202, "Auxiliary Building HVAC Duct Penetrations List Area 2 Floor El 82'-6"," Rev. 0

Section 1A11

SV3-1220-CRW-CV1586, "Unit 3 Auxiliary Building Perimeter A3 (82'-6") Walls Rebar Installation," Rev. 0
 SV3-1221-CE-917, "Auxiliary Building Area 1 Embedments Wall 11 Elevation 82'6" South View," Rev. 7
 SV3-1221-CEX-917, "Auxiliary Building Area 1 Embedments Index Wall 11 Elevation 82'6" South View," Rev. 2
 SV3-1200-CR-917, "Auxiliary Building Areas 1 & 2 Concrete Reinforcement Wall 11," Rev. 14
 SV3-1220-CR-910, "Auxiliary Building Areas 1 & 2 Concrete Reinforcement Wall 11 Sections & Details El 82'-6"," Rev. 4
 SV3-1200-CR-913, "Auxiliary Building Areas 1 & 2 Concrete Reinforcement Walls L & M Elevations," Rev. 7
 SV3-1200-CR-913, "Auxiliary Building Areas 1 & 2 Concrete Reinforcement Walls L & M Sections and Details El 82'-6," Rev. 4

Section 1A12

CAR 2015-1585
 CAR 2015-1111
 CAR 2015-0884
 N&D SV3-CA20-GNR-000577
 N&D SV3-CA20-GNR-000248
 RFI SV3-CA20-GF-000145
 SV3-CA20-S5Y-00005, "Auxiliary Building Areas 5 & 6 Module CA20 Submodules General Notes - V," Rev. 1

Section 1A13

SV3-1220-CRW-CV1586, "Unit 3 Auxiliary Building Perimeter A3 (82'-6") Walls Rebar Installation," Rev. 0
 SV3-1220-CRW-CV2575, "Unit 3 Auxiliary Building A3 (82'-6" to 100'-0") Interior Wall Rebar – Areas 3, 4, 5, & 6," Rev. 0
 SV3-1220-CEW-CV1606, "Auxiliary Building Embed Plates & Anchor Bolts-El 82'-6" Walls – Area 1," Rev. 0

Section 1A14

Calculation No. APP-CA20-S3C-001, "CA20 Connection Design: Module Wall to Module Floor," Rev. 0
 Calculation No. APP-CA20-S3C-017, "AP1000 CA20 Structural Module Connection Design Evaluation," Rev. 1
 Drawing No. SV3-CA20-S4K-CV1428, "Weld Map - CA20-20 Rework and Modifications," Rev. 2
 Drawing No. SV3-CA20-S4K-CV2678, "Weld Map - Installation of CA20 SA3 Floors (47, 48, 49, 50)," Rev. 7
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Welding Procedure Specification No. E91TG-H4, Rev. 11

Procedure Qualification Record No. 13087

Welder or Welding Operator Performance Qualification for ID Nos. 63070462, 63013016, 1667106, 63081804, 3258875

Certificate of Inspector Qualification - Nuclear for ID Nos. 63012442, 2878491

Radiographic film for containment vessel welds: E9/E10, E12/E1, C18/C19, C21/C22

Measuring and Test Equipment:

Welding Machine Tag No. 76, SAWA-14 (amperage), SAWV-14 (voltage)

Temperature Sticks: Lot No. 12013, 7/24/16 and Lot No. 093014A, 1/26/18

Magnetic Yoke, Serial No. 2190

Magnetic Particles #18ARED, Batch No. 14G032

10 lb Test Weight, Serial No. 9912

Light Meter: Serial No. 574895, 8/28/15

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Weld Records:

SMCI Welding Repair Travelers associated with N&D APP-CA04-GNR-850023: Welds 31A, 31D, 51A, and 51B

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APP-CA20-GEF-1416, CA20 Security System (SES) Conduit Penetrations and NCS Penetrations, Rev. 0

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NCSP-PCN-03-16-2-A, "Preventive Maintenance (PM) Program"

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NCSP-04-45-1, "Insulation Resistance Testing"

NCSP-02-08-1, "Nonconformance Reporting and Control"

NCSP-PCN-02-08-1-A, "Nonconformance Reporting and Control"

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SV0-MI01-MHH-001, "Horizontal Lift of RV Upper and Lower Internals," Rev. 0

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SV3-VH01-MHH-001, "Lifting and Transport of Pressurizer," Rev. 0

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2015-0507
2015-1735

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876863
902652
902677
10012411
10021558
10031937
10037855
10039809
10063609

WEC Corrective Action, Prevention and Learnings

100018044
100071584
100071585
100079887
100169819

LIST OF ACRONYMS

ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AWS	American Welding Society
CAPAL	Corrective Action, Prevention and Learnings
CAR	Corrective Action Report
CB&I	Chicago Bridge and Iron
CFR	Code of Federal Regulations
CMTR	Certified Material Test Report
COL	Combined License
CR	Condition Report
CV	Containment Vessel
CVS	Chemical Volume and Control System
E&DCR	Engineering and Design Coordination Report
EPC	Engineering, Procurement, and Construction
ESAB	English for Electric Welding Limited (<i>Elektriska Svetsnings-Aktiebolaget</i> , a Swedish industrial company)
FCAW	Flux Core Arc Welding
IMC	Inspection Manual Chapter
ITAAC	Inspections, Tests, Analysis, and Acceptance Criteria
LAR	License Amendment Request
MT	Magnetic Particle Examination
N&D	Nonconformance and Disposition Report
NCV	Noncited Violation
NDE	Nondestructive Examination
NRC	Nuclear Regulatory Commission
OLP	Overlay Plate
PARS	Publicly Available Records
PJP	Partial Joint Penetration
PM	Preventive Maintenance
PT	Liquid Penetrant Testing
PXS	Passive Core Cooling System
QA	Quality Assurance
QC	Quality Control
RC	Reinforced Concrete
RIR	Receiving Inspection Report
RT	radiographic examination
SC	Steel Concrete Composite
SG	Steam Generator
SNC	Southern Nuclear Company
SSC	Structure, System, and Component
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Testing
VEGP	Vogtle Electric Generating Plant
WEC	Westinghouse Electric Corporation
WPS	Welding Procedure Specification