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

May 18, 2012

Mr. B. L. Ivey
Vice President, Regulatory Affairs
Southern Nuclear Operating Company
PO Box 1295
BIN BO22
Birmingham, AL 35201

SUBJECT: SOUTHERN NUCLEAR OPERATING COMPANY VOGTLE ELECTRIC GENERATING PLANT UNIT 3 – NRC ITAAC INSPECTION- INSPECTION REPORT NO. 05200025/2012-008 AND NOTICE OF VIOLATION

Dear Mr. Ivey:

On May 7, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Vogtle Electric Generating Plant (VEGP) Unit 3. The enclosed inspection report documents the inspection results, which were discussed during an initial exit meeting on March 23, 2012, and during the final exit meeting on May 7, 2012, with you and members of your staff.

During the inspection, the NRC staff examined activities associated with Inspections, Tests, Analysis, and Acceptance Criteria (ITAAC) 3.3.00.02a.i.b, 3.3.00.03a.i.c, and 3.3.00.02a.i.d conducted under your combined license (COL) to confirm compliance with the Commission's rules and regulations and with the conditions of your COL. Within this area, the inspectors reviewed selected procedures, records, design documents, and observed construction activities.

Based on the results of this inspection, the NRC identified a Severity Level IV violation of NRC requirements and a Green ITAAC Finding.

The violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html. The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the enclosed report. The violation involved the failure to seek NRC approval for a departure from Tier 2* information. Specifically, a design change was made to the nuclear island (NI) basemat reinforcement that eliminated the hooks from the termination within the auxiliary building walls. The deletion of the hooks was determined to be a departure from Tier 2* information in the referenced certified design without NRC approval.

Additionally, this report documents one NRC-identified finding that was evaluated under the construction significance determination process as having very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. The violation involved

the failure to assure that regulatory requirements and the design basis for systems, structures, and components were correctly translated into specifications and instructions associated with the NI basemat reinforcement. The violation is cited in the enclosed Notice and the circumstances surrounding it are described in detail in the subject inspection report. As described in Section 2.3, “Disposition of Violations,” of the NRC Enforcement Policy, the violation is cited in the Notice because for reactor facilities under construction, the site corrective action program must have been demonstrated to be adequate prior to the issuance of non-cited violations for NRC-identified violations, and as of this inspection, the NRC had not yet made this determination for VEGP Unit 3.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements. If you contest the violations or significance of the NOV, 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: (1) the Regional Administrator, Region II; (2) the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and (3) NRC Senior Resident Inspector at VEGP Units 3 and 4. If you disagree with the cross-cutting aspect assigned to the finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II and the NRC Senior Resident Inspector at 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 enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material is withheld from public disclosure, you must specifically identify the portions of your response that you seek to have

withheld and provide in detail the bases for your claim (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Sincerely,

/RA/

Kathleen O'Donohue, Chief
Construction Inspection Branch 2
Division of Construction Inspection

Docket No. 52-00025
Combined License No. NPF-91

Enclosures:
1. Notice of Violation (Notice)
2. NRC Inspection Report 052-00025/2012-008
w/attachment: Supplemental Information

cc w/encl: (See page 3)

withheld and provide in detail the bases for your claim (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Sincerely,

/RA/

Kathleen O'Donohue, Chief
Construction Inspection Branch 2
Division of Construction Inspection

Docket No. 52-00025
Combined License No. NPF-91

Enclosures:
1. Notice of Violation (Notice)
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   w/attachment: Supplemental Information

cc w/encl: (See page 3)

■ PUBLICLY AVAILABLE □ NON-PUBLICLY AVAILABLE □ SENSITIVE ■NON-SENSITIVE
ADAMS: □Yes ACCESSION NUMBER: ML12139A192 ■ SUNSI REVIEW COMPLETE

OFFICE	RII:DCI	RII:DCI	RII: DCI				
SIGNATURE	KFO	BJD4	AFP1				
NAME	K.O'Donohue	B. Davis	T. Ponko				
DATE	5/18/2012	5/18/2012	5/18/2012				
E-MAIL COPY?	YESNO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: G:\CCI\INSPECTION REPORTS\NEW REACTORS\VOGTLE\2012 REPORTS\VOGTLE UNIT 3 ITACC NOV.DOCX

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Thomas Bilik
Tom McCallum
Vanessa Quinn
Wanda K. Marshall
Wesley A. Sparkman
Bill Elmore

Letter to Mr. B. L. Ivey from Kathleen O'Donohue dated May 18, 2012.

SUBJECT: SOUTHERN NUCLEAR OPERATING COMPANY VOGTLE ELECTRIC GENERATING PLANT UNIT 3 – NRC ITAAC INSPECTION- INSPECTION REPORT NO. 05200025/2012-008 AND NOTICE OF VIOLATION

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NOTICE OF VIOLATION

Southern Nuclear Operating Company, Inc. (SNC) Docket Number: 05200025
Vogtle Electric Generating Plant (VEGP) License Number: NPF-91
Waynesboro, GA

During NRC inspection completed May 7, 2012, two violations of NRC requirements were identified. In accordance with the NRC Enforcement Policy, the violations are listed below:

A. Paragraph 2.C of the Combined License for Vogtle Electric Generating Plant Unit 3, License No. NPF-91 (Docket No. 52-025), states, "The license is subject to, and the licensees shall comply with, all applicable provisions of the Atomic Energy Act of 1954, as amended (the Act) and the rules, regulations, and orders of the Commission, including the conditions set forth in 10 CFR Chapter I, now or hereafter in effect."

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

AP1000 Design Control Document (DCD), Tier 2 Section 3.8.4.4.1, states, in part, that the design and analysis procedures for the seismic Category I structures are in accordance with ACI 349 for concrete structures, and the ductility criteria of ACI 349, Chapter 21, are applied in detailing and anchoring of the reinforcing steel.

ACI 349-01, Section 12.2.5, "Excess reinforcement," states, "Reduction in development length shall be permitted where reinforcement in a flexural member is in excess of that required by analysis except where anchorage or development for fy is specifically required or the reinforcement is designed under provisions of 21.2.1.4……(A_s required)/(A_s provided)."

ACI 349-01, Section 21.2, "General requirements," subsection 21.2.1.4, states, "All reinforced concrete structural members shall satisfy 21.2 through 21.7 of Chapter 21 in addition to the requirements of Chapters 1 through 17."

DCD, Tier 2 Section 3.8.5.4.4, states, in part, that the two critical sections of the basemat are designed as two-way slabs.

ACI 349-01, Section 13.3, "Slab reinforcement," subsection 13.3.4, states, "Negative moment reinforcement perpendicular to a discontinuous edge shall be bent, hooked, or otherwise anchored, in spandrel beams, columns, or walls, to be developed at face of support according to the provisions of Chapter 12."

Contrary to the above, on or before May 7, 2012, the licensee failed to assure that applicable regulatory requirements and the design basis for systems, structures, and components were correctly translated into specifications, drawings, and instructions associated with the nuclear island (NI) basemat reinforcement. Specifically, the NI basemat bottom flexural reinforcement specified in construction drawings SV3-1000-CR-001-R1 and SV3-1000-CR-904-R2, and revised in Engineering and Design Coordination Report (E&DCR) Number APP-1000-GEF-007, did not comply with the provisions of ACI 349-01, as evidenced by the following examples:

1. The anchorage of the lower NI basemat reinforcement (layers 1 and 2) into the exterior walls of the auxiliary and shield buildings was detailed relying upon the excess

reinforcement provision of ACI 349, Section 12.2.5, to reduce the development length of the bars. ACI 349-01, Section 12.2.5, however, is not applicable for anchoring reinforcement in accordance with the provisions of ACI 349-01, Chapter 21.

2. The anchorage of the NI basemat negative moment reinforcement (layers 1 and 2) into the exterior walls of the auxiliary building in the critical sections was detailed relying upon the excess reinforcement provision of ACI 349-01, Section 12.2.5, to reduce the development length of the bars. As a result, the reinforcement was not developed at the face of the support in a manner consistent with ACI 349-01, Section 13.3.4.

This violation is associated with a Green Significance Determination Process Finding

B. Combined License (COL) No. NPF-91, dated February 10, 2012, paragraph 1.A, states, in part, that "The application for a combined license (COL) for Vogtle Electric Generating Plant…incorporates by reference Appendix D of 10 CFR Part 52."

10 CFR 52, Appendix D, Section VIII B.6.a, states, "An applicant who references this appendix may not depart from Tier 2* information, which is designated with italicized text or brackets and an asterisk in the generic DCD, without NRC approval. The departure will not be considered a resolved issue, within the meaning of Section VI of this appendix and 10 CFR 52.63(a)(5)." AP1000 Design Control Document (DCD), Tier 2 Section 3.8.4.4.1, states, in part, in Tier 2* information, that "The design and analysis procedures for the seismic Category I structures… are in accordance with ACI 349 for concrete structures,…and the ductility criteria of ACI 349, Chapter 21, are applied in detailing and anchoring of the reinforcing steel."

ACI 349-01, Section 21.2, "General requirements," subsection 21.2.1.4, states, "All reinforced concrete structural members shall satisfy 21.2 through 21.7 of Chapter 21 in addition to the requirements of Chapters 1 through 17."

DCD, Tier 2 Section 3.8.5.4.4, states, in the Tier 2* design summary regarding the basemat critical sections, that these portions of the basemat are designed as a two-wayslab.
ACI 349-01, Section 13.3, "Slab reinforcement," subsection 13.3.4, states, "Negative moment reinforcement perpendicular to a discontinuous edge shall be bent, hooked, or otherwise anchored, in spandrel beams, columns, or walls, to be developed at face of support according to the provisions of Chapter 12."

DCD, Tier 2* Figure 3H.5-3, depicts the typical reinforcement details for layers 1, 2, 4, and 5 of the NI basemat/auxiliary building wall connection along column line 1 as having hooks at the termination in the wall.

Contrary to the above, on or before March 23, 2012, the licensee departed from Tier 2* information in the referenced certified design without NRC approval. Specifically, VEGP departed from Tier 2* information by:

1. Revising the connection of the NI basemat reinforcement with the exterior walls of the auxiliary and shield building such that the development length used to anchor layers 1 and 2 of the NI basemat reinforcement into the perimeter walls of the auxiliary and shield building did not comply with ACI 349-01, Chapter 21.

2. Revising the connection of the NI basemat negative moment reinforcement (layers 1 and 2) with the exterior walls of the auxiliary building in the critical sections such that they did not comply with the requirements for two-way slabs specified in ACI 349-01, Chapter 13.

3. By deleting the hooks, the connection of the NI basemat reinforcement (layers 1, 2, 4, and 5) with the exterior wall of the auxiliary building along column line (CL) 1 was not consistent with DCD, Tier 2* Figure 3H.5-3.

This is a Severity Level (SL) IV violation (Enforcement Policy, Section 6)

Pursuant to the provisions of 10 CFR 2.201, Southern Nuclear Operating Company, Inc. is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region II, and a copy to the NRC Resident Inspector at the facility that is the subject of this Notice, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 18th day of May, 2012

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No:	52-00025
License No:	NPF-91
Report No.:	05200025/2012008
Licensee:	Southern Nuclear Operating Company (SNC)
Facility:	Vogtle Electric Generating Plant Unit 3
Location:	Burke County, GA
Inspection Dates:	March 19 – May 7, 2012
Inspectors:	Bradley Davis, Senior Construction Inspector, CIB2 Tony Ponko, Construction Inspector, CIB2
Accompanying Personnel:	Jimi Yerokun, Deputy Division Director, DCI Mike Ernstes, Chief, DCP Mike Brown, Project Manager, DCIP
Approved by:	Kathleen O'Donohue, Chief Construction Inspection Branch 2 Division of Construction Inspection

SUMMARY OF FINDINGS

IR 05200025/2012008; 3/19/2012 through 5/7/2012; Vogtle Electric Generating Plant (VEGP) Units 3; ITAAC-Related Installation of Structural Concrete.

This report covers an announced construction inspection performed by regional based inspectors. One Green ITAAC finding and one Severity Level IV violation were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 2519P, "Construction Significance Determination Process" (SDP). Cross-cutting aspects were determined using IMC 0613P, Appendix F, "Construction Cross-Cutting Components and Aspects." Findings for which the SDP does not apply may be Green or get assigned a severity level after NRC management review. The Nuclear Regulatory Commission's (NRC's) program for overseeing the safe 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. An ITAAC finding of very low safety significance (green) and a VIO of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," were identified by the inspectors on May 7, 2012, regarding the licensee's failure to assure that regulatory requirements and the design basis for systems, structures, and components were correctly translated into specifications and instructions associated with the nuclear island (NI) basemat reinforcement. Specifically, the anchorage of the reinforcement steel inappropriately relied on the excess reinforcement provision of ACI 349-01, Section 12.2.5, to reduce the development length of the bars, and the anchorage of the negative moment reinforcement steel was not developed at the face of the support in a manner consistent with ACI 349-01, Section 13.3.4. At the time of the exit meeting for this report, the planned corrective actions for this issue were being evaluated by the licensee. This issue was entered in to the corrective action program as Condition Report (CR) 442272.

  The inspectors determined that this issue was more than minor because, if left uncorrected, the failure to assure that regulatory requirements and the design basis for the NI basemat reinforcement were correctly translated into specifications and instructions could adversely affect the closure of an Inspection, Test, Analyses, and Acceptance Criteria (ITAAC). The finding is associated with the Design/Engineering Cornerstone. The finding was determined to be an ITAAC finding because it is material to the acceptance criteria of Unit 3 ITAACs 3.3.00.02a.i.b, 3.3.00.02a.i.c, and 3.3.00.02a.i.d in that the reinforcement design for NI basemat and the affected areas of the shield building, non-radiologically controlled areas of the auxiliary building, and the radiologically controlled areas of the auxiliary building deviated from the design basis without being reconciled by the licensee. The inspectors evaluated the finding using the construction SDP and determined that finding was of very low safety significance because it did not impair the design function of the nuclear island (NI) basemat, shield building, or auxiliary building and was assigned to Row 1 of the risk importance table. This finding was cross-cutting in the area of Baseline Inspection, Decision-Making, Systematic Process, because the licensee did not demonstrate that a systematic process, reflecting the potential to impact ITAAC closure, was followed to make design changes. [A.1(a)]. (Section 1-2503.1).

Cornerstone: N/A

- Severity Level IV. The inspectors indentified a Severity Level IV Cited Violation of 10 CFR 52, Appendix D, Section VIII B.6.a for the licensee departing from Tier 2* information in the referenced certified design without NRC Approval. Specifically, the revised design of the NI basemat reinforcement departed from Tier 2* ACI 349-01 code requirements and departed from the details depicted in AP1000 Design Control Document (DCD), Tier 2* Figure 3H.5-3, by deleting the hooks on layers 1, 2, 4, and 5 at the connection with the exterior walls of the auxiliary building.

  The violation was determined to be applicable to traditional enforcement because the NRC's ability to perform its regulatory function was potentially impacted by the licensee's failure to obtain NRC approval prior to departing from Tier 2* information. The finding was determined to be a Severity Level IV violation in accordance with Sections 6.0 and 6.1.d.2 of the NRC Enforcement Policy because the violation was associated with a finding evaluated as having very low safety significance (green) by the construction SDP. (Section 1-2503.1)

B. Licensee-Identified Violation

None

REPORT DETAILS

1. CONSTRUCTION REACTOR SAFETY

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

2503 ITAAC-Related Inspections

.1 ITAAC No / Family: 3.3.00.02a.i.b / F01
ITAAC No / Family: 3.3.00.02a.i.c / F01
ITAAC No / Family: 3.3.00.02a.i.d / F01

a. Inspection Scope

The inspectors performed direct inspections of ITAACs 3.3.00.02a.i.b, 3.3.00.02a.i.c, and 3.3.00.02.a.i.d (described in Table 1 of Attachment 2) using the guidance in Inspection Procedure (IP) 65001.02, "Inspection of ITTAC-Related Installation of Structural Concrete."

The inspectors conducted a field inspection of licensee activities involving VEGP Unit 3 ITAACs 3.3.00.02a.i.b, 3.3.00.02a.i.c, 3.3.00.02a.i.d. The inspection focused on installation of steel reinforcement in the basemat of the nuclear island (NI) with an emphasis on the critical sections identified in Table 3.3-7 of the AP1000 Design Control Document (DCD). Inspection activities included review of applicable documentation, interviews of knowledgeable personnel, and observation of construction activities.

The inspectors reviewed a sample of construction drawings, specifications, procedures, and procurement documents associated with the NI basemat to determine whether construction activities were in conformance with regulatory requirements and licensee commitments. The inspectors reviewed design documents, Engineering and Design Change Requests (E&DCRs), and other design changes to determine whether design deviations were appropriately identified and addressed in a manner that would support closure of the ITAACs. A list of documents reviewed is provided in Attachment 1 of this inspection report.

The inspectors observed reinforcement steel and embedment placement associated with the lower basemat reinforcement to determine whether the activities were being controlled, inspected, and accomplished in accordance with applicable design requirements and the conditions of the license. The inspectors reviewed design documents and observed installation activities associated with the NI basemat reinforcing steel splices to determine whether the process and crews were qualified, and inspections were performed during and after splicing by qualified inspection personnel.

b. Findings

1) Introduction:

An ITAAC finding of very low safety significance (green) and a cited violation (NOV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," were identified by the inspectors on May 7, 2012, regarding the licensee's failure to assure that regulatory requirements and the design basis for systems, structures, and components were correctly translated into specification and instructions associated with the nuclear island (NI) basemat reinforcement.

A Severity Level IV NOV of 10 CFR 52, Appendix D, Section VIII B6.a, was identified by the inspectors for the licensee departing from Tier 2* information in the referenced certified design without NRC approval. This violation was associated with the design control finding and violation listed above.

2) Description:

On March 23, 2012, during a field inspection of reinforcing steel placement in the basemat of the nuclear island, the inspectors observed that the installed lower reinforcement steel (layers 1 & 2) did not conform with the requirements of the DCD. Specifically, the lower basemat reinforcement was not anchored into the exterior walls of the auxiliary and shield buildings around the perimeter of the NI in accordance with the requirements of ACI 349-01.

The nuclear island structures, consisting of the containment building, shield building, and auxiliary building, are founded on a common 6-foot-thick, cast-in-place, reinforced concrete basemat that distributes gravity and lateral loads from the vertical load carrying elements (bearing/shear walls) to the supporting soil. The basemat is an essential component of the overall lateral-force resisting system, transmitting loads between the nuclear island structures and the supporting soil, and connecting various components of the vertical lateral-force resisting system together to permit the nuclear island structures to act as a unit.

The nuclear island structures, including the critical sections listed in Table 3.3-7, are identified as Seismic Category I in DCD, Tier 1 Section 3.3. Seismic Category I structures are those that must be designed to withstand design basis loads, including the Safe Shutdown Earthquake (SSE), without loss of structural integrity and any safety-related functions.

The design and analysis procedures for Seismic Category I structures are described in DCD, Tier 2 subsection 3.8.4.4.1, with Tier 2* information. This subsection states in part:

> "[The design and analysis procedures for the seismic Category I structures … are in accordance with ACI-349 for concrete structures,…]*…
>
> [The criteria of ACI-349, Chapter 12, are applied in development and splicing of the reinforcing steel. The ductility criteria of ACI-349, Chapter 21, are applied in detailing and anchoring of the reinforcing steel.

The application of Chapter 21 detailing is demonstrated in the reinforcement details of critical sections]* in subsection 3.8.5 and Appendix 3H.

[Sections 21.2 through 21.5 of Chapter 21 of ACI 349 are applicable to frame members resisting earthquake effects. These requirements are considered in detailing structural elements subjected to significant flexure and out-of-plane shear. These elements include the following examples described in Appendix 3H:]*

- Reinforcement details for the basemat are described in subsection 3.8.5. [Shear stirrups have T headed anchors at each end.]*

- Reinforcement details for the exterior walls below grade are described in subsection 3H.5.1.1. [Shear stirrups have T headed anchors at each end.]*…"

The seismic provisions of ACI 349-01, Chapter 21, provide additional margin for structural elements resisting seismic forces and assurance that structural integrity will be maintained in the unlikely event of an earthquake beyond the design basis SSE or other unforeseen circumstances.

During the inspection of the basemat bottom reinforcement layers, the inspectors observed that hooks were not provided at the ends of the layers 1 and 2 reinforcement bars. The inspectors also observed that the extension (anchorage) of the reinforcement bars into the exterior walls of the auxiliary and shield buildings around the perimeter of the nuclear island was less than the development length listed in Table I of construction drawing SV3-0000-C9-001-R2.

The inspectors determined that construction drawing SV3-0000-CR-904 was revised by Westinghouse (WEC) with an un-numbered Class III Design Change Proposal (DCP), dated March 15, 2011. The design change modified the connection detail between the basemat and the exterior walls of the auxiliary building around the perimeter of the nuclear island by deleting the hooks at the ends of the layers 1, 2, 4 and 5 reinforcement bars. The connection detail was subsequently revised in Engineering and Design Control Report (E&DCR) Number APP-1000-GEF-007 to add T headed anchors at the ends of the layers 4 and 5 reinforcement bars.

DCD, Rev. 19, Tier 2* Figure 3H.5.3, provides the reinforcement configuration of the connection of the NI basemat with the south exterior wall of the auxiliary building on Column Line 1. In this figure, the top and bottom reinforcement layers are shown as being anchored in the wall with hooks.

Discussions with licensee personnel indicated that the design change was made to reduce reinforcement congestion and the revised reinforcement configuration was evaluated to be acceptable by the responsible design organization. The engineering justification for the design change relied on the excess reinforcement provision of ACI 349-01, Section 12.2.5. The inspectors, however, concluded that this provision is not applicable to members designed in accordance with the provisions of ACI 349-01, Chapter 21, as indicated below.

> ACI 349-01, 12.2.5 – Excess reinforcement, states, "Reduction in development length shall be permitted where reinforcement in a flexural member is in excess of that required by analysis except where anchorage or development for fy is specifically required or the reinforcement is designed under provisions of 21.2.1.4……(A_s required)/(A_s provided)"
>
> ACI 349-01, 21.2 – General requirements, subsection 21.2.1.4, states, "All reinforced concrete structural members shall satisfy 21.2 through 21.7 of Chapter 21 in addition to the requirements of Chapters 1 through 17"

The basemat is a Seismic Category I structure. All reinforcement within Seismic Category I structures is required to be designed under the provisions of ACI 349-01, subsection 21.2.1.4. As a result, the excess reinforcement provision of ACI 349-01, Section 12.2.5, is not applicable.

The design of the two critical sections of the basemat identified in DCD Tier 1 Table 3.3-7 is described in DCD Tier 2 subsection 3.8.5.4.4. This subsection, states, in Tier 2* information, that the two critical sections of the basemate are designed as two-way slabs.

The design of two-way slab systems is addressed in Chapter 13 of ACI 349-01. Based on a review of the applicable sections of ACI 349-01, the inspectors determined that the anchorage of the lower basemat reinforcement (layers 1 & 2) into the exterior walls of the auxiliary building at the critical sections did not comply with the provision of Chapter 21 listed above, in addition to the provision for 2 way slabs listed below:

> ACI 349-01, 13.3.4: "Negative moment reinforcement perpendicular to a discontinuous edge shall be bent, hooked, or otherwise anchored, in spandrel beams, columns, or walls, to be developed at face of support according to the provisions of Chapter 12."

During an inspection debrief conducted on April 19, 2012, the licensee provided additional information regarding the negative moment demand at the connection between the basemat and the exterior wall of the auxiliary building, along column line 1, in the critical section. The licensee also provided information indicating that the capacity of the revised connection exceeds the design basis demand. Based on the information provided, the inspectors concluded that, regardless of the ability of the revised connection to meet the design basis demand, the anchorage of the bottom reinforcement (layers 1 and 2) into the wall did not satisfy the requirements of ACI 349-01, Chapter 13 and Chapter 21.

The inspectors also determined that this finding is associated with a violation of 10 CFR 52, Appendix D, Section VIII.B.6.a. As described in the Green ITAAC finding above, the design change represented a departure from Tier 2* information in the referenced certified design. The description of the critical sections as two-way slabs, the ACI 349-01 code requirements for Seismic Category I Structures, and Tier 2 Figure 3H.5-3 are designated as Tier 2* information in the DCD. 10 CFR 52.98 states, in part, "if the combined license references a certified design, then---changes to or departures from information

within the scope of the referenced design certification rule are subject to the applicable change processes in that rule." 10 CFR 52, Appendix D, Section VIII.B.6.a, states, "A licensee who references this appendix may not depart from Tier 2* information, which is designated with italicized text or brackets and an asterisk in the generic DCD, without NRC approval."

The inspectors determined that the departure from the ACI 349-01 code requirements and Figure 3H.5-3 was a departure from Tier 2* information for which the licensee did not seek NRC approval.

3) Analysis:

The licensee's failure to assure that regulatory requirements and the design basis for systems, structures, and components were correctly translated into specifications and instructions associated with the nuclear island basemat reinforcement is a performance deficiency that was within the licensee's ability to foresee and correct. As a result, the issue was required to be evaluated using the construction SDP. The performance deficiency is associated with the Design/Engineering cornerstone, in that it resulted in design documents not meeting the specified design criteria which adversely affected the cornerstone objective. Specifically, the licensee did not assure that the requirements of the DCD and ACI 349-01 were incorporated into the construction drawings of the nuclear island basemat. The performance deficiency was considered more than minor because it could adversely affect the closure of ITAACs 3.3.00.02a.i.b, 3.3.00.02a.i.c, and 3.3.00.02a.i.d. The finding was determined to be an ITAAC finding because it is material to the acceptance criteria of Unit 3 ITAACs 3.3.00.02a.i.b, 3.3.00.02a.i.c, and 3.3.00.02a.i.d, in that the reinforcement design for the NI basemat and the affected areas of the shield building, non-radiologically controlled areas of the auxiliary building, and the radiologically controlled areas of the auxiliary building deviated from the design basis without being reconciled by the licensee.

The inspectors assessed the ITAAC finding in accordance with Inspection Manual Chapter (IMC) 2519P, Construction Significance Determination Process – Pilot, Appendix A and determined the following: (1) The risk importance of the structure is high as it impacts a critical section listed in DCD Tier 1 Table 3.3-7 (Appendix A, Section 4, Step 8); and (2) The finding is of very low safety significance (Green) because the performance deficiency did not impair the design function of the structure (Appendix A, Section 4, Step 12).

The inspectors determined that the ITAAC finding had a cross-cutting aspect in the Decision-Making component of the baseline program because the licensee did not demonstrate that a systematic process, reflecting the potential to impact ITAAC closure, was followed to make design changes. [A.1(a)]

The licensee's failure to obtain NRC approval prior to departing from Tier 2* information is a violation of 10 CFR 52, Appendix D, Section VIII B.6.a. The violation was determined to be applicable to traditional enforcement because the NRC's ability to perform its regulatory function was potentially impacted by the licensee's failure to obtain NRC approval prior to departing from Tier 2* information. The finding was determined to be a Severity Level IV violation in

accordance with Sections 6.0 and 6.1.d.2 of the NRC Enforcement Policy. Specifically, Section 6.0 of the Enforcement Policy states that if the circumstance for a case do not squarely fit any particular violation example, a comparable example in the same activity area may be considered to determine the severity. The inspectors determined the set of circumstances and considerations in this situation to be comparable to those for the violation example provided in Section 6.1.d.2.

4) Enforcement:

On or before, May 7, 2012, the licensee failed to assure that design activities performed by WEC were accomplished with adequate design control measures as specified in procurement documents.

Paragraph 2.C of the Combined License for Vogtle Electric Generating Plant Unit 3, License No. NPF-91 (Docket No. 52-025), states, "The license is subject to, and the licensees shall comply with, all applicable provisions of the Atomic Energy Act of 1954, as amended (the Act) and the rules, regulations, and orders of the Commission, including the conditions set forth in 10 CFR Chapter I, now or hereafter in effect."

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

AP1000 Design Control Document (DCD), Tier 2 Section 3.8.4.4.1, states, in part, that the design and analysis procedures for the seismic Category I structures are in accordance with ACI 349 for concrete structures, and the ductility criteria of ACI 349, Chapter 21, are applied in detailing and anchoring of the reinforcing steel.

ACI 349-01, Section 12.2.5, "Excess reinforcement," states, "Reduction in development length shall be permitted where reinforcement in a flexural member is in excess of that required by analysis except where anchorage or development for fy is specifically required or the reinforcement is designed under provisions of 21.2.1.4……(A_s required)/(A_s provided)."

ACI 349-01, Section 21.2, "General requirements," subsection 21.2.1.4, states, "All reinforced concrete structural members shall satisfy 21.2 through 21.7 of Chapter 21 in addition to the requirements of Chapters 1 through 17."

DCD, Tier 2 Section 3.8.5.4.4, states, in part, that the two critical sections of the basemat are designed as two-way slabs.

ACI 349-01, Section 13.3, "Slab reinforcement," subsection 13.3.4, states, "Negative moment reinforcement perpendicular to a discontinuous edge shall be bent, hooked, or otherwise anchored, in spandrel beams, columns, or walls, to be developed at face of support according to the provisions of Chapter 12."

Contrary to the above, on or before May 7, 2012, the licensee failed to assure that applicable regulatory requirements and the design basis for systems, structures, and components were correctly translated into specifications, drawings, and instructions associated with the nuclear island (NI) basemat reinforcement. Specifically, the NI basemat bottom flexural reinforcement specified in construction drawings SV3-1000-CR-001-R1 and SV3-1000-CR-904-R2, and revised in Engineering and Design Coordination Report (E&DCR) Number APP-1000-GEF-007, did not comply with the provisions of ACI 349-01, as evidenced by the following examples:

1. The anchorage of the lower NI basemat reinforcement (layers 1 and 2) along the exterior walls of the auxiliary and shield buildings was detailed relying upon the excess reinforcement provision of ACI 349, Section 12.2.5, to reduce the development length of the bars. ACI 349-01, Section 12.2.5, however, is not applicable for anchoring reinforcement in accordance with the provisions of ACI 349-01, Chapter 21.

2. The anchorage of the NI basemat negative moment reinforcement (layers 1 and 2) along the exterior walls of the auxiliary building in the critical sections was detailed relying on the excess reinforcement provision of ACI 349-01, Section 12.2.5, to reduce the development length of the bars. As a result, the reinforcement was not developed at the face of the support in a manner consistent with ACI 349-01, Section 13.3.4.

This ITAAC Finding is of very low safety significance (Green).

The licensee opened Condition Report (CR) 442272, to capture and track this finding. Because the licensee's corrective action program had not yet been demonstrated to be effectively implemented, this finding and violation of 10 CFR 50, Appendix B, Criteria III, "Design Control," is being cited in the enclosed Notice of Violation (Notice), consistent with the NRC Enforcement Policy. (VIO 05200025/2012008-01: Failure to Assure Design Services were Accomplished with the Appropriate Design Control Measures).

On or before May 7, 2012, the ITTAC finding and violation described above resulted in a violation that impacted the regulatory process. The departure from the design bases described in the DCD was a departure from Tier 2* information that required NRC approval. The description of the critical sections as two-way slabs, as well as, ACI 349-01 and Tier 2 Figure 3H.5-3 are designated as Tier 2* information in the DCD.

Combined License (COL) No. NPF-91, dated February 10, 2012, paragraph 1.A, states, in part, that "The application for a combined license (COL) for Vogtle Electric Generating Plant…incorporates by reference Appendix D of 10 CFR Part 52."

10 CFR 52, Appendix D, Section VIII B.6.a, states, "An applicant who references this appendix may not depart from Tier 2* information, which is designated with italicized text or brackets and an asterisk in the generic DCD, without NRC approval. The departure will not be considered a resolved issue, within the meaning of Section VI of this appendix and 10 CFR 52.63(a)(5)."

AP1000 Design Control Document (DCD), Tier 2 Section 3.8.4.4.1, states, in part, in Tier 2* information, that "The design and analysis procedures for the seismic Category I structures…are in accordance with ACI 349 for concrete structures,… and the ductility criteria of ACI 349, Chapter 21, are applied in detailing and anchoring of the reinforcing steel."

ACI 349-01, Section 21.2, "General requirements," subsection 21.2.1.4, states, "All reinforced concrete structural members shall satisfy 21.2 through 21.7 of Chapter 21 in addition to the requirements of Chapters 1 through 17."

DCD, Tier 2 Section 3.8.5.4.4, states, in the Tier 2* design summary regarding the basemat critical sections, that these portions of the basemat are designed as a two-wayslab.
ACI 349-01, Section 13.3, "Slab reinforcement," subsection 13.3.4, states, "Negative moment reinforcement perpendicular to a discontinuous edge shall be bent, hooked, or otherwise anchored, in spandrel beams, columns, or walls, to be developed at face of support according to the provisions of Chapter 12."

DCD, Tier 2* Figure 3H.5-3, depicts the typical reinforcement details for layers 1, 2, 4, and 5 of the NI basemat/auxiliary building wall connection along column line 1 as having hooks at the termination in the wall.

Contrary to the above, on or before May 7, 2012, the licensee departed from Tier 2* information in the referenced certified design without NRC approval. Specifically, VEGP departed from Tier 2* information by:

1. Revising the connection of the NI basemat reinforcement with the exterior walls of the auxiliary and shield building such that the development length used to anchor layers 1 and 2 of the NI basemat reinforcement into the perimeter walls of the auxiliary building did not comply with ACI 349-01, Chapter 21.

2. Revising the connection of the NI basemat negative moment reinforcement (layers 1 and 2) with the exterior walls of the auxiliary building in the critical sections did not comply with the requirements for two-way slabs specified in ACI 349-01, Chapter 13.

3. By deleting the hooks, the connection of the NI basemat reinforcement (layers 1, 2, 4, and 5) with the exterior wall of the auxiliary building along column line (CL) 1 was not consistent with DCD, Tier 2* Figure 3H.5-3.

This is a Severity Level (SL) IV violation (Enforcement Policy, Section 6)

The licensee opened Condition Report (CR) 442272, to capture and track this finding. Because the licensee's corrective action program had not yet been demonstrated to be effectively implemented, this violation is being cited as a Notice of Violation (NOV), consistent with the NRC Enforcement Policy. (VIO 05200025/2012008-02: Failure to Seek NRC Approval for Departing From Tier 2* Information).

2504 Program Inspections

None

2. OTHER INSPECTION RESULTS

4OA6 Meetings, including Exit

.1 Exit Meeting Summary

On March 23, 2012, the regional inspectors presented the interim results of the inspection to Mr. D. Jones and other members of his staff. On April 20, 2012, the regional inspectors re-exited with Mr. Buzz Miller and other members of his staff, and representatives for the consortium. The findings provided during the re-exit were acknowledged by Mr. Miller and other representatives present. On, May 7, 2012, the regional inspectors re-exited with Mr. B. L. Ivey and other members of his staff who acknowledged the cross-cutting and cornerstone attributes associated with the findings. The inspectors stated that no proprietary information would be included in the inspection report.

KEY POINTS OF CONTACT

Licensee Personnel

N. Jackiw, SNC Licensing
D. Jones, SNC Site Vice President
H. Mayhan, SNC Licensing

Westinghouse Personnel

T. Baker, WEC Engineering
S. Bradley, WEC Licensing
M. Corletti, WEC Engineering
T. McKinney, WEC Engineering
J. Speer, WEC Integration Manager
L. Tunon-Sanjur, WEC Engineering

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Status	Description
VIO 05200025/2012008-01	Open	Failure to Assure Design Services were Accomplished with the Appropriate Design Control Measures
VIO 05200025/2012008-02	Open	Failure to Seek NRC Approval for Departing From Tier 2* Information

LIST OF DOCUMENTS REVIEWED

2503 ITAAC-Related Inspections

Westinghouse Policy/Procedure, NSNP 3.4.1 Rev. 4, Change Control for the AP1000 Program.
AP1000 Configuration Management Plan, APP-GW-GOY-002 Rev. 2.
Project Quality Assurance Program Interface Plan for Domestic AP1000 Projects, APP-GW-GAH-010 Rev. 4.
Westinghouse Policy/Procedure, WEC 3.4.6 Rev. 0, Field Change Notice.
APP-GW-GAP-420 Rev. 5, Engineering and Design Coordination Report
Design Specification, SV3-CR01-Z0-001-R2, Furnishing of Safety Related Reinforcing Steel, Westinghouse Safety Class C "NUCLEAR SAFETY RELATED"
SPECIFICATION FOR SUPPLY AND INSTALLATION OF MECHANICAL SPLICES FOR REINFORCING STEEL, SV3-CR01-Z0-010-R4.
PP 5-9-0, N&D INCORPORATION INTO AFFECTED DOCUMENTS
PO No. 132175-J400A-00 between Shaw Stone & Webster, Inc. and Gerdau Ameristeel US, Inc. to supply NQA-1 concrete reinforcing steel, dated 24 December 2009.
E&DCR No. APP-120-GEF-017 Rev. 0, Rebar Details at Elevator and Sump Pits
E&DCR No. SV0-CR01-GEF-000013 Rev. 0, Layer 4, 5 Coupler Location Rev.
E&DCR No. SV0-CR01-GEF-000008 Rev. 0, Rebar Type (Verified incorporation into specification).
E&DCR No. SV0-CR01-GEF-000007 Rev. 0, NI Basemat Layer 2 Rebar Lengths (Verified shop drawing revised)
E&DCR No. SV0-CR01-GEF-000010 Rev. 0, NI basemat rebar shop drawings (Issue in field for bars parallel to I line)
E&DCR No. SV3-CR01-GEF-000009 Rev. 0, Mechanical Splice Stagger
E&DCR No. SV3-CR01-GEF-000008 Rev. 0, NI Layer 1&2 Connector Locations
E&DCR No. SV0-CR01-GEF-000049 Rev. 0, Installation of Threaded T-Heads
E&DCR No. SV0-CR01-GEF-000044 Rev. 0, Couplers with non-contact issues
E&DCR No. SV0-CR01-GEF-000034 Rev. 0, Aids in contact with Rebar
E&DCR No. SV0-CR01-GEF-000020 Rev. 0, Clear spacing between rebar layers
E&DCR No. SV0-CR01-GEF-000004 Rev. 0, NI Basemat Layer 4&5 Orientation (Rejected)
E&DCR No. AP-1000-GEF-007 Rev. 0, Additions to Nuclear Island Basemat Rebar Details
Workplan SV3-1000-CRW-CV0295, Installation of Reinforcing Steel for Nuclear Island Base Mat, 6/6.
Construction Drawing SV3-0000-C9-001-R2, AP1000 Concrete General Notes
Construction Drawing SV3-1000-CR-001-R1, Nuclear Island Basemat Bottom Reinforcement
Construction Drawing SV3-1000-CR-901-R2, Nuclear Island Basemat Reinforcement Sections
Construction Drawing SV3-1000-CR-904-R2, Nuclear Island Basemat Reinforcement Section Details
Construction Drawing SV3-1210-CR-901-R1, Auxiliary Building Basemat Reinforcement Sections NS and Details EL 66'-6"
Construction Drawing SV3-1210-CR-902-R1, Auxiliary Building Basemat Reinforcement Sections EW and Details EL 66'-6"
Shaw Document No. 132175-J400A-00036, Nuclear Island Basemat Bottom Reinforcement – Layer 1 Shop Drawing (Released for Construction)
Shaw Document No. 132175-J400A-00037, Nuclear Island Basemat Bottom Reinforcement – Layer 1 Shop Drawing (Released for Construction)
Shaw Document No. 132175-J400A-00038, Nuclear Island Basemat Bottom Reinforcement – Layer 1 Shop Drawing (Released for Construction)

Shaw Document No. 132175-J400A-00039, Nuclear Island Basemat Bottom Reinforcement – Layer 1 Shop Drawing (Released for Construction)
Shaw Document No. 132175-J400A-00040, Nuclear Island Basemat Bottom Reinforcement – Layer 1 Shop Drawing (Released for Construction)
Shaw Document No. 132175-J400A-00041, Nuclear Island Basemat Bottom Reinforcement – Layer 2 Shop Drawing (Released for Construction)
Shaw Document No. 132175-J400A-00042, Nuclear Island Basemat Bottom Reinforcement – Layer 2 Shop Drawing (Released for Construction)
Shaw Document No. 132175-J400A-00043, Nuclear Island Basemat Bottom Reinforcement – Layer 2 Shop Drawing (Released for Construction)
Shaw Document No. 132175-J400A-00044, Nuclear Island Basemat Bottom Reinforcement – Layer 2 Shop Drawing (Released for Construction)
Shaw Document No. 132175-J400A-00045, Nuclear Island Basemat Bottom Reinforcement – Layer 2 Shop Drawing (Released for Construction)

2504 Program Inspections

None

Other Inspection Results

None

LIST OF ACRONYMS

ACI	American Concrete Institute
ADAMS	Agency-wide Documents Access & Management System
AP1000	Westinghouse Advanced Passive Pressurized Water Reactor
CAR	Corrective Action Report
CFR	Code of Federal Regulations
COL	Combined License
CR	Condition Report
DCD	Design Control Document
E&DCR	Engineering and Design Coordination Report
IMC	Inspection Manual Chapter
IOC	Issure of Concern
IP	Inspection Procedure
IR	Inspection Report
ITAAC	Inspection, Test, Analysis and Acceptance Criteria
MAB	Modular Assembly Building
N&D	Nonconformance and Disposition Report
NDQAM	Nuclear Development Quality Assurance Manual
NI	Nuclear Island
No.	Number
NRC	Nuclear Regulatory Commission
Rev.	Revision
SNC	Southern Nuclear Operating Company, Inc (Licensee)
VEGP	Vogtle Electric Generating Plant
WEC	Westinghouse Electric Company LLC
10 CFR	Title 10 of the *Code of Federal Regulations*

Table 1. ITAACs 3.3.00.02a.i.b, 3.3.00.02a.i.c and 3.3.00.02a.i.d			
ITAAC Number	**Design Commitment**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
3.3.00.02a.i.b	2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	i) An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed for the design basis loads.	i.b) A report exists which reconciles deviations during construction and concludes that the as-built shield building structures, including the critical sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions
3.3.00.02a.i.c	2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	i) An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed for the design basis loads.	i.c) A report exists which reconciles deviations during construction and concludes that the as-built structures in the non-radiologically controlled area of the auxiliary building, including the critical sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions.
3.3.00.02a.i.d	2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	i) An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed for the design basis loads.	i.d) A report exists which reconciles deviations during construction and concludes that the as-built structures in the radiologically controlled area of the auxiliary building, including the critical sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions.

Table 3.3-7 **(Nuclear island critical structural sections)**
<u>Nuclear Island Basemat Below Auxiliary Building</u> Bay between reference column lines 9.1 and 11, and K and L Bay between reference column lines 1 and 2 and K-2 and N

Table 1