



South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483



September 13, 2010  
U7-C-STP-NRC-100200

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
One White Flint North  
11555 Rockville Pike  
Rockville MD 20852-2738

South Texas Project  
Docket No. 52-001  
Reply to Notice of Violation

Reference: Letter, Richard A. Rasmussen to Scott M. Head: "South Texas Project Nuclear Operating Company Aircraft Impact Assessment Inspection, NRC Inspection Report No. 05200001/2010-202 and Notice of Violation" dated August 13, 2010 (ML102100218).

Attached is STP Nuclear Operating Company's (STPNOC) response to the Notice of Violation contained in the referenced NRC inspection report.

Attachment 1 contains STPNOC's reply to the Notice of Violation.

Attachment 2 contains STPNOC's response to observations made in the referenced inspection report.

A summary of the commitments made in this submittal is included in Attachment 3.

If you have any questions, please contact me at (361) 972-7136 or Bill Mookhoek at (361) 972-7274.


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I declare under penalty of perjury that the foregoing is true and correct.

Executed on 9/13/10



Scott Head  
Manager, Regulatory Affairs  
South Texas Project Units 3 & 4

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Attachments:

1. Reply to Notice of Violation
2. Inspection Observations
3. Commitment Summary

cc: w/o attachment except\*  
(paper copy)

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**Statement of Violation:**

Title 10, of the *Code of Federal Regulations* (CFR), Section 50.150, "Aircraft impact assessment," Paragraph (a)(1) requires that each applicant listed in 10 CFR 50.150(a)(3) shall perform a design-specific assessment of the effects on the facility of the impact of a large, commercial aircraft. Using realistic analyses, the applicant shall identify and incorporate into the design those design features and functional capabilities to show that, with reduced use of operator actions:

- (i) the reactor core remains cooled, or the containment remains intact; and
- (ii) spent fuel cooling or spent fuel pool integrity is maintained.

Contrary to the above, as of May 21, 2010, STPNOC failed to use realistic analyses in its AIA. Specifically, the AIA failed to consider the effects of the aircraft impact on the gantry crane; failed to follow through with the alternate missile-target interaction method to determine the extent of damage to the secondary containment wall and its ability to serve as a 3-hour fire rated barrier; failed to accurately determined damage footprints; failed to properly apply the two-barrier rule set resulting in fire doors arranged too close to each other to allow for pressure dissipation; failed to include fire barrier details or to accurately document fire areas; failed to document essential information such as an accurate description of the door to Room 512, an accurate description of the auxiliary feedwater injection (AFI) system, and accurate fire-areas and fire damage footprint drawings; and failed to provide structural design details that were considered within the structural computer model but were not described in the assessment. Further, STPNOC failed to identify and incorporate into the design those design features and functional capabilities credited in the AIA to show the reactor remains cool, or containment remains intact; and spent fuel cooling or spent fuel pool integrity is maintained as required by 10 CFR 50.150(a)(1). For example, the STPNOC AIA credited the following design features and functional capabilities that were not identified in the design: the types of damage the AFI instrument cabling could suffer and the design feature(s) needed to prevent that damage; the structural strength of the surge tank room barrier wall; the spent fuel pool steel liner thickness; and the structural strength and reinforcement requirements for reactor building wall locations and barrier doors.

## **Background**

The assessments performed for the ABWR DCD AIA amendment were conducted under a contract with Toshiba America Nuclear Energy (TANE). TANE assigned the project to Westinghouse Electric Corporation (WEC), who managed and coordinated the AIA assessment effort. WEC subcontracted the structural and fuel cooling assessments to qualified subcontractors. The ABWR DCD AIA fuel cooling assessment was performed by ERIN Engineering and the ABWR DCD AIA structural assessment was performed by ANATECH Corporation. At the time of the inspection, the documents of record were ERIN Fuel Cooling Assessment Report No. C177080001-8760, Rev. 0, dated May 29, 2009, and ANATECH Structural Assessment Report No. ANA-08-0741 Rev 0, dated May 28, 2009, entitled "Evaluation of Aircraft Impact on Toshiba-WEC US-ABWR Plant Design – Structural Response Analyses for DCD Amendment."

These assessments provided part of the technical basis for the ABWR DCD AIA amendment which was initially submitted to the NRC on June 30, 2009 (STPNOC Letter No. U7-C-STP-NRC-090070)(ML092040048). In that submittal, the amendment was referred to as Revision 5 to the ABWR DCD. Following that initial submittal, a revised submittal was made (STPNOC Letter No. U7-C-STP-NRC-100098 dated May 12, 2010)(ML101340547) which incorporated DCD amendment updates, including changes as a result of RAI responses or comments made by the NRC at a meeting with STPNOC on January 27, 2010. As with the previous submittal, this revised submittal referred to the amendment as Rev. 5 of the ABWR DCD. This was the DCD amendment of record at the time of the inspection.

During the inspection, a number of issues were identified by the NRC inspectors relative to the assessment reports as well as to the DCD AIA amendment. As these issues were identified during the inspection, STPNOC and its supporting subcontractors documented and tracked them in the WEC Corrective Action Program (CAP) under WEC CAP No. 10-139-M032. A significant amount of work was performed during the inspection by STPNOC, WEC, ANATECH, and ERIN Engineering to assess the NRC findings and identify required changes to the assessment reports and the DCD AIA amendment to address the issues raised by the NRC inspectors. During the inspection exit meeting, the NRC inspectors summarized the results of their inspection, confirming that the items being tracked by STPNOC captured all of the anticipated inspection findings.

Following the inspection, in accordance the CAP requirements, STPNOC and its subcontractors continued to assess the inspection issues and to identify required changes to the assessment reports and the DCD AIA amendment in advance of receiving the formal inspection report. The DCD AIA amendment was revised and resubmitted (STPNOC Letter No. U7-C-STP-NRC-100168 dated July 12, 2010)(ML102000498) to address the inspection findings. Per conversations between STPNOC and NRC staff, this amendment request was no longer referred to as Rev 5 of the ABWR DCD; instead the amendment application was renamed to the "ABWR STP AIA Amendment Rev. 0." Subsequently, this submittal was further revised (STPNOC Letter No. U7-C-STP-NRC-100187 dated August 4, 2010) as a result of completion of an updated fire spread analysis to address the NRC's interpretation of the fire spread criteria. This revision identified a new fire area and upgraded fire barriers and doors at Elevation B3F to

protect Rooms 111 and 118. This August 4, 2010 submittal was referred to as "ABWR STP AIA Amendment Rev. 1."

The structural assessment report was revised by ANATECH to address the findings from the inspection (ANA-08-0741 Rev 1 dated July 13, 2010, entitled "Evaluation of Aircraft Impact on Toshiba-WEC US-ABWR Plant Design – Structural Response Analyses for DCD Amendment"). The fuel cooling report was also revised to incorporate the inspection findings (Report No. C177080001-8760, Rev. 1, dated August 5, 2010.)

Thus, when the final inspection report was issued on August 13, 2010 (Report No. 2010-202 on Docket No. 05200001), STPNOC and its subcontractors already had completed assessments of the preliminary inspection findings and made changes to the assessment reports and the DCD AIA amendment to resolve those issues. Based on review of the inspection report, STPNOC and its subcontractors have conducted additional reviews of the inspection issues to assure that the revised assessment reports and DCD AIA amendment adequately address the specific examples documented in the Notice of Violation (NOV) and the issues identified by the inspection report.

### **Reply to Notice of Violation**

#### **Reason for the Violation**

STPNOC did not establish a rigorous process that defined how to address a First of a Kind (FOAK) process, such as amendment of the ABWR DCD to comply with the Aircraft Impact Rule. The Aircraft Impact Assessment (AIA) was a FOAK evolution, not just for STPNOC, but for the nuclear industry. The industry AIA guidance at the time the assessment was initiated (NEI 07-13, Revision 7) was still undergoing NRC review and was subject to differing interpretations, and there was no specific guidance concerning the level of detail and content of an AIA amendment. STPNOC's understanding of NRC expectations continually evolved during the course of the NRC review. Although STPNOC utilized available references in determining level of detail and content of the amendment and the assessments (e.g., ABWR DCD, SECY-08-0152), the results did not meet the expectations at the time the inspection was conducted. In addition, the technical bases for the amendment required sophisticated technical analyses conducted by several separate subcontractors who would need to make proper use of information developed by each other. For all of these reasons, a rigorous oversight process was needed to control these activities. Although STPNOC recognized the individual challenges, it did not recognize that the combination of challenges inherent in such a FOAK process would require more rigorous controls.

**Corrective steps that have been taken to restore compliance**

A single point of contact has been designated for the ABWR STP AIA Amendment with responsibility for oversight, review and acceptance of the work products of subcontractors. In addition, as described in the background discussion, each of the examples cited in the NOV was individually assessed to determine the extent of the condition, and corrective actions were implemented to address both the specific examples and similar circumstances identified in the AIA amendment and the assessment reports. The following discussion provides an overview of these steps.

**1. effects of an aircraft impact on the gantry crane****Responsive actions**

NEI 07-13 requires an assessment of the drop of the polar crane inside containment to assess the impact on important SSCs inside containment. Although the ABWR does not have a crane inside containment, the fuel cooling assessment considered whether a drop of the Reactor Building (RB) gantry crane could impact any shutdown cooling equipment. It was concluded that a drop of the RB gantry crane would not impact any safe shutdown cooling equipment. However, based on the inspection team's concern, STPNOC performed an assessment assuming that the incoming aircraft dislodges and projects the crane directly onto the shield blocks. The assessment concluded there was no adverse impact, and that no change to the ABWR STP AIA Amendment would be required to address this issue. In addition, an assessment was performed of the impact of crane components and aircraft components falling into the spent fuel pool subsequent to aircraft impact. It was concluded that such impacts would not compromise spent fuel pool integrity, and would not require any changes to the ABWR STP AIA Amendment. These additional assessments and results were included in a revision to the structural assessment report.

**2. alternate missile-target interaction method****Responsive actions**

The fuel cooling assessment was performed assuming the final barrier that stops aircraft wreckage and debris also is adequate to stop fire spread if there are no doors or penetrations consistent with the NEI 07-13 rule set approach. Some of these final barriers are interior walls that were engineered to stop the aircraft wreckage and debris through detailed structural analyses per an alternate NEI 07-13 methodology. The inspection team was concerned about the ability for the damaged wall to withstand 5 psid pressure pulse needed for fire protection. Based on this concern, STPNOC performed an assessment of the damage sustained by the interior walls and concluded that these engineered walls are capable of resisting 5 psid in the damaged condition. Additionally, the assessment noted that the combination of exterior wall and interior engineered wall is stronger than that of the 3 wall set considered in the NEI rule set approach, which allows that the third wall be considered acceptable as a fire barrier. The structural assessment report has been revised to include this assessment, documenting the conclusion that the engineered interior walls are also acceptable as fire barriers.

In addition, in response to the inspection team's concerns, a provision was added in the ABWR STP AIA Amendment stating that all 3-hour fire barriers in the Reactor Building credited in the analysis are also 5 psid barriers.

3. damage footprints.

**Responsive actions**

As noted in the inspection report, the specific example identified during the inspection did not impact the results of the assessment since the assessment assumed that all equipment in the area touched by the fire would be unavailable. However, STPNOC recognized that the NRC finding was founded on an interpretation of NEI 07-13, Revision 7 that differed from the interpretation STPNOC had applied in the assessment. As a result, STPNOC updated the fuel cooling assessment to comply with the NRC position. This update resulted in the addition of two new fire doors (Room 111 and 118) and a new fire area (F1102) at elevation B3F to protect AFI equipment. These changes were incorporated in the ABWR STP AIA Amendment.

4. fire doors arranged to allow for pressure dissipation.

**Responsive actions**

In response to the inspection team's concern, a review was conducted which identified that in two of the three instances in which fire doors had been added to create an intervening fire area between safety divisions to mitigate the effects of an aircraft impact, the implementing figure in the ABWR STP AIA Amendment did not correctly reflect the spacing between new fire barriers that was specified in the fuel cooling assessment. A corrected figure that provides adequate spacing to allow for pressure dissipation was incorporated in the ABWR STP AIA Amendment.

5. fire barrier details and fire areas.

**Responsive actions**

STPNOC reperformed the entire fuel cooling assessment to validate that fire areas, walls and doors were correctly identified and credited. New fire area drawings were provided in a revision to the fuel cooling assessment report. The ABWR STP AIA Amendment was revised to incorporate updated general arrangement drawings in Chapter 1.2, and fire protection area drawings and the Fire Hazards Analysis in Appendix 9A as a result of the revised fuel cooling assessment. The updated Fire Hazards Analysis description for each affected room (total of 17 rooms) identifies changes to the associated fire area, the type of door(s) to each room and the qualification of the room walls, ceilings and floors consistent with the new fire area designations.

6. documentation of essential information.

**Responsive actions**

The inspection team identified that the description of the AFI System in the fuel cooling assessment report included the safety /relief valve (SRV) nitrogen supply although that feature had been deleted from the ABWR STP AIA Amendment. The fuel cooling assessment report has been updated to remove the description of the SRV nitrogen supply



feature consistent with the ABWR STP AIA Amendment. The remaining concerns associated with this example were corrected by the actions described in item 5 above.

7. design details within the structural computer model.

**Responsive actions**

The structural assessment report was revised to include additional descriptions of the modeling and structural details used in the assessment.

8. design features and functional capabilities credited in the AIA

**Responsive actions**

As a result of the inspection, STPNOC revised the ABWR STP AIA Amendment to include additional key design features from the assessment documents, consistent with the level of detail expected to be included in a Final Safety Analysis Report. The assumptions of the assessment reports without which the success criteria would not be met are now included as key design features in the amendment. Revisions included requirements that AFI cabling shall not be run through physical damage footprints (Subsection 9.5.14.4), wall and barrier characteristics (Figures 1.2-8 and 1.2-9), call-outs for 5 psid doors and fire areas (Section 9A text and figures), Spent Fuel Pool liner thickness (Subsection 9.1.2.1.3), and reactor shield block concrete strength (Subsection 3H.1.4.4.1). Note that the requirement that AFI cabling be 3 hour fire rated was already included in the amendment at the time of the inspection (Subsection 9.5.14.4).

**Summary**

As discussed above, all of the specific examples of the violation cited in the NRC inspection report have been addressed. In addition, reanalysis of the fuel cooling and structural analyses were completed and the associated reports were revised based on STPNOC's understanding of the NRC's interpretation of the guidance contained in NEI 07-13.

The ABWR STP-AIA Amendment was revised and resubmitted (STPNOC Letter No. U7-C-STP-NRC-100168 dated July 12, 2010)(ML102000498) to address the inspection findings.

ABWR STP AIA Amendment, Revision 1, was submitted to the NRC on August 4, 2010 (ML102240419). This amendment includes the information from the updated assessments which resulted from the inspection findings.

ABWR STP AIA Amendment, Revision 2, was submitted to the NRC on September 2, 2010 to incorporate a change in response to a further NRC comment about the single-unit nature of the ABWR DCD, which was not associated with the inspection findings.

A final review of the ABWR STP AIA Amendment is being conducted and a revision incorporating additional clarifications as a result of the additional review will be submitted to the NRC by September 23, 2010.

**Corrective steps that will be taken to prevent recurrence**

As discussed above, the corrective steps to restore compliance assure that the ABWR STP AIA Amendment and the assessment reports comply with 10 CFR 50.150. NRC certification of the amendment and the NRC records and reporting requirements that will apply to STPNOC as the applicant for the amendment assure continued compliance.

A process will be developed and implemented to clearly state and communicate assumptions and design basis considerations when preparing a "First of a Kind" assessment to allow for proper oversight, review, and acceptance. This process is expected to be implemented by December 17, 2010. Until implementation of this process, a single point of contact has been designated for the ABWR STP AIA Amendment with responsibility for oversight, review and acceptance of the work products of subcontractors. In addition, during this interim period before implementation of the new process, project management will consider the designation of a single point of contact for any other process it identifies as a FOAK evolution.

**Date when full compliance will be achieved**

A revised ABWR STP AIA Amendment that includes all changes to reflect the updated assessments and the NRC inspection findings will be submitted to the NRC by September 23, 2010. The revised assessments and amendment will meet the requirements of 10 CFR 50.150. With submittal of this revision, STPNOC will be in full compliance.

### **Response to Inspection Report Observations**

NRC Inspection Report No. 05200001/2010-202 includes two observations unrelated to the Notice of Violation that require a response.

#### **Observation 1**

The inspection report discusses identified discrepancies in between references to the revision of the DCA in structural assessment report and the references in an input document; the assessment report referenced Revision 4 to the DCA but the input document referred to Revision 0 of the DCA. (Inspection Report at page 15).

#### **Response**

Although the Inspection Report states that most of the referenced information did not change between revision 0 and revision 4, the following additional information confirms that the results of the assessment were not affected. In reviewing this observation, STPNOC found that the cited references in both the assessment report and the input document were to the certified ABWR DCD, not to the STP AIA amendment. STPNOC also found that the discrepancies are the result of the input document having based its references on the revision number indicated on the top of the specific page of the DCD being referenced. Since the ABWR DCD was revised on a "page replacement" basis, each individual page states the number to the DCD revision that last modified that particular page. The structural assessment report consistently referenced Revision 4 of the ABWR DCD. Although all of the references to the ABWR DCD in both documents were to the revision that was certified (Revision 4), the input document stated the revision number as "Revision 0" if that revision number was indicated on the DCD page being referenced. To address this observation, the structural assessment report has been revised to clarify that all of the references to the ABWR DCD in the input document are to Revision 4.

#### **Observation 2**

The inspection report states that "the industry peer review . . . lacked technical substance and any reference to technical materials reviewed." (Inspection Report at page 22).

#### **Response**

No industry peer review of the assessment results was conducted. There is no provision calling for a peer review in NEI 07-13, draft Regulatory Guide DG-1176 "Guidance For The Assessment Of Beyond-Design-Basis Aircraft Impacts," 10 CFR 50.150, or Inspection Procedure 37804 "Aircraft Impact Assessment."

The inspection report reference appears to be to the industry "Expert Panel Review," which was a review conducted before the assessment was completed, and not a technical review of the adequacy of the assessment results. The Expert Panel Review was an industry initiative for the purpose of achieving a level of consistency across the industry in the application of NEI 07-13.

It sought to accomplish this objective by meeting with analysts who planned to implement NEI 07-13, to assure that the analysts understood the requirements of NEI 07-13 and that their approach to the analysis would be consistent with the intent of the NEI guidelines. This limited purpose was specified in the charter for the Expert Panel Reviews. Thus, the Expert Panel Review was not intended to be a detailed technical review of the assessment results.

STPNOC believes that the Expert Panel Review accomplished its intended purpose.

<b>Commitment Number</b>	<b>Commitment</b>	<b>Completion Date</b>
10-15721-4	Submit ABWR STP AIA Amendment, Revision 3	September 23, 2010
10-15721-5	Develop and implement a process to clearly state and communicate assumptions and design basis considerations when preparing a "First of a Kind" assessment to allow for pro per oversight, review, and acceptance.	December 17, 2010