

PMSTPCOL PEmails

From: Keith, Felicia
Sent: Wednesday, August 26, 2009 5:03 PM
To: Scott Head; STPCOL; Chappell, Coley; Bill Mookhoek
Cc: Tai, Tom
Subject: Request for Additional Information Letter No. 259 Related To SRP Sections 03.03.02, 03.04.02 and 03.05.02 For the South Texas Project Combined License Application
Attachments: ML092380203.pdf

TO: Scott Head

FROM: Tom Tai

DATE: August 26, 2009

ADAMS Accession No. ML092380203

*Felicia Keith, Secretary
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Hearing Identifier: SouthTexas34Public_EX
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Subject: Request for Additional Information Letter No. 259 Related To SRP Sections 03.03.02, 03.04.02 and 03.05.02 For the South Texas Project Combined License Application
Sent Date: 8/26/2009 5:02:40 PM
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From: Keith, Felicia

Created By: Felicia.Keith@nrc.gov

Recipients:

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Tracking Status: None
"Scott Head" <smhead@stpegs.com>
Tracking Status: None
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Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

August 26, 2009

Mr. Scott Head, Manager
Regulatory Affairs
STP Nuclear Operating Company
P. O. Box 289
Wadsworth, TX 77483

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 259 RELATED TO
SRP SECTIONS 03.03.02, 03.04.02, and 03.05.03 FOR THE SOUTH TEXAS
PROJECT COMBINED LICENSE APPLICATION

Dear Mr. Head

By letter dated September 20, 2007, STP Nuclear Operating Company (STP) submitted for approval a combined license application pursuant to 10 CFR Part 52. The U. S. Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed application.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter.

To support the review schedule, you are requested to respond within **30** days of the date of this letter. However, STP requested that 45 days are allowed to respond to RAIs 3223, 3224, and 3322. The Phase 2 schedule will be adjusted accordingly. If changes are needed to the safety analysis report, the staff requests that the RAI response include the proposed wording changes.

S. Head

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If you have any questions or comments concerning this matter, I can be reached at 301-415-8484 or by e-mail at Tom.Tai@nrc.gov or you may contact George Wunder at 301-415-1494 or George.Wunder@nrc.gov.

Sincerely,

/RA/

Tom M. Tai, Senior Project Manager
ABWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-012
52-013

eRAI Tracking No. 3223, 3224, and 3322

Enclosure:
Request for Additional Information

cc: William Mookhoek
John Price

S. Head

-2-

If you have any questions or comments concerning this matter, I can be reached at 301-415-8484 or by e-mail at Tom.Tai@nrc.gov or you may contact George Wunder at 301-415-1494 or George.Wunder@nrc.gov.

Sincerely,

/RA/

Tom M. Tai, Senior Project Manager
ABWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-012
52-013

eRAI Tracking No. 3223, 3224, and 3322

Enclosure:
Request for Additional Information

cc: William Mookhoek
John Price

Distribution:
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GWunder, NRO
BAbeywickrama, NRO
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NRO-002

OFFICE	SEB2/TR	SEB2/BC	NGE2/PM	OGC	NGE2/L-PM
NAME	MChakravorty	SSamaddar	TTai	SKirkwood	GWunder
DATE	7/16/09	7/16/09	8/26/09	8/19/09	8/19/09

***Approval captured electronically in the electronic RAI system.**

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Request for Additional Information No. 3223 Revision 2

South Texas Project Units 3 and 4 South Texas Project Nuclear Operating Co Docket No. 52-012 and 52-013 SRP Section: 03.03.02 - Tornado Loads Application Section: 03.03.02

QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

03.03.02-1

With respect to the design and analysis of STP 3 and 4 site-specific Seismic Category I structures including the UHS structure, the applicant is requested to discuss in detail (1) the aspects of structural and seismic analysis and design that are not in compliance with the applicable SRP Section 3.7 and 3.8 acceptance criteria, and for each deviation from the SRP acceptance criteria justify the identified deviations, and (2) discuss site-specific analyses performed in order maintain structural integrity of the UHS structure subject to load combinations including the tornado loads.

03.03.02-2

With respect to STP UHS structural design to ensure structural integrity against tornado impact effects, discuss in detail, the results of both the local damage and structural response evaluations performed for controlling UHS wall and roof panels.

03.03.02-3

The applicant stated that "Tornado missile impact effects on the UHS basin and cooling tower enclosures, and the RSW pump houses are evaluated for the following two conditions:

(a) Local damage in terms of penetration, perforation, and spalling, which is evaluated using the TM 5-855-1 formula (Reference 3H.6-1).

(b) Structural response in terms of deformation limits, strain energy capacity, structural integrity, and structural stability, which is evaluated in accordance with BC-TOP-9A (Reference 3H.6-2).

Provide a discussion of the use of the TM 5-855-1 formula (Reference 3H.6-1) and BC-TOP-9A (Reference 3H.6-2) methods as compared to their corresponding SRP acceptance criteria/methodology, and justify their deviations from the same.

03.03.02-4

Appendix 3H.6.4.3.4.3 Reinforced Concrete Load Combinations lists the following:

$$\begin{aligned}U &= 1.4D + 1.4F + 1.7L + 1.7H + 1.7 R_o \\U &= 1.4D + 1.4F + 1.7L + 1.7H + 1.7W + 1.7 R_o \\U &= D + F + L + H + T_o + R_o + W_t \\U &= D + F + L_o + H' + T_o + R_o + E' \\U &= 1.05D + 1.05F + 1.3L + 1.3H + 1.05T_o + 1.3R_o \\U &= 1.05D + 1.05F + 1.3L + 1.3H + 1.3W + 1.05T_o + 1.3R_o\end{aligned}$$

Discuss the differences in load factors as well as the load combinations of the above equations compared to their corresponding SRP acceptance criteria/load combinations, and justify the deviations from the SRP acceptance criteria.

The STP applicant states that for the UHS basin, the required strength defined by the above load combinations are multiplied by the following Environmental Durability Factors (S) defined in ACI 350:

Flexural strength	S = 1.30
Axial tension (including hoop tension)	S = 1.65
Excess shear strength carried by shear reinforcement	S = 1.30

The applicant is requested to discuss any past nuclear facility UHS/intake structures related operating experience that would support the adequacy of the above design practices.

03.03.02-5

Radwaste Service Building is now designed as non-Seismic Category I. Please confirm that the design will prevent the collapse of this building on to adjacent seismic Category I buildings and any missiles generated are bounded by the STP 3 and 4 DBT missiles.

03.03.02-6

Section 3.3.3.4 of the STP 3 and 4 FSAR states that the design criteria for plant structures, systems and components (SSCs) not designed for wind loads are as follows: Such SSCs not designed for wind loads are analyzed using the 1.11 importance factor or are checked to ensure that their mode of failure will not affect the ability of safety-related SSCs to perform their intended safety functions. The applicant is requested to provide more detailed discussion of the approaches and analyses to be used by STP to ensure that site-specific SSCs not designed for tornado loads are analyzed and checked to ensure that their mode of failure will not affect the ability of safety-related SSCs to perform their intended safety functions. Also, discuss the codes and standards (e.g., ASCE-SEI 7-05) that will be used to ensure realization of the expected SSC performance outcome. The discussion should refer to pertinent SRP acceptance criteria or guidance that was relied upon in performing the analyses.

03.03.02-7

STP Units 3 and 4 COL FSAR Section 3.3.2.2, Determination of Forces on Structures, incorporated by reference the ABWR DCD. In the ABWR DCD design, the conversion of tornado wind velocity into

loads on structures and elements followed the methods described in Bechtel Topical Report BC-TOP-3-A, Revision 3 "Tornado and Extreme Wind Design Criteria for Nuclear Power Plants".

The Bechtel Topical Report, BC-TOP -3-A, is not endorsed in Standard Review Plan (SRP) and the conversion of design wind velocity into velocity pressure and design wind pressures in BC-TOP -3-A may be different from the procedures given in ASCE/SEI 7-05, which is approved in the SRP. Please clarify the approach for the design and analysis of STP Units 3 and 4 site-specific structures, including the UHS structure.

03.03.02-8

The applicant is requested to confirm that the design of site-specific category I structures including the UHS structure for load combinations including tornado loads should be in accordance with ASCE 7-05, with exposure coefficients K_z corresponding to exposure D.

03.03.02-9

In STP Units 3 and 4 COL FSAR Applicant has committed to use IBC 2006, which is also adopted by the State of Texas, and not IBC 2003 as referenced in Section 3.3.4 of FSAR. Applicant shall revise and amend section 3.3.4 (and other sections if applicable) to reflect the incorporation of IBC 2006 as one of the codes the plant has been designed for.

Request for Additional Information No. 3224 Revision 2

8/26/2009

South Texas Project Units 3 and 4
South Texas Project Nuclear Operating Co
Docket No. 52-012 and 52-013
SRP Section: 03.05.03 - Barrier Design Procedures
Application Section: 03.05.03

QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

03.05.03-1

Appendix 3H.6.1 Objective and Scope states that "The objective of this appendix is to describe the structural analysis and design of the STP 3 & 4 site-specific seismic Category I structures that are identified below and shown in Figures 1.2-32 through 1.2-37." Provide the following additional information:

- (1) With respect to Appendix 3H.6.4 Structural Design Criteria, provide a detailed comparative discussion of the STP proposed structural design criteria with their corresponding structural design and acceptance criteria of SRP Sections 3.5.3 and 3.8.4. For each Identified deviation from the applicable acceptance criteria of SRP Sections 3.5.3 and 3.8.4, discuss the basis for the deviation and demonstrate its equivalency to or consistency with the applicable SRP acceptance criteria.
- (2) With respect to Appendix 3H.6.5 Seismic Analysis, provide a detailed comparative discussion of the STP proposed seismic analysis methodology and criteria with their corresponding seismic design and analysis acceptance criteria of SRP Sections 3.7. For each Identified deviation from the applicable acceptance criteria of SRP Sections 3.7, discuss the basis for the deviation and demonstrate its equivalency to or consistency with the applicable SRP acceptance criteria.
- (3) With respect to Appendix 3H.6.6 Structural Analysis and Design Summary, discuss the STP rationale for asserting or concluding that applicable acceptance criteria of SRP Sections 3.5.3, 3.7.2 and 3.8.4 are fully complied with for the below listed sections:

3H.6.6.1 Analytical Models

3H.6.6.2.1 UHS Basin, UHS Cooling Tower Enclosure, and RSW Pump House

3H.6.6.2.2 RSW Piping Tunnels

3H.6.6.3 Structural Design

3H.6.6.4 Foundations, and

3H.6.6.5 Stability Evaluations.

03.05.03-2

STP 3 and 4 applicant is requested to provide the following additional information related to COL License Information Item 3.9:

1. More detailed discussion of design procedures pertaining to local damage prediction for concrete structures in Section 3H.6. As applicable, provide the corresponding information for

local damage prediction of steel structures, or confirm that no steel structures are used as barriers for STP site-specific Seismic Category I Structures.

2. Confirm that the same design bases adopted for the UHS are also applied to the tunnel structures connecting the UHS pump house with the Control Building.
3. Discuss pertinent ITAAC requirements for STP Site-Specific Seismic Category I Structures with respect to tornado missile protection and barrier design. Also provide ITAAC tables applicable to the UHS and tunnel structures connecting the UHS pump house with the Control Building.

03.05.03-3

With respect to Section 3.5.4.4, STP states, "...Such plant SSCs are analyzed for the design basis tornado missile to ensure that their failure will not affect the ability of safety-related SSCs from performing their intended safety functions." The applicant is requested to discuss in more detail as to how the STP design will ensure that their failure will not affect the ability of safety-related SSCs from performing their intended safety functions."

03.05.03-4

With respect to Section 3.5.4.7, Failure of Structures, Systems, and Components Outside ABWR Standard Plant Scope, provide a more quantitatively based justification for STP applicant's assertion that potential missiles or debris resulting from failure of structure or from items blown off, when subjected to winds of tornado intensity, would not generate missiles more severe than the design basis tornado missiles defined in Subsection 3.5.1.4.

Request for Additional Information No. 3322 Revision 2

8/26/2009

South Texas Project Units 3 and 4
South Texas Project Nuclear Operating Co
Docket No. 52-012 and 52-013
SRP Section: 03.04.02 - Analysis Procedures
Application Section: 03.04.02

QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

03.04.02-1

The STP applicant incorporated ABWR DCD, Section 3.4.2, Revision 4, by reference with departures including STP DEP T1 5.0-1. The departure introduces a new set of site-specific loads including hydrodynamic loads not accounted for within the certified scope of ABWR DCD. Discuss the site-specific flood (maximum flood level is 1478.3 cm above MSL) design issues including how the lateral hydrodynamic pressure on the structures due to the design flood water level, as well as ground and soil pressures, are calculated. Also, to the extent IBC 2006, which references ASCE 7-05, is adopted at STP Units 3 and 4, justify its application for the flood design of STP SSCs.

03.04.02-2

The applicant stated that "STP 3 & 4 safety-related SSCs are designed for or protected from this flooding event by watertight doors to prevent the entry of water into the Reactor Buildings and Control Buildings in case of a flood. Exterior doors located below the maximum flood elevation on the 12300 floor of the Reactor Building and Control Building are revised to be watertight doors. The Ultimate Heat Sink storage basin and the RSW pump houses are water-tight below the flood level." Discuss a more quantitative performance based definition of a "watertight door," and applicable codes and standards used for the design. Also list STP 3 and 4 site-specific Seismic Category I structures that include watertight doors and penetrations, and discuss how their water tightness is ensured. Provide detailed ITAAC table for STP 3 & 4 safety-related site-specific SSCs including the Ultimate Heat Sink (UHS) structure.

03.04.02-3

Section 3.4.1.1.1 "Flood Protection from External Sources" of the ABWR DCD/Tier2, Revision 4, states that seismic Category I structures are protected from flooding by ensuring that tunnels below grade do not penetrate exterior walls and that the COL applicant will review the use of penetration seals below grade and develop procedures as necessary to protect the plant against the effects of seal failure. The Applicant shall confirm and specify the details of this design requirement by providing the corresponding ITAAC items. For STP 3 and 4 site-specific structures including the UHS, provide ITAAC tables with discussion of the ITTAC contents to demonstrate that seismic Category I structures are protected from flooding by ensuring that tunnels below grade do not penetrate exterior walls and that the integrity of penetration seals below grade is maintained.

03.04.02-4

COL Information item 3.7, Flood Protection Requirements for Other Structures, requires that a COL applicant should also provide procedures to design non-safety related SSC to withstand the effects of design basis flood (DBF) in order not to impair adjacent safety related SSCs from performing their safety functions (a II/I structural interaction concern resulting from a DBF induced non-safety related structural failure). Discuss how STP 3 and 4 applicant is addressing this COL information item.

03.04.02-5

Given the fact that the site design basis flood level is increased from that specified in the DCD and the certified design site parameter for site flooding is changed from 30.5 cm below grade to 442.0 cm above grade (1036.3 cm above mean sea level (MSL)) in order to adequately design for the site design basis flood that would result from a postulated failure of the main cooling reservoir, indicate if there are any piping, access openings or tunnels which penetrate the exterior walls of in scope Seismic Category I structures below grade elevation, whose design and analysis against design basis flood effects might be affected. If applicable, discuss how the design and analysis of these items were adjusted to account for the elevated design basis flood level. Also, address the same question for the site-specific UHS structure.