

PMSTPCOL PEmails

From: Tai, Tom
Sent: Monday, June 01, 2009 2:35 PM
To: John Price (jeprice@stpegs.com)
Cc: STPCOL
Subject: Draft RAI 2926 for Chapter 3.7.2
Attachments: RAI 2926 03.07.02-xx.doc

John,

Please review the attached RAI (03.07.02-xx) of Chapter 3.7.2 of the COL. If you need a conference call to clarify the requested information, please contact me. If a conference call is not needed, please send me an email and I will continue the formal process of issuing the RAI to STPNOC.

Regards

Tom Tai
DNRL/NRO
(301) 415-8484
Tom.Tai@NRC.GOV

Hearing Identifier: SouthTexas34Public_EX
Email Number: 1273

Mail Envelope Properties (C56E360E9D804F4B95BC673F886381E71FB9668BEB)

Subject: Draft RAI 2926 for Chapter 3.7.2
Sent Date: 6/1/2009 2:35:21 PM
Received Date: 6/1/2009 2:35:23 PM
From: Tai, Tom

Created By: Tom.Tai@nrc.gov

Recipients:
"STPCOL" <STP.COL@nrc.gov>
Tracking Status: None
"John Price (jeprice@stpegs.com)" <jeprice@stpegs.com>
Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

Files	Size	Date & Time
MESSAGE	394	6/1/2009 2:35:23 PM
RAI 2926 03.07.02-xx.doc		40954

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Request for Additional Information No. 2926 Revision 2

South Texas Project Units 3 and 4
South Texas Project Nuclear Operating Co
Docket No. 52-012 and 52-013
SRP Section: 03.07.02 - Seismic System Analysis
Application Section: 03.07.02

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

03.07.02-***

ABWR DCD Section 3.7.2.8, concerning Interaction of Non-Category I Structures with Seismic Category I Structures, is incorporated by reference in the FSAR with supplemental COL License Information presented in FSAR 3.7.5.4. ABWR DCD Section 3.7.2.8 specified that all non-Category I structures will meet one of the three requirements as specified in DCD Section 3.7.2.8. Additional information is needed to determine implementation of these criteria for non-seismic Category I structures having the potential to interact with Category I structures. As such, the applicant is requested to provide the following information in the FSAR:

- (a) A Figure or a Table that includes identification and locations of each Category I and non-seismic Category I structures, including the separation distance between these structures and the height of each structure.
- (b) Identify the specific criteria of DCD 3.7.2.8 that each non-Category I structure is designed to meet.
- (c) Describe how the non-Category I structures having the potential to interact with Category I structures are evaluated for sliding and overturning potential (including the coefficient of friction used and its basis) during an SSE and also provide the calculated factors of safety against sliding and overturning for the applicable non-Category I structures.
- (d) State whether or not any non-Category I structure is designed to meet the criterion (2) of DCD 3.7.2.8, and if designed, provide the technical basis for the determination that collapse of the non-Category I structure will not compromise the integrity of seismic Category I structure.

03.07.02-***

The applicant is requested to provide in FSAR Appendix 3H6.5.2.1 per guidelines of SRP Acceptance Criteria 3.7.2.II.1 the actual seismic analysis methods used for site-specific Category I structures (including Ultimate Heat Sink and Reactor Service Water Piping Tunnel) in sufficient detail comparable to ABWR DCD Section 3.7.2.1

03.07.02-***

The applicant is requested to provide in FSAR Appendix 3H6.5.2.2 the information specified per guidelines of SRP Acceptance Criteria 3.7.2.II.2 corresponding to the actual seismic analysis performed for site-specific Category I structures (including Ultimate Heat Sink and Reactor Service Water Piping Tunnel) in sufficient detail comparable to ABWR DCD Section 3.7.2.2.

03.07.02-***

The applicant is requested to provide in FSAR Appendix 3H6.5.2.3 the procedures used for analytical modeling per guidelines of SRP Acceptance Criteria 3.7.2.II.3 corresponding to the actual seismic analysis performed for site-specific Category I structures (including Ultimate Heat Sink (UHS) and Reactor Service Water (RSW) Piping Tunnel). Specifically, the information should include:

1. The criteria and procedures used in modeling for the seismic system analyses (including structural material properties, modeling of member stiffness, modeling of mass [structural masses, live loads, floor loads, and equipment loads], modeling of damping, modeling of hydrodynamic effects, etc.);
2. The type of Finite Element model, the effect of element mesh size, shape, and aspect ratio on solution accuracy, time steps used in the time history analysis if applicable
3. The criteria and bases for determining whether a structure is analyzed as part of a structural system analysis or independently as a subsystem, decoupling criteria for subsystems;
4. The method used to address floor and wall flexibility in the structural modeling;
5. The analytical models used for dynamic analysis of UHS and RWS Piping Tunnel;
6. Special considerations such as addressing wave passage effects, lateral earth pressures, and groundwater effects for RSW Piping Tunnel analysis.

03.07.02-***

The applicant is requested to provide in FSAR Appendix 3H6.5.2.4 soil-structure interaction analysis performed for the site-specific structures including Ultimate Heat Sink (UHS) basin, UHS cooling tower enclosures, Reactor Service Water (RSW) pump house, and RSW piping tunnel in accordance with guidelines of SRP Acceptance Criteria 3.7.2.II.4. The information should include in sufficient detail comparable to ABWR DCD Appendix 3.A but not limited to the following:

1. Model of structure and supporting soil including the backfill material
2. Model boundaries and location of input ground motion
3. Procedure for addressing strain dependent soil & backfill properties in the SSI analysis
4. Method of accounting for the effects of the potential variability in the soil and backfill properties at the site.
5. Potential effect of any side soil-wall separation during a seismic event
6. The SSI analysis methods (e.g., time domain and/or frequency domain analysis, consideration of soil and structural damping, etc.) and results in the

form of site-enveloped seismic response (including in-structure response spectra) at key locations of the site-specific structures.

03.07.02-***

The applicant is requested to provide in FSAR Appendix 3H6.5.2.5 the procedure used in developing in-structure response spectra (ISRS) for the site-specific Category I structures in accordance with the guidelines of SRP Acceptance Criteria 3.7.2.II.5. The information should include but not limited to the following:

1. Method of combining the three ISRS in a given direction developed from separate analysis of the three directions of input motion
2. Frequency increments for calculation of ISRS
3. Spectrum smoothing and broadening to account for uncertainty in soil and structural parameters

03.07.02-***

The applicant is requested to provide in FSAR Appendix 3H6.5.2.6 the procedure used for combining the responses due to three components of earthquake motion for the site-specific Category I structures in accordance with the guidelines of SRP Acceptance Criteria 3.7.2.II.6. The applicant is requested to state in this FSAR Section which acceptable methods of RG 1.92 were used in analyzing the site-specific Category I structures.

03.07.02-***

The applicant is requested to provide in FSAR Appendix 3H6.5.2.9 the procedure used and the amount of peak broadening in accounting the effects of expected variations of structural properties (including effect of potential concrete cracking on structural stiffness), damping values, soil properties, and SSI effects for site-specific Category I structures in accordance with the guidelines of SRP Acceptance Criteria 3.7.2.II.9.

03.07.02-***

The applicant is requested to provide in FSAR Appendix 3H6.5.2.11 further clarification of the procedure used to account for torsional effects (including how accidental torsional moment at a particular location is calculated) in the seismic analysis of site-specific Category I structures in accordance with the guidelines of SRP Acceptance Criteria 3.7.2.II.11. How are the torsional effects combined with other seismic forces of the structure?

03.07.02-***

The applicant is requested to provide in FSAR Appendix 3H6.5.2.14 further clarification of the procedure used in determining seismic overturning moments and sliding forces for site-specific Category I structures in accordance with the guidelines of SRP Acceptance Criteria 3.7.2.II.14. Also include in the FSAR the calculated factor of safety against overturning and sliding and the coefficient of friction used in the calculation and its basis.