December 16, 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. 302 RELATED TO SRP SECTIONS 03.07.01 AND 03.07.02 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. If changes are needed to the safety analysis report, the staff requests that the RAI response include the proposed wording changes.

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. 3915 and 3942

Enclosure:
Request for Additional Information

cc: William Mookhoek
John Price

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.

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

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Request for Additional Information No. 3915 Revision 3

South Texas Project Units 3 and 4
South Texas Project Nuclear Operating Co
Docket No. 52-012 and 52-013
SRP Section: 03.07.01 - Seismic Design Parameters
Application Section: 03.07.01

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

03.07.01-15

(Follow-up Question to RAI 03.07.01-2)

1. In the response to item 1 of RAI 03.07.01-2, STP made reference to Enclosure 1 to this RAI response and also to revised Appendix 3H enclosed to response to RAI 03.07.01-13. In Enclosure 1, STP included the "input spectrum" only for 5% damping for horizontal and vertical direction. "Input Spectra" for other damping ratios were not provided. Enclosure 1 also included the response spectra for SSE design synthetic time histories for 2, 3, 4, 5, and 7% damping levels for horizontal and vertical directions. Marked-up Appendix 3H submitted in response to RAI 03.07.01-13 provided a comparison of GMRS with the "Input Spectrum" in the vertical direction only. The comparison of GMRS with the "Input Spectrum" in the horizontal direction is not included in the Marked-up Appendix 3H (Enclosure to RAI 03.07. 01-13). In addition, Figure 3H.6-2 included in the marked-up Appendix 3H (Enclosure to RAI 03.07.01-13) does not agree with the same figure shown in the revised Section 3H.6.5.1.1 of FSAR Rev 3.

   As such, the applicant is requested to review Figures 3H.6-1 and 3H.6-2 in the response to RAI 03.07.01-13 as well as in Section 3H.6.5.1.1 of the FSAR to reconcile the discrepancies in the figures.

   The applicant is further requested to provide in the FSAR the target "Input Spectra" for horizontal and vertical directions for 2, 3, 4, and 7% damping ratios developed as per guidance of Appendix C to SRP Section 3.7.1.

2. In the response to RAI 03.07.01-2, the time histories shown in Figs. 3A-251 through 3A-259 indicates that the selected duration of the synthetic time histories (using the 1952 Taft Earthquake as the seed) does not provide sufficient time for these time histories to attenuate to low residual ground motion values (zero acceleration and velocity levels) at the end of the earthquake duration. The applicant is requested to provide further justification for selecting duration of the synthetic time history which does not reflect real earthquake characteristics. In addition, the applicant is requested to provide in the FSAR the following information:

   (a) Comparisons between the target design spectra and response spectra of design time histories for both horizontal and vertical directions for damping values of 2, 3, 4, and 7% in accordance with the enveloping guidelines of SRP Section 3.7.1;

   (b) The time increment of the synthetic time history records;

   (c) The range of frequencies at which spectral accelerations were compared; and

   (d) Confirmation that 5% damped response spectrum of the synthetic time history does not fall more than 10% below the target response spectrum at any one frequency.

03.07.01-16

(Follow-up Question to RAI 03.07.01-3)

1. The applicant is requested to clarify whether CSDRS is the same as DCD SSE design spectra.

2. In item 2 of the response to RAI 03.07.01-3 regarding FIRS, the applicant states that, "--***the Foundation Input Response Spectra (FIRS) were developed using the same probabilistic models and analyses which were used for developing the Ground Motion Response Spectra (GMRS). A detailed description of the seismic wave transmission of the site, and the procedure to develop the GMRS, which are the same for the development of the FIRS, are provided in COLA Part 2, Tier 2, Sections 2.5S.2.5 and 2.5S.2.6, respectively***." Because Section 2.5S2 covers the development of the GMRS and not FIRS, it is not clear how FIRS was calculated from the site response soil column. As such, the applicant is requested to further provide information on the development of FIRS, more specifically, clarify whether FIRS at the foundation of Category I structures is developed as "SHAKE Outcrop" or "Geologic Outcrop."

03.07.01-17

(Follow-up Question to RAI 03.07.01-4)

1. In the response to RAI 03.07.01-4, the applicant stated that SSI analysis is described in Appendix 3A, as enclosed in the response to RAI 03.07.01-2. Section 3A.15 of this Appendix states, "***The backfill used along the walls of the structure will be granular soil compacted to 95% Modified Proctor. Based on this, the backfill modulus and damping values were calculated to lie between the upper bound and lower bound in situ soil properties, shown in Table 3H.6-1. Therefore, the effect of the backfill is considered to be bounded by the variation in soil properties used in the analysis***." It is not clear whether the backfill properties used in the SSI confirmatory analysis of the RB and CB are the same as those shown in Table 3H.6-2. In addition, the method used to select the backfill strain-compatible material properties is not described. As such, the applicant is requested to provide the following:

   a. Backfill material properties used for the confirmatory SSI analysis of the RB and CB, if they are different from those listed in Table 3H.6-2. Provide the basis for selecting the backfill properties and describe how the backfill properties will be verified during construction.

   b. Plots showing that the strain-compatible shear modulus and damping properties of the backfill material are bounded by the lower-bound and upper-bound in-situ soil properties. This information should be included in the FSAR.

2 In the response to RAI 03.07.01-2, Appendix 3A.15 states, "***Based on the site groundwater conditions described in FSAR Subsection 2.4S.12, the groundwater elevation of approximately eight feet below grade was used in the analysis to determine the soil properties***." In addition to the location of the groundwater table, the applicant is requested to describe how the groundwater effects on the soil properties are treated in the confirmatory SSI analysis. This information should be included in the FSAR.

3 The applicant references the tables and figures as enclosed in the response to RAI 03.07.01-2, which contains composite SSI models of RB and CB in Figures 3A-264 and 3A-266. In response to RAI 03.08.04-5, the applicant stated that "***The Reactor Building and the Control***

Building will be founded on structural concrete fill." As such, the applicant is requested to confirm whether the composite SSI model consists of the concrete backfill material and Table 3H.6-2 includes the corresponding concrete backfill properties. If the concrete backfill was not included in the composite SSI model the applicant is requested to provide justification.

03.07.01-18

(Follow-up Question to RAI 03.07.01-5)

In the response to RAI 03.07.01-5, the applicant cited DCD Appendix 3A in concluding that "the potential effect of structure-to-structure interaction is relatively small." However, DCD (see DCD Section 3A.9.7, Effect of Adjacent Buildings) also concluded that seismic soil pressure in between the RB and CB increased due to structure-to-structure interaction (SSSI) effect. The applicant is requested to provide soil pressure profile between the RB and CB, and discuss how the potential effects of the increase in the seismic soil pressure in between the RB and CB due to SSSI effect has been addressed and bounded by the certified design.

03.07.01-19

(Follow-up Question to RAI 03.07.01-6)

1. In response to RAI 03.07.01-6, the applicant referred to COLA Part 2, Tier 2, Section 3A.17 for description of the supporting media, dimensions of the structural foundation, and total structural height for the Reactor Building (RB) and Control Building (CB). However, the referenced section does not include the requested information for the Diesel Generator Fuel Oil Storage Vaults (DGFOSV) which is listed as Seismic Category I structure in Revision 3 of the FSAR Section 2.5S.4.10.2. As such, the applicant was requested to provide information on supporting media for DGFOSV. Since the shear wave velocity parameter of the subgrade material (soil or backfill) supporting this structure may be less than 1000 fps, the applicant is also requested to provide quantitative results of the reconciliatory site-specific seismic analysis (with appropriate consideration of dynamic soil or backfill properties) addressing the potential impact on FIRS, SSI, settlement calculations, and structural design concerning DGFOSV.

2. In the response to item 3 of RAI 03-07-01-6 it was stated that "The resulting strain-compatible properties for the three profiles are presented in COLA Part 2, Tier 2 Table 3H.6-1." A review of Table 3H.6-1 indicates that the S-wave and P-wave damping ratio used in the SSI analysis for an individual layer is the same. The applicant is requested to provide the basis for maintaining the S-wave and P-wave damping the same for an individual layer.

3. In response to RAI 03.07.01-6, Item 3, the applicant states that, "The seismic site response analysis was conducted, as described in Section 2.5S.2.5, using P-SHAKE to develop Ground Motion Response Spectrum (GMRS). …." No reference to P-SHAKE program was found in Section 2.5S.2.5 of Revision 3, and no proposed FSAR markup is provided for future incorporation. As such, the applicant is requested to clarify whether P-SHAKE program has been used to develop GMRS and strain-compatible soil properties, as described in Section 2.5S.2.5, and if so, how P-SHAKE program performs site-response analysis (e.g. deterministic or probabilistic method, etc.). The applicant is further requested to clarify whether P-SHAKE

program was also used to perform deconvolution of the SSE design motion specified at the free-field ground surface to calculate the foundation motion for the Seismic Category I structures.

03.07.01-20

(Follow-up Question to RAI 03.07.01-7)

(1) As shown in Table 2 in the response to RAI 03.07.01-7, a Poisson's ratio equal to 0.46 to 0.48 is used for calculating the soil spring constants that are used for the settlement evaluation and mat design. This high Poisson's ratio assumes that the vertical stresses transmitted to the saturated foundation soils are resisted by the incompressible pore water. Nonetheless, depending on the foundation soil permeability, the excess pore water pressures can dissipate quickly; thus, transferring the stresses to the soil grains. In light of the above, the applicant is requested to provide a comparison of the soil spring constant values, calculated using drained Poisson's ratio of foundation soils, with those of the ABWR DCD and justify any differences as to their effect on mat design forces.

(2) In the response to RAI 03.07.01-7, the applicant stated that "***The spring constant values are provided only for the Reactor Building in the DCD. Therefore, a comparison of the spring constant values is provided only for the Reactor Building.***" This justification for not evaluating the effect of site-specific shear wave velocity on the Control Building (CB) foundation design is not acceptable. The applicant is requested to further justify that the design of the CB foundation at the STP site would still be bounded by the standard plant CB design.

03.07.01-21

(Follow-up Question to RAI 03.07.01-11)

1. In the response to RAI 03.07.01-11, Item 1, the applicant has not provided all the necessary information as per acceptance criteria of SRP 3.7.1.II.1B. The applicant stated that "***A single set of time histories (two horizontal and one vertical) was developed satisfying the enveloping requirements of Option 1, Approach 2 of SRP 3.7.1, Section II (Acceptance Criteria), Revision 3.***" As such, the applicant is requested to provide the following information: (a) the time step and total duration of record including trailing zeros, (b) how the response spectra of synthetic time histories were calculated for comparison with target spectra; i.e., number of frequency points and spacing, and (c) how the criteria, that the response spectrum of the synthetic time history at 5% damping shall not fall more than 10% below the target spectrum at any one frequency, was satisfied.

   The accompanying marked-up Section 3H.6.5.1.1.2 is not included in the updated FSAR, Rev 3. The applicant is requested to incorporate the mark-up Section 3H.6.5.1.1.2, "Design Time Histories," in response to this RAI in the next FSAR revision.

03.07.01-22

(Follow-up Question to RAI 03.07.01-12)

In the response to RAI 03.07.01-12, Item 3, the applicant stated that ***"------- (SSE) damping values are used for the generation of In-Structure Response Spectra since the Ultimate Heat Sink structure is highly stressed during the SSE event."*** As such, the applicant is requested to provide in the FSAR a table of stress levels for each of the site-specific structures within which the In-Structure Response Spectra (ISRS) is being generated. This should include representative examples of stresses in both walls and floors and a comparison of stress levels to code allowable stresses. Comparison should be provided for in-plane stresses as well as for out-of-plane stresses. Based on the comparison of actual and code allowable stresses, a technical justification should be provided for the selected damping value.

03.07.01-23

(Follow-up Question to Partial Response to RAI 03.07.01-13)

With regard to Item c of the response to RAI 03.07.01-13, the applicant is requested to address the following:

1 The applicant is requested to provide all missing information in Tables 3H.6-3 through 3H.6-8 and Figures 3H.6-15 through 3H.6-40.

2 The applicant states that "***Development of strain-compatible soil properties for use in the SSI analysis is described in Section 3H.6.5.2.4;"*** A number of inconsistencies were noted among some of the Figures included in Section 3H.6. For example, in revision 3 of FSAR, Figure 3H.6-2, "Comparison of GMRS with the input spectrum (vertical)," does not match with Figure 3H.6-1 for the same comparison provided for horizontal. In addition, Figures 3H.6-9, 3H.6-10, and 3H.6-11 for comparison of spectra at foundation of UHS basin, RSW Tunnel, and RSW Pump House, respectively, in the z direction do not match with similar figures provided for the same structures in the x and y directions in Figures 3H6-3 through 3H6-8. Similar discrepancies are found for Figures 3H.6-12, 3H.6-13 and 3H.6-14. The applicant is requested to correct, as appropriate Figure 3H.6-1 and 3H.6-2, as well as Figures 3H.6-9 through 3H.6-14.

3 Section 3H6.5.1.1.1 (b) states that "***When a deconvolution analysis is performed in the SHAKE program with the Input Spectrum applied at the free field ground surface, the resulting response spectrum at the outcrop of each Seismic Category I foundation will envelop the foundation input response spectrum (FIRS) developed using the same probabilistic approach and model which was used to develop the GMRS***." While this approach uses an ensemble of soil profiles to demonstrate that FIRS is enveloped with the Input Spectrum applied at the free field ground surface, the SSI analysis discussed in Section 3H.6.5.2.4 uses a deterministic approach with three soil profiles only. As such, the applicant is requested to provide at the foundations of each Category 1 structures a comparison of the FIRS and envelope of the three response spectra obtained (through deconvolution analysis with three SSI soil profiles) using the SHAKE program with the input design time history as applied at the free ground surface. The applicant is also requested to show that the FIRS are enveloped by the envelope of the three response spectra obtained above. Include this comparison in the FSAR.

4 Section 3H.6.5.2.4 states that "***The soil layer thicknesses used in the SSI model were sufficiently small to transmit frequency up to 33 Hz for mean soil properties***." Based on the shear wave velocities and layer thicknesses presented in Tables 3H.6-1 & 2 in the response, the applicant is requested to provide the criteria and its basis to justify that the model composed of soil and backfill material is capable of transmitting frequencies up to 33 Hz. Include this justification in the FSAR.

5 The responsedid not describe how the strain-compatible backfill properties are calculated. As such, the applicant is requested to describe in the FSAR as to how the lower bound, best estimate, and upper bound strain compatible backfill properties provided in Table 3H.6-2 were obtained.

03.07.01-24

(Follow-up Question to RAI 03.07.01-14)

1. In the response to RAI 03.07.01-14, Item 1, the applicant cited DCD Appendix 3A in concluding that "***… the potential effect of structure-to-structure interaction was relatively small.***" However, DCD Section 3A.9.7, "Effect of Adjacent Buildings" also concluded that seismic soil pressure in between the RB and CB increased due to structure-to-structure interaction (SSSI) effect. As such the applicant is requested to discuss how the potential effects of increase in the seismic soil pressure in between the Category 1 structures and the retaining wall due to the SSSI effect has been addressed and bounded by the certified design.

2 In the response to RAI 03.07.01-14, Item 2, the applicant stated in the second bullet that "***In comparison to the Reactor, Control and Turbine Buildings, the retaining wall is a light structure and a lighter structure will have less influence on the seismic behavior of the heavy adjacent structures***." While the inertia of the RC retaining wall is not expected to affect the seismic response of the adjacent seismic Category I structures, the stiff retaining wall can act as a barrier to reflect the seismic waves due to kinematic interaction with surrounding soil and could affect the seismic input to the adjacent structures. As such, the applicant is requested to provide a quantitative assessment of the effect of RC retaining wall on the SSI analysis of adjacent Reactor and Control Buildings.

Request for Additional Information No. 3942 Revision 3

South Texas Project Units 3 and 4
STPNOC
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)

03.07.02-13

(Follow-up Question to RAI 03.07.02-1)

1. The FSAR mark-up in the response to item (b) of RAI 03.07.02-1, did not include the list of non-Category I structures requiring the enhanced seismic design and analysis. The applicant is requested to include in FSAR 3.7.2.8 the five identified non-Category I structures that could interact with the Category I structures.
2. The response to item (c) of RAI 03.07.02-1 indicated that non-Category I structures with the potential to interact with Category I structures have not yet progressed to a point where sliding and overturning potential as a result of the SSE can be evaluated. However, as identified in SRP guidance 3.7.2I.8., the staff must review the applicant's seismic design of these non-Category I structures. As such, the applicant is requested to provide in the FSAR factors of safety against sliding and overturning including the basis of coefficient of friction used in the analysis during an SSE for Turbine Building, Radwaste Building, Service Building, Control Building Annex, and Plant Stack.

03.07.02-14

(Follow-up Question to RAI 03.07.02-2)

The applicant has provided an incomplete response in Appendix Section 3H.6.5.2, “Seismic System Analysis” as provided in enclosures to responses to RAI 03.07.01-11 & 13 as well as in the same section of the FSAR, Rev 3. More specifically, the applicant is requested to provide the following information in regards to “Seismic Analysis Methods.”

1. The finite element model referenced in Figure 3H.6-40 (this figure is not yet available in the response to RAI 03.07.01-13).

2. Method used to model the backfill material in the SSI analysis.

3. Method used to incorporate the ground water effects in the SSI analysis.

4. The analysis method used to obtain the seismic forces and moments for design evaluations.

5. The analysis method used to model concrete cracking.

6. The analysis method used to assess the effects of soil separation from the walls.

03.07.02-15

(Follow-up Question to RAI 03.07.02-3)

The response to RAI 03.07.02-3 refers to the response to RAI 03.07.01-13. However, the responses to 03.07.01-13 are either incomplete or not available. Therefore, the applicant is requested to provide the missing information in Section 3H.6 of FSAR for this review to be completed. More specifically, the applicant is requested to provide the following:

UHS Basin and RSW Pump House:

1. Fixed-base dominant frequencies and mass participation factors referenced in Table 3H.6-3.
2. Seismic accelerations and displacements referenced in Table 3H.6-4.
3. A sufficiently detailed description of the model and method used to calculate the fixed-base frequencies and participation factors.
4. A description of how the three orthogonal components of the input motion were applied and the results were combined.
5. A description of how the input motion was specified in the SSI analyses.
6. A description for what and how many frequencies the model was analyzed in SASSI2000 and what frequency cutoff was used.
7. A figure showing the finite element model of the structure in relation to the layered soil system.
8. A description of how the ground water effects were treated in the SASSI2000 model.
9. A description of the time step, number of acceleration points, duration of motion including duration of quiet zone were used in the input motion for the SASSI analysis.
10 A description of how the seismic forces and moments were calculated for design. Include plots of total shear and moment diagram profiles.
11. If a separate static analysis was performed to obtain seismic forces and moments, a sufficiently detailed description of how this model was applied (i.e. model, boundary conditions, loads, soil spring values, etc.).
12. Calculated maximum values of the soil-retaining wall displacements relative to the free field.
13. Provide further details on how the hydrodynamic forces were calculated and applied to the equivalent static model.

RSW Piping Tunnel:

1. A description of the equivalent static analysis method used for the RSW piping tunnel.
2. A description of how the seismic and static loads were calculated and applied to the model. Show the model and boundary conditions including the soil springs used in the analysis.
3. A description of the type of strains (tensile or compression) were calculated in the RSW piping tunnel.
4. A description of how both axial strain and transverse shear demands were considered in the analysis of the RSW piping tunnel.

5. A description of how the concrete elements of the RSW piping tunnel were determined to be rigid so that there are no in-structure amplifications.
6. Describe the SSI analysis from which the accelerations are obtained to establish the SSI forces for the analysis of the RSW piping tunnel (see the last bullet in Section 3H.6.6.2.2).

03.07.02-16

(Follow-up Question to RAI 03.07.02-4)

1. In the response to Item 2 of RAI 03.07.01-4, the finite element model of the UHS basin and RSW Pump House was not provided in Figure 3H.6-40 (this figure was supposed to be part of the response to RAI 03.07.01-13). The applicant is requested to ensure this information be part of Figure 3H.6-40, including a plot showing the basement slab and soil-retaining wall mesh configuration and grid sizes. The response to Item 2 of RAI 03.07.01-4 also states that, "***The model mesh size is detailed enough to model the principal features of the structure and transmit a frequency of at least 33 Hz***." The applicant is requested to a) provide the criteria and quantitative basis to show that the element sizes are sufficiently small to transmit frequencies of up to 33 Hz for the three soil cases; and b) provide a justification that the aspect ratio of the elements is sufficiently small as not to affect the solution accuracy.

2. In the response to Item 5 of RAI 03.07.01-4, the analytical model for the RSW Piping Tunnel is not provided. As such the applicant is requested to provide the analytical model used for analysis of the RSW Piping Tunnel.

The COLA should include the information requested in the follow up RAI's.

03.07.02-17

(Follow-up Question to RAI 03.07.02-5)

1. In the response to Item 1 of RAI 03.07.02-5, the applicant states that, "***The soil layer thicknesses used in the SSI model were sufficiently small to transmit frequencies up to 33 Hz for mean in-situ soil properties. As described in the COLA markup for Section 3H.6.5.2.4 as provided in the response for RAI 03.07.01-3, in order to account for the backfill placed adjacent to the walls, an additional set of SSI analyses was performed by modeling the backfill as the soil horizon above the foundation level in the SASSI2000 model. The soil layer thicknesses used for the back fill were sufficiently small to transmit frequencies up to 33 Hz for the mean back fill soil properties***." The applicant is requested to provide the criteria and quantitative basis that shows the soil and backfill layer thicknesses, as shown in Table 3H.6-1 and 3H.6-2 are sufficiently small to transmit frequencies up to 33 Hz for the SSI analysis using SASSI2000. Also provide justification for not using lower bound soil/back fill properties in determining the soil layer thickness to be able to transmit frequencies up to 33 Hz.

2. In the response to Item 2 of RAI 03.07.02-5, the applicant states that, "***SASSI2000 "Transmitting boundaries" were used at side boundaries of the model***." SASSI is based on a substructure method that does not use lateral transmitting boundaries on the side, and half space boundary at the bottom of the SSI model, such as those used by the total SSI models in

which the structure and soil domain are analyzed together in one step. As such, the applicant is requested to revise the statement in the response to this RAI.

3. In the response to Item 3 of RAI 03.07.02-5, the applicant refers to the response to RAI 03.07.01-3. However, the level of details is not sufficient. The applicant is requested to describe in sufficient details how the strain-compatible back fill properties for the lower bound, upper bound and best estimate cases are developed from the results of probabilistic site response analysis, as described in COLA Part 2, Tier 2, Section 2.5S.2.

4. In the response to Item 6 of RAI 03.07.02-5, the applicant has stated that the results of SSI analysis of the UHS basin, RSW Pump House and RSW Piping Tunnel will be provided at a later date by November 24, 2009. The applicant is requested to provide these results so that the review can be completed.

The COLA should include the information requested in the follow up RAI's.

03.07.02-18

(Follow-up Question to RAI 03.07.02-10)

1. In the second bullet of the response to RAI 03.07.02-10, the seismic loads from the input motion applied separately in three orthogonal directions should be combined following the procedure outlined in Section 2 of RG 1.92, Rev 2. According to RG 1.92 the absolute maximum values of the co-directional forces obtained from the three input motions should be sorted in decreasing values and added by applying 1.0, 0.4 and 0.4 factors to these component quantities. The applicant is requested to clarify whether the procedure used by the applicant complies with the provisions of RG 1.92, Rev 2 for combining effects caused by three spatial components of earthquake, and if not provide justification that the method used is conservative.

2. In the fifth bullet of the response to RAI 03.07.02-10, the response stated that the passive pressure in resisting the foundation sliding and overturning is not utilized. This assumption is conservative in determining the factor of safety against sliding and overturning. However, the passive soil pressure should be considered in the design of the soil-retaining walls. In addition, the magnitude and distribution of the passive soil pressure will depend on the rigidity of the wall and the amount of wall displacement and/or rotation against the soil. As such, the applicant is requested to clarify how the passive soil pressure has been calculated and considered in the wall design.

3. The applicant is requested to provide the calculated factors of safety against overturning, sliding, and floatation in the FSAR as stated in the sixth bullet of the response to RAI 03.07.02-10.

4. In the seventh and last bullet of the response to RAI 03.07.02-10, Figure 1 attached to this response shows the driving force "Es" as static and dynamic soil pressure but does not clarify the nature of the static soil pressure. The applicant is requested to clarify the nature of the driving static soil pressure in Figure 1. Also, please clarify how total at-rest soil pressure is calculated including algebraic expression. This figure with the above clarification should be included in the FSAR.

03.07.02-19

(Follow-up Question to RAI 03.07.02-11)

In the response to RAI 03.07.02-11, the applicant stated that, "***The analysis and design results will be available for review following the completion of the detailed design of the RWB currently scheduled for December 2010***." Since this is part of the seismic SSI analysis and RWB is classified as a non-Category I structure with the potential to interact with Category I structures, the applicant is requested to provide the seismic input motion incorporating the effects of SSSI for design of the RWB. The applicant also is requested to include the method proposed in the response for establishing the design response spectra for RWB together with the design spectra input for RWB in the FSAR.

03.07.02-20

In response to COL License Information Item 3.22 the applicant in FSAR Section 3.7.5.4 states that ***"Nonsafety-related SSCs that are located in the same room as safety-related SSCs will be reviewed to determine if their failure will impact the ability of the safety-related SSC to perform its safety function. Non-seismic Category 1 SSCs whose failure could jeopardize the function of a safety-related SSC will be analyzed to demonstrate that structural integrity will be maintained in an SSE."*** Additional information is needed to determine how this review will be implemented. As such, the applicant is requested to describe in the FSAR in detail (a) the process for completing the design of balance-of-plant and non-safety related systems to minimize II/I interactions, (b) criteria to be used for determining if the failure of non-safety related SSCs will impact the ability of the safety-related SSCs to perform its safety function, and (c) the analysis/design criteria to be used for demonstrating structural integrity of non-seismic Category I SSCs.