June 23, 2010

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 349 RELATED TO SRP SECTIONS 3.7.1 AND 3.7.2 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. 4817 and 4818

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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DATE	6/14/2010	6/16/2010	6/16/2010	6/21/2010

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

OFFICIAL RECORD COPY

Request for Additional Information No. 4817 Revision 3

6/21/2010

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)

03.07.01-25

Follow-up Question to RAI 03.07.01-17 (STP-NRC-100035)

10CFR50 Appendix S requires that seismic evaluation must take into account soil-structure interaction (SSI) effects. STP has performed a site-specific SSI analysis to confirm that the ABWR DCD results envelop the results of the site-specific SSI analysis of the RB and CB. Regarding this reconciliation analysis the staff needs the following additional information to determine that site-specific SSI analysis adequately predicts the RB and CB seismic response:

1. In response to Item 1b of RAI 03.07.01-17, the applicant has provided comparison of the strain-compatible shear wave velocity profiles for the backfill with those of the in-situ and DCD UB1D150 soil columns in Figure 3A-230a. Based on this comparison, the applicant has concluded that a separate confirmatory SSI analysis of the RB and CB incorporating backfill is not necessary because the lower and upper bound shear wave velocities of the backfill are enveloped by those of the in-situ soils and those used in DCD. Although this assertion is acceptable for the lower bound backfill properties, it has not been shown in Figure 3A-230a that the strain compatible DCD shear wave velocity profile envelop the upper bound backfill properties where the velocities exceed those of the in-situ upper bound profile and DCD UB1D150 at depths of approximately 12 to 52 feet below grade (see Figure 3A-230a). While the UB1D150 may be the lowest shear wave velocity case in the DCD, the applicant is requested to provide in the same Figure (3A-230a) comparison of the DCD upper bound strain compatible soil case that envelops the upper bound backfill properties.

2. In response to Item 1b of RAI 03.07.01-17 with respect to the strain-compatible damping properties, the applicant has provided comparison of the soil damping profiles for the backfill with those of the in-situ soil columns in Figure 3A-230b. Based on this comparison, the applicant has concluded that the backfill damping is generally higher than those of the in-situ soils, and thus bounded by the in-situ soil properties. A review of the results presented in Figure 3A-230b shows the lower-bound damping profile for the backfill to be significantly higher than that of the in-situ soils. Because the SSE design motion is specified at the free-field ground surface, a higher damping in the backfill material may result in a higher motion at the foundation level as compared with that obtained from the in-situ soil column with lower damping to compensate for the higher attenuation of the motion in the backfill soils. As such, the applicant is requested to provide further justification that the higher damping in the backfill material for the lower bound case will not result in foundation motions that exceed those of DCD.

3. In the response to Item 2 of RAI 03.07.01-17, the applicant has stated that the Poisson's ratio has been capped at 0.48 for saturated soils in calculating the compression wave velocity. This results in calculated compression wave velocities lower than 5000 ft/sec in saturated soils when the shear wave velocities drop below approximately 980 ft/sec. For example, as shown in Tables 3H.6-1b through 3H.6-2c (see the enclosure to STP's response to RAI 03.07.02-17), approximately 57, 75 and 240 feet of the respective soil column of the in-situ upper bound, lower bound and mean soil cases have calculated P-wave velocities less than 5000 ft/sec. The use of compression wave velocities in saturated soils less than 5000 ft/sec will not allow the higher frequency components of the vertical motion to be transmitted into the structure and may result in less conservative response. As such, the applicant is requested to assess the impact of using P-wave velocities lower than 5000 ft/sec in saturated soils on the response of the structure including in-structure response spectra by performing a sensitivity study and comparing the results for two cases: Case 1 will cap Poisson's ratio at 0.48 for saturated soils and let P-wave velocity drop below 5000 ft/sec (similar to the procedure stated by the applicant) and Case 2 will set P-wave velocity to 5000 ft/sec in saturated soils and allow Poisson's ratio to rise above 0.48 depending on the strain-compatible shear wave velocities.

03.07.01-26

Follow-up Question to RAI 03.07.01-18, Revision 1 (STP-NRC-100093)

10CFR50 Appendix S requires that seismic evaluation must take into account soil-structure interaction (SSI) effects. The applicant has provided the seismic soil pressure profiles between the RB and CB obtained from SSI analysis that include potential increase in the lateral pressures due to SSSI effects for the site-specific Safe Shutdown Earthquake (SSE). The calculated pressures are compared to those of DCD for the RB north wall in Figure RAI 03.07.01-18a and for the CB south wall in Figure RAI 03.07.01-18b. In evaluating the seismic soil pressures obtained from the SSI analysis, the staff does not find any details regarding the SSI model that incorporates the structure to structure interaction effect (SSSI). In order to complete this assessment, the applicant is requested to provide the SSI model and properties and describe in sufficient detail a) how the SSI analysis including the effects of SSSI was performed, b) how the input motions were defined, c) what software was used to perform this analysis, and d) how the results from input in three directions were combined. The applicant is also requested to include this description in the FSAR. The staff needs this information to determine that the effect of structure to structure interaction on seismic soil pressure at STP site is properly evaluated and bounded by the DCD design.

03.07.01-27

Follow-up Question to RAI 03.07.01-19 (STP-NRC-100093)

1. 10CFR50, Appendix S requires that evaluation for SSE must take into account soil-structure interaction (SSI) effects and the expected duration of vibratory motion. In the response to the first paragraph of RAI 03.07.01-19, the applicant has presented its approach for developing the input motion for the SSI analysis and design of the DGFOSV that takes into account the impact of the nearby heavy RB and RSW Pump House structures. The applicant also stated that *"Conservatively, a 3-dimensional SAP2000 response spectrum analysis was used to obtain the safe-shutdown earthquake (SSE) design forces due to structure inertia. The seismic induced dynamic soil pressure on DGFOSV walls were computed using the method of ASCE 4-98, Subsection 3.5.3.2"* The response, however, does not provide details as to how the SSI analysis

of the DGFOSV are performed and how the input motion developed are subsequently specified in the SSI analysis of DGFOSV to develop the structural response and in-structure response spectra for any equipment and subsystems within DGFOSV. From the response it appears that the applicant has not included explicitly DGFOSV structural model in the SASSI model of the RB and RSW Pump House structures to properly evaluate the SSSI effect on the DGFOSV. In order for the staff to determine if the evaluation of DGFOSV for SSE has appropriately accounted SSI effects, the applicant is requested to provide in the FSAR the following information:

(a) Describe in detail the method used for the SSI analysis of DGFOSV including the procedures for treatment of strain dependent backfill material properties in the model, input motion used and how it is specified in the analysis, variation of soil properties, and the computer programs used for SSI analysis.

(b) Describe in detail how SAP2000 analysis of DGFOSV was performed including, how foundation soil/backfill material was represented, how many modes were extracted, what modal damping values were used, how the input motion was specified, and what type of boundary conditions were used.

(c) Demonstrate that the DGFOSV foundation response spectra and dynamic soil pressure (on DGFOSV basement walls using ASCE 4-98 criteria) used in the design of DGFOSV will envelop the results of structure to structure (SSSI) interaction analysis which explicitly models DGFOSV structure in the SSI model of RB and the RSW Pump House structure.

(d) Describe in detail if there is any Category I tunnel structure for transporting Diesel Fuel Oil between DGFOSV and the Diesel Generator located in other buildings including its layout and configuration and seismic analysis and design method.

2. In the response to Item 2 of RAI 03.07.01-19, the applicant has stated that the P-wave damping ratios are assigned the same values as those calculated for the S-wave damping ratios because of the **upcoming** recommendations of ASCE 4-09 standards. It is further stated that this recommendation is based on the recent observation of earthquake data and the realization that the waves generated due to SSI effects are mainly surface and shear waves. It is noted that the NRC has not endorsed ASCE 4-09 for estimating the P-wave damping. In general, the P-wave damping is primarily associated with the site response rather than SSI effects. Because the P-wave energy for the most part will travel in water within the saturated soil media at relatively high propagation speed and is not affected by shear strains of degraded soil, the P-wave damping will be small. As such, the applicant is requested to provide quantitative assessment by performing sensitivity analysis that shows that seismic responses of Category I structures are not adversely affected to a lower P-wave damping.

03.07.01-28

Follow-up Question to RAI 03.07.01-20 (STP-NRC-100036)

In the response to Item 2a) of the RAI 03.07.01-20, the applicant has calculated the site-specific vertical and horizontal soil spring values for the STP soil conditions for the Control Building (CB) using drained Poisson's ratios of 0.15 to 0.30. The weighted soil spring values obtained for the STP best estimate, upper range, and lower range soil cases are shown in Table 03.07.01-20c, where they are compared against those estimated using the soil input from DCD, Section 3H.2.4.2.1. For the best estimate and upper range soil cases, the calculated site-specific soil spring values for the CB are the same or higher than those of the DCD; for the lower range soil case, the calculated spring constants are lower than those of the DCD.

To evaluate the impact of the lower spring constants calculated for the CB on the mat design, the applicant has performed a sensitivity analysis comparing the stresses in the CB base mat obtained using the site-specific lower range spring values versus those obtained using the DCD-derived soil spring constants. This analysis was performed for the total dead load of the structure with seismic moment applied about the x-axis (along East-West). Based on the results of this analysis, the applicant has stated that there is no significant difference in the mat stresses calculated using site specific and DCD spring values.

In evaluating the mat stress analysis results, it is noted that for the seismic load combination, the seismic moment has been applied about the x-axis (along East-West) in which the mat is expected to behave in a more rigid manner (with the results presented in Figures 03.07.01-20b through 03.07.01-20i). However, it is not clear whether the stress analysis of the CB mat foundation included the vertical seismic loads. Furthermore, the mat is expected to behave in a more flexible manner about the y-axis (North-South direction) as compared to the x-axis (East-West direction) (as the mat thickness/length ratio is larger in the y-direction as compared to the x-direction, and the two shear walls in the y-direction have no stiffening effect on the mat flexural behavior about the y-axis). As such, the applicant is requested to evaluate the mat stresses due to seismic moment acting about the y-axis. The applicant is also requested to clarify whether the vertical seismic loads were included in the sensitivity analysis, and if not what is the justification for not including the vertical seismic loads in the mat stress analyses. The staff needs this information to conclude that CB foundation mat on STP site will be bounded by the standard plant CB design.

Request for Additional Information No. 4818 Revision 3

6/21/2010

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)

03.07.02-22

Follow-up Question to RAI 03.07.02-12 and 03.07.01-13 S2 (STP-NRC-090129 & 090230)

10CFR50, Appendix S requires that evaluation for SSE must take into account soil-structure interaction (SSI) effects. In the response to RAI 03.07.02-12 regarding the dynamic soil pressures on the UHS Basin and RSW Pump House, the applicant has provided the calculated pressures that include the effect of SSI in Supplement 2 response to RAI 03.07.01-13 (see letter U7-C-STP-NRC-090230 dated 12/30/2009). A comparison of the envelop of calculated soil pressures on the RSW Pump House and UHS Basin walls calculated from the SSI analysis (Figure RAI 03.07.01-13A and RAI 03.07.01-13B in the Supplement) and those calculated using the ASCE 4 procedures (shown in Figures 3H.6-41, 3H.6-42 and 3H.6-43 of the same supplement) reveals that for the UHS Basin, the SSI pressures for the west and east walls are significantly higher than those of ASCE 4 (approximately by a factor of 2 or more everywhere). For the UHS Basin north and south walls, the SSI pressures are higher at all points but, in particular, significantly higher near grade. For the RSW Pump House, the overall difference between the magnitude of the calculated SSI and ASCE 4 pressures are less than those of the UHS Basin but the distribution of the pressures are different. As such, use of pressures using the methodology of ASCE 4 may under predict the pressure loads on the wall and thus, could impact the wall designs. As such, the applicant is requested to provide justification for not using the dynamic soil pressures calculated from the SSI analysis for design of the UHS Basin and RSW Pump House walls that takes into account the inertia effect of the structure and SSI effects.

03.07.02-23

Follow-up Question to RAI 03.07.02-14 (STP-NRC-100036)

10CFR50, Appendix S requires that evaluation for SSE must take into account soil-structure interaction (SSI) effects. In the response to Item 6 of RAI 03.07.02-14, the applicant has stated that for evaluating the effect of soil separation from the walls, the method recommended in Section 3.3.1.9 of ASCE 4-98 was used. The ASCE 4-98 criteria is a general guidance, and NRC has not endorsed this guidance for estimating the depth of soil separation for Seismic Category I structures, such as UHS Basin and RSW Pump House. As such, the applicant is requested to provide additional basis to justify that use of ASCE guidance is conservative in estimating the depth of soil separation. In providing the justification, the applicant may obtain the dynamic soil pressures calculated along the height of each soil-bearing wall from the SSI analysis of the UHS Basin and RSW Pump House, and compare the results with the static soil pressures acting on the walls. From this comparison, the applicant may calculate the net negative pressure exerted on each wall, and use the results to estimate the depth of soil separation from the walls and compare it with that obtained from ASCE guidance to demonstrate acceptability.

The staff needs this justification to ensure proper consideration of effect of potential soil separation in SSI evaluation.

03.07.02-24

Follow-up Question to RAI 03.07.02-15 (STP-NRC-100036)

UHS Basin and RSW Pump House**:**

1. 10CFR50, Appendix S requires that evaluation for SSE must take into account soil-structure interaction (SSI) effects and the expected duration of vibratory motion. In the response to Item 6 of RAI 03.07.01-15, the applicant has provided a table summarizing the frequencies at which transfer functions are calculated as well as the cut-off frequency used in the SSI analysis for various analysis cases including the lower bound (LB), best estimate (BE) and upper bound (UB) in-situ soil cases; LB, BE and UB backfill soil cases; the cracked concrete and de-bonded soil case. The selected cut-off frequency for the different analysis cases varies from a low of about 16 Hz to a high of 25 Hz. The applicant has stated that the lowest cut-off frequency of 16 Hz meets the ASCE 4-98 Section C3.3.3.4 recommended values.

   With respect to the selected frequency cut-off and frequencies of analysis, the staff needs the following information:

   a) Staff has not endorsed ASCE 4-98 Section C3.3.3.4 as acceptable criteria for selecting the cut-off frequency for the SSI analysis for detailed finite element model such as UHS Basin with cooling tower enclosure and RSW Pump House. The applicant is requested to provide comparisons of in-structure response spectra at some selected locations by increasing the frequency cut-off to a minimum of 33 Hz and using a SSI model capable of transmitting a frequency up to 33 Hz (refer to Follow-up Question to RAI 03.07.02-17) for all analysis cases considered demonstrating that cut-off frequencies used in the SSI analysis are acceptable. The staff needs this information to ensure that the selected cut off frequencies less than 33 Hz in SSI analysis will accurately or conservatively account for the expected frequency content of the SSE in the SSI analysis.

   b) In reviewing the tabulated SSI analysis frequencies, it is observed that some frequencies are excluded from the calculation of un-interpolated transfer functions in certain directions. For example, the frequency 14.16 Hz is not included in the z-response analysis for the mean soil case and 9.521 Hz is not included in the z-response analysis for the upper bound soil case. The applicant is requested to provide the basis for selecting the frequencies of analysis for calculating the un-interpolated transfer functions and excluding any frequencies from such calculations. The staff requires this information to ensure that the SSI analysis results are not adversely affected by any numerical instability that may be caused by large numbers of soil layers used in SASSI to model deep non-uniform soil site at the UHS/RSW Pump House.

RSW Piping Tunnel:

10CFR50, Appendix S requires that evaluation for SSE must take into account soil-structure interaction (SSI) effects and the expected duration of vibratory motion. In order to ensure that evaluation of RSW Piping Tunnel for SSE has appropriately taken into account SSI effects, the staff needs the following information:

1. In the response to Item 1 of RAI 03.07.02-15, the applicant has stated that a 2-D SSI analysis of the RSW tunnel has been performed to quantify the in-structure response of the tunnel. No details of this analysis have been provided. As such, the applicant is requested to describe in sufficient detail in the FSAR how the SSI analysis of the RSW tunnel has been performed. The description shall include the SSI methodology, figures showing the SSI model and boundary conditions, summary of the soil and structure properties, the input motion, etc. so the review can be completed.

2. In the response to Item 2 of RAI 03.07.02-15, the applicant has stated that simple manual calculations were used for the analysis and design of individual components of the RSW piping tunnel. For this analysis, the tunnel walls, slabs and base mat are considered as rigid elements, and seismic loads are calculated based on a ZPA of 0.21g. The applicant further states that the analysis did not include any model or soil springs; the seismic loads are applied in terms of dynamic soil pressures on the exterior walls, calculated as per ASCE 4-98 recommendations. Staff has not endorsed ASCE 4-98 recommended dynamic soil pressures for design of tunnel walls. As such, the applicant is requested to provide comparisons of the dynamic soil pressures on the RSW tunnel walls calculated using 2-D SSI model versus those of ASCE 4-98 to demonstrate that the design pressures are still bounding when the effects of kinematic interaction between tunnel structures and surrounding soils as well as the effects of structure-soil-structure interaction (SSSI) due to nearby heavy structures are considered.

03.07.02-25

Follow-up Question to RAI 03.07.02-16 (STP-NRC-100036)

10CFR50, Appendix S requires that evaluation for SSE must take into account soil-structure interaction (SSI) effects. In the response to Item 1 of RAI 03.07.02-16 with regard to the adequacy of the structural mesh size used in the SSI analysis, the applicant has presented comparisons of the first two modes of the fixed-base structure in the E-W direction (f_1 = 2.133 and f_2 = 2.056 Hz) and N-S direction (f_1 = 3.187 and f_2 = 3.028 Hz) calculated using the SSI and design meshes. Although the comparisons of the two modes are good, they only represent a mass participation of about 17.1% and 15.4% for the E-W and N-S directions, respectively. In addition, the local modes are not reflected in these comparisons. As such, the applicant is requested to provide comparisons of the higher modes that include the out-of-plane modes of the slabs and walls to ensure the adequacy of the SSI mesh for transmitting frequencies of at least 33 Hz. This should include comparisons of in-structure response spectra of slabs, roofs and wall panels for the fixed-base structure calculated using the coarse SSI and fine design meshes subject to representative horizontal and vertical foundation motions. The staff needs this information to determine that the coarse mesh size (for modeling the structure) used in the SSI analysis is adequate for evaluation of SSI effect.

03.07.02-26

Follow-up Question to RAI 03.07.02-17 (STP-NRC-100035)

10CFR50, Appendix S requires that evaluation for SSE must take into account soil-structure interaction (SSI) effects. To properly account for SSI effect, SSI model should be adequate for transmitting the maximum frequency content of interest which for the site is the PGA frequency (33 Hz) of the site specific GMRS. In the response to Item 1 of RAI 03.07.02-17, the applicant has provided the criteria ((H=Vs / (5* Ft-s)) for determining the maximum soil layer thicknesses in the SASSI SSI model to adequately transmit the highest frequency of interest for mean soil properties. However for the lower bound soil case, the highest transmitted frequency for the in-situ and backfill materials calculated using the criteria stated above is about 26 Hz. As justification, the applicant further states that this lower cut-off frequency (26 Hz) is justified in light of the recommendation of ASCE 4-98, Section 3.3.3.5. However, NRC has not endorsed ASCE-98 acceptance criteria for selecting the cut-off frequency for the SSI analysis. The selection of maximum layer thicknesses based on the shear wave length criteria [as shown by the applicant in Equation H=Vs / (5* Ft-s)], is acceptable to the staff to ensure that a correct variation of ground motion with depth is calculated for site response solution in the SASSI finite element model. In addition for the impedance solution aspect of the SASSI SSI model, the maximum horizontal dimension of the excavated soil elements should also satisfy the above shear wave length criteria, where H is the maximum horizontal dimension of soil elements. As such for the lower bound soil case, the applicant is requested to provide a quantitative assessment demonstrating that the results using the existing soil mesh size will be conservative when compared to an analysis using a more refined soil mesh size (meeting the criteria stated above for both element thickness and horizontal element dimension) capable of transmitting a frequency of 33 Hz. The staff needs this information to ensure that the use of existing soil mesh size used in the SSI analysis adequately accounts for the SSE frequencies of interest in the evaluation of SSI effect.

03.07.02-27

Follow-up Question to RAI 03.07.02-19 (STP-NRC-100093)

The COLA markup provided in the response to RAI 03.07.02-19, Revision 1 describes the procedure for establishing the SSE input at the foundation level of the RWB. According to this procedure, five interaction nodes at the depth corresponding to the bottom elevation of the RWB foundation will be added to the 3-D SSI model of the Reactor Building (RB). These five nodes correspond to the four corners and the center of the RWB foundation. The RB SSI model is analyzed for the STP site-specific SSE. The envelop of the resulting response spectra at the foundation level of the RWB (based on the average of responses at the 5 nodes) and 0.3g Regulatory Guide 1.60 response spectra will be used as the design response spectra for II/I evaluation of the RWB. This procedure for estimating the foundation input motion for the seismic SSI response analysis of non-Category I structures is acceptable. However, the procedure does not address the potential increase in dynamic soil pressures on the exterior walls of RWB due to the SSSI effects. The applicant is requested to describe how the increase in dynamic soil pressures on the RWB walls due to the SSSI effects will be accounted for in the design of the RWB exterior walls. The staff needs this information to ensure that the RWB exterior walls are adequately designed to maintain its structural integrity during a SSE in controlling any potential release of radioactive materials to the environment.

03.07.02-28

Follow-up Question to RAI 03.07.02-21 (STP-NRC-100069)

10CFR50, Appendix S requires that evaluation for SSE must take into account soil-structure interaction (SSI) effects. STP is a deep non-uniform soil-site which is modeled with a large number of soil layers in the SSI analysis. In order for the staff to gain additional assurance and confidence in the SSI analysis results, the staff is performing a confirmatory analysis to verify acceptability of the site specific SSI analysis of the UHS Basin and RSW Pump House for the best-estimate soil case. In performing the confirmatory SSI analysis of the UHS Basin and RSW Pump House, the staff requires the following clarifications:

1. The SSI model assigns no hydrodynamic masses to the submerged columns inside the UHS basin. Because of the relatively large surface area of these columns, their responses and design could be affected by the omission of the hydrodynamic effects. As such, the applicant is requested to provide justification for not assigning hydrodynamic masses to the submerged columns inside the UHS Basin which could have impact on the calculated member forces and stresses in the columns.
2. Based on the review the SSI model of UHS Basin and RSW Pump House as well as the description of the SSI model provided in the STP response to RAI 03.07.02-15 (STP letter U7-STP-NRC-100036 dated February 10, 2010), the columns inside the UHS Basin appears to be rigidly connected to the UHS Basin basemat. To provide moment transfer at the column/basemat connections, all the columns are extended into the solid elements with rigid mass less beams except for two columns located at UD/U4 and UD/U8 line intersections. These two columns have pin-connection at the basemat causing higher accelerations at top as compared to the rest of the columns. The applicant is requested to clarify whether these pinned connections at the base of the columns at UD/U4 and UD/U8 are consistent with the intent of the UHS Basin design.