PMSTPCOL PEmails

From: Govan, Tekia
Sent: Friday, April 02, 2010 10:12 AM
To: 'Bense, Richard'
Cc: STPCOL
Subject: Draft RAIs
Attachments: RAI 4610.doc; RAI 4551.doc; RAI 4477.doc

Dick,

Please review the attached RAIs. If you feel we need a conference call to clarify the requested information, please contact me within 5 days. If a conference call is not needed (please send an email) I will continue the formal process of issuing the RAI to STPNOC.

These RAIs relate to section 2.4 and are a product of the Phase 2 review.

Tekia V. Govan, Project Manager
U.S. Nuclear Regulatory Commission
Office of New Reactors
MS T-6-D48
Washington DC 20555-0001
301-415-6197
Tekia.Govan@nrc.gov

Hearing Identifier: SouthTexas34Public_EX
Email Number: 2043

Mail Envelope Properties (F5A4366DF596BF458646C9D433EA37D728FFD16FF3)

Subject: Draft RAIs
Sent Date: 4/2/2010 10:11:58 AM
Received Date: 4/2/2010 10:11:59 AM
From: Govan, Tekia

Created By: Tekia.Govan@nrc.gov

Recipients:
"STPCOL" <STP.COL@nrc.gov>
Tracking Status: None
"'Bense, Richard'" <rhbense@STPEGS.COM>
Tracking Status: None

Post Office: HQCLSTR01.nrc.gov

Files	Size	Date & Time
MESSAGE	598	4/2/2010 10:11:59 AM
RAI 4610.doc	32250	
RAI 4551.doc	44538	
RAI 4477.doc	32250	

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

Request for Additional Information No. 4610 Revision 3

South Texas Project Units 3 and 4
South Texas Project Nuclear Operating Co
Docket No. 52-012 and 52-013
SRP Section: 02.04.13 - Accidental Releases of Radioactive Liquid Effluents in Ground and Surface Waters
Application Section: 2.4.13

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.13-***

NRC review of responses to RAI 11-02-7 and RAI 11.02-8 notes that the CST is an alternative for disposition of treated radioactive water and is located outside and surrounded by a dike. NRC review of STPNOC response to RAIs 11.02-7 note that a CST release to groundwater and/or surface water should take into account assumptions of release similar to those used in FSAR Section 2.4S.13 for the LCW tank in the Radwaste Building. NRC staff believe the statement in the response to RAI 11.02-7 that design features of the CST will preclude releases of contaminated liquid to the groundwater or surface water if there is a failure of the CST does not take into account assumptions similar to those of the postulated release from the LCW tank.

Using similar assumptions of leaks and system failures associated with the LCW tank release, a CST release should be postulated. Further, review of the postulated release of the LCW tank contents to surface water in FSAR Section 2.4S.13 indicates a dilution factor of 178 associated with flooding of the Radwaste Building before LCW tank contents contact surface waters outside the building. Taking this dilution into account, the isotopic concentrations in the CST and in water leaving the Radwaste Building from a LCW tank release are more comparable, and those for key isotopes H-3, Cs-134, and Cs-137 are higher in a CST release. Because the analysis of the LCW tank release during an MCR breach flood event takes into account design features of the Radwaste Building, the MCR breach flood event as applied in FSAR Section 2.4S.13 for the LCW tank release may not apply to a CST release.

NRC requests STPNOC assess the potential for CST release to groundwater and surface water consistent with assumptions previously made with regard to LCW tank release from the Radwaste Building. Such a release should be considered independent of and in conjunction with a flood event. One of these scenarios could be more severe than the groundwater or surface water release scenarios currently included in FSAR Section 2.4S.13.

Please provide information concerning the severity of the CST release scenarios. If one or more of these CST scenarios are analyzed to be more severe than the scenarios currently included in the FSAR for accidental release of radioactive liquid effluent to groundwater and surface waters, please provide (1) the detailed design information of CST tank and dike (e.g., elevation, dimension, dike materials, holding capacity, etc.), (2) an assessment of the radiological effects of the potential release from the CST, and (3) modifications to FSAR Section 2.4S.13.

Request for Additional Information No. 4551 Revision 0

South Texas Project Units 3 and 4
South Texas Project Nuclear Operating Co
Docket No. 52-012 and 52-013
SRP Section: 02.04.12 - Groundwater
Application Section: 2.4.12

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater modeling is required. Aquifer pump test data and data reduction to mean values are inconsistent between the ER and FSAR (which are consistent), and the groundwater model document. Provide a consistent presentation of the hydraulic conductivity data and mean values, and, if necessary, provide amendments to the ER, FSAR and/or groundwater model document. Differences exist in the number of data presented and the data values, see ER Table 2.3.1-15, FSAR Table 2.4S.12-10, Groundwater Model document Section 2.7.1 (page 19, Table 4).

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater modeling is required. Evaluate simulated upward or neutral gradients at Kelly Lake with respect to the field data and hydrogeochemical characteristics of the groundwater as acknowledged in the Groundwater Model document. Note that Strata C and E do not exhibit discharge to Kelly Lake in the post-construction setting. (See Groundwater Model document, page 27 of 177, Figure 82 {calibrated model discharge}, Figures 84, 85, 93, 94 {post-construction model pathlines}).

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater modeling is required. The calibrated model was used to simulate an MCR surface water level of 49 ft MSL. Provide quantification of the predicted MCR seepage into the groundwater aquifer, and groundwater capture by the system of relief wells and sand drains. For example, provide a water budget for the post-construction simulation of the MCR surface water level at 49 ft MSL similar to that shown for the calibrated model (run 201) in Figure 82. To help evaluate the model as a tool for post-construction predictions, please also discuss whether calibrated model results have been compared against the 47 ft MCR level and the corresponding piezometric heads in FSAR Table 2.4S.12-18.

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater modeling is required. In the Groundwater Model document, page 33 of 177, STP states “The Colorado River streamflow gain during a low-flow period in 1918 is estimated to have been about 20 gpm. This result suggests that discharge from the Shallow Aquifer along the model boundary would have been on the order of 100 to 200 gpm prior to filling of the MCR.” Provide the source reference for this estimate, and provide a more complete explanation on how the 20 gpm streamflow gain estimate translates into a model boundary discharge estimate of 100 to 200 gpm.

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater piezometric surfaces in the vicinity of the filled excavation is required.

a. Consistent with the groundwater model results (Figure 71), provide field data from STP Units 1&2 in Stratum C, the Upper Shallow Aquifer, supporting the simulated depression of the water table. Figure 71 would seem to indicate a predicted depression on the order of 4 to 5 ft. Is this depression reflected in observed water levels? If so, provide field data from STP Units 1&2 in Stratum E of the Lower Shallow Aquifer, supporting the simulated mounding of the piezometric surface. Such a mound would be consistent with the groundwater model results of Figures 91 and 100 that indicate 3 to 3.5 ft of mounding at STP Units 3&4 in the future. (See Groundwater Model document, pages 40 and 41 (discussion of Scenarios 1 and 2), and Figures 71, 90, 91, 99 and 100.)

b. Review of the model grid in the vicinity of structures indicates irregular grid geometry, (i.e., matching geologic or engineered structures) that results in plunging and rising verticals. Describe the extent to which model results in the vicinity of structures could be an artifact of the grid? What MODFLOW alternatives exist to simulating this region and its transmissivity, and were these alternatives evaluated for impacts on simulated results?

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater model results and the influence of the dry cells is required. Describe the potential influence of dry cells in model results. The manually calibrated model (run 201) presents large areas in the northeast quadrant of Layer 1 and around the MCR as dry cells. Was defining the top layer of dry cells as

inactive cells attempted? In the current model, describe the impact on recharge through those cells that appear as “dry” in the solution. Are heads imported from prior simulations to start or restart simulations? If heads for dry cells are imported from a previous run are used as initial conditions, what is the impact on the new or restarted simulation?

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater modeling and the influence of the flooded cells is required. Describe the potential influence of flooded cells in model results. The manually calibrated model (run 201) presents relatively large areas in the western and southern side of the model exhibit flooding (hydraulic head above the specified land surface). Where flooding of cells is indicated, are the model results reasonable given the hydrologic system?

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater modeling is required. Staff requests additional infomation for the groundwater model results and the bands of piezometric contours. The manually calibrated model (run 201) exhibits several rectangular bands of piezometric contours at locations on the south and west sides of the model domain in Layers 1&2. Describe whether these model results are reasonable, or whether they indicate model configuration issues with the drain boundary conditions (e.g., surface elevation, drain boundary conditions)?

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater modeling and the influence of the model bias is required. While the calibration gives reasonable metrics like RMSE, the distribution of the positive and negative residuals shows spatial correlation in each of the strata. In Layer 3, (i.e., Stratum C), points along the north/northeast side of the MCR (where facilities are located) have a higher calculated head than observed head, while around the MCR, the calculated heads are lower than observed. In Layers 5 and 7, (i.e., strata E and H), calculated heads west and northwest of the facilities are higher than observed while calculated heads at locations to the east and southeast are lower than observed. Provide a discussion of whether the spatially biased residuals seen in the calibration could act to remove a plausible southwest directed pathway from the analysis in the Upper and Lower Shallow Aquifer. The ER and FSAR note that the hydraulic gradient observed to the southwest is quite low and nearly flat. Accordingly, higher predictions of piezometric elevation to the northwest of proposed Unit 4 in the model would seem to diminish the possibility of a predicted southwest pathway in either the Upper or Lower

Shallow Aquifer. In this discussion, include consideration of the predicted and/or observed groundwater piezometric depression and mound in the Upper and Lower Shallow Aquifer, respectively, in the vicinity of proposed STP Units 3&4.

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater modeling and the influence of the model conceptulization and boundary conditions is required. Does use of the given boundary conditions overly constrain the boundary of the potentiometric surface and cause the internal boundary conditions and stresses to have undue influence on the potentiometric surface? Describe whether such fixed external boundary conditions may be acceptable for the calibrated model while constraining post-construction predictions. Provide assurance that the calibrated groundwater model has been used to predict post-construction cases that exhibit conservative or bounding behavior for maximum groundwater level within the powerblock, and maximum groundwater gradients from postulated release points at Units 3 and 4 to an off-site receptor. Alternatively, use pre-construction data and the completed simulations to technically defend the conservative or bounding nature of results presented in FSAR 2.4S.12 regarding the site characteristic of maximum water table, and in FSAR 2.4S.13 regarding the plausible pathways of an accidental release.

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater modeling is required. Describe the sensitivity cases used to evaluate post-construction infiltration rates within the powerblock of proposed STP Units 3&4, and the excavation backfill hydraulic properties, (e.g., saturated hydraulic conductivity). In addition, describe the potential influence of structures that will remain in the subsurface. For example, in addition to the slurry wall which is simulated and described, what is the potential influence of the two Crane Foundation Retaining Walls which are described as permanent structures (890 ft long, 80 ft deep, and 3 ft wide)? Also, describe the influence of the existing relief well system on the water table within the powerblock of proposed STP Units 3&4. For example, what would occur if the system or a portion of the system failed? Alternatively, describe the conservative or bounding assumptions made in the evaluation of the maximum water table within the powerblock and the plausible pathways from the proposed STP Units 3&4 to points of possible human exposure.

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater modeling is required. The NRC notes that

revisions to FSAR, Rev 3, Section 2.4S.12.5 Site Characteristics for Subsurface Hydrostatic Loading submitted on September 21, 2009 (U7-C-STP-NRC-090146) state that “In summary, based on measured groundwater levels in observations wells and modeled post-construction groundwater levels, the maximum post-construction groundwater elevation at the STP Units 3 and 4 site is estimated to be 28 ft MSL, …”. While the summary statement is made, the specifics are not provided in the section. Provide a list of the specific conclusions made regarding the measured pre-construction groundwater levels and a list of specific post-construction model results that support the maximum post-construction groundwater elevation of 28 ft MSL.

02.04.12-***

To meet the requirements of 52.79(a) and assist staff in its analysis, additional information concerning the groundwater modeling is required. The NRC notes that based on review of FSAR, Rev 3, Sections 2.4S.12 and 2.4S.13, revisions submitted to Section 2.4S.12 and 2.4S.13 on November 23, 2009 (U7-C-STP-NRC-090205), and the groundwater model results (Figures 91 and 100), the applicant may not have considered results of post-construction groundwater simulations on the southwest pathway analysis. The pathways analyzed in FSAR, Rev 3, Section 2.4S.12 and 2.4S.13 (with revisions of 11/23/2009) may not adequately consider a southwest pathway in the Lower Shallow Aquifer. The current groundwater model results indicate a 3 to 3.5 ft increase in piezometric surface at the filled excavation in the Lower Shallow Aquifer. Provide a discussion of this key simulation result with regard to the elimination of a plausible southwest directed groundwater pathway in the Lower Shallow Aquifer.

Request for Additional Information No. 4477 Revision 3

South Texas Project Units 3 and 4
South Texas Project Nuclear Operating Co
Docket No. 52-012 and 52-013
SRP Section: 02.04.05 - Probable Maximum Surge and Seiche Flooding
Application Section: 2.4.5

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.05-***

(1) The applicant's estimation of the effects of the Probable Maximum Storm Surge (PMSS) are based on the estimation of storm surge using two approaches: (i) use of the SURGE model to estimate storm surge in the Gulf of Mexico and applying the estimated storm surge as a boundary condition in HEC-RAS modeling software to predict water surface elevations near the STP site, and (ii) extrapolation from storm surge values obtained from the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model near the STP site for Category 1 through 5 hurricanes in the Gulf of Mexico to estimate the storm surge for probable maximum hurricane (PMH) conditions. The applicant-estimated maximum PMSS water surface elevation at the STP site was produced by the second approach above (31.1 ft MSL) and did not reach the site grade (34 ft MSL).

Through independent confirmatory analysis, the staff determined that the maximum PMSS water surface elevation of 31.1 ft MSL, obtained by the applicant using the extrapolation procedure described above may not be technically valid or conservative. Based on its independent estimation of PMSS water surface elevations, the Staff determined that the outer face of the MCR north embankment may be subject to wave action from PMSS. Because the outer face of the MCR embankment is only grass-lined and not protected by reinforced soil-cement or riprap, the staff postulated that the MCR embankment could possibly fail during the PMSS event. If this scenario were to occur, the MCR breach flood would coincide with the PMSS event.

Please provide the following information: (a) an analysis of the PMSS event using a conservative approach such as those predicted by a storm surge model (e.g., SLOSH) with input from appropriate PMH scenarios, (b) reasons why exposure of the outer face of the MCR embankment to the PMSS event would not lead to a breach, and (c) if an MCR breach is postulated under PMSS conditions, a revised estimate of the design-basis flood water surface elevation at the STP site.

(2) In case the design basis flood level is changed, provide proposed text changes for 2.4S.10 considering the followings: (a) describe how safety-related facilities are designed to withstand the combination of newly established flooding conditions and wind wave run-up; (b) for safety-related facilities, re-identify the doors and hatches that are affected by the new design flood level; and (c)

describe how the watertight doors and hatches are designed to resist static and dynamic forces of flooding without water penetrations, or provide any design specifications that could be applicable to this case.