PMComanchePeakPEm Resource

From: Magee, Michael
Sent: Friday, April 09, 2010 6:38 AM
To: Donald.Woodlan@luminant.com
Cc: ComanchePeakCOL Resource; Monarque, Stephen; Raione, Richard; Tiruneh, Nebiyu; Barnhurst, Daniel
Subject: Comanche Peak COL - Failed Fuel Fraction and Determination of Source Tank Concentrations for 2.4.13 Accidental Effluent Release Analysis

Don,

The purpose of this email is to briefly summarize the issues related to the use of the appropriate failed fuel fraction to determine LWMS tank concentrations for the US-APWR reactor and highlight the relevance to the Comanche Peak 2.4.13 site specific accidental effluent release analysis. This issue has been the source of some recent confusion due to NRC guidance and RAIs submitted during the concurrent reviews of the DCD and COL.

It is the responsibility of the COL applicant to use the radionuclide inventory and concentrations of the tank of the highest volume and concentration as the source term for the accidental effluent release analysis within FSAR section 2.4.13. The COL applicant obtains this information from the DCD. During the safety review of the US-APWR DCD the NRC Health Physics Branch noted that these tank concentrations were not included in the DCD. They also noted that concentrations reported at hypothetical receptor locations, which were reported, appeared to result from the use of a failed fuel fraction of 0.12% which differed from the 1% value hard coded into the RATAF code, the code used for the analysis. As a result, the Health Physics Branch asked RAI 523-4246 to address these issues. The specific request (DCD Question Number 11.02-28 item 4) is included below:

4. The RATAF code referenced in NUREG-0133 in BTP 11-6 calculates liquid tank and receptor concentrations based on 1% failed fuel. Further reducing RATAF liquid tank concentrations to 0.12% for an evaluation of the respective radionuclide ECLs at the critical receptor does not ensure that the "highest potential radioactive material inventory is selected among the expected types of liquid and wet waste streams processed by the LWMS," and neither results in the "highest concentrations of radioactive materials at the nearest potable water supply located in an unrestricted area" in accordance with BTP 11-6. Independent staff calculations on evaporator tank concentrations using the USAPWR design basis source term corrected for a fuel defect of 0.12%, information from applicant responses, and guidance in SRP Sections 11.2 and 2.4.13, BTP 11-6, NUREG-0133 and NUREG-0017 result in higher tank inventories and ECL fractions. For the US-APWR design and site-specific applications, the staff requests that the applicant add in Table 11.2-17 the failed tank concentrations calculated by the RATAF code based on 1% failed fuel for the HT, WHT, and BAT, identify the corresponding RATAF calculated ECL fractions at the critical receptor, and discuss these results in Sections 11.2.3.2 and 2.4.13 for the failed liquid tank evaluation.

In response to RAI 523-4246, Questions 11.02-28 and 11.02-30 on the RATAF code for the US-APWR DCD Tier 2, Sections 11.2.3.2 and 2.4.13, the applicant revised Table 11.2-17 to include a column identifying the failed tank concentrations for the HT, WHT, and BAT calculated by the RATAF code with 1% failed fuel. The RATAF critical receptor concentrations in Table 11.2-17 reflect an adjustment to 0.12% failed fuel in accordance with BTP 11-6 and NRC guidance. DCD Tier 2, Section 11.2.3.2 was also revised to describe the applicant's basis and methodology in the evaluation of the liquid tank failure analysis. From a review of the applicant's response, the staff has confirmed that the tank and critical receptor concentrations presented in DCD Tier 2, Table 11.2-17 are consistent with those calculated by the RATAF code for the liquid tank failure analysis.

As mentioned above, the NRC HP Branch reviewer performed alternate method analyses and concluded that adjustment of the RATAF calculated source tank concentrations to 0.12% outside of the RATAF code resulted in conservative estimations of radionuclide concentrations and was acceptable. For the COLs which reference

this design, this implies that while they must refer to the revised Table 11.2-17 within the DCD to obtain the RATAF calculated source tank concentrations as the source term for the site specific accidental effluent release calculation, it is then acceptable to adjust these values to the 0.12% failed fuel fraction for use as the source term.

The purpose of Hydrology Branch supplemental RAI 2.4.13-7 was to ensure that any change in source tank concentrations in the DCD, which resulted from the RAIs mentioned above, was appropriately incorporated into the source term used in the accidental effluent release calculations performed as part of the COL FSAR Section 2.4.13. In response to the portion of the Hydrology Branch RAI relating to determination of source term for the site specific accidental effluent release analysis NRC staff request that the COL applicant simply confirm that tank concentrations were obtained from the revised DCD Table 11.2-17 and address whether any further adjustment (based on the 0.12% failed fuel fraction) was made in their site specific analysis.

If you have any questions, please let me know –

Sincerely,

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