Acceptance Review Deficiencies from Section 2.4.13 "Accidental Releases of Radioactive Liquid Effluent in Ground and Surface Waters"

Comanche Peak Nuclear Power Plant, Units 3 & 4 COL Application FSAR

Accidental Release Evaluation

The last paragraph of Section 2.4.13 of the CPNPP FSAR contains the conclusion that the predicted impact of an accidental effluent release to potential future water users is "expected to be SMALL". However, Section 2.4.13 does not contain a quantification of what this impact would be or the technical information needed to document this conclusion and enable a review by NRC staff.

As directed by SRP 2.4.13 (NUREG-0800) and Section 2.4.13 of the US-APWR DCD the applicant should evaluate and detail "the effects of accidental releases of radioactive liquid effluents in the ground and surface waters on existing uses and known and likely future uses of ground and surface waters". Additionally, Section 11.2.3.2 of the US-APWR DCD states that the applicant should provide both the data and analysis used to demonstrate that the potential groundwater contamination from an accidental release is bounded by the analysis presented in the DCD. RG 1.206 C.I.2.4 directs that there be enough information provided of the transport evaluation to "permit an independent hydrologic engineering review".

Guidelines defining the mechanism of the potential release, assumptions for the analysis and an approach to assessing impact at receptor locations are provided in Branch Technical Position 11-6 (NUREG-0800) and Section 11.2.3.2 of the DCD.

To satisfy the acceptance requirement of completeness and technical sufficiency, Section 2.4.13 of the CPNPP FSAR should include the following information, as well as a description of how each item listed below contributes to the conservative nature of the overall analysis. This information includes:

- Quantitative documentation of all physical parameters that could potentially impact transport along the identified pathway(s) and concentrations at receptor locations. This includes a discussion of dilution (in ground and surface water), concentration, ion-exchange, dispersion and the potential for complexants in the tanks chosen for the scenario. In keeping with 10 CFR 100.20(c)(3) these parameters should be site-specific (where applicable).
- A description of the release scenario. The scenario should be similar to scenarios described in NRC guidance documents such as Branch Technical Position 11-6 of NUREG-0800.
- A description of the transport evaluation including procedures, methods, assumptions and parameters which were used in the evaluation.
- A description of the approach used in assessing the radiological impact of the release. This approach should be consistent with Branch Technical Position 11-6 which recommends that concentrations at potential receptor locations be compared to the concentration limits for water in 10 CFR 20 Appendix B (Table 2, Column 2 under the Unity Rule). Results should be provided in a format which aids review, such as a table, and exceedences, if any, should be called out.

Alternate Conceptual Model Development

The groundwater flow scenarios described in Section 2.4.13 of the CPNPP FSAR account for a realistic amount of variability in flow depths along flow paths to Squaw Creek Reservoir, which is identified as the likely receptor. However, they do not address the possibility of flow to other receptors (nearby pumping wells) or the mechanisms which could potentially create these alternate flow paths (i.e. changes in groundwater elevations).

Per guidance in SRP 2.4.13 (NUREG-0800), a variety of alternate conceptual models for groundwater flow paths should be envisioned based on the geological and hydrological characteristics of the site. These are then used to select the bounding set of plausible pathways that produce the most adverse contaminant concentrations to potential receptors in a conservative transport analysis.

Monitoring data indicate that water levels in about 8 wells are above the DCD based elevation of 821' msl (1 foot below the established plant grade of 822' msl) and have been rising steadily throughout the year, several rising over 20 feet. In the FSAR, these wells were described as illustrating "no indication of reliable equilibrium". Several of these are located within the shallow aquifers near the source areas. Changes to groundwater elevations near the source could potentially affect ground water flow directions and impact receptors not considered in the discussion within section 2.4.13. As a result, additional alternate conceptual models describing potential groundwater flow paths should be evaluated.