REQUEST FOR ADDITIONAL INFORMATION
Volume 2 – Preclosure
Chapter 2.1.1.5, Set 2 – Consequence Analyses
(RAI #1 - #6)

The following questions pertain to DOE's consequence analyses described in SAR Section 1.8 and other supporting documents and references. The NRC review of this part of the license application evaluates the applicant's dose methodology, source term, public dose, worker dose, and dose compliance demonstrations. This information is needed to verify compliance with 10 CFR 63.111(a) (1) and (2), 10 CFR 63.111(b) (1) and (2), 10 CFR 63.111(c) (1) and (2), 10 CFR 20.1201, and 10 CFR 20.1301.

RAI #1

Provide the technical basis for the potential onsite public doses during normal operations, listed in SAR Table 1.8-28. Specifically, address the following:

a. Explain the basis for the public dose at the Warehouse and Non-Nuclear Facility location (17 mrem/yr) being significantly smaller than the dose at the Lower Muck Yard location (78 mrem/yr), even though the Warehouse location is at a similar distance from the Rail Car and Truck Buffer areas.

b. Clarify whether the dose rates on the external surfaces of the transportation casks in the buffer areas are based on 10 CFR 71.47 requirements (SAR Section 1.8.3.1.3). If not, provide the basis for these dose rates.

c. Provide the technical basis for not incorporating contributions from any single cask or TEV in transit, in developing the dose contour maps of BSC (2007am, section 7).

d. Explain how the 1.31 and 0.272 scaling factors were developed as referenced in BSC (2007am, Table 7).

e. Explain how the values in BSC (2007am, Table 7) were developed, including how the values in Column III represent the dose rate for 25 casks, and basis for not accounting for truck cask numbers (5) in column V. Also, provide a reference or describe the location and boundaries for the buffer areas.

RAI #2

Provide the technical basis for selecting TS125 as a representative rail cask for the shielding calculations in the staging area and for the transient operations (BSC 2007a, sections 6.1.1 and 6.1.2.1). Also, clarify whether or not DOE has used the TS125 dose rates in any dose calculations in the SAR to demonstrate compliance with dose limits.

RAI #3

Provide information on the minimum distances from the surface waste handling facilities to the restricted area of the GROA used for developing X/Q values in SAR Table 1.8-12 for the offsite public not within the general environment. Also, verify the values of minimum distances listed in SAR Table 1.8-10. For example, the distance used to calculate the X/Q value for the SSE direction (from NNW) is listed as 18,500 meters in Table 18 of BSC (2007bp). However, in SAR Table 1.8-10, the same distance is listed as 10,200 meters.

RAI #4

Clarify the statement in SAR Section 1.8.3.1.2 (Normal Operations Surface Facility Releases) that onsite public doses are based on ground level releases. If the airborne TEDE doses presented in Tables 1.8-28 and 1.8-32 are derived from elevated vent release points, provide the heights used for the vents to perform the X/Q calculations.

The airborne release TEDE values for workers in SAR Table 1.8-28 and for the onsite public in Table 1.8-32 appear to come from BSC (2008ak, Table 15). Table 15 is based on X/Q values that appear to come from BSC (2007al, Table 32). BSC (2007al, Section 3.2.4) discusses the exit velocities for the various handling facilities and how ARCON96 compared exit velocities to wind speeds to determine the elevated release heights. BSC (2007al, Table 1) provides site elevations for the highest release points. BSC (2007al, Table 32) is the original average X/Q calculations. These values are listed as the source for BSC (2008ak, Table 8) which is used for the dose calculations given in BSC (2008ak, Table 15). Table 15 is the source for SAR Tables 1.8-28 and 1.8-32 for the airborne TEDE values.

RAI #5

Clarify the statement in SAR Section 1.8.3.1.3 (*Public Direct Radiation Methodology)* that the dose rates outside the facilities and within the GROA, were calculated using the computer code MCNP5. In BSC (2007am), DOE provides the calculated GROA dose rates and provides, in Table 9, a listing of TEDE exposures for the various onsite locations. These include the 78 mrem value at the lower muck yard and the 36 mrem at the switchyard. This table appears to be the source document for SAR Table 1.8-32. According to BSC (2007am, Section 4.2.1), the dose rates in Table 9 were calculated using the SCALE 4.4A computer code.

RAI #6

Justify the use of SCALE/ORIGEN-S (SAR Section 1.10.3.2) in source term evaluations for high-burnup spent nuclear fuel (SNF) (e.g., maximum PWR CSNF assembly with 80 GWd/MTU, or maximum BWR CSNF assembly with 75 GWd/MTU (SAR Table 1.8-2). The SCALE/ORIGEN-S cross-section library validation is currently limited to 47 GWd/MTU (NRC, 2003).

References

BSC. 2007a. "GROA Shielding Requirements Calculation." 000-00CMGR0-03300-000-00A. Las Vegas, Nevada: Bechtel SAIC Company, LLC.

BSC. 2007al. "GROA Airborne Release Dispersion Factor Calculations." 000–PSA–MGR0–00600–000. Rev. 00B. CACN 001. Las Vegas, Nevada: Bechtel SAIC Company, LLC.

BSC. 2007am. "GROA External Dose Rate Calculation." 000–PSA–MGR0–01300–000–00A. CACN 001. Las Vegas, Nevada: Bechtel SAIC Company, LLC.

BSC. 2007bp. "General Public Atmospheric Dispersion Factors." 000–00C–MGR0–02800–000. Rev. 00B. CACN 001. Las Vegas, Nevada: Bechtel SAIC Company, LLC.

BSC. 2008ak. "GROA Airborne Release Dose Calculation." 000–PSA–MGR0–01200–000–00C. Las Vegas, Nevada: Bechtel SAIC Company, LLC.

NRC. 2003. NUREG/CR–6798, "Isotopic Analysis of High-Burnup PWR Spent Fuel Samples From the Takahama-3 Reactor." Washington, DC: NRC.