REQUEST FOR ADDITIONAL INFORMATION
Volume 2 – Preclosure
Chapter 2.1.1.1 – Site Description as it Pertains to PCSA
2nd Set (RAIs #1 to #7)

RAI # 1

Provide a geological map covering the footprints and geological cross sections (in the east-west and north south directions) of the surface and subsurface portions of the Geological Repository Operations Area (GROA) at a scale sufficient to delineate geologic features such as faults and stratigraphic contacts, and their relationship to major GROA features such as drifts, shafts, ramps and SSCs important to safety and waste isolation (SAR Section 1.1.5.1.2; SAR Section 1.1.5.1.4).

The geological map provided at a scale of approximately 1:15,000 as Figure 1.1-64 in SAR Section 1.1.5.1.4, covers only the central and western portion of the surface GROA footprint and DOE does not provide a detailed geological map of the subsurface GROA footprint. The geological cross sections shown in Figures 1.1-65 to 1.1-67 cover only a portion of the surface GROA footprint. SAR, Section 1.1 does not provide any detailed geological cross sections intersecting the width and length of the subsurface GROA footprint. This information is needed to support the preclosure safety analysis and the GROA design and establish compliance with 10 CFR 63.21(c)(1)(ii) and 10 CFR63.112(c).

RAI # 2

Justify the value of Manning's roughness coefficient based on field observations, and address sensitivity of the predicted water surface elevations to this parameter used in the probable maximum flood analyses (SAR Section 1.1.4.3.2).

This information is needed to verify compliance with 10 CFR 63.21 (c)(1)(ii) and 10 CFR 63.112(c).

RAI #3

Provide the following information regarding Quaternary faults and associated fault splays known to occur within or adjacent to the emplacement drift area: (1) how the age of a buried fault of significant displacement is to be dated as Quaternary or younger; (2) what is a significant displacement; (3) how significant displacement may be determined in underground openings; and (4) from what part of a fault or fault zone the setback is to be measured (SAR Table 1.3.4-1, Postclosure Control Parameter 01-05, p. 1.3.4-49; SAR Section 1.1.5.1.2; SAR Section 1.3.4.2.2).

This is needed to determine how the applicant will implement the 60-meter minimum setback distance of emplacement drifts from “a Quaternary fault with potential for significant displacement.” Staff needs the information to verify compliance with 10 CFR 63.21 (c)(1)(ii) and 63.112(c).

RAI #4

Explain the technical basis for the single azimuth value of the emplacement drifts alignment considering that the prevailing joint orientation in the main host horizon - the Topopah Spring lower lithophysal zone (the zone to contain the larger number of waste packages) - is different from the prevailing joint orientation in each of the three other host horizons. Include an explanation of why subhorizontal joint sets were not considered in the assessment of which joints sets prevail or dominate. The actual (specific) joint orientation data sets and methods used to assess the characteristic prevailing or dominant joint orientation of each zone should be referenced. (SAR Section 1.1.5.1.3.1; SAR Section 1.3.4.2.1; SAR Section 1.3.4.2.3; SAR Table 1.3.4-5, Parameter 01-08, page 1.3.4-50).

The applicant has proposed the same 72-degree-azimuth alignment (allowed to range between 70 and 80 degrees) of the emplacement drifts in the four lithologic zones comprising the Repository Host Horizon even though the prevailing or dominant joint orientation in each zone is different (Bechtel SAIC Company (BSC) 2007b, Section 4.2.13.8.6). This information is needed to verify compliance with 10 CFR 63.21 (c)(1)(ii), and 63.112(c).

RAI #5

Provide the technical basis for shear modulus and damping curves for tuff rock. Specifically, address the basis for (1) shape of the curve being the same as for the cohesionless soil (EPRI, 1993, SAR Section 1.1.10); and (2) fitting the curve to the measured data at strains smaller than 0.1 percent (SAR Section 1.1.5.3.2.6.3).

This information is necessary for assessing compliance with 10 CFR 63.21(c)(1)(ii) and 63.112(c).

RAI #6

Provide technical basis for extrapolating normalized shear modulus and damping curves for ‘tuff’ and ‘alluvium’ to strains beyond 0.1 percent for which no measured data are available (SAR Section 1.1.5.3.2.6.3).

This information is necessary for assessing compliance with 10 CFR 63.21(c)(1)(ii) and 63.112(c).

RAI #7

Provide the technical basis for using a one-dimensional model for the site response analysis for inclined and faulted soil layers at the surface facilities (SAR Section 1.1.5.2.5.2).

BSC (2004e, Sections 6.1.4 and 6.1.6; SAR Section 1.1.10) refers to a validation study at the Gilroy site as justification for using one-dimensional simulation. However, no justification has been provided in the SAR and in relevant documents why the subsurface geology at the surface facilities area would be similar to the Gilroy site and, consequently, will not have significant amplification of ground motion estimated using a one dimensional analysis. Existing literature (e.g., Bardet, et al., *Site Response Analyses*, The Lorna Prieta, California, Earthquake of October 17, 1989 - Marina District, Thomas D. O'Rourke, Editor, U.S. Geological Survey Professional Paper 1551-F, 1992, pp. F85-F114) suggests potentially larger ground motion experienced by the site, which can only be predicted using two- or three-dimensional analyses. This information is necessary for assessing compliance with 10 CFR 63.21(c)(1)(ii) and 63.112(c).