Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29802

MAY 20 2011

Mr. Drew Persinko, Deputy Director
Environmental Protection and
Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs
U.S. Nuclear Regulatory Commission
11545 Rockville Pike, Mail Stop T8F5
Rockville, MD 20852-2738

Dear Mr. Persinko:

SUBJECT: Second Request for Additional Information on the 2009 Performance Assessment for the Saltstone Disposal Facility at the Savannah River Site (SRS)

References: 1. Letter, Gutmann to Persinko dated April 21, 2011
2. Letter, Skeen to Gutmann dated December 15, 2010.

Reference 1 provided a partial response to comments (19 of 55) identified in Reference 2. The responses in Reference 1 as well as the strategy to resolve the balance of the comments identified in Reference 2 were the subject of a public meeting held between our agencies on April 27, 2011 in Aiken, South Carolina. This strategy includes DOE performing additional modeling through a deterministic sensitivity (Case K) evaluation to support a subsequent response package. Subsequent to this public meeting members of our staffs, as well as SRS contractor technical staff, participated in a series of five conference calls over the period May 3, 2011 to May 19, 2011 to continue technical discussion of the Reference 1 responses, the proposed modeling evaluation, and the additional planned responses. The excellent, professional engagement exhibited by your staff during these conference calls is greatly appreciated.

The enclosed table describes the parameters associated with the proposed Case K evaluation derived from the discussions between our technical staffs. Your confirmation that the enclosure sets forth an acceptable approach toward resolving the remaining open questions to support NRC completion of a Technical Evaluation Report (TER) would be much appreciated. The courtesy of a response by June 10, 2011 is respectfully requested to support DOE's submittal of a revised, complete response to the Reference 2 request in the September 2011timeframe to support NRC's completion of a TER in the December 2011 timeframe.

I look forward to our conference call planned for June 2, 2011 to inform the public of the above activities and path forward for resolving the Reference 2 request.

MAY 2 0 2011

Please contact me at (803) 208-7408 or Patricia Suggs (803) 208-6804 if you have questions regarding this letter.

Sincerely,

Thomas S. Gutmann, Director
Waste Disposition Programs Division

WDPD-11-65

Enclosure:
Model Parameter Changes from Case A to Implement Sensitivity Case K

cc: w/encl
Nishka Devaser, NRC

Model Parameter Changes from Case A to Implement Sensitivity Case K

Modeling Parameter	Change from Case A (associated RAI)
Saltstone and clean cap physical degradation	Complete degradation occurs within 10,000 years with degraded saltstone having a saturated hydraulic conductivity of 1E-06 cm/sec and an effective diffusion coefficient of 5E-06 cm^2/sec using a semi-log relationship. Final degradation values based on soil properties. (SP-1, SP-2, SP-7 and SP-17)
Moisture Characteristic Curves (MCCs)	MCCs will not be used for fractured cementitious material. Relative permeability and saturation are set equal to 1 for all suction levels for saltstone, clean cap, and disposal unit concrete. (SP-3)
Saturated hydraulic conductivity for intact saltstone and clean cap	Assumed to be 1E-8 cm/sec – largest value reported using simulants with a minimum of 90 day curing time and nominal curing temperature. (SP-5)
Effective diffusivity of saltstone and clean cap	For intact saltstone and clean cap the value is unchanged but increases to 5E-06 cm^2/sec (soil property) as the saltstone and clean cap degrade within 10,000 years using a semi-log relationship. (SP-6)
Saltstone pore volumes required to initiate Eh and pH transitions	Eh transition volume changes to 18% of the Case A value based on reducing by a factor of four the reduction capacity of saltstone and a porosity correction. pH transition volume changes to 73% of the Case A value based on a porosity correction. (SP-12)
Tc release via shrinking core model	Modified using a single porosity model utilizing a fracture growth model based on the Smith and Walton (1993) approach and using a semi-log fracture growth relationship with a final fracture spacing of 10 cm. Pertinent parameters are: • Constant diffusion coefficient of intact matrix of 1E-07 cm^2/sec • Reduction capacity of 0.206 meq e-/g (one-fourth of Case A value) • Dissolved oxygen concentration at fracture face is 1.06 meq e-/L (SP-13)
Drainage layer performance	No Change (IEC-8) Time periods refined to capture significant changes to model parameters (C-22)
Physical degradation of disposal unit concrete	Using a semi-log relationship, concrete fully degrades to soil properties with a saturated hydraulic conductivity of 1E-06 cm/sec and an effective diffusion coefficient of 5E-06 cm^2/sec • Initially for walls of Vaults 1 and 4 (VP-6) • Within 3,500 years for the roof of Vault 4 • Within 10,000 years for other disposal unit concrete (VP-2 and VP-3) Undegraded properties provided in PA Table 4.2-16
Dose to the chronic intruder in vicinity of disposal units	Dose estimated based on water concentrations below Vault 4 and an FDC for this alternative sensitivity case (II-2)
Radionuclides analyzed	No change - all radionuclides
Inventory	Key radionuclides being investigated (Ra-226, I-129, Tc-99). Th-230, U-234, and Pu-238 inventory being investigated for in-growth of Ra-226. (IN-5)
K_d values for saltstone, disposal unit concrete, and soil	Based on latest issued reports (SP-10, SP-14, SP-15, FFT-2 and FFT-3)
Dose methodology	Biotic transfer factors based on latest report (B-1) Inclusion of poultry and egg pathway (B-2) 25 year buildup of radionuclides in irrigated soil (B-3) Inclusion of leafy portion in plant transfer factor (B-4)