February 22, 2008

MEMORANDUM TO: Brian E. Holian, Director
Division of Nuclear Materials Safety
Region I

FROM: Scott C. Flanders, Deputy Director **/RA/**
Environmental & Performance
Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials and Environmental
Management Programs

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION IN RESPONSE TO TECHNICAL ASSISTANCE REQUEST DATED DECEMBER 18, 2007, FOR R-14 RANGE AT ABERDEEN PROVING GROUND

Region I submitted a Technical Assistance Request, dated December 18, 2007, requesting a determination of appropriateness of a site-specific Derived Concentration Guideline Level (DCGL) for depleted uranium contaminated soils at the R-14 Range located at the Aberdeen Proving Ground. This site-specific DCGL was originally approved for use by the licensee for the Transonic Range which is also located at the Aberdeen Proving Ground. The licensee provided a description of the development of the DCGL for R-14 Range in "Determination of the Derived Concentration Guideline Level for R-14 Range Soils" [ML073180601]. The Performance Assessment Branch has completed its review of this, and other referenced documents, and requests additional information. Based upon the review, staff finds that additional information is needed in order to make a determination on the appropriateness of the suggested DCGL for the soils at the R-14 Range.

If you have questions regarding this review, please contact Karen Pinkston, Systems Performance Analyst at 301-415-3650, or Hans Arlt, Senior Systems Performance Analyst at 301-415-5845.

Enclosure:
Request for Additional Information

cc: Betsy Ullrich

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Determination of the DCGL for the R-14 Range Soils at Aberdeen Proving Ground
Request for Additional Information
Prepared by: Hans Arlt and Karen Pinkston

Background

The U.S. Army Research Laboratory (USARL) is the license holder for the R-14 Range located at the Aberdeen Proving Ground (APG). The licensee proposes a decommissioning objective of unrestricted use for this former test firing range, and proposes to use a site-specific Derived Concentration Guideline Level (DCGL) for soils contaminated with depleted uranium of 230 picocuries per gram (pCi/g). The DCGLs used for the Transonic Range at APG were based on site-specific uranium guidelines derived for a 50-year total effective dose equivalent (TEDE) to a hypothetical individual not exceeding 25 mrem in any one year, and evaluated over a 1000-year time interval. The decommissioning plan and the associated DCGLs for the Transonic Range were approved by the NRC. The licensee provided a description of the development of the DCGL for R-14 Range in "Determination of the Derived Concentration Guideline Level for R-14 Range Soils" [ML073180601] and contrasted and compared the parameters used to develop the DCGL applied at the Transonic Range site to the R-14 Range site. The Performance Assessment Branch has completed its review of this and other referenced documents and requests additional information. Based upon the review, staff finds that additional information is needed in order to make a determination on the appropriateness of the suggested DCGL for the soils at the R-14 Range.

Additional Information Needed

1.) Staff at NRC's Commercial and Research and Development Branch at Region I requested additional information in a letter to USARL [ML080020667] in order to continue their review of the decommissioning plan for the site at the R-14 Range. Staff at the Performance Assessment Branch agrees with request number eight pertaining to the depth of the contaminated surface soil. Independent analysis has shown that the DCGLs are dependent on the depth of soil contaminated with depleted uranium. Based on information gathered at the R-14 Range site, "Thickness of the Contaminated Zone" is one of the default parameters in RESRAD that has been changed to a more site-specific value (0.15 m from the default value of 2.0 m). However, analytical results of a subsurface soil sample (i.e., from 6 to 12 in. below ground surface), were obtained from only one location. A better technical basis needs to be provided to support the assumption that contamination is limited to the upper 6 inches of soil.

2.) Staff at NRC's Commercial and Research and Development Branch at Region I requested additional information in a letter to USARL [ML080020667] in order to continue their review of the decommissioning plan for the site at the R-14 Range. Staff at the Performance Assessment Branch agrees with request number five pertaining to information that should be provided by the licensee for dose modeling using site-specific information. This information should include the input and output files from the computer code as well as a discussion of the effect of uncertainty on the results.

3.) The licensee proposes to use the DCGL of 230 pCi/g that was originally developed for use at the Transonic Range for the R-14 Range. Additional information is needed regarding the applicability of the conceptual model used for the Transonic Range to the R-14 Range, such as the physical features important to modeling the transport pathways and the source term, including the configuration and areal variability of the source. In addition, in Appendix C, "Determination of DCGL for R-14 Range Soils", it is stated that the composition of the DU in the R-14 Range consists of U-234, U-235, and U-238 activity fractions of 0.084, 0.012, and 0.904, respectively. However, Appendix C also states that the DCGL for the Transonic Range was generated based on a source term with U-234, U-235, and U-238 activity fractions of 0.190, 0.021, and 0.790. Additional information is needed regarding the applicability of the DCGL from the Transonic Range to the R-14 Range given the different ratio of radionuclides present in the source term.

4.) Table 5 in the document "Determination of the Derived Concentration Guideline Level for R-14 Range Soils" shows the results of individual uranium isotope and the depleted uranium (DU) DCGLs. However, the calculation method used to determine the final DU DCGL for the R-14 Range differs from the methodology used to calculate the DU DCGL for the Transonic Range (ANL, 1999). While the dose limit and the total dose/source concentration ratios for uranium at the depleted uranium study area of the Transonic Range were used to calculate the DU DCGL for the Transonic Range, the DU DCGL for the R-14 Range in Table 5 was calculated by simply multiplying the respective activity fractions of each of the uranium isotopes in DU with the DCGL calculated for that individual uranium isotope and adding the products. Since the licensee is seeking the use of the approved Transonic DCGL at the R-14 Range site, the same methodology should be used for the R-14 Range calculations as were used for the DU DCGL calculations for the Transonic Range. These calculations should be provided for review.

Reference

ANL, 1999. Derived Uranium Guidelines for the Depleted Uranium Study Area of the Transonic Range, Aberdeen Proving Ground, Maryland. M. Picel and S. Kamboj, Argonne National Laboratory, Argonne, IL. April 1999.