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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 HANFORD PROJECT OFFICE
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RICHLAND, WASHINGTON 99352

August 24, 1993

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CORRESPONDENCE CONTROL

Brian L. Foley
U.S. Department of Energy
P.O. Box 550, Mail Stop A6-95
Richland, Washington 99352

Re: **Screening Performance Assessment/Risk Assessment for the Proposed Environmental Restoration Storage and Disposal Facility**

Dear Mr. Foley:

Enclosed are the combined comments from the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) on the **Screening Performance Assessment/Risk Assessment for the Proposed Environmental Restoration Storage and Disposal Facility (ERSDF), Preliminary Draft**. The document was transmitted by the U.S. Department of Energy (USDOE) on July 30, 1993.

We feel it is important to restate our position regarding possible uses of the "Kindred Model" that were applied in this analysis. This model was originally designed as tool to assist the decision makers (USDOE, EPA, and Ecology) in reducing the potential 16 disposal alternatives to a smaller subset. The model started out as a fate and transport model but after several modifications it contained cost and risk parameters. It has fulfilled it's task as a screening tool. However, the model may not be used for the final assessment of alternatives in order to select a single option.

In order to select a trench design that does not include a standard Minimum Technology Requirements (MTR) liner system and a RCRA equivalent cap, an analysis of the alternatives using an approved model based upon available field data must be completed. Due to the imposed time constraints required in choosing a preferred alternative, this analysis is impossible. Ecology and EPA therefore recommend that USDOE proceed with the MTR liner and the RCRA engineered barrier in the Conceptual Design Report (CDR). Any deviation from the standard MTR liner and RCRA barrier will only be considered after the initial Phase I construction of the disposal facility.

A Word Perfect 5.1 diskette of the enclosed comments is included for your convenience.

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AUG 1993 RECEIVED Becky A. Austin

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If you have any questions please call Pamela Innis at (509) 376-4919 or Richard Hibbard at (206) 493-9367.

Sincerely,

Richard B. Hibbard, P.E.
Washington State
Department of Ecology
Nuclear and Mixed Waste
Management Program
Unit Manager

Pamela Innis
U.S. Environmental Protection Agency
Hanford Project Office
Unit Manager

Enclosure

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Becky Austin, WHC
Ted Wooley, Ecology
Toby Michelena, Ecology
Audree DeAngeles, PRC
Bill Lum, USGS
Administrative Record, ERDF

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Cathy Massimino/Carrie Sikorski, EPA
George Hofer, EPA
Dave Fagan/Ann Price, EPA HQ

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INTRODUCTION

The U.S. Environmental Protection Agency and the Washington State Department of Ecology have completed the review of the preliminary draft Screening Performance Assessment/Risk Assessment for the Proposed Environmental Restoration Storage and Disposal Facility (ERSDF), Hanford, Washington. This report, which was prepared by the U.S. Department of Energy, Richland Operations Office, is dated July 30, 1993. The document was reviewed for technical adequacy and completeness. Because of a lack of additional information on the calculated source concentrations, the assumptions used in the Hydrologic Evaluation of Landfill Performance (HELP) model, and on computer output data, the review is incomplete.

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COMMENTS

Overall, the document adequately addresses the scoping of screening performance assessment and risk assessment for the proposed Environmental Restoration Storage and Disposal Facility (ERSDF). However, there are several concerns that need to be addressed.

1. The following six constituents were selected for a modeling study based on the criteria cited in the text (Section 1.2.1, page 2):

   - Uranium-238 (U-238)
   - Strontium-90 (Sr-90)
   - Plutonium-239 (Pu-239)
   - Hexavalent chromium (Cr[VI])
   - Trichloroethene (TCE)
   - Polychlorinated biphenyls (PCBs)

However, elevated levels of technetium-99 (Tc-99) were detected in groundwater in the 100, 200, and 300 areas relative to levels of uranium-238 present in the groundwater. This fission product of uranium-235 is highly mobile (probable distribution coefficient [Kd] for Tc-99 for the Hanford site is zero) compared to uranium (probable Kd for uranium for the Hanford site is 1) (DOE/RL 1993). This constituent (Tc-99) should therefore be included in the modeling study.

2. The text in Section 1.2.1 references Table 1-2 for the concentration of contaminants selected for the three waste types: Type E, Type C, and Type A. There are a few concerns regarding the reported values in the table.

- The terms soil radiation concentration and bulk soil concentration are not defined in the text.

- The unit for bulk soil concentration is reported as milligrams per kilogram (mg/kg) for organic and inorganic constituents as well as for radionuclides. The unit of bulk soil concentration for radionuclides should be reported in picocuries per gram (pCi/gm). The reported values for radionuclides should be appropriately corrected to pCi/gm.

- The bulk soil concentrations of U-238 for waste types A, C, and E are higher than its soil radiation concentration. On the other hand, the bulk soil concentrations for Sr-90 and Pu-239 are assumed to be substantially lower than their soil radiation concentrations. These assumptions are not explained.

3. The text in Section 1.3, the fourth paragraph, points out that all points of compliance appear to be unrealistic. Though institutional controls will be in place for some time, it is unlikely that they will extend for the proposed time of compliance for the facility (10,000 years). This sentence should be deleted from the text and other text modified to take this into consideration.

4. Equations are provided to estimate the source concentrations (Co) of each constituent in untreated waste and treated waste (Sections 2.3.1 and 2.3.2). From these equations, the minimum value out of concentration by the sorption equilibrium, solubility of constituent, and concentration resulting from matrix and diffusion of mass through pore moisture of waste matrix is used in the modeling study. The solubilities of U-238, Sr-90, and Pu-239 are listed in milligrams per liter (mg/L) in Table 3-4. The concentrations of radionuclides are generally expressed in picocuries per liter (pCi/L). It is not clear how the solubility values in mg/L are compared with the concentrations of radionuclides in pCi/L estimated by sorption equilibrium and matrix dissolution and diffusion rates.

5. The model does not give consideration to the time that the trenches are open during operation. This is an important consideration and should be accounted for in the model. It is not likely that the final cover will be advanced as waste is disposed therefore an operational model should be considered.

6. Values of 0.03 centimeter per year (cm/yr) for the Hanford barrier and 0.06 cm/yr for the modified Resource Conservation and Recovery Act (RCRA) barrier were assumed as infiltration rates through the barriers (Section 3.2, page 21). The basis for the assumption of two different infiltration rates for the Hanford barrier and modified RCRA barrier is not clearly explained but should be. Also, the estimated values must be confirmed through testing and monitoring.

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7. On page 19, section 3.1.2, last paragraph, a mixing factor is used in modeling the ratio of contaminated and uncontaminated infiltration through the cap. It should be noted that this will be inappropriate in the "Mega-Trench" concept for the disposal facility since any infiltration through the cap of the Mega-Trench will go into the buried waste.

8. The design of a 1:3 slope factor for lined trenches is noted in the report. Lined trenches have been constructed with steeper slopes of up to 1:2 and should be considered for the ER disposal facility.

9. Silt amended with bentonite is proposed to be used as a liner material at the ERSDF facility (Section 3.5.2, page 23). However, it is not explained in the report why synthetic liners are not considered in place of the bentonite liners.

10. The calculated values for source concentration (Co) in untreated waste and treated waste are not tabulated, but should be included for verification.

11. In the sensitivity analysis (Section 4.2, page 29), the text does not explain how each parameter cited as a variable affects the performance of each alternative.

12. The differences between the performance of the RCRA barrier and the Hanford barrier were concluded to be virtually indistinguishable (Section 4.2.2, page 31). However, no data or results are included to support this assertion. There is no separate model analysis of the RCRA barrier alternative to allow comparison of its performance with that of the Hanford barrier alternative.

13. The text in the discussion on data needs and issues (page 34) states that an infiltration barrier is probably the most critical element of the facility performance. It is not clear whether the statement refers to the surface barrier (Hanford or modified RCRA) or the liner (minimum technology requirements [MTR] liner or a single liner) or both as an infiltration barrier.

14. The discussion on data needs (page 34) identified solubility and retardation as the most important parameters for estimating risk. The discussion of the sensitivity analysis, however, does not explain how these two parameters affect the estimated risk.

15. As a worst-case scenario for waste type E, at a minimum the following alternatives should have been modeled to narrow down the alternatives remaining from the performance assessment values for incremental cancer risk and hazard quotient for selection of at least 4 + best alternatives. Only alternatives 1, 2, 5, 7, 10, and 11 are evaluated, however. The modeling results are not sufficiently complete to allow comparison of the performance among alternatives.

16. Unrealistic risk numbers are estimated from the modeling study for screening performance assessment of the 16 alternatives. The report should identify the process and the criteria to be used for further evaluation and detailed analysis of those alternatives selected by EPA, Ecology, and DOE for

consideration in estimating the realistic risk numbers. The mechanism to be adopted for going from alternative screening to conceptual design of ERSDF should also be explained.

17. Page 34, last bullet on page, "An infiltration barrier is probably the most critical element of the facility performance." We agree and this points out how important it is to have real world performance data in assessing the construction and physical shape (above prevailing land surface or equal to it) of the barrier. So far, this is unproven technology and no data exists to evaluate it.

18. The text on page 35 states that, "Although the benefits of fixation and vitrification are not warranted . . . other types of treatment . . . may deserve further attention." The treatment technology considered for further evaluation should be specified for regulators approval before proceeding to a detailed evaluation.

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REFERENCES

DOE/RL 1993. 200 West Groundwater Aggregate Area Management Study Report. U.S. Department of Energy. DOE/RL-92-16, Revision 0. January.

CORRESPONDENCE DISTRIBUTION COVERSHEET

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Subject: SCREENING PERFORMANCE ASSESSMENT/RISK ASSESSMENT FOR THE PROPOSED ENVIRONMENTAL RESTORATION STORAGE AND DISPOSAL FACILITY

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