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STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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April 15, 1994

Mr. Steven H. Wisness
Project Manager
U.S. Department of Energy
P.O. Box 550 MSIN: A5-15
Richland, WA 99352

0013294.3175

Dear Mr. Wisness:

The Washington State Department of Ecology has completed the review of the Draft Corrective Action Management Unit Application for the Environmental Restoration Disposal Facility, dated March 15, 1994. Enclosed are our comments.

If you have any questions or concerns regarding these comments, please call me at (509) 736-3048.

Sincerely,

Norman T. Hepner
Environmental Engineer
Nuclear Waste Program

NH:mf
Enclosure

cc: Bryan Foley, USDOE
Pam Innis, EPA
Administrative Record (ERDF)

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COMMENTS ON ERDF CAMU PERMIT APPLICATION

GENERAL COMMENTS:

1. The CAMU permit application is a lengthy document. Much of the text is not applicable to a CAMU designation. Instead of articulating what a CAMU is, the document strongly states what a CAMU is not. In doing so, the document defends what is not to be done versus explaining the merits of a CAMU.

   Changes made to the permit application should ensure a more readable text discussing the merits of a CAMU. The text should be rearranged to provide a more comprehensive review of the CAMU criteria. As currently written, the CAMU criteria take second stage to the document structure. In fact, the CAMU criteria (Section 15) has the greatest potential to be a clear evaluation. However, because it references other sections, its ability to convey information and rationale is lost.

   The organization of the current document is not appropriate for a CAMU application. The repeated discussions of non-CAMU related requirements are confusing and misleading. At a minimum, the discussions of non-CAMU related requirements for land based units should be removed. We suggest that the document be re-organized to generally follow the CAMU criteria specified in 40 CFR § 264.552. We suggest that the revised document include:

   An introduction, addressing the scope of the CAMU being requested and including a brief discussion of the CAMU regulations;

   A background section, discussing the Hanford site cleanup and the relationship of the requested CAMU to site-wide remediation;

   A relationship to CERCLA section, discussing the duel regulatory status of the unit and the relationship of the CAMU application to the RI/FS document and the Proposed Plan;

   Expanded sections on each of the CAMU designation criteria;

   Sections on CAMU design, operation, maintenance, closure and post-closure; and

   A section on characteristics of remediation waste to be managed at the proposed CAMU.

2. The application repeatedly references additional information submittals; a schedule for such submittals should be provided. In some cases, it will be difficult

to make a determination regarding CAMU designation until the additional information has been reviewed (e.g., information on waste acceptance, waste handling, and waste analysis is not complete).

3. The CAMU permit application states that the application will be modified following receipt of additional information. In several instances, it mentions that this information will be provided prior to receipt of a permit. This information is necessary prior to the trench accepting CERCLA waste. The application does not clearly state that operation of the ERDF CAMU will not begin until all substantive regulatory requirements are met. It is important that the reader understands that plans, studies, reports, and investigations will be completed prior to accepting any waste.

4. References to the 100% Draft CDR appear throughout the document. This reference is not currently releasable to the public. The CAMU application needs to be edited to incorporate the Final CDR requirements.

5. More detail is necessary regarding the types of remediation waste proposed for management in the CAMU. For example, waste generated by removal and decontamination activities associated with closure of RCRA regulated units is excluded from the definition of remediation waste and not eligible for management in a CAMU. Some wastes generated through decommissioning and deactivation activities (e.g., containerized waste stored at facilities scheduled for D/D) may be more appropriately considered "as generated" wastes, and would not be eligible for management in a CAMU. Additionally, care should be taken to consistently refer to wastes anticipated for management in the CAMU as remediation wastes.

Section 1: Introduction

6. Comment: page 1-1, line 29

   The definition of Waste Management Area (WMA) is not needed. The groundwater monitoring systems associated with CAMU design, operation, maintenance, closure, and post-closure should be considered part of the CAMU and do not require a separate definition.

7. Comment: page 1-1; line 39

   Each "land based unit" within the ERDF, if separate from the CAMU trench, should be considered a separate CAMU. A CAMU is a single land based unit and its support and ancillary equipment; a CAMU can not be a series of land based units.

8. Comment: page 1-2; line 29

What "applicable requirements of RCRA" are being referred to? As a CAMU, the only applicable requirements are those in 40 CFR § 264.552, which do not specify design criteria for liners, leachate collection, interim, or final covers. Avoid references which lead the reader to believe that the CAMU "should" or "may" be subject to conventional requirements for hazardous waste landfills.

9. Comment: page 1-3; line 27

For ancillary support units located at or within the CAMU and intended for management of hazardous remediation waste, the application should discuss the status of those units under RCRA. Non-land based units located at or within the CAMU are not considered part of the CAMU, maintain their separate regulatory identity, and are subject to all applicable hazardous waste management requirements.

Section 2: Facility Description

10. Comment: page 2-9; line 42

Please avoid presenting the CAMU as a mechanism to "mitigate problems associated with mandatory compliance with LDRs." The CAMU should be presented as a legitimate, appropriate, and environmentally protective management facility for remediation waste, not as a mechanism to avoid compliance with complicated or costly portions of the regulations for as-generated wastes.

Section 3: ERDF CAMU Waste Characteristics

11. Comment: page 3-6, Sections 3.2 & 3.3

Decisions on designation of the ERDF as a CAMU are not possible until much of the additional information on characterization and acceptance criteria for remediation wastes referenced in this section is provided. Specific references to additional information include:

3.2.1 - Role of Generation & Waste Acceptance Services;
3.2.2 - Pre-approval protocols and waste tracking;
3.2.3 - Procedures for undocumented waste and waste which does not match pre-approved characterization;
3.2.3.2 - Waste tracking system;
3.2.10 - Procedures for incompatible waste and management of ignitable wastes;

3.3.1 - Leachate concentrations, health-risk based waste acceptance criteria levels, ERDF trench performance assessment;
3.3.2 - Assumptions and methods used to calculate leachate and health-risk based waste acceptance levels;
3.3.3.1 - Waste identification, quantification, and tracking for waste generated at ERDF; and
3.3.3.2 - Sampling and analysis plan for ERDF storm water and treated waste water.

12. Comment: page 3-2; line 35

CAMUs are not necessarily appropriate for "wastes requiring remediation," only for wastes generated through remediation of the facility, that is, remediation wastes.

13. Comment: page 3-6; line 11

Please clarify that the Waste Acceptance Plan will require and review characterization of the hazardous/dangerous remediation waste destined for management in the proposed CAMU.

14. Comment: page 3-6, Section 3.2.1

The discussion of the relative responsibilities of Generator, CAMU Operator, and Generator & Waste Acceptance Services is confusing. At a minimum, the discussion should be clarified to indicate that the "generators" are actually operable units and the units/points-of-generation are all part of the site-wide Hanford cleanup. Since the three groups seem to have overlapping jurisdictions and responsibilities, a flow chart diagraming remediation waste management and decision points from point-of-generation to ultimate disposition would be helpful.

15. Comment: page 3-11; line 24

Clarify that the CERCLA actions will produce remediation wastes, and that only remediation wastes will be considered for management in the proposed CAMU.

16. Comment: page 3-12; line 20

Emphasize that only remediation waste will be evaluated against the waste acceptance criteria for management in the CAMU.

17. Comment: page 3-15; line 16

Wastes generated by equipment and facilities not included in the CAMU (e.g., spent HEPA filters from non-land based support units) are likely not included in

the definition of remediation waste and should be considered "as-generated" wastes. It's true that wastes derived from treatment of remediation wastes are also considered remediation wastes, but the status of wastes generated by regulated management of remediation wastes is less clear.

18. Comment: page 3-15; line 24

Only remediation wastes generated pursuant to implementation of corrective actions are appropriate for management within a CAMU.

Section 4: ERDF CAMU Process Information

19. Comment: page 4-1; lines 40 - 49

The structure of section 4 is not appropriate for a CAMU application. Evaluating the proposed CAMU against standards for management of as-generated waste in conventional land based units is not appropriate as CAMUs are a different type of unit, subject to a different set of CAMU-specific standards. Discussion of the design, operation and maintenance of the proposed CAMU should be presented as suggested standards for the regulatory agency to specify as required by 40 CFR § 264.552(e)(2) and should be discussed in the context of the CAMU designation criteria at 40 CFR § 264.552(c).

20. Comment: page 4-2; line 5

Avoid referring to the proposed CAMU as a "landfill" or as a unit closely resembling a landfill. In order to be approved as a CAMU, the proposed CAMU must differ significantly from a hazardous waste landfill in that it will designated in accordance with the criteria at 40 CFR § 264.552(c) and will be used only for management of remediation waste.

21. Comment: page 4-2; line 25

If additional land based units are added for management of remediation waste, their approval will constitute designation of separate and distinct CAMUs instead of "expansion" of the proposed CAMU.

22. Comment: page 4-5, Section 4.12

The discussion of the design of the proposed CAMU as it relates to guidance on design and operation of hazardous waste landfills should emphasize that the design criteria for hazardous waste landfills were chosen because they represent well-documented conservative design criteria. Discussions of the applicability of the criteria for landfills to the proposed CAMU and presentation of the proposed CAMU as a landfill-equivalent unit should be avoided.

23. Comment: page 4-12, Section 4.12.4

A schedule should be provided for completion and provision of the subsurface characterization and field data described in section 4.12.4.

24. Comment: page 4-36, line 10

A schedule for provision of the CAMU-specific Response Action Plan should be provided.

25. Comment: page 4-51; lines 26-31

The information necessary to support designation of additional land based units needed for management of remediation wastes as CAMUs should be presented in the context of the CAMU designation criteria rather than the criteria for permitting of land based units intended for management of as-generated wastes.

26. Comment: page 4-53, lines 33-37

If this discussion is meant to articulate the "RCRA empty container rule," it should include a commitment to meet the empty container rule performance standard in 40 CFR § 261.7(b)(1)(ii), that is, "all wastes that can be removed using the practices commonly employed to remove materials from that type of container, e.g., pouring, pumping, and aspirating . . . ."

27. Comment: page 4-55; line 31

A schedule for provision of information on the design and construction of the secondary containment system should be provided.

Section 5: Groundwater

28. Comment: page 5-3, Section 5.3.3.1

According to the text, there are "numerous informally recognized stratigraphic units." However, nowhere in the text does it describe any of these stratigraphic units. Some of these stratigraphic units in the Ringold Formation are well established and should be clarified before we describe the Hanford site specific geology and hydrogeology.

29. Comment: page 5-8 thru 5-9, Section 5.3.4

This section doesn't describe the presence of perched water zones in the area. The lateral extent and composition of the Plio-Pleistocene and early "Palouse" soil units may provide conditions amenable to the formation of perched water zones

GENERAL COMMENTS

In general, the Pilot-Scale Treatability Test Plan for the 200-UP-1 Groundwater Operable Unit adequately describes a framework for a remedy selection treatability test for a pump-and-treat alternative using ion exchange technology. However, the test plan should not be considered complete until detailed laboratory and pilot-scale test procedures, information on the detailed hydrogeologic study/modeling for the selection of extraction and injection wells, a sampling and analysis plan, a quality control project plan, and a waste control plan are reviewed and approved. Other general concerns that should be addressed are as follows:

The test plan focuses on achievement of at least 90 percent removal of primary contaminants (total uranium and technetium-99 [^{99}Tc]) from the extracted groundwater by the selected ion-exchange technology. The performance level for nitrate removal during ion exchange treatment should also be specified. In addition, reduction of nitrate may also be important since uranium mobility is potentially linked to the presence of nitrate.

The scope of the test plan states that the preferred treatment technology will be tested. It is not clear why the scope is limited to testing the preferred treatment technology instead of testing the entire alternative (i.e., removal of the contaminated mass by pumping and treatment of contaminants with the preferred treatment technology).

A substantial amount of uranium (28,100,000 pounds and ^{99}Tc (mass unknown) was disposed of at the 200-UP-1 operable unit. The estimated dissolved plume quantity is 0.5 pound and 20.2 pound for uranium and ^{99}Tc respectively. The test plan does not discuss where the remaining contaminant mass is located, in the vadose zone soils or in saturated zone soils. If the uranium K_d is as low as assumed in the test plan, then a high proportion of the mass of uranium disposed should be dissolved in the plume. Since this is not the case, a significant quantity of residual uranium may be sorbed in the saturated zone. Therefore, evaluating the "recoverability" of the contaminants from the saturated zone is an important component of addressing whether a pump and treat alternative will be effective. Additionally, (1) pumping and treatment may be a potential interim as well as a final remedial action alternative; and (2) during the detailed analysis of alternatives in the feasibility study (FS), the entire alternative is evaluated. Thus, the scope of the test plan should address testing the preferred alternative, instead of only the treatment portion of the alternative, in order to most effectively use the treatability study data for remedy selection.

The performance level for reduction of total contaminant mass (uranium, ^{99}Tc, and nitrate) in the groundwater aquifer by pumping is not identified. To fully address the effectiveness of this alternative in remediating groundwater, the performance level for reduction of the contaminant mass in the groundwater aquifer should be specified. The test should be designed so that performance data from the test can be used to address this question when a full-scale pump and treat system is evaluated.

Although the performance goal is set at 90 percent for removal of uranium and ^{99}Tc by the ion exchange system, the interim remedial measure (IRM) contaminant limits should be specified for each contaminant in order to evaluate the technology, and whether the data obtained from this study will support an interim action Record of Decision (ROD) for the 200-UP-1 Operable Unit. As presented, it is not clear whether 90 percent removal efficiencies will ultimately meet IRM remediation goals, should return of the treated water back to the aquifer be considered.

The report does not have any information on the hydrogeologic aspects of well selection for extraction and injection. The modeling and other related hydrogeologic studies that were carried out need to be incorporated.

The test plan should include a section on treatability study data interpretation.

The test plan does not include costs for mobilization and demobilization, installation and testing of extraction and injection wells, equipment, materials, utilities, chemicals, monitoring, sampling and analysis, data analysis, and report preparation, but should.

The report does not give any information on how and when the system will be used at the maximum capacity once the pilot-scale treatability study is successful.

The test plan ignores all the lab/bench studies that will be carried out for nitrate as per the recent Tri-Party Agreement.

SPECIFIC COMMENTS

Section 1.0, page 1-1, line 49-55

Update the information according to the recent TPA negotiation.

Section 1.1, page 1-3, second paragraph

The test plan proposes to evaluate the resins selected for removal of uranium and ^{99}Tc for their effectiveness at removing nitrates. Although anionic resins remove both uranium and nitrate, nitrate ions compete with uranium for exchange sites on the resin. High nitrate, and to some extent other ions in general, can therefore adversely affect cost. Because of elevated levels of nitrate (up to 1,300 mg/L) in the 200-UP-1 operable unit groundwater, a two-stage ion-exchange treatment process should be considered if the study is intended to obtain data for remediation of groundwater. The first stage should use nitrate-selective resins to reduce the nitrate concentration to a level acceptable for subsequent removal of uranium and ^{99}Tc in the second stage ion-exchange treatment. This approach will be cost effective in terms of efficiency and secondary waste disposal with radionuclides. Laboratory studies and full-scale nitrate removal processes have shown that some strong-base and weak-base ion-exchange resins are nitrate-selective and can reduce the nitrate concentration from as high as 50 milligrams per liter (mg/L) as N to 0.5 mg/L (Gauntlett 1975; Gregg 1973; Korngold 1973; Beulow et al. 1975).

Section 1.2, page 1-4, fourth paragraph

The text states, "other contaminants with well defined plumes that are observed within the target area of the IRM plume include: carbon tetrachloride, chloroform, iodine-129 (^{129}I), arsenic, and fluoride." If these contaminants are within the target area of the plume, then the test plan should include a scope of work to assess the effects of these contaminants on the performance of the selected alternative. The test plan, however, does not discuss these contaminants in terms of defining the scope of the pilot-scale treatability test. The test plan should identify the concentration levels of other contaminants within the target area of the IRM plume for the treatability study. It should then explain why the effect of these contaminants on the performance of the selected remedy is not evaluated.

Table 1-1, page 1T-1

The quantity disposed of and the dissolved plume quantity for uranium and ^{99}Tc are reported both in curies (ci) and in pounds. The conversion factor used to estimate the mass in pound should be provided in Appendix C to allow verification of the values. Additionally, the dissolved plume quantity is reported greater than the disposed quantity for nitrate. The source for the excess quantity of nitrate dissolved in the groundwater should be cited in the footnote.

Section 2.1, page 2-1, second paragraph

The text states, "under the IRM, the selected groundwater interim action should proceed until the response objective (e.g., reduction in risk) is met, a point of diminishing returns is reached, or natural attenuation exceeds active treatment." This response objective is vague. The IRM objective should be clearly identified and the IRM contaminant limits should be based on the anticipated cleanup criteria to be established in the interim ROD.

Section 2.0, page 2-1, line 42-49

The physical/chemical limitations as described are not clear. As far as we know, the contaminants are not in the form of immiscible liquid in the groundwater. Once we pump the groundwater, the contaminants are also expected to move along with it. Explain clearly what you meant by the physical/chemical limitations.

Section 2.2.2, page 2-4, line 10 and 15

Describe what chemicals are you going to add to neutralize the water.

Table 3T-1, page 3T-1

Provide a list of analytes that are going to be screened during the test.

Section 3.1, page 3-2, first bullet

The text reads "assess impacts of groundwater constituents on operational efficiency." The specific constituents that will be assessed should be identified and the method of assessing their impacts on operational efficiency should be explained.

Assessment of operating parameters (e.g., flow rates, residence times, and pH) is proposed to optimize treatment efficiency. The text should explain the way these operating parameters will be varied during the test to optimize treatment efficiency. A range of values for these operating parameters should also be specified, as should the number of tests for each variable. A statistically designed experimental plan should be used to determine the best values for the proposed operating parameters. A factorial or fractional factorial design developed by Box et al. (1978) will reduce the number of experimental runs and provide more information at a lower cost.

Table 3-2, page 3T-2a, second bullet

Process chemistry (e.g., total suspended solids, dissolved oxygen, sodium, chloride, sulfate, arsenic, fluoride, ^{129}I, and organics) is included under operational parameters.

The frequency of sampling for these parameters, however, is not identified, nor are the types of organics to be monitored. These omissions should be rectified.

Section 4.1, page 4-2

Provide the information on the different types of ion exchange resins including properties of resins to be tested in the laboratory.

Section 4.1, page 4-2

The text should state whether single-run or multiple-run tests will be conducted on screened candidate resins during flow-through column measurements to determine a preferred resin or resins. The flow-through column height should be specified.

Section 4.2.3 and 4.4

These sections must include a detailed information of modeling and other related hydrogeologic information to justify the well selection, rate of pumping, etc.

Section 4.4, page 4-8, second and third paragraphs

These two paragraphs discuss the selection of wells for groundwater extraction and recirculation. The saturated screen lengths for the proposed extraction wells (W19-24 and W19-25) are 10.3 and 13.6 feet respectively. Section 1.3 states that the plume thickness was assumed to be 33 feet, although the aquifer thickness is 160 feet. Performance data from the extraction well and associated monitoring wells should be used to better establish the vertical extent of the plume, and to help adequately design a groundwater extraction system that will capture the contaminant plume to IRM action levels.

Section 4.5, page 4-9, second paragraph

A map showing the locations of recommended monitoring wells 299-W19-29 and 299-W19-30 should be included. The wells are not present on Figures 1-2, 1-3, or 4-3.

REFERENCES

Beulow et. al., R.W., 1975. Nitrate Removal by Anion-Exchange Resins. Journal AWWA, V.67, No. 9, pp. 528.

Box, G.E.P., W.G. Hunter, and J.S. Hunter 1978. Statistics for Experiments, An Introduction to Design, Data Analysis, and Model Building. John Wiley and Sons. New York.

EPA 1992. Guide for Conducting Treatability Studies Under CERCLA. EPA/540/R-92/071a. U.S. Environmental Protection Agency. October.

Gauntlett, R.B. 1975. Nitrate Removal from Water by Ion Exchange. Water Treatment Exam. V. 24, No. 3.

Gregg, J.C. 1973. Nitrate Removal at Water Treatment Plants. Civil Engineering. V. 43, No. 4.

Korngold, E. 1973. Removal of Nitrates from Potable Water by Ion Exchange. Water, Air, Soil Pollution. V. 2, pp. 15-22.