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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 HANFORD PROJECT OFFICE
712 SWIFT BOULEVARD, SUITE 5
RICHLAND, WASHINGTON 99352

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February 4, 1994

Robert G. McLeod
U.S. Department of Energy
P.O. Box 550, A5-19
Richland, Washington 99352

Re: 300-FF-1 RI Phase II Report Comments

Dear Mr. McLeod:

Enclosed are the combined U.S. Environmental Protection Agency and Washington Department of Ecology comments on the 300-FF-1 Operable Unit Remedial Investigation Phase II Report (DOE/RL-93-96, Draft A). These comments were previously transmitted to you electronically. If you have any questions, please do not hesitate to call me at 376-3883. 33429

Sincerely,

David R. Einan
Operable Unit Manager

Enclosure

cc: J. Field, WHC
T. Wooley, Ecology
Administrative Record (300-FF-1 Operable Unit)

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GENERAL COMMENTS

The 300-FF-1 operable unit (OU) physical separation of soil treatability study, in general, demonstrates the potential to reduce the amount of contaminated soils in the 300-FF-1 OU by over 90 percent at a cut-off point of 0.425-millimeter (mm) particle size using a physical separation system. However, it lacks conclusive evidence that soil washing is a viable option for volume reduction of contaminated soils in the 300-FF-1 operable unit. The evidence for success is provided more from the standpoint of benchscale results than from pilot scale performance. There must be a successful propagation of adequate performance beginning with bench scale operations all the way through to full-scale operations for soil washing to be considered for remedial action in 300-FF-1.

In addition, several issues remain to be addressed:

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- The proposed test performance levels (TPL's) are not explained. The proposed TPL's are high for most of the contaminants of concern (COC). For example, the TPL for uranium (U)-238 is 370 picocurie per gram (pCi/g.) Preliminary risk-based screening for radioactive soil contaminants at the North Process Pond calculated the following soil concentrations for U-238 (DOE 1992):

  - 0.93 pCi/g at external lifetime incremental concern risk (ICR) = 10^{-6}

  - 27 pCi/g at oral ICR = 10^{-6}

  - 7 pCi/g at inhalation ICR = 10^{-6}

  If these conservative levels are used to return the "clean" soil fractions for backfilling, then the volume reduction achievable by these physical separation systems would likely be significantly lower.

- Test results indicate that soil containing the "green material" was the primary source of the radioactivity contributed primarily by U-238 radioisotope. The soil characterization protocol should include examination of the various size fractions of a representative sample of radioactive soil to provide additional information on contaminant and host-material (green material) mineralogical and physical properties in support of feasible volume reduction techniques.

- An important consideration in a large-scale remediation process using water is the amount of water required. If the wash water can be recycled, an appreciable amount of water will be conserved. Further, recycling will eliminate the necessity of disposal or treatment of large volumes of radioactive liquids. This report does not identify the recycle capability of the wash water. Future studies should examine whether wash water could be disposed

or C, soil cleanup levels. This should be clarified. The basis for setting these performance levels for the treatability tests should also be explained in the text.

2. **Section 1.4, page 1-7**

This section discusses soil washing as a water-based technology without the use of chemicals. It is seeming doubtful that a water-only-based technology will be adequate for the contaminant reduction in 300-FF-1 soils. Add text that discusses the potential for use of chemical additives.

3. **Section 1.4, Figure 1-3, page 1-10**

In this figure, screen size and clean soil fraction size are specified in inches, in millimeters (mm) and in both units (for example 1-inch to 2-mm clean soil). A single unit should be used to specify screen sizes and size fractions of processed soils, (either inches or mm) or both units could be used with one in parenthesis.

This comment is also applicable to Figures 2-1a and 2-2a.

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4. **Section 1.4, page 1-11, second, fourth, and fifth bullets**

The wire mesh screen size for the United States National Bureau of Standards (US) #40 or US #70 should be given in millimeters within parenthesis for clarity.

A schematic diagram of the off-line water treatment process used in this study should be included.

The kind of box to be used and the range of specific activity applicable to disposal of wastes in the low-specific-activity (LSA) boxes should be identified.

Section 2.1, page 2-1, fourth paragraph, second bullet

The text states that the cleanup levels are "(i) < 20 μR/hr above background radioactivity; (ii) the Residual Radioactivity Program, < 25 mRem/hr; (iii) WHC radioactive threshold concentrations for accessible soils; and MTCA, Method C, soil cleanup levels." A definition for the units "μR/hr" and "mRem/hr" should be provided. The relationship between (μR/hr), (mRem/hr), and pCi/g should be discussed.

Also, when was MTCA Method C agreed upon and where was this documented?

5. **Section 2.1, page 2-1, last paragraph**

Although water treatment is a secondary objective for the tests, data on the type and amount of wastewater generated from washing operations would be useful for selecting appropriate technologies and estimating the cost for treatment and disposal or recycling of wash water. The treatability tests

12. **Section 2.2.2, page 2-8, first paragraph**

A total of 17.5 tons of material was processed during test run #1. The text should specify the total duration of the tests for processing this material and the amount of soil processed each day.

13. **Section 2.2.2, page 2-8, last paragraph**

The amount of additional storage volume created by evaporation in each fractionation rank should be identified.

14. **Section 2.2.2, Table 2-2, page 2-9**

The number of process soil and effluent samples collected in test run #1 is shown in this table, categorized by laboratory analysis, physical analysis (XRF and gamma spectrometry), and toxicity characteristic leaching procedure (TCLP) analysis. The discussion on page 2-8 (first paragraph), identifies the off-site analytical laboratory, and PNL. The report should identify which samples were sent to which laboratory. A revised table showing sampling location, sample designation, and the type of analysis to be performed for samples sent to each laboratory would be useful.

This comments is also applicable to Table 2-3.

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15. **Section 2.2.3, page 2-10, last paragraph**

The text states that "A US #40 sieve was used for this test (Test #2) because soils processed in Test #1 using the US #40 sieve did not meet test goals." This statement is confusing because the same sieve (US #40) was used both in tests #1 and #2.

16. **Section 2.2.3, page 2-11, third paragraph**

Additional soils containing green material were processed with equipment adjustments. For example, sprays were added to the 0.425-mm screen and the speed of the screen vibration was reduced. The operating parameters (such as nozzle pressure and flow rate and the speed of screen vibration), however, are not shown, but should be, in Figure 2-2b.

17. **Section 2.2.4, page 2-11, second paragraph**

Operating parameters, sampling locations, sample numbers, and types of analyses performed should be included for water treatment tests conducted following completion of test run #2.

18. **Section 2.2.4, page 2-16, second paragraph**

The text states that approximately half of the water from the fractionation tanks was processed through the clarifier skid. The handling and disposal of the clarified effluent, however, is not discussed, but should be.

two fractionation tanks. This inconsistency should be corrected as appropriate.

The second paragraph states, "Process effluent was recycled through the treatment system and back into the fractionation tanks until solids were removed from the tanks and effluent met purgewater acceptable standards." In Section 2.2.4 (page 2-16, second paragraph), the text states that approximately half of the water was processed in a single cycle through the clarifier skid. It is not clear whether all of the water containing fine solids was treated in a single cycle or several cycles. This should be clarified.

In the third paragraph, the text states that the solids removed from the effluent were contained in low-specific-activity boxes. The number of boxes, the amount of solids contained in each, and sampling and analysis procedures used should also be discussed.

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26. Section 3.2.2, Table 3-8, page 3-10

Particle sizes are shown in the first row of this table. It is not clear whether the sizes are greater than or less than the given values. In the last column of the first row, zero (0) size is listed. The meaning of "0" size should be explained in the text or in a footnote to the table. The values for total uranium in the last row are presented in pCi/g by converting total uranium milligrams per kilogram (mg/kg) to pCi/g. The source for analytical results in mg/kg for total uranium should be cited in a footnote. Further, the reported values are misaligned, making it difficult to evaluate the results. The values corresponding to lead (Pb) appear to be very high, but actually are not. Those values may be for uranium in mg/kg. At any rate, the reported values listed for U in pCi/g by using a conversion factor of 0.35 are incorrect. These discrepancies should be corrected.

27. Section 3.2.2, page 3-11, third paragraph

This paragraph discusses the fact that performance levels for uranium were met in the course fractions between 2- to 9.5 mm. A table that shows which performance levels were not met and a brief statement to explain how each problem will be addressed in future tests would be helpful.

28. Section 3.3.2, page 3-25, sixth paragraph

The source for the contaminants tetrachloroethylene (PCE) and trichloroethylene (TCE) found in test run #1 process water samples should be identified.

29. Section 3.4, page 3-34, first paragraph

The text states that, "As a result of . . . decided to drain the system for the winter." It is not clear whether the decision was to drain the contents of the fractionation tanks, the contents of the clarifier or the entire water treatment system. The text should also identify where the contents of the system were drained.