Department of Energy
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Mr. Dave C. Nylander
Nuclear Waste Program
State of Washington
Department of Ecology
P.O. Box 1386, MSIN N1-05
Richland, Washington 99352-0539

Mr. Douglas R. Sherwood
Hanford Project Manager
U.S. Environmental Protection Agency
712 Swift Boulevard, Suite 5
Richland, Washington 99352

Dear Messrs. Nylander and Sherwood:

100 AREA SOIL WASHING: BENCH-SCALE TESTS ON 116-F-4 PLUTO CRIB SOIL (WHC-SD-EN-TI-268, REV. 0) 36871

Enclosed please find the subject document provided for your information. Tests reported in the enclosure were prompted by the U.S. Department of Energy, Richland Operations Office (RL), the U.S. Environmental Protection Agency (EPA), and the State of Washington Department of Ecology (Ecology) 100 Area Unit Managers agreement (documented in 100 Area NPL Agreement/Change Control Form #51) to treat contaminated soil excavated from the 116-F-4 crib. RL, EPA, and Ecology unit managers agreed that soil washing was the preferred method of volume reduction treatment. RL tasked the Westinghouse Hanford Company (WHC) to implement the following agreement: "The 116-F-4 crib soil will undergo the level of soil washing bench scale testing necessary to confirm whether this material is amenable to soil washing." This report was prepared for WHC by the Pacific Northwest Laboratory.

The report concludes that autogenous attrition grinding of soil excavated from 116-F-4 is needed to achieve the test performance level of 30 pCi/g for ^{137}Cs, which results in a volume reduction of 55% to 66%. Additional grinding, with a corresponding decrease in volume reduction, would be required to further reduce the level of ^{137}Cs. Autogenous attrition grinding is appropriate for, and was performed on, gravel and cobble fractions only.

Treatment of the sand fraction was much more difficult. Two stage attrition scrubbing with electrolyte followed by chemical extraction was required to reach the ^{137}Cs test performance goal, which also resulted in a volume reduction of 80%. The success of this approach is balanced by RL's judgement that it is probably not economically feasible for implementation on a pilot scale on soils with similar characteristics to those excavated from 116-F-4. Sand particles comprise only about 10% of the soils in the 116-F-4 samples. In addition, ^{137}Cs was found to be solubilized by the electrolyte, indicating the need for a significant amount of water treatment in addition to the attrition scrubbing.

By strict interpretation, these conclusions are valid only for the soil samples tested (80% gravel or larger with initial contamination levels of approximately 300pCi/g for ^{137}Cs); however, the performance is probably typical of coarse soils comparably contaminated in other 100 Area waste sites. The success of 80% volume reduction using two stage attrition scrubbing with electrolyte followed by chemical extraction on a finer than #10 mesh soil is significant, and it may be appropriate at other 100 Area waste sites with large fractions of fine grained soils. Further consideration of the chemical extraction approach should be based on results of recommended future cost/benefit analyses.

Please note transmittal of the subject document to EPA and Ecology was proposed by RL as an interim milestone (M-15-07F) in the Hanford Federal Facility Agreement and Consent Order Change Control Form M-15-94-05 transmitted to EPA and Ecology on May 13, 1994. Please address any comments or questions regarding this correspondence to Mr. Eric D. Goller on (509) 376-7326.

Sincerely,

Patrick W. Willison
Acting Hanford Project Manager

END:EDG

Enclosure

cc w/encl:
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