



Department of Energy

Idaho Operations Office
West Valley Project Office
P.O. Box 191
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January 8, 1991

*Project M-32
PDR/LPDR*

Mr. R. Davis Hurt
U. S. Nuclear Regulatory Commission
Headquarters
Washington, D. C. 10555

SUBJECT: Selection of Technology for Sludge Washing

Dear Mr. Hurt:

Attached is Draft C of the White Paper, "Evaluation and Selection of a Process to Remove Plutonium from West Valley High-Level Waste Sludge Wash Water." Based on the results of our laboratory testing and the review of the peer review team, the West Valley Demonstration Project (WVDP) has selected a combination of elevated pH in the wash water and titanium coated zeolite (IE-96) in the Supernatant Treatment System (STS) ion exchange columns to remove plutonium from the wash water. These technologies were selected as a result of the experiments performed at WVDP and at Pacific Northwest Laboratories (PNL); the data from the tests is reported in the attached White Paper.

The WVDP assembled a peer review team to technically review the results of the experiments performed and concur with the conclusions drawn from the results of these experiments. Specific comments from the peer review team and the WVDP response to these comments are given in Attachment A. In general, the peer review team agreed that the experiments supported the selection of the combined technologies and that the experiments showed that the technologies appeared compatible with the present WVDP systems. The team did, however, express some reservations and suggested additional studies to relieve their concerns. These additional tests will be performed as noted in Attachment A and the results of these further experiments will be reported in the final draft of the White Paper.

Based on the test results and the favorable peer review, the WVDP is actively pursuing the procurement of the titanium coated zeolite IE-96.

Sincerely,

Tom Rowland

T. J. Rowland, Acting Director
West Valley Project Office

Attachments: A) WNS Response to Peer Review Team's Comments and Proposed Additional Studies
B) White Paper - Draft C

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ATTACHMENT A

These are the peer review team's comments and proposed additional studies and the WVNS response to these proposed studies and comments.

COMMENT: The R_d data for Pu is of questionable value.

RESPONSE: The R_d test is used only for screening purposes. The value is a good indicator if plutonium (Pu) is being removed from the wash solution. The actual mechanism for the removal of the Pu is unknown at this time.

COMMENT: No data is available to indicate how an uncoated zeolite column would perform for Pu removal at pH 12.5.

RESPONSE: A column study was conducted by PNL to determine if uncoated zeolite at pH 12.5 has a decontamination factor (DF) for Pu. Preliminary data indicates that no significant DF was obtained from this test.

COMMENT: Source of treated zeolite is definitely in question.

RESPONSE: There is a patent confidentiality agreement between PNL and UOP for developing the titanium coated zeolite. A third party is being developed to supply titanium trichloride to UOP. Titanium coated zeolite will be prepared for testing purposes using a solution of titanium trichloride. The titanium coated zeolite will be used in a R_d test for Pu, Cesium (Cs), and Strontium (Sr). The results will show if the solution is suitable for use by UOP for production of titanium coated zeolite. This test is scheduled to be completed by February 1, 1991.

COMMENT: Concentration of Pu on the treated zeolite increases the criticality concerns for the total process.

RESPONSE: WVNS feels the question of criticality has been satisfactorily addressed in the criticality analysis and SAR addendum. The DOE-HQ TRG independently reviewed and agreed with these conclusions.

COMMENT: Further column tests are suggested to enlarge the data base for the process scale-up.

RESPONSE: WVNS will conduct column tests at 6°C using titanium coated zeolite prepared by PNL and UOP. This test will provide the DF for Cs, Pu, and Sr. A comparison of the data from the UOP and PNL prepared titanium coated zeolite will determine if the UOP titanium coated zeolite is suitable for use in the STS.

COMMENT: Get better and more complete analyses of Pu, carbonate, and sulfate material balances for both the zeolite decon and sludge wash steps.

RESPONSE: The data generated and the data which will be obtained from the additional studies will be sufficient to answer the question of material balance concerning the sludge and the wash water.

COMMENT: Study leakage of Cs and Pu from the column during nonoperational periods when the zeolite is covered with water.

RESPONSE: WVNS is currently studying the effect of Cs and Pu leakage from the columns while the column is in the recirculation mode. The data will be available by the end of January 1991.

COMMENT: Study the effect of pH 12.5 solution on the zeolite.

RESPONSE: During the experiments conducted by both WVNS and PNL, no column solidification was detected while using wash water at pH 12.0.

COMMENT: A back-up process should be actively pursued since titanium coated zeolite may not be available.

RESPONSE: The four back-up processes, proposed by the peer review team, are discussed below. These suggested processes are not all applicable to the current process and some have been done already. Placing a dedicated Pu removal material into the column has been accomplished using titanium coated zeolite; using a lower percent titanium loading on the zeolite is being accomplished by purchasing zeolite coated with titanium trichloride at 2 to 4 weight percent. Mixing treated and untreated zeolite is not possible to incorporate into the STS; the addition of absorbent material for Pu into the supernatant wash to achieve the small DF (5-10) required for Pu at pH 12.5 is being investigated and data will be available by April 1991.