

# CHEMETRON CORPORATION

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Wednesday, March 16, 1994

Mr. Timothy C. Johnson  
Section Leader  
Materials Decommissioning Section  
Decommissioning and Regulatory Issues Branch  
US Nuclear Regulatory Commission  
Washington, DC 20555

Subject: Chemetron Remediation Project - Solubility Testing

Dear Mr. Johnson:

In response to your letter dated January 6, 1994, Chemetron has reviewed the NRC recommended Kalkwarf Method for determining uranium solubility in soil. Based on this review, Chemetron proposes to use the recommended method, with the following minor modifications or additions:

- Three soil samples will be submitted for analysis. One sample will be split and run as a duplicate; therefore, solubility testing will be completed for a total of four (4) soil samples.
- The USNRC guidance for evaluating the solubility of uranium in soils recommended that the soil samples be reduced in particle size to less than 50 microns by sieving; therefore, the samples will be dried, ground (ball mill), and sieved to 50 microns or less.
- It is proposed that the "third dissolution" technique recommended in the Kalkwarf procedure be performed. This technique is suitable for 0.05 gram sample aliquots and 5.0 ml volumes of simulated lung fluid (SLF). The sample and SLF in a reaction vessel will be constantly stirred and heated at 37° C. Every 3 days, the solution will be withdrawn and filtered through a 0.22 µm filter into a storage container, where it will be held until total uranium analysis is performed. The filter residue will then be back-washed off the filter with 5.0 ml of fresh SLF into the reaction vessel. The dissolution will continue for 60 days, with aliquots removed every 3 days.
- At the end of the 60 day reaction period, the residual sample will be leached with 5.0 ml of warm concentrated nitric acid, as described in the Kalkwarf Method.

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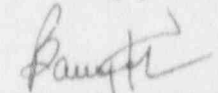
- It is proposed that the soil residual and a split of the initial soil aliquot be analyzed for isotopic uranium (alpha spectroscopy). This will characterize the sample both before and after the SLF dissolution study, and will provide a material balance.
- It is proposed that pulsed laser induced kinetic phosphorescence analysis (KPA) be used to determine the total uranium concentration in the SLF solutions. The detection level for this analysis is 1 µg uranium per liter. The "uranium analysis" method described in the Kalkwarf Method, therefore, will not be used.
- Standard Certificates of Analysis will be provided for all analyses performed.

It is anticipated that the analytical process, data evaluation and report preparation will take between 75 and 100 days after receipt of samples by the contractor laboratory.

Chemetron hereby requests NRC concurrence with the proposed solubility test method with the specified modifications/additions. Upon receipt of the NRC concurrence, Chemetron will submit the selected soil samples to IT Corporation Laboratory for performance of the NRC accepted method.

Your attention to this matter is greatly appreciated. Prompt NRC review and concurrence with the subject solubility test method will allow Chemetron to confirm the solubility of the depleted uranium contaminated soil at the Harvard Avenue and Bert Avenue sites and will provide the necessary input information for completing the design of the closure cells.

Sincerely yours,



Barry Koh, Ph.D.  
Project Manager

BK/cmw

cc: D. Sargent  
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