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U. S. Department of Energy
Fernald Environmental Management Project
Letter No. C: ESH:(EP):93-0604

Tony Nocito
DSI Industries Consolidated. Inc.
153 Waverly Place
New York. NY 10014

Dear Mr. Nocito:

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT ABCOV DEMONSTRATION SUMMARY

I would like to thank you for providing a bench top demonstration of the ABCOV technology on site. It has given us a better understanding of how we can use this technology to meet the Fernald Environmental Management Projects-(FEMP) remediation goals.

I have enclosed a summary of the demonstration for your information and comments.

Sincerely.

L. Wayne Johns
Technologist - Clean Air Program

lwj
ABCOV Demonstration Summary

July 27, 1993

ABCOV DEMONSTRATION SUMMARY

The following is a description of the ABCOV (Asbestos Conversion) Method, demonstrated at the FEMP on April 29, 1993. The description is in a procedure format and summarizes the events. Lab results and special comments are separated by brackets.

BACKGROUND

A significant amount of asbestos is in the radiological controlled areas of the site. Under a DOE directive it is FERMCO's responsibility to minimize the amount of material requiring disposal as radioactive waste. DSI Industries Consolidated Inc. claims to have proved and demonstrated the ABCOV Method to the United States Air Force, Griffiss Air Force Base, and the Electrical Power Research Institute (EPRI). Presently Griffiss Air Force Base and Consolidated Edison of New York are purchasing the equipment to set up a conversion facility. Both facilities expect to be operating by September, 1993. Some claimed advantages of this method are:

1. Converted asbestos may be treated as non-asbestos waste.
2. A 25% reduction in asbestos removal costs.
3. On site treatment of waste, with a possible 80% waste volume reduction for thermal system insulation (TSI).
4. Materials used for asbestos removal can be reused after cleaning with an ABCOV solution.

TEST GOAL

The goal of the demonstration was to evaluate the ABCOV method's ability to destroy asbestos fibers for typical ACM material types found at the FEMP.

SUPPLEMENTARY TEST GOALS

Can ABCOV-C be used as a solvent for Uranium contamination?

TEST

I. A bulk sample was obtained from each material listed below according to SP-P-41-052 "Collecting Bulk Samples of Suspect ACM." Each bulk sample was split into streams A and B. Stream A was tested by PLM. The sample numbers and the material types with their PLM results are as follows: (Sample stream A was not analyzed for radioactivity because our lab does not have an established procedure to perform this analysis on asbestos.)

Sample #1. Formed Pipe Thermal System Insulation. [25% Amosite, 5% Chrysotile, 10% Crocidolite by PLM]

Sample #2. ACM Rain Gutter Debris [30% Chrysotile by PLM]

Sample #3. ACM Mud Joint Packing [2% Chrysotile by PLM]

Sample #4. ACM Cement Looking Joint Packing Material [5% Amosite and 1% Crocidolite by PLM]

Sample #5. Asbestos-cement (Transite) [30% Chrysotile by PLM] (The transite was pulverized inside a glove bag, using a water spray to control asbestos emissions.)

II. Sample stream B was treated using the ABCOV Method.

A. A two oz. sample was placed in a blender, and misted with ABCOV-T.

B. ABCOV-C was added to the asbestos sample, just below the 19.5 oz. mark on the blender container.

C. The blender cap was placed on the top, the speed set at LOW, and the blender turned on.

D. The mixture was blended between 45 to 75 minutes.

E. An initial sample was taken of the homogeneous solution in each blender, dried and a PLM analysis done. [No asbestos fibers were found in any of the 5 samples by PLM]

F. After PLM analysis, the samples were sent to a commercial lab for TEM analysis. [Sample #1 and #5 dried residues were found to have less than the surface contamination limits for radioactivity and sent to a commercial lab for TEM analysis. TEM results from both samples were negative for asbestos. Samples #2, #3, and #4 are radioactive. We are still working to meet the specific requirements to get TEM analysis for these remaining samples.]

G. Solids were filtered from solution #1. Formed pipe Thermal System Insulation, using a standard filter. [The particle size of the solid material caused the filters to clog, causing three separate filters to be used on solution #1. (For this reason the remaining samples were not filtered.)]

H. Total Uranium analysis was performed on the filtered solids from sample #1. [Sample results on solids were 360 ppm total Uranium.]

I. Lime was added to neutralize solutions #1, #2, #3, and #4.

J. All the ABCOV sample solutions were then set aside allowing the solids to settle to the bottom. The liquid portions were then sampled for total uranium concentration, specific gravity, and Ph.

K. Each bottle was then shaken vigorously and a total Uranium analysis was performed on the homogeneous solution.

L. After the solids settled to the bottom, the height of the solids and the liquids of each sample solution were measured and their weight taken. These measurements were used to estimate their respective volumes.

M. The total uranium concentrations, volume, weight, and specific gravity were used to determine the amount of uranium found in the solids verses the liquid.

N. Test complete.

RESULTS

Table 1

SAMPLE #	TOTAL SAMPLE WEIGHT (grams)	HOMOGENOUS SAMPLE U (ppm)	EST. WEIGHT OF LIQUID (grams)	LIQUID SAMPLE U (ppm)	Liquid pH
1	409	15	200	3.8	5.4
2	687	241	397	4.6	5.1
3	561	229	295	20.3	5.8
4	526	204	274	52.3	5.8
5	533	18.0	473	.9	4.5

NOTE 1 Sample 1 solids were filtered off and sampled separately. The solid material in this sample is comprised mainly of the lime used to neutralize the solution.

Table 2

SAMPLE #	EST. U CONTENT OF TOTAL SAMPLE (mg)	EST. U CONTENT OF LIQUID SAMPLE (mg)	EST. U CONTENT OF SOLID SAMPLE (mg)
1	6.3	.8	5.5
2	165	1.8	163
3	128	8.1	120
4	107	14	93
5	10	.4	9.6

NOTE 1 Sample 1 solids remaining after the ABCOV treatment were filtered off and analyzed separately. The mass of the solids were not determined.

NOTE 2 "Milligrams of uranium" was used as the unit of measure to minimize data variations due to the addition of lime used to neutralize solutions #1, #2, #3, and #4.

CONCLUSIONS

Although the test results are not complete, we can say that:

1. PLM analysis shows that the ABCOV method can successfully destroy asbestos fibers in the various material matrix found on site including transite.

2. Although not measured, it was obvious that ABCOV significantly reduces the volume of ACM thermal system insulation.

3. Lime added to neutralize the effluent solids will need to be considered when evaluating the waste reduction characteristics of this technology.

4. Only a minimal amount of uranium is dissolved in solution. Prospective decontamination technologies should concentrate on removing the contamination from the effluent solids.

5. In all five samples, comprised of different matrix material types, the effluent ABCOV solids were easily dispersed in the solution. The fine granular particles resulting from this process seems ideal for bulk radiological decontamination using chemical or mechanical separation methods.

6. Care should be taken when choosing a filter arrangement to separate the solids from the ABCOV solution.

QUESTIONS CONCERNING THE PROCESS

1. What is the total cost of using this method? [Initial estimate is $1 per pound based on the treatment of TSI. It should be noted that two industries that do not have radiological contaminated ACM are using this technology.]

2. Is this technology compatible with our plan for final disposal? Some possible remediation technologies/options are:

    a. Soil washing technology under development at the FEMP.

    b. Electromagnetic migration or osmosis being developed by Westinghouse Technologies.

    c. ACT*DE*CON technology developed by RUST International INC.

    d. Disposal at a radioactive disposal site. (NTS)

3. What regulatory concerns are associated with this treatment?

4. Who will be performing the work?

5. How will we dispose of the liquid? From past conversations it seems that the ABCOV solutions may be compatible with the FEMP waste water treatment system.

6. How will the pulverizing of transite be accomplished? Does the lime in the transite affect the reuse of the ABCOV?

7. If the ABCOV treatment is used for waste reduction prior to going to a radioactive waste disposal site how will the moisture be removed from the solid material?

Please send comments on this document to Wayne Johns (EMCLWJ) MS-51 x-738-9115