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Technical Service Report

Conoco Inc.
Research and Development Department
Corporate Services Section
Ponca City, Oklahoma

Report No. 1-81-839-0

To Paul Fetzer, VCM Plant, Lake Charles

From Charles A. Bleckmann and Jeffrey Dean Meyers, Research Services, Ponca City

Date January 12, 1981

Subject ASSESSMENT OF SOLIDIFIED WASTES FROM THE LAKE CHARLES VCM PLANT FOR THEIR RCRA EXTRACTION PROCEDURE (EP) TOXICITY AND ORGANIC CARBON LEACHABILITY

OBJECTIVE

1. Determine if three solidified waste samples are EP toxic according to RCRA criteria.
2. Determine the leachability of organic carbon from these same wastes.

BACKGROUND

Recently promulgated Resource Conservation and Recovery Act (RCRA) requirements have increased financial liability and significantly affected waste disposal. Because of the great potential for groundwater contamination, liquid wastes can no longer be landfilled (except under very special circumstances) unless they are rendered to a nonflowable state. Although such treatment will reduce immediate leachate problems, water will eventually infiltrate even the best constructed landfill. Hence even solids have a long-term potential for generating contaminated leachate. One alternative for reducing such potential is to render both liquids and solids to forms in which metals are insoluble and hence more geologically stable.

A copper chloride catalyst, copper hydroxide sludge, and a combination of the two have been stabilized with Solidtek products. Samples of such materials were subjected to the EP toxicity and leaching tests to give results which will provide guidance for proper disposal management.

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SUMMARY

Evaluation of RCRA EP toxicity was performed on three solidified wastes from the Lake Charles VCM Plant. No samples failed applicable criteria. For 18 additional metals, only sodium and calcium were found to leach appreciably.

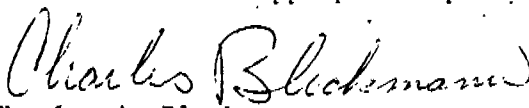
When waste samples were mixed with either an equal volume or 16 volumes of distilled water, the pH of the solidified copper hydroxide sludge (Solidtek System "Ten," Series "200") was greater than 12.5. While an aqueous waste with a pH $\geq$ 12.5 is classified by RCRA as corrosive, the pH test does not apply to solid wastes. However, since contact with water in a landfill is inevitable, a corrosive leachate will be formed. Hence, if used, waste so stabilized should be handled as a corrosive material. Relatively low concentrations of organic carbon were leached from these wastes and should not present disposal management problems.

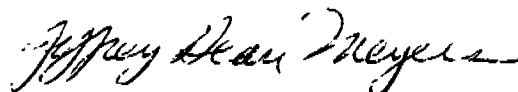
CONCLUSIONS

1. Based on RCRA criteria, none of these wastes are EP toxic.
2. Leachate from the copper hydroxide sludge stabilized with Solidtek System "Ten," Series "200" has a pH $\geq$ 12.5. An aqueous waste is classified as hazardous by RCRA.
3. Insignificant amounts of organic carbon are leached from these materials.

RECOMMENDATIONS

1. If other wastes are solidified to specifically render metals to insoluble forms, an unsolidified sample should also be extracted as a control.
2. Because the leachate formed from the copper hydroxide sludge stabilized with Solidtek System "Ten," Series "200" would be corrosive, waste stabilized with this product should be handled as a corrosive material and appropriate precautions taken during disposal.


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APPROVED:


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INTRODUCTION

At your request, three solidified wastes were analyzed for RCRA extraction procedure (EP) toxicity and leachability of organic carbon. The wastes had been treated using Solidtek System "Ten," Series "200" or System "Nine," Series "Ace," as described in Table 1.

EXPERIMENTAL METHODS

Methods of analysis for RCRA EP toxicity are referenced in the attached Analytical Research Section TSR 148-80-839-0.

Organic carbon leachability was determined by extracting 25 g of waste with 25 g distilled water for 30 minutes on a gyratory shaker at 200 rpm. Samples were filtered through 0.45- μ m millipore filters. Filtrates were then analyzed for total organic carbon and pH. During the course of EP toxicity analysis, a 16:1 mixture of distilled water and waste was made and thoroughly mixed for 5 minutes. The pH was then measured and recorded before adjustment.

RESULTS AND DISCUSSION

Metal concentrations for the EP toxicity analysis and 18 other metals are shown in Table 2. For the EP metals, all are well below prescribed RCRA criteria. Most are also below or near drinking water standards, as shown in Table 1. Since pesticides and herbicides are reportedly not associated with this type of waste, no analyses were made for them. Results for pH and TOC in the 1:1 distilled water extract are shown in Table 1. Also shown is the pH of a 16:1 distilled water-waste mixture taken during the course of the EP toxicity test.

Since these wastes are solid, they do not require RCRA testing for corrosivity. However, should disposal of Sample I-80-113 allow contact with water, a corrosive leachate (pH $\geq$ 12.5) would likely be produced. In a landfill, this could cause solubilization of metals in surrounding waste.

No standard and only limited experience exist for the leaching of organic carbon from wastes by aqueous contact. Studies on other samples from Lake Charles Chemical Plant and VCM Plant indicate the organic carbon leaching potential of these wastes is relatively low.

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TABLE 1

<u>Sample No.</u>	<u>Description</u>	<u>TOC (ppm)</u>	<u>1:1 pH</u>	<u>16:1 pH</u>
I-80-111	Combined catalyst (1 part) to (1/2 part) copper hydroxide, solidified with Solidtek System "Ten," Series "200"	134	8.7	11.5
I-80-112	Catalyst, solidified with Solidtek System "Nine," Series "Ace"	180	7.7	8.5
I-80-113	Copper hydroxide sludge solidified with Solidtek System "Ten," Series "200"	25	13.1	12.7

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TABLE 2
METALS ANALYSIS

A. EP Toxicity Metals

<u>Metal</u>	<u>SAMPLE</u>			<u>RCRA Criteria</u>	<u>Drinking Water Standards</u>
	<u>111</u>	<u>112</u>	<u>113</u>		
Arsenic	<.002	<.002	<.002	5	0.05
Barium	0.39	1.6	0.17	100	1
Cadmium	<.015	.094	<.015	1	0.01
Chromium	<.03	<.03	<.03	5	0.05
Lead	<.25	<.25	<.25	5	0.05
Mercury	<.01	<.01	<.01	.2	0.002
Selenium	<.002	<.002	<.002	1.0	0.01
Silver	<.03	<.03	<.03	5	0.05

B. Other Metals

Aluminum	<.15	<.15	.32	-	-
Antimony	<.25	<.25	<.25	-	-
Beryllium	<.005	<.005	<.005	-	-
Boron	.11	.16	.069	-	-
Calcium	2,500	1,500	1,500	-	-
Copper	.40	.60	.03	-	1
Iron	<.3	<.3	<.3	-	.3
Manganese	.21	.43	<.01	-	0.05
Magnesium	26	21	.34	-	-
Molybdenum	<.05	<.05	.079	-	-
Nickel	.65	6.4	<.075	-	-
Sodium	700	110	890	-	-
Strontium	3.2	2.0	3.2	-	-
Thallium	<.5	<.5	<.5	-	-
Tin	.14	<.1	.13	-	-
Titanium	<.025	<.025	<.025	-	-
Vanadium	.030	<.025	<.025	-	-
Zinc	.14	.83	<.025	-	5

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