



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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M E M O R A N D U M  
June 7, 1984

To: Bob Goodman  
From: Bill Yake *BY*  
Subject: Results of Total and EP Metals Analyses on Flue Dust and Battery Chip Samples from Western Processing

This memorandum transmits the results of total and extracted (EP) metals analyses conducted on two types of wastes stored in large quantities on the Western Processing (WP) site. The characteristics (high metals content) and quantities of these materials make them potential sources of high metals concentrations detected in nearby groundwater and surface waters.

Samples were collected on two occasions. On January 19, 1984, Jim Oberlander collected a sample of flue dust from WP. This sample was a composite of several subsamples collected from the surface of the flue dust pile. This sample was extracted using the extraction procedure (EP) delineated in "Chemical Testing Methods for Complying with the State of Washington Dangerous Waste Regulation" (WDOE, 1983). The extract was analyzed for nine metals. On April 11, 1984, I collected similar composite samples from both the flue dust and battery chip piles. A subsample of a battery chip sample was extracted as noted above and analyzed for ten metals. The flue dust sample and battery chip sample were also both subjected to a strong acid digestion and each analyzed for seven metals. This test is referred to as a total metals analysis.

Table 1 summarizes pertinent sample data including date of sample, type of analysis, and laboratory log number.

Table 1. Flue dust and battery chip sample information.

Date of Sampling	Sample Source	Metals Analysis			WDOE Log Number
		Extraction Procedure	Total	Laboratory	
1/19/84	Flue dust	X		WDOE - Redmond	140248
4/11/84	Flue dust		X	WDOE - Redmond	141559
	Battery chips	X	X	WDOE - Redmond	141560

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The results of the analyses are presented in Table 2 (attached). Total metals results are reported in two forms: mg/Kg wet weight (as received), and mg/Kg dry weight and represent essentially the total concentration of metals in the sample. These results are essentially equivalent to an assay, such as that which would be conducted on an ore sample.

The extracted (EP) metals results are reported in three forms. The extraction procedure used in this method is designed to approximate conditions in a landfill and determine the fraction of metals in a waste which would be mobilized in this environment. Full details of the extraction procedure are available in the reference noted earlier. Essentially, the method involves extracting metals from 1 part waste (wet weight, as received) in 20 parts water, while the slurry is maintained at or below a pH of 5 for 24 hours. The first EP metals column reports the metals concentration in the liquid phase after filtration. This is the form in which the data are reported from the laboratory. The other two forms in which these data are tabulated are as mg/Kg wet weight and mg/Kg dry weight. These conversions were provided to allow direct comparison between the total metals data and the EP metals data. In a general sense, this provides a comparison between total and potentially mobile metals in each of the materials samples. It should be noted that the mg/Kg dry weight conversion for the EP metals on the flue dust sample is an approximation because a percent solids analysis was not conducted on the flue dust sample collected on January 19, 1984. The percent solids value on the April 11, 1984 flue dust sample (74.7 percent) was used to make this conversion.

Two observations regarding these analyses are noted below:

1. Although an EP metals analysis is, by itself, inadequate to designate wastes, these results indicate that both wastes would be classified as, at least, dangerous wastes. This designation is based on the flue dust results for lead (100 mg/L) and cadmium (10 mg/L), and the battery chip results for lead (440 mg/L).
2. In addition to the metals noted above, flue dust zinc appears to have the most potential for causing water quality problems. This is based on the relatively high concentration of zinc in the flue dust and apparent, high mobility of this zinc (the total zinc and EP zinc concentrations were essentially equivalent).

BY:cp

Attachment

cc/att: Dick Cunningham  
John Littler  
Gary Brugger  
Jim Oberlander  
Joan Thomas  
Neal Geitner, CH2M Hill

and battery chip samples from Western Processing.

		Battery Chips			
		4/11/84	4/11/84		
Total Metals mg/Kg d.w.	mg/Kg w.w. mg/<g d.w.	Total Metals		EP - Extracted Metals	
		mg/Kg w.w.	mg/<g d.w.	mg/L	mg/Kg w.w. mg/Kg d.w.
(<0.5)				<0.02	<0.4
(0.08)				0.007	0.14
(72)				<0.08	<1.6
(270)	40	44		0.26	5.2
(<0.5)	38	42		<0.02	<0.4
(56)	110	122		0.05	0.1
(<0.005)	0.13	0.14		0.0011	0.022
(2700)	26	29		0.05	0.1
(29,000)	124,000	137,500		440	8800
	5600	6260		16	320
	90.1				
					90.1