PROGRESS REPORT

TECHNICAL SERVICES DEPT. - W. G. KRUMMRICH PLANT

JOB NO.	REPORT NO.	DATE
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• TO RECEIVE DETAIL SECTION

TITLE: Aroclor Control

PERSONNEL: M. Pierle (C.F. Buckley)

PROBLEM: Report Total Aroclor Analyses to Date

SUMMARY

Sampling and analysis for aroclor has continued at W.G.K. since July, 1969.

Results at Department 246 indicate that the major source of losses is the blow tank scrubber jet.

Losses recorded at the Village Waste Treatment Plant have shown a decrease from 700 ppd in 1969 to 230 ppd from December, 1969, to February, 1970, and to the present level of 45 ppd. The latter decrease coincides with the installation of a trap in the pipeline to the scrubber. The trap is collecting between 115-385 ppd.

River sediment losses show that the Village outfall significantly increases the aroclor concentration in Mississippi River sediment.

Michael Pierle

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TSD

MONS 057401

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INTRODUCTION

Aroclor sampling and analysis has been conducted for W.G.K. since July, 1969. To date 95 samples have been analyzed. Sampling has been concentrated in three areas: 1) Department 246 effluent; 2) Village Treatment Plant; and 3 Mississippi River sediment. The results expressed and discussed below represent all sampling to date.

RESULTS AND DISCUSSION

All results are expressed as total aroclor found in samples. Abbreviations used are: 1) ppd = pounds per day; 2) ppm = parts per million; and 3) ppb = parts per billion.

A. Department 246

Sampling in Department 246 has consisted of both grab and composite sampling. Results are given in Table 1.

Table 1

AROCLOR LOSSES FROM DEPARTMENT 246

DATE	TOTAL DOWNSTREAM OF DEPT. ppd	DATE	TRENCH SEWER ppd	MAIN SEWER ppd	DATE	SCRUBBER JET ppd
7/69	<1	11/21/69	<1	2	1/29/70	100
7/69	14	11/22/69-		1	2/4/70	30
7/15/69	17	11/24/69			2/9/70	115
7/18/69	19	11/25/69	<1	1	2/11/70	90
7/21/69	<1	11/26/69	<1	3	2/12/70	90
7/28/69-	<1	12/2/69	<1	2	3/25/70	20
8/3/69		12/17/69		10	5/6/70	40
9/25/69-	2	12/22/69	<1	2	5/7/70	80
9/30/69		12/26/69	<1	<1		
10/2/69-	4.5	1/14/70	<1	2		
10/7/69						
11/6/69	9					

The data from the department illustrates the difficulties in obtaining representative samples. Samples at the main sewer, trench sewer, and downstream sewer were composites while the scrubber jet samples were grab samples taken directly from the jet discharge. The scrubber jet discharges into the main sewer.

The main difficulties with composite sampling are: MONS 057402

1) Aroclor' low solubility results in two phase liquid in sewers.

2) Aroclor's affinity for any surface dictates sampling in a receiver which can be sent directly to lab for analysis.

Therefore, sampling at the source should be conducted on a grab sampling basis with the sample receiver forwarded intact to the lab for analysis. Improvements in composite sampling technique are desired and will be developed.

RESULTS AND DISCUSSION (continued)

A. Department 246 (continued)

The results from the scrubber jet represent a loss of approximately 100 ppd. This figure has been verified by physically collecting aroclor from a trap installed in the pipeline before the scrubber. Measured losses collected in this manner have varied between 115-385 ppd. Entrained losses in the scrubber influent pipe have been measured at 5-30 ppd.

B. Sauget Village Treatment Plant

All influent and effluent samples taken at the treatment plant were composites. Sludge and scum samples were grab. The results are given in Table 2.

Table 2

AROCLOR LOSSES AT TREATMENT PLANT

DATE	INFLUENT		EFFLUENT		SLUDGE	SCUM
	ppm	ppd	ppm	ppd	ppm	ppm
7/69	.86	200				
7/69	.67	155				
7/15/69	.08	16				
7/18/69	6.0	1400				
7/21/69	15.3	3500				
7/28-8/3/69	5.88	1350				
9/25-9/30/69	.67	155				
10/2-10/7/69	.53	120				
11/6/69	1.43	330				
11/8/69					.513	
11/9/69					204	
11/20/69	.538	125				
12/2/69	2.68	620	1.456	335		
12/3/69						6000
1/14/70	71.25	16,400	1.85	425		
1/15/70	1.18	270	1.41	320		
2/5/70	.97	220	.588	135		
2/13/70	.76	175	.887	200		
4/27/70	.007	2	.148	34		
4/28/70	.008	2	.398	90		
4/29/70	.012	3	.114	25		
4/30/70	.235	55	.163	40		
5/1/70	8.75	2000	.171	40		
5/2/70	64.0	14,200	.109	25		
5/3/70	61.0	14,000	.256	60		

The high values on the sludge and scum samples indicate that the treatment plant is removing aroclor.

RESULTS AND DISCUSSION (continued)

B. Sauget Village Treatment Plant (continued)

The wide range of values for the influent are not readily explained. No problems were reported in either the manufacturing or using departments at the end of April when high losses occurred. The aroclor loss numbers during this time period may not be exact but they do indicate that a significant amount of material was lost. The Rip Track washed a car on 4/29/70 with no indication of a major loss.

The effluent values do indicate a significant reduction in losses after 2/13/70. This coincides with the installation of trap in blow tank off-gas line to remove condensed aroclors. Present level to the river is 45 ppd. New sampling techniques will be utilized to verify that this number is accurate, since all effluent samples are in the solubility range of PCB in water. Tests will be conducted to determine if 1) the present sampler is collecting only soluble material, or 2) the results are accurate.

C. River Sediment

Sampling has been conducted at four points along the Mississippi River bank: 1) approximately 0.5 miles upstream; 2) 200 ft. below outfall (Monsanto dock); 3) 0.5 miles downstream; and 4) 2.0 miles downstream (Cargill dock).

Samples have been taken at various river levels to determine concentration profiles both along the river and down the river bank. Results are given in Table 3.

Table 3

AROCLOR CONCENTRATION IN RIVER SEDIMENT

DATE	RIVER LEVEL ft.	UPSTREAM ppm	MONSANTO DOCK ppm	DOWNSTREAM ppm	CARGILL DOCK ppm
1/29/70	1.8	.488	69.6	14.3	.700
12/9/69	4.1	1.2		5.138	
10/10/69	4.2	.001	4.6	3.19	
3/4/70	8.3	.056	5.86	.497	3.58
8/25/69	9.2	.041	825	106	
4/6/70	14.2	.096	59.61	12.34	.010
4/29/70	21	.113*			
5/6/70	27.4		4.3	.211	

* approximately 2 miles upstream MONS 057404

The data as plotted in Figure 1 shows the influence of the Village outfall on aroclor levels in river sediment.

RESULTS AND DISCUSSION (continued)

C. River Sediment (continued)

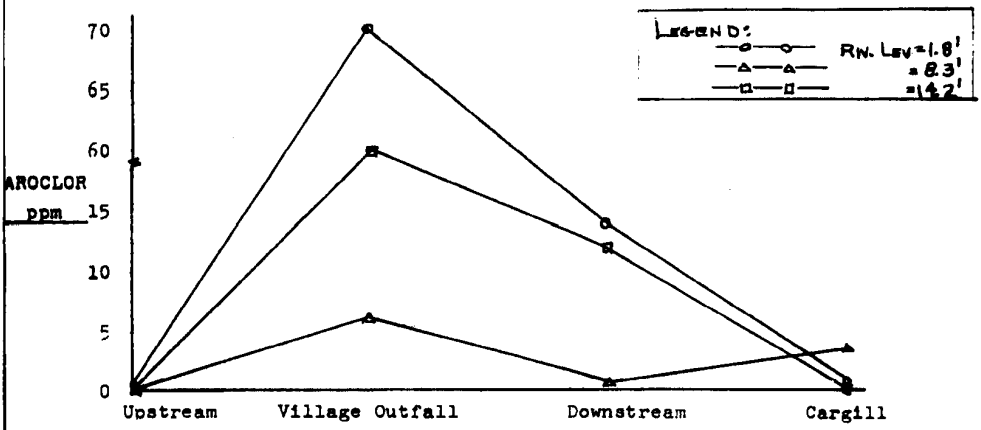

FIG. 1 AROCLOR CONCENTRATION PROFILE IN MISSISSIPPI RIVER SEDIMENT

Sampling has not been extended downstream because of high river levels making sampling sites inaccessible. This will be done when physically possible.

It can be concluded from the data that aroclor is present in high concentrations along the river bank. The downstream extent of contamination will be defined. It cannot be concluded from the data whether or not the concentration in the sediment is increasing or decreasing with time.

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D. Miscellaneous Samples

1. Carbon Towers in Muriatic Acid

   Two samples of spent carbon were found to contain 8 and 6 ppb aroclor. The results indicate the difficulty of desorbing aroclor from activated carbon. This probably means that the spent carbon which was sewered did not significantly contribute to the aroclor concentrations in the Village effluent.

2. A 16 oz. sample of River Ranney well water was analyzed at < 1 ppb. This indicates that contamination problems now experienced with phenol from the landfill are not inherent to aroclor. This is probably due to low aroclor solubilities in water. A gallon sample will be analyzed to afford lower detectable levels.

RESULTS AND DISCUSSION (continued)

D. Miscellaneous Samples (continued)

3. C/S Scrubber Acid

A sample of scrubber effluent analyzed at 1.6 ppm. The results were on a solution of 10 ml. of scrubber acid in 2 liters of H_2O. This indicates that aroclor is reaching Department 217 in the HCl gas.

FUTURE WORK

1. Continue to determine concentrations in the Village outfall.
2. Extend surveillance of Mississippi River downstream.
3. Conduct sampling in Department 246 to evaluate control projects.
4. Revise sampling procedures and program as needed.

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