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TITLE:

PCB Reduction in Tank Car Wash Water - Dept. 246

PERSONNEL:

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PROBLEM:

Decanted aroclor tank car wash water contains PCB's in the ppm range, whereas solubility is believed to be about 300 ppb. A procedure must be devised to remove more PCB's from the wash water before sewering.

JUSTIFICATION:

Permit eventual control of PCB content in the sewer stream from the plant to 0.5 #/day.

SUMMARY:

Based on laboratory tests performed to date, it appears that the most effective procedure for removal of PCB's from the wash water is filtration with either lime or carbon.

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Details

Background

Facilities were installed at the Rip Track to permit the continuous decanting of wash water as part of the aroclor tank car washing procedure. It was hoped that after settling, the decanted wash water would contain polychlorinated biphenyls at approximately the 300 ppb level. However, the sewered water has been found to contain PCB's in the ppm range.

The tank cars are washed with H_2O only. This water is collected in a catch tank that may contain residual detergent solutions from washes of other types of tank cars. The aroclor car washes are passed from this catch tank to a 6000 gallon settling tank. After a settling period the wash water is decanted from the top of the trailer. It is thought that an emulsion might be forming in the wash water, accounting for amounts above the 300 ppb level in the decanted water.

Procedure

A one gallon sample of aroclor wash water was taken from the catch tank. This material was tested for demulsifying and filtration.

Results

This sample was a turbid, yellow liquid with some residue on the bottom. The pH of the sample was 7.6.

Test No.	PCB's (ppm)	Type of Test
1	54.48	Sample as is (after mixing).
2	0.726	Mixed with filter aid and filtered thru filter paper.
3	1.58	Filtered thru filter paper, only.
4	0.007	Carbon treated and filtered thru filter paper.
5	0.074	NaCl treated and filtered thru filter paper.
6	22.93	NaCl treated and decanted.
7	0.466	CaO treated and decanted.
8	18.23	Acetone treated and decanted.
9	3.24	Filtered thru polypropylene bag filter, only (5 micron).
10	8.25	$AlCl_3$ treated and decanted.
11	2.82	New wash water sample taken directly from a tank car. This sample was allowed to settle and then decanted for analysis.

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Discussion of Results

The sample used for Tests #1 - #10 was thoroughly mixed before obtaining portions for each test. The sample solution was allowed to settle for two hours, after treatment, before decanting in the tests as indicated. The filter paper used in each test as indicated was 1-3 micron, glass fiber paper.

The sample used for test #11 was a turbid, light green-brown liquid with brown residue on the bottom and also floating on top. A portion of this sample was taken for analysis from the middle of the sample in an effort to exclude the residue.

Conclusions

A comparison of the as is analyses of the sample taken from the catch tank and the sample taken directly from the tank car is not a good one because the catch tank sample was thoroughly mixed and the tank car sample was allowed to settle before analyzing. It appears that the PCB content is directly proportional to the amount of solids present in the sample portions used for analysis.

The only decanting procedure that shows any promise is that made after lime treatment. Comparable results could probably have been achieved with carbon, also. Decanting procedures will require some settling time.

Reference

WGK Research Notebook, pp. 16026-16029, 16032-16033.

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