Monsanto

CONFIDENTIAL

FROM (NAME & LOCATION): W. C. Engman, Krummrich

DATE: May 3, 1972

cc P. B. Hodges - ElSF
A. E. Leisy

SUBJECT: PCB POLLUTION REDUCTION EFFORTS AT WGK

REFERENCE:

TO : Mr. W. B. Papageorge
General Offices
B2NK

Paul Hodges asked that I gather together pertinent detailed information concerning plant PCB pollution reduction effort. Please let me know if you need anything in addition to the following.

Project Work

The following projects were completed in the last two years at a cost of about $200,000.

1. Catch basins were installed at the Aroclor department and Rip Track ($30,000).

2. 15 Therminol units were changed out to non-PCB fluids ($80,000).

3. Paving and curbing was installed at truck and tank car loading areas and around storage tanks. ($40,000)

4. A Brink demister was installed to reduce entrainment losses from the blow tanks ($22,500).

5. Four miscellaneous piping modifications were made to reduce losses or the potential for losses in the Aroclor department ($10,000).

6. An electron capture chromatograph was purchased for our laboratory ($8,000).

Sampling

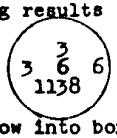
Our first effort was to balance the PCB losses at the two main plant exit sewers with the losses measured at the Waste Treatment Plant Influent. Figure 1 attached illustrates the discrepancy.

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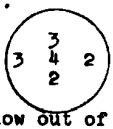
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Sampling (cont'd)

Traverse of the cross sectional area of a sewer line gave the following results in lbs. PCB/day.



Flow into box



Flow out of box

Profiles along length of sewer runs gave the following results also in lbs PCB/day:

24" sewer 81 - 98 - 5 - 86
30" sewer 6 - 6 - 6 - 33

Filtering samples gave a 70 to 90% reduction in PCB level when compared to the corresponding unfiltered sample.

Samplers

As part of the sampling program, we have gone through an evolution of sampling devices to try to obtain the most representative sample we could.

The first sampler used was the old slow speed sampler that has been used for the phenol and mercury reduction programs. This is a continuous composite sampler which will take about 1 qt. sample in a shift. This is inadequate in trying to sample for solids as the settling velocity of the solids is greater than the velocity of the liquid rising in the sample tube.

We tried a continuous high speed sampler. This seemed to work well for short periods of time. Results indicated PCB levels about 6 times higher than with the slow speed sampler. We gave up on this sampler when we found the tubing would wear out after 2 to 3 days service.

The barrel sampler is the type being used at the Waste Treatment Plant for control measurements of solids, phenolics, mercury, etc. We have also used this sampler for PCB's up to this month. Briefly, this sampler consists of a 55 gallon drum housed in a

Samplers (cont'd)

heated shed. A timer is used to periodically activate a peristaltic "high speed" pump. The total sample is drawn into the barrel. Once, each morning, the WTP operator agitates the drum with a small propeller type agitator (no baffles). He shuts off the agitator and allows a portion of the material to drain and then obtains a gallon sample in a glass jug. He shakes this bottle and pours about 1/4 into a second glass gallon jug. This jug is filled over 3 to 4 days. Someone from the pollution control group comes twice a week and, after shaking, pours a sample from the gallon jug into a 16 oz. sample bottle for PCB analysis. Not only are there inherent problems in obtaining the sample but also subsequent sample handling leaves much to be desired.

The flip-flop sampler is our latest development. We have adopted this as our permanent PCB sampler both at the Waste Treatment Plant and at the in-plant sewers. This sampler also utilizes a timer to periodically activate a high speed peristaltic pump. The sampler is pointed up stream and is sized so that the velocity of the sample entering the tube matches the velocity in the sewer line itself. This we call "isokinetic" sampling. The sample flow is first diverted back to the sewer. After 15 or so seconds, a second timer activates a solenoid which flips the sample tube over a 2-1/2 liter plastic sample bottle. After a second or two the solenoid is deactivated and flops the sample tube back to the sewer. The first timer then cuts off the pump. A 16 oz. sample is drawn after shaking from the 2-1/2 liter bottle twice a week for PCB analysis.

Comparative results from the two types of samples at the WTP effluent are:

Date	Flip-Flop	Barrel
3/23/72	226 ppb	1076 ppb
3/24/72	193	63
3/25/72	169	37
3/26/72	181	22
3/27/72	170	26
3/28/72	109	78
3/29/72	168	211

Samplers (cont'd)

We ran the following additional tests to get a better feel for our sampling accuracy:

1. 2-1/2 liter bottle was shaken and the entire amount poured into 16 oz. sample bottles. The first, middle and last bottle were analyzed.

First	120 ppb
Middle	168 ppb
Last	211 ppb

2. Two flip-flop samplers were installed at the WTP effluent at exactly the same location in the sewer line. 16 oz. samples were drawn.

Sampler #1	192 ppb
Sampler #2	128 ppb

3. Sample points were moved about 1' vertically and 1' horizontally apart for the two samplers.

Sampler #1 (higher)	130 ppb
Sampler #2 (lower)	117 ppb

Our conclusion for this work was that the flip-flop sampler was superior to the barrel sampler both theoretically and in consistency of results. The sampler is not perfect, but seems to give reproducible results within the accuracy of the PCB analytical method. Results starting in May will be from the flip flop sampler. These results will tend to be higher than those in the past.

Current Reduction Program

Our current in-plant reduction program is outlined in my memo to G. L. Bratsch dated 4/24/72. A copy is attached.

In Department Control

Attached is our Aroclor Department Pollution Control Data Sheet for the month of March. The catch basins and demisters are monitored daily.

Present Knowing Losses

Present knowing losses are listed in the above mentioned memo. They run from 0.7 to 2.3 lbs/day when HCl is not sewered. I can get you the raw data and/or loss calculations if you need them.

Stated in this memo, is that losses at the Chlorosulfonic Acid Department (from the HCl) were unknown. We have since determined from sewer sampling at that department that losses from this source are essentially zero (at least less than 0.05 lbs/day).

Unknowing Losses

Our best measure of unknowing losses is the monthly averages from the Waste Treatment Plant. Figure 2 attached shows these losses over the past 12 months.

Some additional measurements made are these:

1.	River Ranney well water	4 - 33 ppb
2.	Ground water adjacent to Dept. 246	83 - 290 ppb
3.	Streams from neighboring industries	6 - 56 ppb
4.	Plant cooling tower water	None detectable
5.	City water	None detectable

W. C. Engman
Technical Services Department

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attachments

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