D R A F T

CONTROL OF PCB IN PLANT EFFLUENTS

As soon as it became apparent that polychlorinated biphenyls (PCB) were being identified as environmental pollutants, Monsanto reviewed its practices and modified its manufacturing facilities to further assure that losses to the environment are prevented.

Our initial technical work was in two areas. First, sources of actual and potential PCB losses were identified and appropriate projects were undertaken. These projects had the objective of elimination or containment of the loss.

1. Catch basins were installed in the producing department to contain accidental spills and department clean-up.

2. Paving and curbing was installed around PCB storage and loading areas again to prevent accidental loss.

3. Projects were completed to the manufacturing equipment and facilities themselves to bring all known points of loss under tight control and to reduce these losses to their absolute practical minimum. Process changes are being [illegible] make this an [illegible] process.

4. All heat transfer units in the plant were modified and changed to substitute non-PCB heat transfer fluids.

Our second area of technical effort has been in establishing a monitoring program. Here we have met with considerably less success. Let me illustrate.

First we tried to balance our plant PCB losses with PCB levels entering the Sauget Village Municipal treatment facilities. We used our elaborate sampling systems which have been highly successful on other plant pollution applications. Our objectives were to use our main plant sewer outflows as a base to back-track through our plant sewers to points of origin of loss. We encountered difficulties in achieving a material balance. PCB levels were different by factors of 1.5 to 3.

We then did some experimentation.

a. We first ran profiles down each of the two main sewers leaving the plant. By this I mean we sampled four adjacent sewer boxes along each sewer line in a short space of time. Results went something like this: in one sewer, the third sample point down the line had 20 times less PCB then the other three points. On the other sewer line, the fourth sample point down the line had a 5½ times higher PCB level than the first three sample points.

b. We tried a second experiment. At one sewer box we sampled the sewer line at the top, bottom, sides and middle. We did this for both the sewer line entering and leaving the box. On the exit flow, we found the level in the center flow about 1½ to 2 times higher than the other points. In the entering flow, the sample taken at the bottom of the pipe had a level 200 to 400 times higher than the other points.

MONS 038347

c. We next took a number of samples both in-plant and in the exit stream to the Mississippi River and filtered a portion of the sample in the laboratory. In all cases the filtered samples showed a 70 to 90% reduction in PCB level when compared to the corresponding unfiltered sample.

The problem at this point became obvious. We were attempting to obtain representative samples where solids concentration was the most important variable in the sample. This problem was and is compounded by solids stratification in the sewer lines themselves.

From this point we have gone through an evolution of sampling devices with the objective of obtaining what we feel is a truly representative sample from our sewers. At this time, this objective has not been fulfilled. A number of factors are involved.

a. Do you point the sampler upstream or downstream?

b. Do you pump the sample fast or slow?

c. Where do you place the sampler in the sewer line? Middle? What is the sensitivity of moving slightly left or right or up or down?

d. And so forth.

Not all of these questions have been answered as yet but we are continuing our efforts to resolve them. I think it goes without saying that, as we reach very low discharge levels, we are keenly

aware of the need to obtain true representative samples and accurate results in order to continue carrying out an effective further reduction program.

This brings us to where we are today.

1. Although all our in-plant sources of loss are essentially eliminated or contained through projects that have been completed, we are continuing to change and modify our operation to further minimize potential losses.

2. Our on-going sampling control program is confined to the in-flow and out-flow from the Sauget Village Municipal treatment facilities as we feel this gives us the most accurate data.

3. We are continuing to improve and upgrade our techniques of sampling.

4. In the producing department we are installing a Parshall flume which is a device to measure sewer flow. This will improve our ability to monitor and control at this point.

What are present level of losses?

1. From our PCB manufacturing facilities they range from 2 to 4 #/day at our current production rate of 3 to 3½ million #/month.

2. From the Minicipal treatment facilities to the Mississippi River, losses are 5 to 10 #/day average depending on the type of sampler used.

Why the difference? The problem is age. We have been producing and using PCB's at the plant for over 30 years. We have a complicated old sewer system inside the plant. Although we have a continuing plant program to repair and upgrade plant sewers, at no time do we expect that the sewers are leak free. In fact, it would be nearly impossible to tell. We are confident that this situation contributes significantly to the PCB losses we see in the out-flow to the river. This source of loss should decline with time.

In summary, activity has, is and will remain high in carrying out our PCB loss control program. As a result of our efforts the losses have been reduced to the 5 to 10 #/day level. Efforts to reduce the 2 to 4 #/day resulting from the current production activities will continue. The remaining 6 to 8 #/day result from currently unknown sources but with the controls in PCB losses these should eventually decrease.