Keeping PCB's Out of the Environment

4051

—a status report

- on what we've done,
- what we're doing,
- what we will do

Wm. G. Krummrich plant
Sauget, Illinois
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This is a report on what we at the Wm. G. Krummrich plant have done, are doing, and will do to control the manufacture of Polychlorinated Biphenyls (PCB's) and to keep PCB's out of the environment.

Our program can be summarized this way:

- we are manufacturing a more biodegradable Polychlorinated Biphenyl.
- we have taken steps to eliminate losses of PCB's - in the manufacturing area and in the remainder of the plant.
- we have developed sophisticated systems to monitor our effluent.
- we have established loading and shipping safeguards to prevent accidental PCB loss during transportation.
- we have assumed responsibility for safely disposing of used PCB's (returned in the proper form) from customers.

We estimate the manpower already invested in these programs is 20 22 man years (since 1969).

Please note that this summary describes our manufacturing program only. Positive steps have also been taken by other Monsanto functions (Marketing, for example) to keep PCB's out of the environment.

The following pages present more detail on our programs.

1. Manufacture of more biodegradable PCB's

In 1971, we installed a new distillation column in our manufacturing department at a cost of $970,000. This allows us to separate the higher chlorinated, less biodegradable compounds from the lower chlorinated, more biodegradable ones.

Our PCB's are known by the trade name Aroclor. We manufacture different grades of Aroclor (1016, 1242, 1254, for example). The lower the grade number, the less chlorinated and more biodegradable is the product.

Production of the lowest grade Aroclor (1016) will total about 60% of our PCB production in 1972. Production of the higher chlorinated products (Aroclor 1248 and above) has decreased 60% since 1969.

Total Aroclor production at our plant has declined [illegible] since the peak year of 1970.

To illustrate how our production mix has changed, we have developed the chart on the next page.

2. Steps to eliminate losses of PCB's

Past Efforts

We have spent $170,000 to modify equipment in the manufacturing department. Programs include the following:

- Installing settling basins and directing all flow to these basins by improved paving, curbing, and sloping. In the manufacturing area, drainage is directed to trenches and piping, and then to one of two 3,000-gallon settling basins. This insures PCB containment in case of accidental spill or equipment failure. The heavier, virtually insoluble PCB's will settle to the bottom of the basin, are later pumped into drums, and eventually incinerated.

  In the incinerator area, drainage is directed to trenches and piping which flow into a 10,000-gallon basin. Recovered PCB's are periodically pumped to storage, and later incinerated.

- Rerouting of rupture disc lines and atmospheric vents through catch tanks, or redirecting them to settling basins. This insures that if a rupture does occur, PCB's will not get into the environment, but will be contained in a controlled area.

- Providing nitrogen blanketing on storage tanks to eliminate any "breathing" of the tanks and resultant PCB escape.

- Installing mist eliminators in vapor lines - once again to eliminate the possibility of PCB's leaving the manufacturing area through these lines.

- Replacing underground sewers with above-ground sewers, and repairing or combining others, so that we can have accurate monitoring of the effluent from the department. In addition, this will prevent any unknown buildup of PCB's in our sewer systems or any contamination of PCB's into other sewers.

2. Steps to eliminate losses of PCB's (continued)

In the plant, we have replaced all PCB fluids in Therminol units and hydraulic systems with non-PCB fluids. Cost of this program was $80,000.

— Extensive Education/Housekeeping Effort —

We have conducted an extensive education program with our operating personnel to emphasize - and re-emphasize - the need for control and containment of PCB's within the department.

Much of the success of our efforts depends on maintaining a high housekeeping level in the department. Below is a listing of the kinds of housekeeping responsibilities our operators have assumed:

- All pumps are checked for leakage on every shift. Drip pans that collect leaks are emptied into scrap Aroclor drums.
- All leaks are reported and documented so that corrections can be made and settling basins observed.
- "Floor Dry" is used to absorb any liquid Aroclor that has spilled or leaked. If it becomes necessary to flush PCB's to the settling basin, a minimum amount of water is used.
- Sampling drums and scrap-Aroclor drums are quickly palletized, labeled, and transferred to the incineration area.

2. Steps to eliminate losses of PCB's (continued)

Future Plans

As a result of past programs and present efforts, our operations take place in essentially closed equipment, run by personnel following specific operating instructions. Key operating controls are monitored and recorded. All product transfers are within closed piping systems.

We believe that PCB losses from the operating department can be controlled to meet the expected EPA guideline as stated in the "Polychlorinated Biphenyls and the Environment" report of May 1972 by the Interdepartmental Task Force on PCB's. Average values will consistently be below 0.01 ppb as calculated in the receiving water.

3. Use of sophisticated systems to monitor our effluent

Past Difficulties

Monitoring effluent streams for PCB's is not an easy effort. PCB measurement can be changed dramatically -

- by taking the sample at different places along the sewer main,
- by changing the level at which the sample is taken (top, middle, bottom of sewer line or box),
- by changing the speed at which the sample is taken,
- by the varying velocity of the effluent.

Through exhaustive study, we feel we have installed the best sampling facilities and flow instrumentation, so we can continuously and accurately sample the stream and determine any PCB content in it.

In addition, to analyze the stream samples, we have purchased laboratory equipment which enables us to determine PCB content in the parts-per-billion range.

Present Monitoring Program

Process waters from the Aroclor manufacturing department, as well as any overflow from [redacted] the settling basins, enter the plant sewer system at one point. ([redacted])

The stream (200 to 300 GPM) passes through a Parshall flume, where instruments measure the quantity. A continuous sample of department effluent is taken at the flume. These samples are analyzed twice a week, and losses are calculated ([redacted]) from the flow measurements and laboratory analyses.

The Technical Services Department and department supervision review loss data to determine if corrective action is needed.

A similar procedure is followed to measure effluent from the incinerator area.

This product contains POLYCHLORINATED BIPHENYLS (PCB's) which some studies have shown may be persistent, an environmental contaminant and, possibly, injurious to certain forms of bird, aquatic and animal life.

PREVENT ANY ENTRY INTO THE ENVIRONMENT THROUGH SPILLS, LEAKAGE, DISPOSAL, VAPOURISATION, REUSE OF CONTAINERS OR OTHERWISE.

SPILLS, LEAKAGES AND WASTE PRODUCT MUST BE COLLECTED.

Use of this product must be restricted to applications which can be controlled so that entry into the environment does not occur and to applications in which it cannot come into contact with food, animal feedstuffs or pharmaceuticals.

HARMFUL SUBSTANCE IF TAKEN INTERNALLY OR IF IN PROLONGED CONTACT WITH THE SKIN.

CAUSES IRRITATION OF SKIN AND EYES.

DURING SHIPMENT AVOID SPILLS AND LEAKAGE INTO INLAND WATERWAYS AND THE SEA.

CAUTION!

CONTAINS CHLORINATED HYDROCARBONS

Store away from food, animal feedstuffs and pharmaceuticals.

Keep container tightly closed.

Do not eat or smoke when using.

Avoid breathing vapours, mist or fumes.

Do not wear contaminated clothing.

Wash product from skin with soap and water.

Wash eyes by flushing with water.

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4. Loading and Shipping Safeguards

In the plant

During loading operations, we follow very specific operating procedures, based on very specific written instructions, to prevent accidental spills. The same is true for filling drums.

All loading and drum-filling operations take place in self-contained areas ~~where drains and sewer systems are connected to settling basins~~.

Aroclor in transit

For additional insurance, we have substituted a safer drum for shipping Aroclors. The metal thickness was increased by 26% (18-gauge drum to 16-gauge drum), and double chimes were added to give strength to the heads.

In addition, we have ~~added~~ specific instructions ~~to our Aroclor labels, as follows:~~ printed on yellow drums.

~~"This product contains polychlorinated biphenyls, which some studies have shown may be persistent, an environmental contaminant and, possibly, injurious to certain forms of bird, aquatic and animal life. Extreme care should be taken to prevent any entry into the environment through spills, leakage, use, disposal, vaporization or otherwise."~~

~~"WASTE DISPOSAL. Used plychlorinated biphenyl fluids may be returned freight prepaid for proper incineration at 3¢ per pound. Ship to: Supervisor, Dept. A-246, MONSANTO COMPANY, SAUGET, ILLINOIS 62201"~~

4. Loading and Shipping Safeguards (continued)

"ATTENTION - DO NOT USE IN ANY SYSTEM INVOLVING PROCESSING OR HANDLING OF: Food or food-related products; Food wrapping or container materials; Pharmaceuticals or animal feed stuff. ANY CONTACT MAY CONTAMINATE THESE ITEMS TO THE EXTENT THEY MUST BE DESTROYED."

"IN CASE OF LEAK OR SPILL, CALL COLLECT 618-271-5835."

Truck drivers have been instructed as follows:

ENVIRONMENTAL CONTROL

THE PRODUCT THAT YOU CARRY CONTAINS POLYCHLORINATED BIPHENYLS(PCB'S)WHICH SOME STUDIES HAVE SHOWN MAY BE PERSISTENT, AN ENVIRONMENTAL CONTAMINANT AND, POSSIBLY, INJURIOUS TO CERTAIN FORMS OF BIRD, AQUATIC AND ANIMAL LIFE.

CARE MUST BE TAKEN TO PREVENT ANY ENTRY INTO THE ENVIRONMENT THROUGH SPILLS, LEAKAGE, DISPOSAL, VAPORIZATION, REUSE OF CONTAINERS OR OTHERWISE. SPILLS, LEAKAGE AND WASTE PRODUCT MUST BE COLLECTED.

IN THE EVENT THAT YOU ARE INVOLVED IN A TRAFFIC MISHAP WHILE TRANSPORTING THIS PRODUCT STEPS MUST BE TAKEN AS SOON AS POSSIBLE TO CLEAN UP AND COLLECT ANY LEAKAGE, INCLUDING CONTAMINATED RAGS, CHAT, DIRT, ETC., REGARDLESS OF HOW LARGE OR SMALL THE SPILL.

FOR ADVISEMENT IN CASE OF LEAK OR SPILL CALL COLLECT:

(618) 271-5835
SUPERVISOR DEPT. 246
MONSANTO COMPANY
SAUGET, ILLINOIS 62201

5. Safe disposal of used PCB's

We can now dispose of liquid-waste Aroclors

- assuming the organic solvent in which the Aroclors are contained is "incinerable", and
- which are delivered to us properly in tank cars, tank trucks, or drums.

This is accomplished through incineration at 2000°+F. Cost of the incinerator was $790,000.

An ~~installation~~ operating permit has been received from the Illinois EPA for this Aroclor incinerator. The unit meets all requirements specified by the EPA.

CONCLUSION

We feel we have a dynamic program to keep PCB's from the environment - one which has produced excellent results.

We are reducing discharges to the lowest technically achievable level - and will continue to do so.

The expected EPA guideline would restrict PCB losses to an amount less than 0.01 ppb in the receiving water. We are consistently meeting this expected EPA guideline as stated in the "Polychlorinated Biphenyls and the Environment" report of May 1972 by the Interdepartmental Task Force on PCB's. All our efforts are directed toward continuing to meet the guideline.

This, we feel, is proof of our sincerity and effectiveness in the effort to control losses of PCB's in the environment.

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However Dr Scott Tucker, our PCB analytical expert advises however that the determination of the PCB contained in distilled water is 1 ppb (parts per billion) ± 25%. If dirty water containing other materials which interfere with the determination are present the accuracy is 100 ppb ± 25%.

The table below shows the analytical accuracy that can be expected in determining the PCB content of various substances with and without interference

Substance	Clean Samples	Samples with interference	Sample Size
Water	1 ppb ± 25%	100 ppb ± 25%	1000 grams
Sediment	5 ppb ± 25%	500 ppb ± 25%	250 grams
Biological Tissue	20 ppb ± 25%	2000 ppb ± 25%	50 grams

From this you can see the extreme importance of sophisticated expert sampling supplemented by experience and expertise of analysts.

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