Monsanto

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POLYCHLORINATED BIPHENYLS

CONTROL OF ESCAPE TO THE ENVIRONMENT

Manufacture

The PCB's are manufactured by the chlorination of biphenyl produced by cracking benzene. The process is a relatively simple, high-yield reaction which takes place in a closed system with no inherently difficult emission problems. There are no stack gases or water streams which are in contact with the product during the manufacturing process. Control of emissions is therefore concerned with the prevention of leakage and spillage and safe disposal of any material which escapes in this way.

High priority is given to maintenance of all equipment and curbs and drip pans have been provided to collect leaks where they occur. We have constructed catch basins in the main sewer of each of our PCB plants as an added safety measure.

Air emissions are virtually non-existent as the boiling point of the PCB's is extremely high and they can only be distilled under vacuum. This means that vapors are easy to control and they are returned to the system by means of condensers.

A special high-temperature incinerator has been developed for the destruction of PCB residues collected from the process. The flue gases produced contain CO_2, H_2O and HCl which is scrubbed out, neutralized and passed through our normal waste treatment plant.

The above actions have resulted in our PCB losses to the environment being reduced to the parts per billion level, but we are still not satisfied and are carrying out research work on a tertiary treatment process designed to remove even

these minute traces from our waste water streams. We expect to complete this program prior to year-end when the additional equipment will be installed in our plants.

Industrial Usage

The PCB's as a group exhibit many interesting properties:

Fire Resistance
Chemical Resistance
Adhesivity
Resistance to Oxidation
Low Volatility
Resistance to Hydrolysis

These properties together with their compatibility with a wide range of natural and syntehtic polymers and copolymers have made the PCB's extremely useful components in many industrial formulations such as specialty paints, adhesives and coating compounds.

Major volume uses for the PCB's, however, are as fire resistant fluids in closed system applications such as:

Transformers
Capacitors
Heat Transfer Systems
Industrial & Hydraulic Applications (usage now terminated)

where their excellent dielectric properties, fire resistance, inertness and stability at elevated temperatures make them key factors in maintaining a high level of safety in many industrial operations.

In view of the possible threat to the environment posed by the polychlorinated biphenyls, Monsanto has taken the position that it will restrict sales of PCB's only to those applications where their unique fire resistant properties are important and where it is possible to control collection and regeneration or incineration of spent material. We have therefore taken the following actions:

1) Discontinued sales of PCB's for all general plasticizer applications.

2) Phased out the PCB's as components of industrial and hydraulic fluids where control of spillage and collection of spent material is not possible.

3) We are continuing to sell PCB's as dielectric fluids for transformers and capacitors, cooperating with customers collecting spent and arced fluid for regeneration and/or incineration.

4) We are continuing to sell PCB's as fire resistant heat transfer fluids in non-food and feed applications. However, we are restricting our sales to replacement fluid for existing systems, and are refusing to supply fluid for new systems.

5) We are continuing research efforts to develop alternatives to the PCB's and modify PCB's to make them biodegradable in conventional secondary waste treatment facilities.

Other Work

In addition to these major actions, we are continuing to study analytical techniques for accurately determining the PCB's in air, water and animal tissues--the biodegradation of the PCB's--the toxicity of the PCB's to mammals, birds and fish. Detailed information on our analytical techniques and procedures is attached, and also brief summaries on the status of biodegradation and toxicity studies.

We are also cooperating closely with the joint agency task force, under the direction of the Office of Science and Technology, and the special committee appointed by OST to study the PCB problem.