

Monsanto

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THE POLYCHLORINATED BIPHENYLS

Biodegradation Studies

Monsanto is currently involved in research studies on the biodegradation of PCB's both in the U.S.A. and in the U.K. where we are working closely with Professor E. C. Evans of the University of North Wales.

This work is aimed firstly at establishing the degree of biodegradability of the commercially produced PCB's, and secondly to develop ways and means of modifying these products to enable them to be broken down into harmless by-products in a conventional secondary treatment waste plant.

As anticipated, the PCB's have proven extremely resistant to biodegradation under conditions which normally exist in the environment. This is particularly true of those products containing isomers with high chlorine content, i.e. those containing 5 or more chlorine atoms. However, progress has been made in developing strains of microorganisms which are effective in degrading isomers containing 2, 3, and 4 chlorine atoms. Work is continuing in this area with the aim of finding new and more effective cultures which are capable of degrading the higher chlorine containing isomers.

As a result of this initial work, we are currently developing commercial PCB products where the higher chlorinated isomers have been removed. Although the resultant reduction in chlorine content reduces fire resistance and affects dielectric properties, we are hopeful that we can develop satisfactory products which can be broken down into harmless by-products, when passed through conventional waste treatment facilities.

It should be clearly understood that we have no intention of trying to develop PCB compounds which will degrade in the environment. Our aim is to keep the PCB's out of the environment, but by making them degradable in conventional waste treatment facilities we hope to add an extra safety measure should spills and leakages escape the other safety measures we have already established.

NEV 027550



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OCT 8 1970

Monsanto

FROM NAME & LOCATION: W. B. PAPAGEORGE - ST. LOUIS

DATE

OCTOBER 6, 1970

cc

H. S. Bergen
J. Mason
J. E. Springgate

SUBJECT

PCB ENVIRONMENTAL PROBLEM
SEPTEMBER STATUS REPORT

TO

P. J. A. Marsh - BRUSSELS
W. S. Clark
J. R. Durland - TOKYO
M. W. Farrar - 2nd Street
E. V. John
R. E. Keller - 2nd Street
R. M. Kountz
T. L. Gossage
P. S. Park
W. R. Richard
J. R. Savage
E. P. Wheeler

ED-4

GENERAL:

Performance against the PCB plan was reviewed with the CMC on September 14. Overall the committee was satisfied with the progress which has been made and complimented the various departments in the Division who have been involved in the action. However, it was emphasized that we must continue to emphasize to all remaining users of PCB's the importance of preventing escape to the environment and we must ensure that these warnings are fully documented so that they will support the action we have taken in this area should we become involved in legal actions.

Two variances from the original plan were requested and approved:

1. NCR - As the customer has proved unwilling to commit himself to a take or pay contract, it was agreed that we can go ahead on the basis of producing MIPB in existing equipment or using toll manufacturing facilities ensuring that a satisfactory level of profitability is maintained. The emphasis here was to phase 1242 out of NCR formulations as soon as possible.
2. It was recognized that good progress is being made in reformulating industrial/hydraulic fluids and that it was not easy to completely replace PCB's with alternate material. In view of the progress made, an extension of a further three months (i.e. end first quarter 1971) was granted to enable



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us to reformulate those products still containing Aroclor 1242. It was emphasized, however, that this would be the last extension granted and if we are not successful in reformulating, it will be necessary to discontinue the business in spite of the significant gross profit involved.

Preparations are underway to test the disposal of solid waste contaminated with Aroclors in Enviro-Chem Systems pilot unit in St. Charles, Mo. Solid wastes from transformer and capacitor manufactures will be introduced into the unit during the week of October 12.

Negotiations are continuing with Rollins-Purle, Inc. to establish their capabilities and cost of incineration of liquid Aroclor waste.

MARKETING:

The withdrawal of Aroclor plasticizers from the market appears to have been completed with very few loose ends. Only a couple of companies have called claiming that they had not heard of our withdrawal, and to date these inquiries have not caused any significant problems. Our distributors are well on their way to zero inventories of the Aroclors, having pretty well matched their purchases from Monsanto with firm orders from their customers. It does not appear that there will be any extensive returning of unsold materials.

Orders for the products which will replace the withdrawn Aroclors in the market are starting to come in. It will be several months before substantial volumes are being sold, however, as most companies have some inventory of the old products in stock. Two major items of information indicate that the replacement program is progressing well. The first is that 3M has replaced Aroclors 1254 and 4465 with Aroclor 5442 in five product lines in the Industrial Tape and Electro Products Division. The second is that Thiokol states that Santicizer 261 now has the inside track ahead of all other products including chlorinated paraffins as a replacement for Aroclors 1254 and 1260.

ENGINEERING:

Waste Incineration - CEA 2415

Design is in progress both internally and at John Zinck's. Approval drawings for the incinerator are expected the week of October 7.

Aroclor Distillation - CEA 2417

Definitive design is in progress. Because of recent decisions by Corporate and Division Management, marketing forecasts for MCS 1016 have been reduced. Accordingly, elements of the project are being reviewed with the idea of reducing the scope of work.

Tributyl Phosphate - CEA 2371

The project scope report is being reviewed by the plant. The II building explosion and subsequent related work has delayed this plant review. A preliminary estimate has been developed. Timing of the project has become critical so pre-approval funds will be requested for engineering and commitment of long-delivery equipment.

N-C Phosphate

Although Research has had success in bench scale operation, it has been decided to prove out the process in the E-E building at JFQ. Thus, the latest schedule for having process assurance is March 1971. Project development will not be resumed until after the process is proven.

EUROPE:

An informal meeting was held with the Directors of some of the voluntary societies, e.g. British Trust, for Ornithology, and they expressed considerable satisfaction at the responsible attitude adopted by Monsanto in Northern America and the U.K.

The N.E.R.C. REPORT on the Irish Sea incident is now expected to be published November/December.

We have been promised a copy of the latest draft.

Further contact with the other European manufacturers has not yet yielded agreement on when or how to act and it has not yet been possible to arrange a decision-making meeting with them.

MEDICAL:

The latest status reports on the dog and rat chronic feeding studies, rat reproduction studies and chicken toxicity, reproduction and residue studies were reviewed with representatives of the National Institute of Environmental Health Sciences, Bureau of Commercial Fisheries Laboratory, Food and Drug Administration, U.S. Department of Agriculture and the Patuxent Wildlife Research Center.

PUBLIC RELATIONS

The July news release, stating our position to withdraw from certain PCB markets, was used in whole or in part by 13 more major newspapers. Total to date is 22. As the month closed, plant management at Pensacola speculated Monsanto may be sued by the Southeast Fisheries Association, Inc. for polluting Escambia Bay with PCB. At this writing, the suit has not been filed. A preparedness statement was drafted for use by the Plant Manager, should a suit develop.

RESEARCH:

Carbonless Carbon Paper Solvents

NCR now seems more committed to MIPB-2 as replacement for Aroclor 1242. It appears that an additional 100,000 lbs will be required for full scale trial with a "firm" answer expected late 1970 or early 1971.

Assistance has been provided the plant in preparing for the upcoming run of MIPB. An amendment was written to allow the manufacture of a MIPB containing higher (1.5 vs. 0.6) ratios of propylene to biphenyl. The most recent information indicates that this higher ratio material will not be needed by NCR.

Manufacturing is searching for a location to make larger quantities of MIPB.

Nashua likes a blend of Aroclor 5442/HB-40-1/4 as a dye solvent even though its viscosity is above their "upper limit". Three more blends are being sent them to help zero in on the proper ratio.