CONFIDENTIAL

MONSANTO CHEMICALS LIMITED
RESEARCH AND DEVELOPMENT DEPARTMENT
RUABON

073

TO: R.A. Baxter, Ruabon
D.S. Cameron, Brussels
W.R. Richard, St. Louis

c.c. J.W. Barrett, London
H.N. Dahlstrom, Brussels
J.C. Garrels, London
E.V. Weekes, Brussels
W.B. Papageorge, St. Louis

AROCLOR - ENVIRONMENTAL CONTAMINATION
STATUS REPORT OF EUROPEAN STUDIES - 2nd MARCH 1970

1. Biodegradation

Biphenyl-adapted micro-organisms appear to degrade the following P.C.B. isomers in the presence of biphenyl: 2:3 dichlorobiphenyl, 3:4 dichlorobiphenyl, 4:4' dichlorobiphenyl, 2:3':4' trichlorobiphenyl and, possibly, 2:3:2' trichlorobiphenyl. Isomers which appear to resist degradation include the following: 4:4' dichlorobiphenyl, 2:4:6 trichlorobiphenyl and 2:4:2':4' tetrachlorobiphenyl.

Work is in progress to study the effects of a pure culture of an organism found by workers at Bangor University to metabolize biphenyl and early results suggest that this may be more active in degrading some of the chlorinated biphenyls than the broad spectrum cultures used previously.

Work has also started to study degradation of some bromochlorobiphenyls.
from SHL Research

DEPOSITION EXHIBIT
Papageorge-DMC
31-1D 8.31.81

0010119

3. Technical Visits and Discussions

At a meeting with representatives of the Ministry of Agriculture, Fisheries and Food (Fisheries Laboratory) the main uses of Aroclors were discussed, but names of companies were not divulged, nor was the N.C.R. paper application. The Ministry officials aim to establish a use and distribution pattern to assist them in sampling coastal waters around the U.K., specifically to relate this to P.C.B. levels in fish. They reported that North Sea herring contain up to 1 p.p.m. P.C.B. (measured as penta- and hexa-chlorinated biphenyls) in muscle tissue. They have also established that the brown shrimp is sensitive to P.C.B. and have deduced an LC50 concentration at 0.3 ppm, which compares with a level of 0.003 ppm for D.D.T. A further meeting has been arranged for 10 March at which more information will be exchanged on analytical and toxicological studies and on the pattern of pollution in U.K. coastal waters.

Correspondence with the Natural Environment Research Council has revealed that the report on the 'Irish Sea Incident', involving the deaths of thousands of sea birds, is likely to be published early in April. This is expected to draw attention to the fact that many of the dead birds contained high concentrations of P.C.B.'s., but it is unlikely to draw the conclusion that the deaths were caused by P.C.B.'s.

A visit to the Central Institute for Nutrition and Food Research at Zeist, Holland, (reported by RAL and HAV on 23/2/70) confirmed that their analytical techniques for P.C.B.'s are very good. They also have good facilities for toxicological studies and work closely with the Institute of Veterinary Pharmacology and Toxicology at Utrecht. An item of interest arising from the discussions was that samples of Phenoclor and Clophen examined at Zeist contained measurable amounts (20-30 ppm) of chlorinated dibenzofuran, whereas samples of Aroclor did not. Since chlorinated dibenzo furans are highly toxic, this was claimed to explain why toxicity tests showed that Clophen and Phenoclor were about 10 times more toxic than Aroclor. This work is being published shortly and we hope to see the manuscript prior to publication.

4. Liaison with Bayer, Prodelec and Caffaro

A special meeting of EITA was held at Frankfurt on 9/10 February to discuss the problem of P.C.B.'s in the environment. Monsanto summarized the commercial and technical developments arising from this problem. Detailed discussions followed under the headings of analytical, toxicological, degradation and disposal, and a number of actions were agreed to gather and exchange information. There appears to be no public concern yet in Germany, France or Italy, but Bayer recognize the international implications and have initiated a programme of work to study analytical and toxicological aspects. They are starting to check on their own and customers' plants. Prodelec and Caffaro have not yet initiated any work on this subject and their main contribution appears to have been in stimulating reclamation, particularly of transformer askarels.

0010120

WATER_PCB-SD0000039620

5. P.C.B. Disposal at Customer Plants

Technical discussions with and have resulted in some agreed actions for exchange of information and the provision by Monsanto of analytical data on effluent samples from and effluent has already been shown to be contaminated and suggestions have been made to improve the situation.

An analysis has been made by to estimate the quantity of Aroclor (1242) which could, at present, be discharged into effluent drains in the U.K. It is estimated that the 1969 amount was about 250 tons.

Work is currently in progress to analyse effluent from the plants at

6. Incineration

Arrangements have been made for incineration trials to be carried out on Newport waste samples at a contract waste disposal unit at Rainham, Essex. This unit operates at around 1200°C with a 3 second residence time. Gas scrubbing facilities are provided so that analysis of volatile residues can be made.

ACTION PLAN

(1) Continue bio-degradation studies and attempt to establish structural/degradation pattern for P.C.B.'s.

(3) Exchange information with Bayer, Prodelec and Caffaro as agreed.

(4) Continue to advise customers on disposal procedures and support them where necessary with analytical data and information on techniques.

(5) Co-operate with Ministry of Agriculture, Fisheries and Food and with the Natural Environment Research Council.
Seek discussion with interested organisations who can contribute effectively to a better understanding of the problem.

(6) Follow up incinerator trials.

H.A. Vodden

H.A. VODDEN

HAV/mch
9th March, 1970

0010121

WATER_PCB-SD0000039621