Those Present

TO: M. W. Dietrich
E. M. Emery
W. B. Papageorge
R. A. Lidgett
R. H. Munch
J. P. Mieure
W. M. Mees
R. E. Keller
V. W. Seager
E. S. Tucker

Others

W. R. Richard
E. Wheeler

MINUTES OF MEETING

DATE: December 1, 1972

PLACE: Monsanto Research Center
R-452
St. Louis, Missouri

PURPOSE: MICC-MCL Information Exchange

- PCBs (Methodology, Biodegradation, etc.)
- Analytical (Biological residues, bioassays, etc.)

Discussions were opened by Dr. R. E. Keller, who asked R. A. Lidgett to review MCL plans for present and future PCB work. R. A. Lidgett commented that they presently planned no further PCB biodegradation studies and that emphasis would be placed upon analytical support for the pond and EVOP plant process studies.

Pond Study

Study set up in response to a suggestion by Swedish regulatory officials that PCB products be evaluated in a "real life situation". Construction of ponds was complete in August of this year. Five ponds were constructed in Ruabon, one for each of the following fluids: Aroclor 1016, Aroclor 1242, Aroclor 1254 and MCS 1238 plus the control pond. The ponds are figure eight in shape, constructed of concrete, with a maximum depth of 3 - 4', and placed so that each receives an equivalent amount of sunlight. The first set of goldfish placed in the ponds promptly died. Their death was attributed to the high pH of the water caused by materials leached from the fresh concrete. The ponds were drained, cleaned, areation added, and re-stocked with fish.

The ponds were doped by sprinkling ∿1 kg of fluid coated sand into each. The MCS 1238 pond will not be dosed until the weather breaks in March or April, 1973. The ponds are being monitored by period removal of the fish for residue analysis. Preliminary data indicates that Aroclor 1242 and Aroclor 1016 build up in the fish more rapidly than does Aroclor 1254 (Table I). These results are attributed to the higher water solubility of the lower chlorinated products. Water samples taken from the Aroclor 1242 pond contained ∿0.1 ppb PCBs. Water samples from the other ponds have not been analyzed yet.

Some problems with fish mortalities are still being experienced. However, the deaths are being attributed to fungal infections and not to the presence of PCBs.

The long term objectives of these experiments is to demonstrate that Aroclor 1016 is better product than Aroclor 1242 and Aroclor 1254 from an environmental point of view and to determine if the fluids effect the reproduction and survival of the fish.

Because of MCL's re-location plans, MICC will develop a procedure for analyzing fish for MCS 1238 residues. A summary of MICC's recent efforts was presented. Completion of method development work was re-scheduled for March, 1973.

EVOP Plant Process Study

The objective of this study is to determine if an "improved Aroclor" (less than 2.5% penta and higher homologs) can be produced by suitable adjustment of process conditions. The level of penta and

higher homologs is monitored with a high resolution capillary column GC procedure developed by MCL. The procedure uses a hexachloro biphenyl isomer as an internal standard and assumes that the relative amounts of the low boiling penta isomers which overlap the high boiling tetra isomers does not change. Each sample requires 1/2 man day to analyze.

MICC uses two procedures to determine the high boiler content of Aroclor 1016. A rapid empirical procedure for plant control purposes and a high resolution SCOT column GC procedure when more accurate data are needed.

Preliminary data on an Aroclor 1242 sample analyzed by both MCL and MICC with their respective high resolution procedures produced comparable results. MCL found 7.0%, MICC 7.2%. However, MCL has never taken a serious look at MICC Aroclor 1016. It was, therefore, agreed that MCL and MICC would analyze several lots of Aroclor 1016 for high boilers to establish that the two procedures produce comparable results with this product.

None of the aforementioned GC procedures completely resolves each homolog. MICC is currently working on a GC procedure which appears to give homolog resolution. It was agreed that if the new procedure proves to be reproducible that it would be more acceptable than either in hand method and that development work should be continued.

It was suggested the MCL should analyze their "improved Aroclor 1242" EVOP samples by MICC's rapid empirical method. The suggestion was based upon the feeling that two types of methods are needed. A rapid plant control procedure backed by a more accurate high resolution procedure.

MICC has submitted the rapid empirical procedure to ASTM for acceptance as the standard method for determining the high boiler content of Aroclor 1016. It was suggested that MCL should consider a similar approach standardizing methodology in Europe. However, it was felt that competitive "improved PCB products" should be first analyzed by this procedure to insure that Aroclor 1016 and MCL "improved Aroclor 1242" were at least equal to if not better than others as judged by this method. MCL agreed to supply MICC samples of the German, French, and MCL "improved Aroclor 1242" to MICC for comparative analysis.

The remainder of the meeting was spent reviewing current and future MICC PCB defense work. An outline of the subjects reviewed follows.

E. S. Tucker

I. PCB Analytical Methodology

A. Current procedures employed for analysis of: (improvements and problems)

1. Environmental samples

2. Commercial products

3. Impurities - furans, etc.

B. Future plans

II. PCB Biodegradation Studies

A. Current studies

B. Future plans

III. PCB Residue and Toxicity Studies

A. Current studies

B. Future plans

IV. Misc. PCB Environmental Studies

A. MICC - U.S.

1. Soil migration - photodegradation

2. Chlorination of biphenyl $\bar{c}$ $Ca(OCl)_2$ in water

3. PCB silo paint formulations

a. Volatility

b. Extractability

4. Future studies

B. MCL - UK

1. Aroclor and MCS 1238 pond studies

2. Other (?)

PCB CONTENT OF GOLDFISH

Sample No.	PCB Type	Feeding Time	ppm Aroclor	Remarks
17308	1242	10 days	24/20	
17326	1242	25 days	22	
17334	1242	35 days	44/30	
17356	1242	42 days	*22/25	
17309	1016	10 days	16	
17327	1016	25 days	19	
17335	1016	35 days	35/29	
17357	1016	42 days	*40/16	
17333	1254	6 days	2/1	Changed pattern
17355	1254	13 days	4*	
17358	1254	20 days		