Monsanto

MAR 7 1977

FROM (NAME & LOCATION): J. P. Mieure - T2F

DATE: March 3, 1977

SUBJECT: Formation of PCBs in the Environment

REFERENCE: R. A. Stohr memo 2/18/77 to W. E. McCurdy and S. K. Torrey

TO: J. C. Weber - B2SK

cc: W. C. Hammann - T3A
R. E. Keller - T1B
W. E. McCurdy - E2NE
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Per your request, I am documenting our current opinions on the formation of chlorinated biphenyls in the environment.

The lower chlorinated isomers are reported to be formed during treatment of waste water by chlorination if biphenyl is present. Likewise, minute quantities can probably be formed by chlorine radicals from seawater reacting with biphenyl from petroleum spills. However, in either case, we expect only mono- or dichlorobiphenyls would form to a significant extent. Thus, this mechanism does not account for the tetra-hexachlorobiphenyls normally observed in environmentally weathered samples.

The suggestions that DDT may degrade into PCBs was logically discounted by Harvey (Science, 180, p 1122) who argued that lower chlorobiphenyls would be formed.

A very recent paper (Uyeta et al, Nature 264, 583 (1976)) describes photoformation of PCBs from chlorobenzenes. This reaction produces highly chlorinated biphenyls such as found in the environment. However, large quantities of tri- through hexachlorobenzene would have to exist in the environment for photoformation to account for the levels of PCBs in nature. This is unlikely.

In summation, formation of tri- and higher chlorobiphenyls may be of legal interest because it cannot be conclusively disproven. However, we think it is highly unlikely that in situ formation accounts for a significant percentage of the PCBs in the environment.

J. P. Mieure

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