Monsanto

FROM (NAME & LOCATION) R. E. Keller - R&D Laboratories - South Second Street

DATE June 2, 1970

cc:

SUBJECT AROCLOR ENVIRONMENTAL PROGRAM
EUROPEAN TRIP

REFERENCE

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AROCLOR ENVIRONMENTAL PROGRAM

EUROPEAN TRIP - MAY 1-21, 1970

Summary of Analytical Findings

1. No significant advances have been made in methodology in Europe and the UK the past year for the identification and measurement of PCB's. One new approach involves use of thin layer chromatography at Folkhalsan in Sweden prior to gas chromatography to get free of interferences and obtain increased specificity. A technique involving extraction with cold acetone for isolation of PCB's from tissue may shorten our tissue analysis program markedly.

2. No new analytical workers with the exception of Wiggins-Teape in the UK and Folkhalsan in Sweden have become involved in Europe during the past year.

3. Competitive companies in Germany (Bayer), France (Prodelec) and Italy are about where Monsanto was one year ago on methodology. Gas chromatography equipment suitable for this work has been purchased and will be installed in Germany and France within 1 to 3 months.

4. Monsanto methodology at Ruabon and more recently at Newport is based on work in St. Louis. Ruabon has yet to look at water from estuaries and the sea and wildlife for PCB's.

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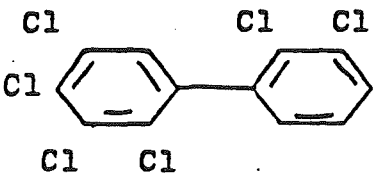
5. Professor Widmark who first identified PCB's at the Institute of Analytical Chemistry in Sweden now has a secondary role on PCB's. His prime interest is long range fundamental computerized mass spectrometry methodology.

6. Biodegradation facilities and supporting methodology at Ruabon is no better able to carry out degradation studies of Aroclor products, HB-40 and monoisopropyl biphenyl than St. Louis.

7. Ruabon theory says that the highest chlorinated biphenyl that will degrade is -



Other structures that will degrade will be isomers produced by taking chlorines from this structure. It has also been postulated at the Pest Infestation Control Laboratory in the UK that chlorinated biphenyls should be biodegradable if a CH_3 group is present on the ring.

8. An organism which grows on PCB's has been found at the University of Bangor. A grant to continue this work has been made by Monsanto (Ruabon).

9. PCB's continue to be found in a variety of fish, mussels, birds, margarine, vegetable oils and foods of animal

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origin in the UK and Europe. PCB residues are most typical of Monsanto Aroclor 1254. (March publication in Statens Institut for Folkhalsan, "Levels of Organochlorine Pesticides and Polychlorinated Biphenyls in Margarine, Vegetable Oils and Some Foods of Animal Origin on the Swedish Market -1967-1969", Gunnel Westoo, Koidu Noren and Margit Anderson.

10. PCB's continue to be found in the environment - both in fresh and marine waters and sludge from sewage treatment plants.

11. have been identified in herring by Unilever in the UK and presumably by the Folkhalsan Institute in Sweden.

12. PCB's found in dead seals in the UK and birds from the Irish Sea incident are not sufficiently high compared to that in healthy specimens to cause death.

13. PCB's found in nuts and many other foods in the UK have been traced to Littlejohn packaging drums manufactured from broke paper containing Aroclor 1242

14. The lack of suitable known isomers continues to slow down Monsanto and outside laboratories carrying out analytical, biodegradation and toxicological studies.

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15. PCB's were found in fish in the waters of Scotland back to 1963 as shown by examination of old GC curves. No curves available for earlier years.

16. Less than 1% of fish from east and west coast of Scotland contain more than 0.1 ppm PCB with a 0.05 ppm detection limit.

17. PCB's in Scotland appear to be discharged in sewage trade wastes - hundreds of ppm found in sewage sludge - not in effluent or liquors. No problem with fresh water - appears to be marine environment only.

18. The possibility of PCB's being a contaminant in pesticides appears to be ruled out. Reason - in Scotland the PCB's are not always fellow travelers with pesticide residues. Comment was made that only two chlorinated compounds occur in nature.

19. PCB residue results for 5-7" Rainbow Trout exposed to 0.1 ppm Aroclor 1254 were inconclusive. Dead fish after 121 hours contained 15-56 ppm compared to 12-70 ppm for fish which lived.

20. Results of fish studies indicate no biological isomeric change in Aroclor 1254 per GC curves.

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21. Beef, mutton and butter from New Zealand shows no PCB compared to that from the UK.

22. Work is underway at Utrecht on the GC separation and identification of toxic components in PCB's. No GC peaks have yet been found for toxic components (furans) in Aroclor products. Study will be extended to looking for furans in seals and wildlife.

23. General comments suggest that Bayer may be aggressive on substitute products - we were asked if we had considered fluorinated biphenyls.

24. Observations were made that the isomeric composition of Aroclor 1254 changes upon standing in air - presumably due to volatility.

25. A two year study at Monks Wood in England shows that fresh water fish feeding birds contain more PCB than mammal feeding birds. Insect feeders contain the lowest level. (July publication in Environmental Control (?), "Polychlorinated Biphenyls in Wild Birds in Britain and Their Avian Toxicity" by Ian Prestt, D. J. Jefferies and N. W. Moore).

26. Above workers conclude off the record that thin egg shell problem in Britain is due to pesticides and not PCB's.

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R. E. Keller

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