MONTHLY SUMMARY - JUNE, 1969
FUNCTIONAL FLUIDS - RESEARCH

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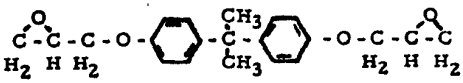
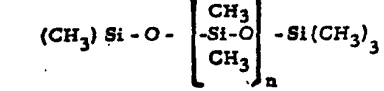
IV. Electrical Fluids

The epoxy additive in Bayer experimental product Clophen 14057 was found to be:



Identification was by NMR. Titration of oxirane oxygen indicated that there was 1% of the additive present. This material is a readily available unpatented epoxy resin ingredient which we could use if it seemed desirable.

A sample of fluid from Aerovox was identified as a silicone of the following structure:



The viscosity of the fluid was 2.5 centistokes. The application for which this fluid was used might present an opportunity for us to promote OS-59 silicate ester.

V. Aroclor Wildlife Analytical Studies

Analysis of the Biotest chicken tissues was completed. The objectives of this study were as follows:

- to establish the validity of the analytical procedures developed for Aroclor analysis.
- to determine if the electron capture chromatograms of chlorinated naphthalenes and selected pesticides extracted from tissues resembled those of Aroclors.
- to determine if there was any significant changes in the isomer distribution of Aroclor extracted from tissues with respect to that feed.
- to obtain a rough fix on the amount of Aroclor held by the various tissues.

These objectives have been accomplished. A more detailed report is being prepared and will be issued shortly.

The analytical methods for the analysis of Aroclors in water, soil, and sediment have been completed (Analytical Chemistry Method No. 69-7). Arrangements have also been made with Anniston and Krummrich people to begin sampling of the Aroclor production areas. The analysis of these samples will be carried out at South Second Street.

The investigation of the nitration clean up procedures of Risebrough and Widmark was completed. A memo is being prepared.

One hundred and thirty-two water samples and an equal number of trout and bluegill fingerlings have been received from Biotest for residue analysis. These are a part of the 96 hour fish toxicity studies currently being carried out.

Forty-five Aroclor treated soil samples, from a Florida test plot were provided by the Agricultural Division. The Aroclor was placed in these plots in 1938. We will attempt to determine the degradation, if any, which has occurred in the past 30 years.

The Beroza dehalogenation-hydrogenation experiments with Aroclor have been delayed. Our second gas chromatograph will now be used to check the feasibility of 5460 analysis by electron capture gas chromatography.

PCB analysis of the Biotest albino rat tissues has been started. These samples were generated in a Biotest Laboratories' 30-day tissue collection study in albino rats with Aroclors.

Replacements for Aroclors

Polychlorinated biphenyls have been reported in tissues of fish and birds along with chlorinated pesticides such as DDT. Jensen and Widmark (U. of Stockholm) report that the biphenyls containing 5 and more chlorine atoms per biphenyl are biological contaminants in the Baltic Sea. We have therefore synthesized bromo-chlorobiphenyls as potential replacements for Aroclor 1248 and 1254 in hydraulic fluids (and perhaps for plasticizer applications). We expect greater biodegradability and light degradation for the bromo derivatives.

The bromination of Aroclor 1232 followed by isomerization with $AlCl_3$ gave bromo-chlorobiphenyls with % halogen equivalent to Aroclor 1248 and 1254. Aroclor 1242 was brominated to the 1254 and 1264 stage. Costs of partial bromination are expected to run from 2.5 to 5¢/lb. greater than the chlorinated biphenyls, depending on the amount of bromine added. We are working on the bromination of Aroclor 1232 to the chloro-bromo-biphenyl corresponding to Aroclor 1242. Samples were submitted for acute toxicity. Larger samples will be prepared for photodegradation, biodegradation and application evaluation.

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