

STATEMENT BY WESTINGHOUSE MANAGEMENT OFFICIAL, D. M. SAUTER, AT EPA MEETING
ON PCB'S - January 14, 1976

Westinghouse very much appreciates the opportunity to make these comments at this conference. It is the hope of Westinghouse that this meeting will be devoted to the safety aspects of electrical equipment. Westinghouse recognizes that environmental effects are one of the many elements that affect human safety. The production, use and operation of electrical equipment must not increase the danger to humans.

Since the early 1970's, when scientific studies indicated that polychlorinated biphenyl mixtures presented some hazard in the environment, Westinghouse has expended considerable money and effort to reduce the amount of Aroclor 1016 and 1242 that might escape into the environment. Measures that have been employed are: Sealing drains in manufacturing areas where Inerteen is used; (note - Westinghouse uses the term Inerteen for Aroclor 1016 and 1242); utilizing specially designed incineration facilities for the destruction of scrap Inerteen and special scientific landfills for the disposal of Inerteen contaminated material; instructing operating personnel and our customers regarding the need for care, and that special waste disposal is required; and reducing the number of pounds of Inerteen for each rating of transformers and capacitors. Most of these measures were implemented prior to the enactment of the Federal Water Pollution Control Act Amendments of 1972.

Westinghouse recognized that these measures could not prevent the total elimination of Inerteen escaping into the environment. Therefore, concurrent with the above measures, we have conducted extensive evaluation programs designed to utilize those mixtures of polychlorinated biphenyls

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having low persistence and high biodegradability in the environment. By February 1968, Westinghouse determined that a mixture of polychlorinated biphenyls, sold by Monsanto as Aroclor 1242, would be satisfactory as Inerteen for transformers. Aroclor 1242 contains about 91% of the lower isomers (containing 4 chlorines or less) that more readily biodegrade in the environment. This material has been used by Westinghouse since that time with the understanding that over 90% of any small amounts that did enter into the environment would have relatively low persistence.

Monsanto subsequently developed a new material from Aroclor 1242 which contained more of the lower chlorinated isomers and marketed this material as Aroclor 1016. By the first quarter of 1972, this material was introduced by Westinghouse into the manufacture of all capacitors. This material contains 99% of the more biodegradable isomers (4 chlorines or less) so that less than 1% of this material that might escape into the environment might be more resistant to biodegradation.

The industry, Monsanto, our own research of the scientific literature and most of the papers presented at the EPA Conference in Chicago have indicated that the lower chlorinated mixtures of polychlorinated biphenyls are more biodegradable and do not present the same long term toxic environmental problems as those which contain the higher chlorinated isomers. It is interesting to note in this regard, that not only have Environmental Protection Agency researchers found a significant difference between the effects of Aroclor 1242 and Aroclor 1016 on rats, but also Dr. Robert W. Riseborough and Dr. Ian Nisbet concluded that there were significant differences between

the various mixtures and that comments concerning the higher chlorinated mixtures should not be associated with the lower chlorinated mixtures.

Because of the long term nature of biodegradable and toxicity tests, limited data is available on Aroclor 1016 and Aroclor 1242. We hope the government is gathering test data on biodegradability, toxicity and flammability of 1016 and 1242. Otherwise, industry as it develops alternate fluids will have no sound basis for comparison.

To gather data to evaluate alternate fluids, Westinghouse after 40 years of experience, has found these steps necessary:

1. Check the fluid for possible harmful effects to the environment.
2. Check the electrical characteristics.
3. Check for safe handling.
4. Check for availability, wide use and economic feasibility.
5. Make small model capacitors and transformers and check for system compatibility.
6. Perform accelerated life tests on small model capacitors and transformers.

If a fluid passes step one thru six it becomes a candidate for full scale tests.

Westinghouse instituted development programs to evaluate various fluids as possible impregnants for high voltage power capacitors and transformers using these six steps over five years ago. These programs were first aimed at

consideration and testing of several known existing impregnating fluids and, secondly, to seek out and test new fluids as possible impregnants. This effort has been carried out at both Research and Development Laboratory levels and plant engineering levels.

In the first phase of this program, it was determined that none of the known available capacitor impregnants were a satisfactory replacement for Aroclor 1016 either due to poor electrical performance at the high voltage stresses required, or due to poor flammability characteristics. Similar results were found when testing for substitutes for 1242 which is used in power transformers.

In the search for new fluids, a large number of raw material suppliers of chemicals and petrochemicals have been contacted. Among these have been Dupont, Dow Chemical, Dow Corning, Monsanto, Sunoco, Exxon, Pilot Chemical, Union Carbide, Huppon Oil, Prodelec, Pittsburgh Chemical and USS Chemicals. Many tests have been carried out with materials supplied by most of the above suppliers, some tests on the fluids themselves and others using the more promising fluids in both small model capacitors and in full-size capacitor units. Although none of these fluids have flammability characteristics equal to that of 1016 fluid, some have adequate electrical performance sufficient to consider them as possible replacements for Aroclor 1016 should this action become necessary. In the transformer area, no economical substitute for Aroclor 1242 could be found with adequate flammability characteristics either. The electrical characteristics of mineral oil obviously are suitable for power transformers if flammability could be ignored.

5

Precipitous action to replace electrical equipment would result in billions of dollars spent by utilities, industrial plants and commercial installations. While this could increase orders for electrical manufacturers it would be a disaster for customers who would have to replace equipment prematurely and rebuild their electrical systems. The government is meeting with utilities and will learn of capacitor replacement problems. Industrial and commercial customers are the primary users of askarel power transformers. They should be included in government meetings since they will be faced with unreasonable costs for replacements also.

In conclusion, Westinghouse believes the U.S. government and scientific community should determine the biodegradability, toxicity and flammability of Aroclor 1016 and 1242. The tests and results for these two askarels can then serve the electrical industry as standards that should be improved upon. By putting forth scientific data and performing suitable tests on alternate fluids, the U.S. government can assist the electrical industry in selecting alternate fluids which potentially are less dangerous to man and his environment.