## APPENDIX C

### HISTORY OF ASKAREL DEVELOPMENT

Although no one had facilities to make biphenyl, in 1929 Mr. Theodore Swann accepted order for two carloads to be used as an indirect heating medium in an oil refinery.

Swann built and filled the order only to learn that this terminated the biphenyl business. Crystallizing at 69°C., biphenyl readily froze in the pipes. This problem was not solved until later when Dow discovered the eutectic of biphenyl and biphenyl ether which became well known as Dowtherm A.

To get useful properties out of biphenyl, Swann simply and cheaply chlorinated it leading to the broad spectrum called the aroclor family which now has more uses than any other chemical.

G.E. promptly recognized aroclor as a good dielectric and equally unusual because it did not burn. This led to G.E. use patents in the early 1930's covering aroclor and mixtures with chlorobenzenes, called Pyranol, for capacitors and transformers. G.E. began a very effective job promoting and developing markets for these new dielectrics and also licensed others to use them.

Swann holding the basic product patents was the sole producer of the material required to meet the quality specifications set by G.E. for electrical use which today remains the prime outlet.

Monsanto acquired Swann in 1935 and remains the sole supplier even though the basic patents expired around 1950. Prudent pricing, pressured by G.E., but not without allowing Monsanto good long-term profitability, was contracted around 1936 and remains the prime factor thwarting competitive action.

Thus until around 1950, when G.E.'s use patents also expired, Monsanto's sole function was to promptly supply the amount and quality of transformer askarel required by G.E. and their licensees. It was a cozy box to be in with G.E. sitting on the lid. The Inorganic District Sales force routinely handled the orders promptly filled by our factories, and a product man in St. Louis coordinated the business. Thanks to G.E.'s strong sales promotion, use of transformer askarel reached about 10 million pounds a year around 1950.



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With expiration of G.E.'s patents, we began to notice the first evidence of their change in attitude toward askarel. No longer interested in helping their former licensees who now competed on more equal terms, G.E. referred their people to Monsanto for assistance on their problems. This led to our publishing, in 1956, a book, "The Proper Handling of Aroclor and Their Mixtures in the Electrical Industry," which came to be known as the "Bible." The lid on our box began to open, at least in the technical areas. Monsanto was soon recognized and depended on to render excellent technical service.

In 1954, Monsanto transferred askarel to the Organic Division where the district sales people handled the routine business satisfactorily, as was done before. Transformer askarel use had grown to near 14 million pounds a year, but at the market place, G.E. began to take a neutral attitude. Like their competitors, they now considered askarel as merely one of the various types of transformers offered to get the transformer business.

The early fanfare, the hopes and expectations about the superior safety performance of askarel units at premium prices, had passed. Askarel now had to stand as judged by its 20-year actual performance. Unquestionably, this is an excellent record, but careful study at utility networks shows it to be no better on primary explosions than mineral oil units available at much lower cost.

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