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MONSANTO TO PRODUCE
NEW CAPACITOR FLUID
AS PCB REPLACEMENT

ST. LOUIS, Dec. 22 -- Monsanto Company today announced that it has received word from General Electric Company, one of the nation's leading capacitor manufacturers, of its intentions to begin converting its entire capacitor product line from polychlorinated biphenyl (PCB) material to Monsanto's new dielectric insulating fluid, code named MCS 1238, effective immediately.

Dielectric insulating fluids are non-conductors of direct electric current and are a necessary ingredient.
In making the announcement, Earle H. Harbison, Jr., general manager of Monsanto's Specialty Chemicals Division, said the new fluid has been under evaluation by the capacitor industry for some time and that General Electric's decision is the culmination of a major ~~effort~~ *which have been* efforts to develop an acceptable replacement for PCBs -- the industry's standard dielectric fluid since 1929.

According to Mr. Harbison, Monsanto has already made the commitments necessary to ~~ensure sufficient capacity to~~ *total* meet General Electric's ~~capacitor~~ *further* needs by late 1976. He ~~also~~ *pointed out* that ~~the company will also be able to handle~~

Sufficient additional capacity could be in place at the same time to handle the requirements of the entire U.S. capacitor industry -- should the other producers elect to switch their product lines to the new fluid.

Development work on this project has been underway within Monsanto for many years and was supported by following confirmation of the first identified PCBs in the environment.

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"In early 1970 Monsanto began its program of voluntarily terminating PCB sales to open applications -- those which could result in losses to the environment," he said. "At the same time," he continued, "Monsanto made the conscious decision to continue selling PCBs only to manufacturers of sealed electrical equipment such as transformers and capacitors because no usable, acceptable alternate products existed for many of these applications."

Mr. Harbison pointed out that the company's restricted PCB sales program was reviewed by a Federal Interdepartment Task Force in 1972. The report, issued by that Task Force, supported and endorsed Monsanto's program.

"Regarding our search for a usable alternate fluid," he went on, "we elected to pursue a scientific solution in a scientific atmosphere, while working with the entire capacitor industry. We further felt that to have done otherwise might have produced premature public claims which would have been irresponsible and inconsistent with our long-standing policy of seeking a solution to the dilemma that would satisfy the industry's needs and environmental concerns, as well."

According to Mr. Harbison, MCS 1238 is based on the company's proprietary technology in hydrocarbon chemistry. He further described it as being a mixture of alkyl biphenyl (a synthetic hydrocarbon) and di-aryl-sulfone (a high dielectric constant modifier), and said Monsanto has established a worldwide patent position on the capacitor use of MCS 1238.

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He added that the new fluid is designed to operate in all capacitors currently using PCBs and that its dielectric properties so

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*Don't
Could be more
than 100 mg
per volume
purpose of
fluid*

closely match those of PCBs that it will be possible to substitute one for the other in both capacitors and equipment using them, with little or no modifications. "This feature, an important development objective, could result in considerable cost savings to both industry and the ultimate consumer," he said.

The Monsanto official emphasized that, unlike PCBs, MCS 1238 is not a chlorinated product...a significant environmental consideration and another major objective of the development program. Substantial testing has already been completed and indicates that MCS 1238 is ~~an environmentally acceptable fluid~~ ^{environmentally compatible}. The components undergo ~~primary~~ ^{slow} degradation in simulated sewage treatment at an acceptable rate ~~and proceed to ultimate degradation with carbon dioxide evolution~~.

Regarding toxicity results to date, he said residue accumulation studies, with mammals, have demonstrated that neither component is concentrated in tissues when ingested in the diet. Available acute toxicity data in mammals and fish show MCS 1238 to be only a moderately toxic material with no apparent undue environmental or industrial risk. "A subacute toxicity study (90-days in rats) with the major components of the new fluid did not reveal any adverse ~~effect~~ ^{effect} at the highest dietary concentration -- 1000 parts per million. These results support the expected low order of toxicity of this material," he said.

"Additional studies currently underway include acute toxicity to wildlife, mutagenicity, teratogenicity, and long-term animal feeding tests for carcinogenicity. We are confident, based on our knowledge of the chemistry involved and the results of all work done to date, that no major problems will surface from these on-going studies. Nevertheless, all data generated from this comprehensive biological evaluation program will be fully reviewed, step-by-step, with appropriate government agencies to ensure full compliance with applicable regulations.

Mr. Harbison also emphasized that, while not inherently as fire resistant as PCBs, the new fluid is far from flammable, adding, "Any move to a non-PCB material, yet developed or even marked for further investigation by any would-be manufacturer, will represent a compromise (or trade-off) to some extent. It is a simple fact of scientific life that, in order to achieve improved environmental compatibility, (vis-a-vis PCBs) some degree of fire safety will have to be sacrificed."

"The capacitor industry, fully recognizing this, has, on its own, ^{considered what} ~~come up with~~ a technical ^{could be made &} ~~modifications~~ ^{to the capacitor} ~~to the capacitor~~ ^{itself} ~~that~~ ^{When combined with MCS 1238,} ~~could impart~~ ^{to the total system} a degree of fire ^{safety} ~~resistance~~ ^{approximating} that previously obtainable only through the use of PCB dielectric fluids. ^{We have been told by experts in the industry that suitable technology appears to be close at hand.}

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"In MCS 1238, we feel we have developed the best alternate to PCBs that modern chemical technology and 45 years of capacitor dielectric production experience is capable of producing. The result, based on a thorough industry evaluation, is a product that balances the essential dielectric, reliability, fire resistance and biological properties to the maximum extent possible, consistent with its intended use.

Mr. Harbison said that limited quantities of MCS 1238 from Monsanto's pilot plant operation are being offered to all U.S. PCB capacitor manufacturers at the present time. He added that the company intends to be in a position to supply the entire U.S. capacitor industry's needs from interim production facilities at its William G. Krummrich Plant, just south of East St. Louis, Ill., by the fourth quarter of 1976. According to Mr. Harbison, Monsanto further plans to have a major new facility in place, capable of expanded MCS 1238 supply in 1978.

A successful changeover to MCS 1238 will effectively
~~"When the change over to MCS 1238 is complete, Monsanto's~~
reduce Monsanto's ~~total U.S. production of PCBs, (which for the past several years has~~
~~amounted about 40 million pounds) will be reduced by some 16 million~~
~~pounds per year.~~ *for all uses have been going to other*
As capacitor and transformer dielectric
 Another 13 million pounds is exported to other countries
restricted sales policy used in the U.S.
 where we apply the same ~~dielectric fluid and sales restrictions.~~

The remaining 11 million pounds of annual U.S. production is consumed by the domestic transformer industry where, according to Mr. Harbison, development work on replacement fluids is also being aggressively pursued. "The same basic problems ^{confront} face anyone attempting to develop a replacement dielectric for transformers as for capacitor: but fire resistance is even more essential in many transformer applications for two fundamental reasons: 1) transformers contain

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about 2,000 pounds of dielectric fluid compared to from two to four ounces in the typical ballast-type capacitor, and 2) many of these 2,000-pound-units are installed in high-rise buildings, hospitals, schools and urban commuter trains where a fire could well be catastrophic.

"It is because of this that, despite the normal commercial incentives to replace them, PCBs have endured as the standard dielectric fluid for over 45 years, consistently performing their designed functions better and safer than any other product yet conceived.

"With this in mind," he continued, "Our research

~~is to determine that the chemistry which imparts high fire~~
~~resistance tends also to produce stable molecules.~~
~~Efforts here are focused on developing~~
replacement fluids that will provide performance reliability, acceptable fire resistance and environmental compatibility, as well."

Mr. Harbison explained that another major objective of this program centers around the need to develop replacement fluids that will not only work in newly designed transformers but also in the thousands of existing Askarel-type fire resistant transformers currently ~~in use~~ *used in wide spread use* in high density population applications.

"Electrical, zoning and building codes, and indeed, insurance rates have been traditionally predicated on the use of these Askarel units which, without exception, get their fire resistance ratings from the use of PCB fluids.

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Report to be filed in the file on PCBs

"We feel we have a responsibility and a commitment, to the extent it is technically possible, to develop a fluid that can be used, interchangeably, in these Askarel transformers...thus avoiding the obvious economic burdens and serious power disruptions that would otherwise result from having to replace or retrofit them.

According to Mr. Harbison, the challenges incumbent with this assignment have been quite formidable but he said he is encouraged by the progress made to date. He continued, "I am confident that, given the combined technical resources of Monsanto Company and the transformer industry, a successful solution will be achieved for this segment of the industry just as ~~soon~~ ^{it is about to be realized} for the capacitor segment."

"Some promising candidates have already been identified and are currently being readied for evaluation by transformer manufacturers. These compounds are in a relatively early stage of refinement and, therefore, we feel that a description of their chemical makeup or performance specifications would be inappropriate at this time.

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In conclusion, Mr. Harbison said, "It is Monsanto's intention to eventually cease all PCB production, ideally, in a planned and orderly manner."

"While refusing to speculate on an exact timetable, I can only say that it will be as soon as we are satisfied that the electrical power supply industry's needs for usable, acceptable, alternate dielectric fluids have been completely met. This is our first priority. In the interim, we will continue to work with industry and ~~the federal~~ government to ensure that the restrictive measures and controls we implemented in the early 1970's remain in force and are diligently enforced.

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