IN 1972 MONSANTO VOLUNTARILY DISCONTINUED SALE OF PCB-CONTAINING PRODUCTS TO THE FOLLOWING MAJOR APPLICATION AREAS:

- -CARBONLESS PAPER
- -FIRE RESISTANT HYDRAULIC FLUIDS
- -HEAT TRANSFER
- -PLASTICIZER

OTHER MISCELLANEOUS MINOR APPLICATIONS
DISCONTINUED AT THE SAME TIME.

SALES IN THESE AREAS FELL FROM
32.5M LBS. IN 1970 TO 0 IN 1973.

IN 1975 WE CONTINUE TO SELL TO THE
ELECTRICAL INDUSTRY FOR INCLUSION IN
CAPACITORS, TRANSFORMERS AND ASSOCIATED
CLOSED ELECTRICAL EQUIPMENT
BECAUSE -

1. UTILITY - THE AROCLOR FLUIDS PERFORM AN ESSENTIAL ROLE IN ELECTRICAL DISTRIBUTION.

2. LACK OF EFFECTIVE PROVEN REPLACEMENT.

3. OUR BELIEF THAT USE IN CLOSED SYSTEMS IS CONTROLLABLE.

MONSANTO CURRENT MARKETING POLICY - PCB

1. SUPPLY ONLY MANUFACTURERS OF SEALED ELECTRICAL EQUIPMENT SUCH AS CAPACITORS/TRANSFORMERS.

2. SUPPLY LOWER CHLORINATED HOMOLOGS FOR CAPACITOR APPLICATIONS, E.G., AROCLOR 1016.

3. DO NOT RECLAIM ELECTRICAL FLUIDS.

4. OFFER INCINERATION SERVICE FOR LIQUID PCB WASTES.

5. CONTINUE RESEARCH PROGRAM (STARTED 1969) TO DEVELOP EFFECTIVE REPLACEMENTS.

6. ENSURE THAT SIGNIFICANT DIFFERENCES BETWEEN AROCLOR DIELECTRICS AND REPLACEMENT CANDIDATES ARE FULLY REVIEWED.

UTILITY IN CAPACITORS

PROPERTY		FUNCTION
FIRE RESISTANCE	→	CONSUMER/PLANT SAFETY
THERMAL STABILITY CHEMICAL STABILITY HYDROLYTIC STABILITY POWER FACTOR	→	RELIABILITY
DIELECTRIC CONSTANT DIELECTRIC STRENGTH	→	AVAILABILITY OF OTHER SYSTEM COMPONENTS CAPACITOR SIZE ECONOMY

UTILITY IN TRANSFORMERS

FIRE RESISTANCE - SAFETY

THERMAL/CHEMICAL STABILITY - RELIABILITY

MONS 039043

TRANSFORMER APPLICATIONS

1. RAILROAD TRANSFORMERS - RAPID TRANSIT SYSTEMS.

2. URBAN SUBSTATIONS.

3. INDUSTRIAL LOAD CENTERS.

4. ELECTROSTATIC PRECIPITATORS - POLLUTION CONTROL IN POWER PLANTS.

MONS 039044

FIRE RESISTANCE OF ASKAREL TRANSFORMERS

1. FIRE INITIATION.
2. ARC FORMED GASES.
3. FIRE PROPAGATION.

POTENTIAL SUBSTITUTES

CAPACITORS

RESEARCH OBJECTIVES

1. MATCH OR EXCEED AROCLOR 1016 CAPABILITY.

   A) DIELECTRIC CONSTANT - AVAILABILITY
      DIELECTRIC STRENGTH CONVERTABILITY

   B) STABILITY - RELIABILITY
      POWER FACTOR

   C) SAFETY - FIRE RESISTANCE

2. GOOD ENVIRONMENTAL COMPATIBILITY.

3. A) SPAN EXISTING APPLICATIONS - COMPLETE SOLUTION.

   B) INTERNATIONALLY AVAILABLE - NOT SOLELY USA SITUATION.

MCS 1043

1. DICHLOROBIPHENYL TYPE.

2. COULD BE SUBSTITUTED FOR AROCLOR 1016.

3. SLIGHTLY LESS FIRE RESISTANT.

4. FURTHER DEVELOPMENT CONTINGENT ON INDUSTRY/GOVERNMENT/PUBLIC/MONSANTO CONCLUSIONS ON DIFFERENCE IN PCB HOMOLOGUES.

NON-PCB

THE CAPACITOR INDUSTRY IS CURRENTLY EXAMINING

MCS 1238

MCS 1588

1. THESE CONTAIN NO CHLORINATED BIPHENYL.

2. THEY REPRESENT A SINGLE CONCEPT.

3. NEITHER PRODUCT IS CHLORINATED.

THE ADDITION OF A LIMITED QUANTITY
OF VERY HIGH DIELECTRIC CONSTANT FLUID
TO A GOOD DIELECTRIC BASE LIQUID TO
GIVE A DIELECTRIC MIXTURE "EQUIVALENT"
ELECTRICALLY TO AROCLOR 1016.

1. MCS 1238 = HYDROCARBON + HIGH DK COMPONENT

2. MCS 1588 = HYDROCARBON + HIGH DK COMPONENT

PROPERTY	AROCLOR 1016	MCS 1238	MCS 1588
DK 25°C	5.9	6.0	6.1
100°C	4.85	5.1	5.1
CORONA IV/EV	INDUSTRY	INDUSTRY	INDUSTRY
HYDROLYSIS STABILITY* (NEUTRALIZATION NUMBER)	0.00	0.00	0.00
DISSIPATION FACTOR FLUID TAN δ 60 HZ. 100°C	0.0025	0.05	0.05
DISSIPATION FACTOR MODEL CAPACITOR AT 90°C	0.0032	0.0039	0.0035

*SEE TEXT

MONS 039051

MONSANTO CANDIDATES ARE NOT FIRE RESISTANT.

ENVIRONMENTAL CONSIDERATIONS

EXPOSURE

DEGRADATION

ACCUMULATION

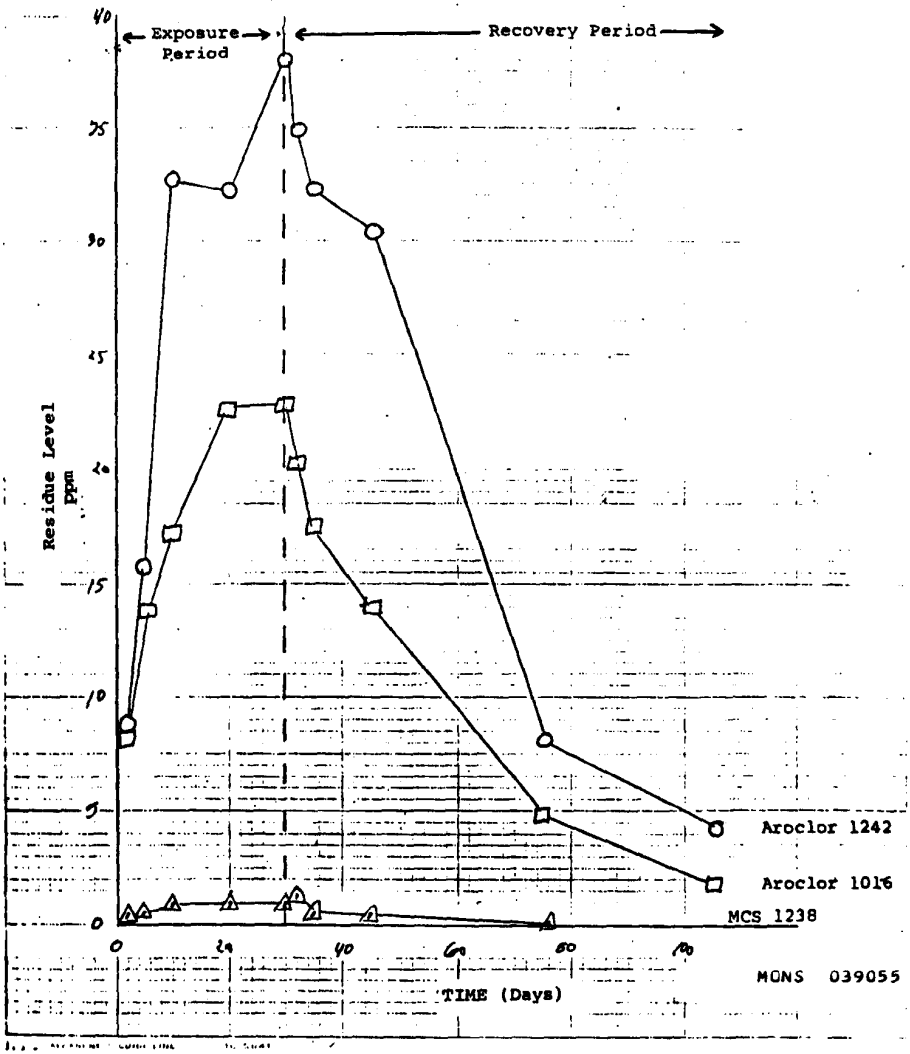
TOXICITY < OCCUPATIONAL SAFETY
TOXICITY < ENVIRONMENTAL COMPABILITY

BIODEGRADATION OF DIELECTRIC FLUIDS

Material	% Biodegradation	Exposure Time
Aroclor 1254	15	48
Aroclor 1016	33	48
MCS 1238	70	48

MONS 039054

FAT TISSUE RESIDUE LEVEL VERSUS TIME
25 ppm Feed Level For Rats



TOXICITY STUDIES - MCS 1238

IN-PLANT HANDLING

1. RATE - ACUTE SINGLE ORAL DOSE LD 50 - 3800 MGS/KG.

2. RABBIT - DERMAL LD 50 - 5.0 - 8.0 GMS PER KILOGRAM.

3. RABBIT - POTENTIAL EYE IRRITATION - 12.0/110.0.
   NORMAL AFTER 72 HOURS.

4. RABBIT - POTENTIAL SKIN IRRITATION (24 HR. CONTACT) - 3.6/8.0.

MONS 039056

MCS 1238 - FURTHER PROGRAMS IN PROCESS OR SCHEDULED

1. VAPOR INHALATION.

2. ULTIMATE DEGRADATION.

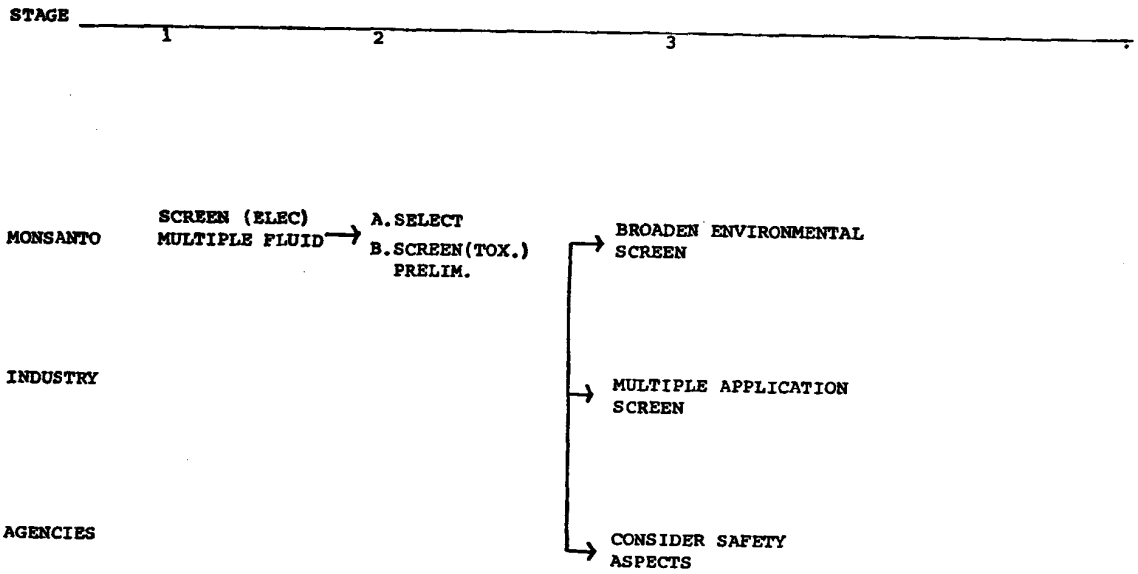
3. ARC GASES.

4. PILOT FEEDING STUDY (90 DAY).

5. LONG-TERM (2 YEAR) FEEDING STUDIES.

6. FISH TISSUE RESIDUES.

CAPACITOR REPLACEMENT



MONS 039058

TRANSFORMERS

NEITHER WE NOR ANY OTHER COMPANY TO OUR KNOWLEDGE HAS DEVELOPED A TRANSFORMER INSULANT WITH EQUIVALENT FIRE RESISTANCE TO AROCLOR.

A. PROTECTION UNDER TRANSFORMER FAULT CONDITIONS.

B. ARC FORM GASES.

C. POTENTIAL SPREAD OF EXTERNAL FIRE.

WE DO HAVE CANDIDATES WITH

INTERMEDIATE FIRE RESISTANCE

OUR MAJOR OBSTACLE

ABSENCE OF OBJECTIVE STANDARDS TO

GUIDE

POTENTIAL FLUID SUPPLIER

TRANSFORMER PRODUCERS

TRANSFORMER USERS

INSURANCE GROUPS

SAFETY ORGANIZATIONS

GOVERNMENT AGENCIES

ON REQUIRED LEVEL OF FIRE RESISTANCE.