David Woods

IN 1971 MONSANTO DISCONTINUED SALE OF PCB-CONTAINING PRODUCTS TO THE FOLLOWING MAJOR APPLICATION AREAS:

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

THERE WERE NUMEROUS MINOR ADDITIONAL APPLICATIONS DISCONTINUED AT THE SAME TIME.

SALES IN THESE AREAS FELL FROM

32.5M LBS. IN 1970 TO 752,000 LBS.

IN 1972 and 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. DO NOT RECLAIM ELECTRICAL FLUIDS.

3. OFFER INCINERATION SERVICE FOR LIQUID PCB WASTES.

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

5. 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 CONVERTABILITY ECONOMY

MONS 035551

UTILITY IN TRANSFORMERS

FIRE RESISTANCE - SAFETY

THERMAL/CHEMICAL STABILITY - RELIABILITY

TRANSFORMER APPLICATIONS

1. RAILROAD TRANSFORMERS - RAPID TRANSIT SYSTEMS.
2. URBAN SUBSTATIONS.
3. INDUSTRIAL LOAD CENTERS.
4. ELECTROSTATIC PRECIPITATORS.

MONS 035553

FIRE RESISTANCE OF ASKAREL TRANSFORMERS

1. FIRE INITIATION.

2. ARC FORMED GASES.

3. FIRE PROPAGATIONS.

POTENTIAL SUBSTITUTES

CAPACITORS

RESEARCH OBJECTIVES

1. MATCH OR EXCEED AROCLOR 1016 CAPABILITY.

   A) DIELECTRIC CONSTANT
      DIELECTRIC STRENGTH
      – AVAILABILITY
      CONVERTABILITY

   B) STABILITY
      POWER FACTOR
      – RELIABILITY

   C) SAFETY – FIRE RESISTANCE

2. IMPROVE FURTHER-ENVIRONMENTAL COMPATIBILITY.

3. A) SPAN EXISTING APPLICATIONS - COMPLETE SOLUTION.

   B) INTERNATIONALLY AVAILABLE - NOT SOLELY USA SITUATION.

out

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.

THE CAPACITOR INDUSTRY IS CURRENTLY EXAMINING

MCS 1238

MCS 1588

MCS 1475.

1. THESE CONTAIN NO CHLORINATED BIPHENYL.

2. ALL THESE REPRESENT A SINGLE CONCEPT.

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 + SULFONE.

2. MCS 1588 = HYDROCARBON + SULFONE.

3. MCS 1475 = PHTHALATE ESTER + SULFONE.

THE MAIN THRUST TODAY IS TOWARDS PRODUCTS 1 & 2.

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 8 60H_2 100°C	0.0025	0.05	0.05
DISSIPATION FACTOR.MODEL CAPACITOR	0.0034	0.0039	0.0035

*SEE TEXT

MONS 035560

FIRE RESISTANCE

	AROCLOR 1016	MCS 1238	MCS 1588
FLASH PT. °F.	358°	303°	325°
FIRE PT. °F.	NONE TO BOILING PT. (620°)	328°	350°
AIT. °F.	1185°	835°	870°

CONCLUSION

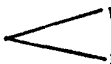
MONSANTO CANDIDATES ARE NOT FIRE RESISTANT.

ENVIRONMENTAL CONSIDERATIONS

EXPOSURE

BIODEGRADATION

ACCUMULATION

TOXICITY 

% BIODEGRADATION

SCAS.

	48 HR.	160 HR.
AROCLOR 1254	15	✓ JPM
AROCLOR 1016	33	✓ JPM
MCS 1238	78	86
HYDROCARBON	90	90
SULFONE	52	78

RAT TISSUE RESIDUE (JPM)

FISH TISSUE RESIDUE

(TO BE COMPLETED)

TOXICITY STUDIES -MCS 1238

IN-PLANT HANDLING

1. RAT - ACUTE SINGLE ORAL DOSE LD50 - 3800 MGS/KG.
2. EYE IRRITATION - RABBIT - 12.0/110.0
   NORMAL AFTER 72 HOURS.
3. RABBIT - DERMAL LD50 - 5.0-8.0 GMS PER KILOGRAM.
4. RABBIT - SKIN IRRITATION (24 HR. CONTACT) - 3.6/8.0.

ENVIRONMENTAL IMPACT

1. DEGRADATION ✓

2. ACCUMULATION ✓

3. FISH TOXICITY

   - 4 DAY STATIC STUDY

   - 96 HOUR LC50

   RAINBOW TROUT - 2.0 PPM

   BLUE GILL - 3.2 PPM

MCS 1238 - FURTHER PROGRAMS SCHEDULED

1. VAPOR INHALATION.

2. ULTIMATE DEGRADATION.

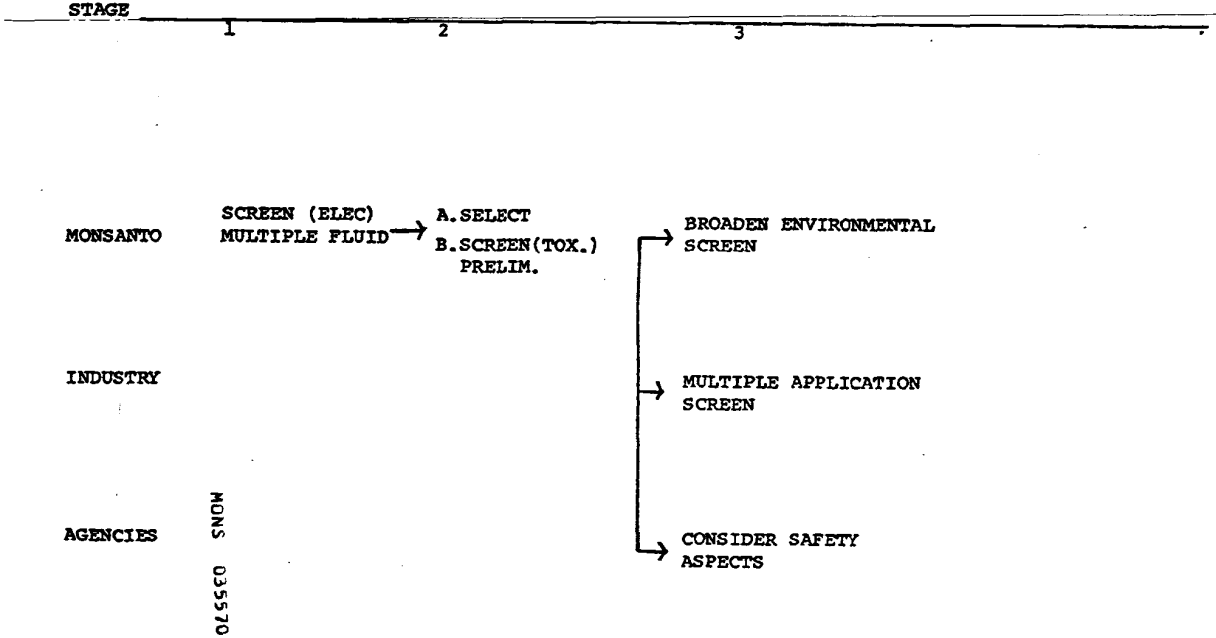
3. ARC GASES.

4. PILOT FEEDING STUDY.

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

6. FISH TISSUE RESIDUES.

CAPACITOR REPLACEMENT



MONS 035730

TRANSFORMERS

WE HAVE NOT DEVELOPED ANY MATERIAL 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

	MCS	MCS	MCS
PROPERTY			

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.

MONS 035574