cc C Tilton

P.L. Wright - LA2SC

December 15, 1975

G. Roush, Jr., M.D.
A2SA

The replacement capacitor fluid, MCS 1238, has been evaluated to define its biological properties in the two areas of major environmental concern at least from a PCB standpoint. The results of these tests indicate MCS 1238 will be an environmentally acceptable fluid. The components undergo primary degradation in simulated sewage treatment at an acceptable rate, proceeding to ultimate degradation with carbon dioxide evolution. 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-day in rats) with the major component of MCS 1238 did not reveal any adverse effect at the highest dietary concentration - 1000 ppm. These results support the expected low order of toxicity of this material.

The long-term chronic toxicity or potential carcinogenicity of MCS 1238 has not been determined. Two-year feeding studies with rats are underway. There is no reason to anticipate extreme adverse or carcinogenic responses from the components in MCS 1238. The final results of these tests will not be available until early 1978.

Summary:

A comprehensive biological evaluation program is being conducted to define the properties of MCS 1238, the candidate for replacing PCBs in capacitors. To date, biodegradation and toxicity test results are favorable. Studies currently underway include: acute toxicity to wildlife, mutagenicity, teratogenicity, and long-term animal feeding tests for carcinogenicity. Except for the carcinogenicity tests, the results are expected during the first half of 1976.

Paul L. Wright DSW 185378

/bkp

Monsanto

FROM (NAME & LOCATION) P.L. Wright - A2SC

DATE December 11, 1975

CC: M. E. Gibbs - W1A
J. C. Weber - B2SK

SUBJECT MCS 1238 Environmental Evaluation

REFERENCE :

TO :

W. C. Hammann
B3SA

Total cost 200-300 M

The attached table includes the biological tests we discussed for MCS 1238 and its components MCS 1045 and MCS 1302. Tests are included on the individual components for those parameters primarily directed toward environmental exposures. For several short-term toxicity tests both the components and the formulation will be tested to provide information relative to potential synergistic responses.

The mouse lymphoma and teratogenicity tests are planned for the formulation only because these are primarily in plant exposure concerns. All cost estimates are based upon recent quotations for similar studies.

Refined cost quotations and starting dates will be obtained upon receipt of your authorization to initiation these studies.

PLW

Paul L. Wright

/bkp

att.

12/15
Hammann to give OK today

DSW 185379

STLCOPCB4051625

Study	Material	Projected Completion Date	Estimated Cost 1/76 Initiation	1/77 Initiation
8-day LC50 Bobwhite quail	MCS 1045	3/76	750	
"	MCS 1302	3/76	750	
"	MCS 1238	3/76	750	
8-day LC50 Mallard ducks	MCS 1045	3/76	750	
"	MCS 1302	3/76	750	
"	MCS 1238	3/76	750	
Chick Edema Factor Bioassay	MCS 1238	2/76	1500	
Microbial Mutagenic Plate Assay	MCS 1045	3/76	500	
"	MCS 1302	3/76	500	
"	MCS 1238	3/76	500	
Mouse Lymphoma Mutagenicity	MCS 1238	3/76	2500	
Rat Teratogenicity	MCS 1238	3/76	5000	
Human Skin Patch Test	MCS 1045	3/76	1000	
"	MCS 1302	3/76	1000	
"	MCS 1238	3/77		1000
4-wk. Inhalation Study	MCS 1045	4/76	5100 (pd.)	
"	MCS 1302	4/76	5100 (pd.)	
90-day Rat Feeding	MCS 1045	completed		
"	MCS 1302	7/76	8500	
"	MCS 1238	7/77		part of 2-yr. study
2-yr. Rat Feeding	MCS 1045	4/78	24000 (12,000 pd.)	
"	MCS 1302	4/78	24000 (12,000 pd.)	
"	MCS 1238	6/79		75000
6-month Inhalation	MCS 1045	1/78		70000
"	MCS 1302	1/78		70000
^{14}C Metabolism Rat	MCS 1045	6/76*	7500	
"	MCS 1302	6/76*	7500	
^{14}C Fish Residue	MCS 1045	7/76*	10000	
"	MCS 1302	7/76*	10000	

*Requires ^{14}C-labeled materials available 3/1/76

Biodegradation Studies (In-House)

River Die-Away	MCS 1045	
"	MCS 1302	
Aquatic Organisms	MCS 1045	
"	MCS 1302	
$^{14}CO_2$ Evolution Studies	MCS 1045	
"	MCS 1302	

DSW 185380

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MCS 1238 TOXICITY DATA

TABLE

	MIPB FA-45234		TXS MCS 1302 CP 16697		MCS 1238 MA-45234 + CP 16697	
	Value	Study	Value	Study	Value	Study
Toxicity - Mammalian						
Acute						
Oral LD_{50} mg/kg (rats)	3379 5000	SA-56-0012 BT-70-0012A	7600 >7940	Y-71-0125 Y-72-0367	3800 4780	Y-72-0366 Y-72-0295
Skin Absorption mg/kg (rabbits)	3900 > 5010 >10200	SA-56-0012 Y-72-0368 BT-70-0012A	>7940	Y-71-0125	2000-3160 5010-7940	Y-72-0295 Y-72-0366
Inhalation Effect	Hrs Mort C 6 0/4 25 7 0/6 25	SA-56-0012 Y-58-0027A		BTL-75-0051	Hrs Mort C 6 0/6 25	Y-72-0295
Skin Irritation (max. 8.0)	1.5 slight 6.6 severe 4.3 moderate	Y-58-0027 BT-70-0012 Y-72-0368	2.6 mild 0 non-irritating	Y-71-0125 Y-72-0367	6.3 corro 4.0 moder 3.6 moderate	Y-72-0295 Y-72-0295A Y-72-0366
Eye Irritation (max. 110)	0 7.3 slight 4.8 slight	SA-56-0012 Y-58-0027 BT-70-0012A	10.0 slight	Y-71-0125	12.0 slight 13.0 slight	Y-72-0366 Y-72-0295
Sub-Acute						
90-day Feeding Study (rats)	No effect @ 1000 ppm	BT-70-0012A				
Chronic						
2 yr. Study (rats)		BTL-75-87 (finish 11/77)		BTL-75-85 (finish 11/77)		
Toxicity - Aquatic Organisms						
96 hr. LC_{50} Bluegill 96 hr. LC_{50} Trout	32 ppm 28 ppm	BT-72-0084 BT-72-0084			3.2 2.0	BT-74-0067 BT-74-0067
Threshold Limit Value		BTL-75-0054 (finish 12/30/75)		BTL-75-0052 (finished 12/30/75)		
Tissue Residue - Accumulation & Depletion Study in Rats; Fat Tissue Residue (ppm)			Day 2 5 10 20 30 <5 <5 <25 <1 <5 <25 <25 <25	Y-74-0050	Day 2 5 10 20 30 -32 -35 -45 -75 .4 .5 .9 .9 .9 1.2 .5 .4 <.4 2 2 2 3 2.3 1.8 2.1 .7 <.4	Y-74-0048

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