Tucker Dep. Exhibit 5

The handwritten notes and underlining in this exhibit were made by OMC's counsel.

For a clean copy of the exhibit, see the produced documents.

From the desk of

WILLIAM RICHARD

9/9/69

Elmer,

I promised a draft for committee review before I left on vacation. Please consider this only a 1st draft of what might be done.

Thanks,

Bill Richard

DEFENDANT'S EXHIBIT
5 for ID
4/15/82 MBR

10966

W. R. Richard - Research Center

September 9, 1969

cc: P. Hodges PHODG
M. Farrar Res. 1
H. Bergen HBERG

DEFENSE OF AROCLOR - F. FLUIDS

E. Wheeler - EWHEE

General Policy

Make the Govt., States and Universities prove their case, but avoid as much confrontation as possible. Comply and work with public officials to meet or exceed requirements ahead of time. Adverse publicity and competition are the real weapons.

Analytical for Aroclor { In Air - Which Aroclors are present? Where? / In Water - Which compounds / In Animals - interfere? } Govt. Agencies

Keep track of how much contamination - which sources.

Prove Bioharmful - Let Govt. prove its case, on case by case basis.

Monsanto Visit-Govt. Biolabs - in search of toxicological experiments and evidence vs. Aroclors to keep up with progress.

Monsanto Prove Bioharmless - Limited work at Ind. Bio-test -

"Safe" toxic level for { man / mammals via / fish } { Rats / Chickens / Fish }

Seek evidence of Biodegradation
Question evidence against us.
Question shrimp toxicology especially other toxic chemicals.
If Aroclor bad, others must be worse.

Probable Outcome

We can prove some things are OK at low concentration. Give Monsanto some defense.

We can't defend vs. everything. Some animals or fish or insects will be harmed.

Aroclor degradation rate will be slow. Tough to defend against. Higher chlorination compounds will be worse than lower chlorine compounds.

Therefore we will have to restrict uses and clean-up as much as we can, starting immediately.

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Therefore we will have to work for alternate products in end use applications; for Aroclor production facilities.

Clean Up Aroclors and substitute products where necessary and when required, before threats of publicity and competitive activity overwhelm us.

Water Pollution seems to be first issue

Aroclor product is refractive, will settle out on solids - sewerage sludge - river bottoms, and apparently has a long life.

Florida or Gulf Coast - Aroclor 1254 - Aroclor 1260 present issue.

40-200 ppb - causing problem at Pensacola (Monsanto) in plant effluent-causing " with shrimp.
- can't risk shut-down of plant.

Federal and State can extrapolate to other plants in Gulf area.

San Francisco - Aroclor 1254 and 1260

Reported Aroclor to be present in San Francisco Bay.

Reported to be thin egg shells in birds -

Lot of screaming -

Great Lakes — Warf studies on DDT
Aroclor 1254 will be found!
Aroclor 1242 will be found?

Air Pollution - Possible spread - but less of an issue right now.
Analytical work more difficult.

Direct Contact with Product

Doesn't seem to be an issue - except for food heat transfer.

We don't believe Aroclor is being used as carrier for insecticide - sprayed around -

We are not positive but most uses are "closed" systems or products used in solid plastics, or adhesives, or sealants.

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F. Fluids	Possible Pollution by Customers Plant Operation	Possible Pollutic by Customers Proc
Product		
Hydraulic Fluids	Yes, leakage external	Possible - See Johnson Motors Castings.
Air Compressor Fluids	Yes, leakage external	Leakage into produ
Heat Transfer	Yes, leakage external	Leakage into produ
Capacitor Fluids	Yes, leakage from plant - Scrap materials.	In product but closed for end use
Transformer Fluids	No, Should be clean. Yes, Reworked transformers	In product but closed for end use

* Capacitors can go to land fill dumps. Probably not burned, in Al containers.

** Need to take care of Aroclor in discarded transformers. Product could be drained and reworked.

Probable Conclusions

Hydraulic Leakage - Product could be caught at machines but will take a lot of clean-up work with customers. - Will have to have replacement product - with less-sensitive components. Work from this base on clean-up to prevent more pollution problems.

Air Compressor Fluids "

Hydraulic Fluids Must expect "shrimp" experiments, West Florida State, to be "aired" sometime soon; next few months.

This will lead to bad publicity and competitive action vs. all Pydrauls.

We will have to try to confine to Aroclor 1254 and Aroclor 1260.

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We will have to take action before that time.

Gulf Coast -

Action W. Richard	Be able to replace Aroclor 1254 and Aroclor 1260 in Pydraul AC and 625 in 2 month's time before Nov. 15, 1969.
Fallon/ Richard	Have trial product in hands of Gulf Coast accounts and distributor before Dec. 15.
Fallon	Suggest possible buy of "all phosphate" ester from Food Machinery. Use this as one trial fluid MCS___ for insurance.
Richard/	Suggest possible substitution of Aroclor 5442 for Aroclor 1254 in hydraulic and compressor blends. E. Wheeler judges lower order of toxicity and solubility for 5442 series. Have to test product in pump test for deposits.
Fallon/ Richard	Suggest field trials of our own all-phosphate ester.
Fallon/ Kuhn/ Kountz	Work with large customers to clean-up streams. Bring in Findett as mfg. partner in the recycle business. Get money out of recycle operations.

Inland-Waterways-

Wheeler/ Richard	Be close enough to Great Lakes studies to judge situation. Are there animals which are being affected by the concentrations found?
Richard	Be prepared to replace Aroclor 1254 and Aroclor 1260 in 4 months in hydraulic fluids and in air compressor fluids.
Richard	Be prepared to replace all Aroclor 1242 or 1248 in 6 months in hydraulic fluids. This means replacement of Pydraul 312 series, and control of sale of Aroclor 1248 to other hydraulic accounts such as Cities Service and Mobil.

Heat Transfer

Fallon/ Roush/ Kountz	Systems will have some leakage depending strongly on engineering and maintenance. Need to work with customers on clean-up.
Fallon/ Roush	Need to replace FR especially in food or sensitive product areas where the product is getting into water. See dish washer compounds. See letter E. Wheeler to J. Fallon.

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We have possible replacement products in Therminol 55. Therminol 66.

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Action	
Kuhn	Try to assure adequate production of Therminol 66 in face of decreased Aroclor production. H_2 and terphenyl supply may become short.
	Switch customers to Therminol 55 or Therminol 66 ahead of pollution problems in customers plant.
	Work with customers on plant and dumping practices.
Kuhn/ Fallon	Findett already set up to rework. Need to make them a manufacturing arm. We get sale of recycle-rework fluid.

Capacitor Fluids	Capacitor plants have re-purification and recycle systems but up to 5% of product can be lost by poor plant producers and off-quality material.	**Capacitor products**
		Enclosed in Al or stainless steel for 5 to 25 year period.
Mkt. Benignus/ Bryant		Will ultimately have to dispose of capacitor products.
Eng.-Kountz/ Mfg-Hodges	5% of production could be 1M lbs/year. This is a big loss for the type of pollution we are trying now to guard against.	Recommend we try to save this product for a time.
Action	Monsanto must start to work with capacitor people to clean up plant practices. We have set-up to accept material for rework into hydraulic fluid but this relocation is not a satisfactory solution. Material must be reworked to electrical grade or destroyed, whichever is more economical. Must start now to get control of off-grade material.	Recommend replacement of future Aroclor business with other products. Have 2 years.
Eng.,TSD-Plant Pollution Control		
Hodges/ Kountz		

Action	Monsanto must help plant clean-up of customer plants decantation, coalescing, adsorption, disposal of adsorbent or recycle of adsorbents. Monsanto badly needs "know-how" for clean-up.
	Monsanto should seek Govt. contract money for clean-up research, (See MRC R. Binning, D. Nelson)

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Transformers	Transformer Plant can operate in a clean, efficient manner with recycle of off-grade Aroclor.	Product transformers can remain closed and no exposure for 25 yrs
Action Benignus/ Bryant	Should advise disposal of filter element materials so as to minimize chance of water pollution. Incinerate or dispose.	
	Reworked transformers pose a threat if the Aroclor is dumped into a water stream.	Should try to retain business by clean-up; by education of customers.
Action Benignus/ Bryant	Should try to minimize chance of dumping "old" fluid by reworking and by educating co. shops and collecting product for rework or disposal.	
	Dalton is set up in England to rework electrical grade fluid.	
Kuhn/Kountz Findett?	Need rework facility here + disposal scheme.	

Monsanto Plants

The Dept. of Interior and/or State authorities could monitor plant outfall and find ppm of chlorinated biphenyls at Krummrich or Anniston anytime they choose to do so. This would shut us down depending on what plants or animals they choose to find harmed.

Action - Take steps to see that every precaution is taken to prevent Aroclor entering water streams. Try to reduce to ppb level.

P.Hodges-TSD - Seek a Govt. contract on adsorption and incineration cycles - MRC.

Engrg.-Kountz - Take samples of streams and river water and mud evidence for before and after clean-up. Samples can be stored for further analysis if we can't keep up current with analytical determinations.

Apply Monsanto clean-up methods to customer plant clean up equipment and procedures.

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Action - Engrg. & Mfg. Kountz and Kuhn	Evaluate liquid incinerators vs. solids handling incinerators for disposing of Aroclor and pentachlorophenol wastes. I estimate Aroclor disposal at 1-4M lbs/year, exclusive of cleaning up river bottoms or outfall bottoms.
	Hydraulics
	Heat Transfer
	Capacitors
	Transformers
Central Eng. & Mfg TSD Kountz & Kuhn	Set up an incinerator to handle Aroclor disposal - preferably one which will handle solids such as muds - slurries as well as liquids. Have in operation within 12 months. Ideally have incinerators available different sections for disposal.
Possible help from MRC	

Chronic Toxicity Studies - Ind. Bio-Test

Wheeler Keller Ind.Bio-Test	Continue studies to establish FDA type limits of toxicity on Aroclor 1242, Aroclor 1254 and Aroclor 1260.
	Rework with R. Keller-S. Tucker the number of samples which are to be analyzed for Aroclor in tissue. Try to see if Aroclors are changed metabolically. Does concentration level off, decline if feeding is stopped?
	Institute studies against the most limiting biological parameters. If shrimp are the most limiting species for Aroclor levels of toxicity, then we will have to have biological studies on these species to confirm or deny adverse findings.

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Biodegradation Studies

Swisher
Set up rate of biodegradation studies with Inorganic Div.
on Aroclor 1242 vs. Aroclor 1254
Aroclor 5442 vs. Aroclor 5460
Chlorinated diphenyl ether
Chlorinated paraffin vs. chlorinated naphthalene -
Chlorobromo Aroclors 1242 and 1248

Baxter
Lidgett
MCL
Contact Baxter and Lidgett at MCL regularly for results on Aroclor degradation. They are reported to be moving on laboratory experiments.

Establish contact with chlorophenol degradation studies of Cellu-Chem Group.

WRR

W. R. Richard

WRR:ms

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