

MONSANTO TRIP

September 4, 1975

Westinghouse Personnel: R. Sawyer
K. Kelly
L. Shoaff
G. Mercier
L. Mandelcorn

Monsanto Personnel: Tom Gossage, Dir. Marketing
David Wood, Marketing Manager Dielectrics
Bill Moore, Marketing Representative
Dr. Ralph Munch, Distinguished Science Fellow
Jim Bryant, Senior Research Specialist
Dr. Jim Mieure, Group Leader Applied Science
Vic Saeger, Applied Science
Dr. George Levinskas, Medical Dept.
Representative

1238 Price and Availability

- A. Test quantities. We estimate a requirement of 500 gallons in drums over the next six months.

Price until 10/1/76 \$.71/lb. LTL Drums (8.4#/gal. est.)

Price after 10/1/76 \$1.05/lb. TL Drums
\$1.07/lb. LTL Drums

Availability Two drums are on order. Will ship by 9/15/75.
Present capacity 2-400 gal./day.

- B. Production Quantities. We estimate 1 tank car/month (8,000 gal.)
1st year.
We estimate 2 tank cars/month (16,000 gal.)
2nd year.

To achieve production quantities in 6-9 months, temporary facilities would be required. These would be used until a new plant could be built in 18-24 months. (For 1-1½ years.)

Price first 1-1½ years of production: est. \$1.00/lb.-\$.85/lb.
In new plant: Objective price \$.65/lb. (at today's costs).

C. Monsanto's Market Position

Monsanto may terminate production of PCB. Their programs are structured on the basis that PCB will be discontinued. T. Gossage estimates that PCB will be eliminated through government edict, Monsanto decision, or utility industry decision, within six months to one year.

Monsanto is offering only 1238 as a substitute for Aroclor for the total capacitor industry. They will not offer either or both components of 1238 to the industry. Developmental costs of 1238 will be borne by Aroclor buyers. A 3¢/lb. increase across the board on Aroclor will be effective on

on 10/1/76. Another large increase is predicted for 1977. (Settlements of law suits do not represent a portion of the 1016 cost. The amounts are "not significant".)

D. Monsanto's Decision to Invest

\$10,000,000 capital investment will be required to build a plant to produce 1238. This decision will hinge on:

- a) Continued favorable reports from the Medical Department.
- b) Acceptance by most of the industry of 1238.
They need a volume of 10-15 million lbs./year.
- c) An estimated life of 1238 of 10 years.

E. Affect on Transformer Aroclor

To achieve production within 6-9 months in temporary facilities, one of the two transformer fluids now used by Westinghouse, PDS 54201KA or 54201CM, would be discontinued.

A decision to discontinue should probably be made four months ahead of beginning production of 1238 (two months for physical changes, two months to announce to the trade).

The transformer divisions have not been advised of this possibility. Monsanto would like guidance from this division on how to go about this.

F. 1588

1588, which has been tested by R & D, will be withdrawn by Monsanto. At this time the price is raised to \$1.17/lb. LTL drums. Monsanto recommends that tests be discontinued.

G. Contracting for 1238

Monsanto expects to sell 1238 under the terms of their standard sales agreement. No indemnity agreement is planned. Such an agreement is considered undesirable since it would imply that the material is hazardous.

Because of frequent changes in railroad policy, Monsanto does not know whether or not a trip lease agreement will be required for rail shipment.

Monsanto intends to reserve the right to increase prices with 15 days written notice.

ELK/16
9/5/75

100718

Monsanto Meeting - September 4, 1975

1. Monsanto has been working with substitute fluid since 1969.
2. With pressure on PCB's, Monsanto sees very possible termination of continued use of PCB as far as Monsanto's continued supply of the material.
3. Dielectric Research Groups: Dielectrics (Munch & Bryant)
Analytical (Mieure, Seeger)
Medical (Levinskas)
4. Environmental Impact:

- a. Biodegradation
- b. Accumulation in animal tissue.

Biodegradation studies: Main emphasis in activated sludge tests.
Described details of tests.

Monsanto feels comfortable with MCS 1238 degradation because all components (hydrocarbon & sulfone portion) biodegrade even though the biodegradation rates are not significantly higher than for MCS 1016.

Accumulation studies on rats: 30 day feed + 75 day recovery period. Curve comparing 1242 and 1238 presented shows 1238 accumulation to be insignificant compared to 1242. 1016 accum. has also been measured and is about half that of 1242. Higher chlorinated types such as 1254 or 1260 accumulate more than 1242 and recovery is also much less.

5. Toxicity data (Levinskas)
Have started inhalation studies on one-month exposures on various animals and will check for liver and other organ damage. This will be complete at about the end of the year.
Acute toxicity (LD₅₀ value) for 1238 discussed.
Skin irritation is less for 1238 than for 1016. Vapor inhalation is not strongly objectionable.
New materials 2 - stage review: (presently between 1st & 2nd stage)
 - (1) continued inhalation studies
 - (2) carcinogenic studies: now running pilot study. Complete study will be at end of 1977 or first of 1978. Reasonably confident that this material will not be carcinogenic.
 - (3) Acute fish toxicity to also be complete at end of 1977.

Disposal of 1238 would have to be handled similar to mineral oil.
Could be incinerated as is motor oil or fuel oil.

6. Industry status of non-PCB cap. dielectric:
 - a) Monsanto has made decision to offer only 1238 to cap. industry. No other material is planned to be offered at this time, nor are the 1238 components to be offered separately.
 - b) Use of esters: reprocessing causes gradual degradation and also a hydrolysis problem exists.

7. Properties:

- a) auto ignition temp is 835°F (446°C)
 - b) refractive index: Monsanto will get.
 - c) Monsanto to check saleability of 1238 vs. temp. down to -40°C.
 - d) Will get absor. of PP and 1238.
 - e) Additives: Unox 4221 has been found to give better results than other epoxides on other hydrocarbons, but 1238 has only been tested with 4221 for ac capacitors. For dc capacitors, Monsanto has tested quinones and they enhance life on dc.
 - f) Electrical breakdown of fluid will generate no strong acid by-products (H₂S and H₂O plus some sulphonated compounds).
 - g) Life Test: Ballast capacitors impreg. by preheat for 2 hours in air oven 125°C, vacuum dry at 125°C, impreg. with de-gassed fluid heated to 95°C, cap. at 1-5µ before flooding at 125°C cap. temp. then vacuum is broken, cool to room temperature and then solder sealed. Accel. life test 90°C oven temperature, 1000 volts rms 60 Hertz on 2 sheets of .00066 (.9 den) 1238 units have run more than 1000 hours. Measure P.F. periodically (✓ each week).
8. No need for antioxidant with 1238 even for long time storage.
9. Avoid use of epoxy-type sealants for ballast type cap. cans.
DC S2348 (Dow Corning) - O.K.
3M EC1447 (Phenolic Type) - O.K.
10. Westinghouse to supply Monsanto with FPF units (75-50-75) for life tests (process 8 at a time) - need 100 to 200 units.

George E. Mercier

Monsanto INDUSTRIAL CHEMICALS CO.

J. P. Mleure - T2F

DATE : December 3, 1974

cc. R. E. Keller - T18
R.H. Munch - T18
W. R. Richard - T3A

SUBJECT : FDA DETECTION OF CHLORINATED
DIBENZOFURANS IN AROCLOR

REFERENCE :

TO : W. B. Papageorge
B2SK

Per your recent request, I have talked by telephone with John Roach of FDA regarding his paper at the national meeting of the Association of Official Analytical Chemists reporting detection of chlorinated dibenzofurans (CDF) in Aroclors. This memo documents our conversation.

According to Mr. Roach, he and his co-workers have isolated and identified CDF in Aroclors 1016, 1242 and 1254 but not in Aroclor 1221. These reference Aroclors were provided by Monsanto. The concentrations were in the low (probably 1-10) ppm range. Dichlorodibenzofurans were found in Aroclor 1016, di-tetra homologs in Aroclor 1242 and tetra and penta homologs in Aroclor 1254. He estimates their lower limit of detection at less than 0.1 ppm.

The analytical method was similar, but not identical, to that used to determine CDF in Kanechlor 400 (see attached reference). Isolation of the CDF was accomplished by column chromatography followed by identification by GC/MS. I raised the question whether other potential impurities such as chlorinated methyl biphenyls (which have similar mass spectra) could have been mistakenly identified as CDF. Roach's response was negative, followed by a sophisticated and technically correct explanation that they have obtained and characterized several chlorinated methyl biphenyls as reference materials to eliminate this possibility. They are currently attempting to identify some of the individual isomers which have been isolated.

Roach agreed to send me a copy of the paper he presented at the AOAC meeting as well as a preprint of their entire study when completed in about two months. They plan to publish their findings.

Their methodology is similar to that first reported by Vos and duplicated in our laboratories during a 1971 survey of our Aroclor products for CDF. This survey did not detect any CDF with a lower detection limit of 0.5 ppm for each isomer. (Several isomers at lower concentrations totaling >1 ppm could have been present). Roach indicated their current technique gives better (but not complete) recoveries than the method of Vos. FDA also has a more sensitive MS than our current model, although we will have a superior instrument in a few weeks.

db



Jim
J. P. Mleure

906646

STR GC6687



S0000074

EX. 757

April 24, 1970

elb
Mr. Lou Shoaff
Westinghouse Electric Corp.
Bloomington, Indiana

Dear Lou:

As relayed to you on the phone, we were indeed sorry you could not attend the meeting here in St. Louis. We were happy to have the other Westinghouse representatives. They felt the situation sufficiently critical to involve corporate Westinghouse. The meeting proceeded as follows:

Introduction of Westinghouse People to Monsanto People

Meeting began with welcome by N. Bergen of Monsanto with Paul Benignus introducing each speaker. Earl Sillette questioned why Bloomington was not represented. He was informed that Mr. Shoaff had called to say he could not attend.

E. Wheeler

E. Wheeler spoke covering the medical aspects. He provided a booklet 8 inches X 11 inches about 2 inches thick with related articles on PCB pollution. Attached are copies of the most recent related articles.

Basically, Wheeler's remarks were a review of the information in the booklet. Three other booklets were given to the Westinghouse representatives covering the studies on rats and dogs using Aroclors 1242, 1254, and 1260.

Dr. R. E. Keller & Dr. S. Tucker

Drs. Keller and Tucker discussed the analytical techniques in the PCB work to date. They covered that Monsanto has several teams working on this problem. Additionally many governmental and academic institutions are studying the problem.

W. Papageorge

W. Papageorge discussed the involvement of many people into this problem area and the various regulatory agencies involved. He



NEV 004934

704172

He covered the Ryan report and the Monsanto reply.

Dr. W. Richard

Dr. W. Richard discussed the various techniques of waste control. Considerable discussion was held on future disposal systems for the electrical industry. He discussed the modified mixes etc. He discussed complete control for water, land, and air.

Dr. R. Munch

Dr. R. Munch discussed the intentions to modify the product compositions to more suitable biodegradable materials. He pointed out the following composition of normal Aroclor 1242 is 20% dichlorobiphenyl, 30% trichlorobiphenyl, 23% tetrachlorobiphenyl, and 7% pentachlorobiphenyl or higher. The modified Aroclor 1242 (B) is about the same ratio for di and trichlorobiphenyl and the quantity is the difference between the tetra and higher. The tetrachlorobiphenyl is 67%. The pentachlorobiphenyl and higher are reduced to 2.3%. On biodegradation the normal Aroclor 1242 showed the following percentages of the respective peaks remaining after biodegradation.

Peak Number	1	2	3	4
1242	nil	66%	64%	42%
(Modified) 1242B	nil	10%	3%	1%

He mentioned that we particularly seek guidance on capacitor fluids.

Again the Westinghouse people emphasized the importance that the Bloomington people be involved.

Attached are some reference articles. Please advise if we can be of further service. Also, please advise when you plan to go to bulk shipments of scrap.

Regards,

J. G. (Jim) Bryant
Product Specialist
Dielectric Fluids

/dn
Attachments

cc: G. Randall Graham - New York
P. G. Benignus - St. Louis

NEV 004935