MONSANTO COMPANY
W. G. Krummrich Plant

May 12, 1967

MINUTES OF
AROCLOR MEETING

cc: Messrs.
R. E. Howard - G.O.
J. R. McClain
F. MacDonald - Newport
W. B. Papageorge - Anniston
A.C.W. Pemberton - Newport
W. J. Wilson

COMPANY CONFIDENTIAL

Messrs.

D. C. Armstrong		N. T. Johnson	- G.O.
G. W. Ashworth	- S. 2nd	O. A. Meyer	
A. Arpino	- Brussels	G. W. Miller	- Anniston
P. G. Benignus	- G.O.	J. W. Molloy	
G. R. Buchanan	- G.O.	R. H. Munch	- S. 2nd
V. Brawley		G.J.S. Perry	- Newport
J. G. Bryant	- Anniston	H. F. Ray	
H. C. Carder	- G.O.	W. R. Richard	- G.O.
C. R. Coleman	- Newport	V. W. Saeger	- S. 2nd
P. D. Collins	- G.O.	R. A. Steenrod	- G.O.
J. Cresce	- G.O.	R. P. Stevens	- G.O.
H. J. Day	- G.O.	J. D. Sullivan	- G.O.
L. C. Fuhrmeister	- Anniston	M. T. White, Jr.	- G.O.
H. O. Hehner	- G.O.	C. M. Williams	- G.O.
P. E. Heisler		H. L. Williams	- Anniston
H. J. Horner		D. Wood	- Brussels
H. L. Hubbard	- S. 2nd	R. S. Yates	- G.O.

A general Aroclor meeting was held on May 9-10, 1967, in St. Louis at the Holiday Inn North. Progress to date and future plans were presented in a company effort to meet capacity and quality goals. Minutes of the meeting are attached.

R M McCutchan

R. M. McCutchan
Technical Services
Department

/gg

0196029

TOWOLDMON0057293

TOPICS COVERED

I. The Market Place - G. R. Buchanan

II. Quality

A. Comparison - H. O. Hehner

B. Measurement - J. Miller, J. G. Bryant, R. H. Munch

C. Improvement - J. G. Bryant, D. C. Armstrong

D. Storage and Shipping Containers - J. C. Bryant, L. C. Fuhrmeister

E. Plant Programs - L. C. Fuhrmeister, G. J. S. Perry, H. F. Ray

III. Capacity

A. CED Plans and Timing - R. P. Stevens, R. S. Yates

B. Plant Debottlenecking Programs - L. C. Fuhrmeister, J. W. Molloy

IV. Quality Measurement Program - R. H. Munch

V. Future Plans - All groups represented

0196030

TOWOLDMON0057294

ACCOMPLISHMENTS

I. The Market Place

Aroclor sales in 1966 were $19 M and a forecast of $34 M in 1971. Aroclor's return on investment is 20%. This year's production will be approximately 70 M lbs. Monsanto is being given a world-wide image, with delivery of Aroclors from any of three manufacturing plants.

II. Quality

A. Goals

Aroclor quality goals have been set as follows:

		In-Plant	As Packaged	Delivered
1254:	Resistivity	15,000 >	10,000*	5,000 >
	Power Factor	< 0.3% (≠ 0.1)	< 0.4%**	< 0.5%
	TCC	< 0.1***	---	0.1***
1242:	Resistivity	10,000 >	5,000*	3,000 >
	Power Factor	< 0.6% (≠ 0.1)	< 0.9%**	< 1.0%
	TCC	< 0.1	---	0.1

*Clear values less than these with Marketing (C. Williams).
**Do not send these values to customer.
***Limits must be defined by lab work.

The "as packaged" goal is being emphasized.

B. Product Refinement

1. Work at Anniston indicates that thermal chemical chlorides can be reduced to 0.1 ppm by distillation and porocel treatment. With this processing, only Anniston material meets company quality goals. WGK Aroclor will meet only the electrical properties goal with this treatment.

2. Changes in the current process will be recommended for each manufacturing location according to each plant's requirements to meet company Aroclor quality goals.

C. Chlorinator Conditions

0196031

Work by WGK PR&D (D. C. Armstrong) indicates that by altering chlorinator conditions, the effect of biphenyl variations is minimized, and a more stable Aroclor produced. Improvements in TCC analysis were seen in the laboratory with a reaction temperature of 200°C, 0.2% $FeCl_3$ catalyst, and good agitation. Lime tests were inconclusive. No plant tests to date.

TOWOLDMON0057295

II. Quality (Continued)

D. Drumming

Testing of clean-surface and coated drums has been carried out at Anniston. Drums investigated were:

1. Galvanized
2. Dalbon coating
3. Clear phenolic or epoxy phenolic with additive
4. Impregnated series 46

To date the dalbon coated drums have given the best results in maintaining high Aroclor resistivity values. Increased drum cost is $3-5 each. Adding attapulgus clay to the drummed product is not recommended as a solution to quality problems. Galvanized drums require a finished coating inside the drum to maintain the high quality desired. Confirmation of an aluminized coating used by Bayer was completed. Further work will be continued for optimum cost drums to meet quality requirements.

III. Measurements

A. Studies of power factor by Research have turned up a number of variables which must be investigated and/or controlled.

B. It has been found that bubbling oxygen through Aroclor may be a measurement of its stability (Dr. Munch).

C. A more sensitive thermal chemical chloride test has been developed in Anniston plant efforts to measure Aroclor upgrading.

IV. Capacity

A. CED plans for Aroclor expansion at MCL (from 10 M #/yr to 17 M #/yr) were submitted to Newport for comments and suggestions.

B. Preliminary planning for Anniston drumming, warehousing, and storage facilities is underway. Storage capacity is to be increased from 71 M gallons to 255 M gallons.

C. The Delaware River plant is no longer being considered as a site for Aroclor expansion (only $16,000/yr savings).

D. Present sales forecast and Aroclor increase indicate a major expansion of 40 M #/yr liquid Aroclor would be required at WGK.

TOWOLDMON0057296

GOALS AND FUTURE WORK

	EDC
PR&D (D. C. Armstrong)	
1. Assist in plant demonstration of optimum chlorinator operating conditions.	7/15/67
2. Assist as needed in closing storage tank system.	---
3. Find optimum conditions for continuous chlorination system.	11/ 1/67
4. Define process requirements to meet quality goals.	---
Manufacturing and TSD	
WGK	
1. Quality	
a. Basket removal results (in progress)	8/ 1/67
b. Individual chlorinator profile (in progress)	9/ 1/67
c. Earth vs. Bauxite treatment	8/ 1/67
d. Granular vs. pulverized $FeCl_3$ catalyst	9/ 1/67
e. Optimization of chlorinator conditions	
1. Temperature	8/ 1/67
2. % catalyst	8/ 1/67
3. Lime charge	8/ 1/67
2. Investigate recycling recovered biphenyl and Aroclors.	10/ 1/67
3. Nitrogen purge on tanks (design).	8/ 1/67
4. Capacity	
a. Chlorine supply limitation (installed)	9/ 1/67
b. Distillation revision (temporary)	8/ 1/67
c. Flexibility (temporary)	7/ 1/67
d. Storage evaluation	7/ 1/67
e. Blend system (design and installation)	10/ 1/67
Anniston	0196033
1. Quality	
a. Plant test bauxite treating column	8/ 1/67
b. Complete work on optimum container and loading facilities	---
c. Upgrade piping in storage (isolate systems)	12/ 1/67
d. Nitrogen blanket storage and treating tanks	
2. Capacity--debottleneck stills (design for indirect firing)	9/ 1/67
3. Railroad spur installation	---

TOWOLDMON0057297

Anniston (Continued)	EDC
4. Chlorinator capacity check (feed data to CED)	---
5. Install and check in-line cell	---
6. Investigate vacuum HCl removal for crude Aroclor	---
Newport	
1. Capacity	
a. Biphenyl expansion from 5.4 to 14.7 M lbs/yr	15 to 18 mos after approval
b. Aroclor expansion from 10.0 to 17.0 M lbs/yr	6/ 1/68
1. Off-gas system	
2. External cooling on chlorinators	
3. Better agitation	
c. Remove chlorinator baskets	
d. Increase still capacity	
1. Entrainment reduction	8/ 1/67
2. Heating and cooling improvement	
e. Increase storage for electrical grade Aroclor, use N_2 blanket	
2. Quality	
a. Better loading facilities	6/ 1/67
b. Column treat (depending on Anniston work)	
c. In-line testing	
d. Better TCC test and procedure	
CED	
1. Storage tank package at Anniston (scope and estimate)	6/15/67
2. Increase Aroclor capacity - Alternatives: (estimates for review)	8/ 1/67
a. Debottlenecking and expansion at both WGK and Anniston	
b. 40 M lbs/yr expansion at WGK	
3. Anniston warehouse project (complete after expansion decision)	
Research	
1. Round robin testing at plant locations	10/ 1/67
2. Standardization of resistivity and power factor measurements	

0196034

TOWOLDMON0057298

Research (Continued) EDC

3. Work with customer on dielectric Aroclor capacitors

4. Firm up work on causes of instability

Marketing

1. Maintain 100% of market in U.S.A. and U.K.

2. Supply rest of world except EEC

3. Increase non-domestic sales

4. Create global Monsanto image

5. Create preference for askarel transformers over petroleum and dry-type units

6. Establish manufacturing position in Japan

7. Maintain 25% excess global capacity by improved forecasts

8. Continue to improve communications with Manufacturing, Research, and Engineering

Other Commitments

1. H. C. Carder - Tank car fleet requirements (N. L. Sample)

2. H. J. Day - Recommend minimum inventories

3. H. C. Carder requests a monthly report of sales versus actual capacity by H. J. Day or M. T. White for domestic locations.

0196035

TOWOLDMON0057299