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(the Mfg. Aroclor

FROM (NAME & LOCATION) R. S. Yates - General Offices

DATE January 9, 1969

SUBJECT Minutes of Meeting Held January 7, 1969 to Review Aroclor 5460 Process Details

REFERENCE

TO : CEA 2080 - Solid Aroclor Expansion Anniston Plant

CC: R. E. Howard
J. C. Landwehr
W. R. Richards - T Bldg.
H. L. Williams

Those Present:

L. W. Bannister - T Bldg.
E. M. Emery - JFQ
M. E. Gibbs - JFQ
G. W. Miller - Anniston
V. R. Haupt - Anniston
J. T. Bell ~~T. Deal~~ - Anniston
~~C. Paton~~ - G.O.
R. M. Kountz - G.O.
W. A. Kuhn - G.O.
J. E. Smith - G.O.
R. S. Yates - G.O.

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The list below summarizes the problem areas that exist with the Aroclor 5460 process at the present time.

1. New Catalyst - $RAlCl_3$

It has been shown in the laboratory that use of $RAlCl_3$ catalyst allows the addition of chlorine at a faster rate than with $FeCl_3$. Some color improvement has also been observed. The problem involved with substituting this catalyst at this time is the effect it might have on final quality. In view of the work now being done to gain FDA clearance, we did not feel justified in going to this new catalyst system.

2. Present Catalyst - Higher Pressure

A single chlorinator line will cost $65,000 in new capital. The use of a back pressure controller on the chlorination system ~~would allow faster input of chlorine into the chlorinator by keeping the superficial vapor velocity at a reasonable level~~. This technique would allow increased throughputs through a fixed diameter unit. We could double the throughput, on this basis, by feeding chlorine at 40 psig pressure. Again, there are unknown factors in this process change such as the effect of increased pressure on gas solubility. Would the finished product change in composition. We decided the unknown technology was too hazardous to make any changes in this area at this time.

The "carrot" is not big enough to warrant an extensive research program.

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3. Two Chlorinators - Two Distillation Units

Potentially the safest approach for expansion, however, we are investing capital particularly in the distillation area with this approach.

4. Two Chlorinators - One Distillation Unit

CED will organize its project on this basis and design one distillation unit to handle 20 M pounds per year of product.

5. One Big Chlorinator - One Distillation Unit

Unknown technology on the scale-up of the large chlorinator. Two chlorinators will allow us to go continuous in the future although the "carrot" is not too high.

6. Fractionation

We may have to fractionate Aroclor 5460 to meet FDA requirements. Since the amount of FDA approved material required to meet our sales requirements is only 20% of our total output, we decided this could be an "add-on" project after the process is finalized by Research.

7. Sodium Treatment

Plant investigation has successfully upgraded the color of Aroclor 5460 from an APHA color of 2.0 to [redacted] treating Santowax R with metallic sodium. Estimated cost is 0.4 cents per pound. Mr. Paton will explore with some of our customers whether they would take this lower color material at a premium price. This upgrading of color can also be an "add-on" project after the process is finalized by Research. [redacted]

Review of Process

Mr. Yates reviewed the process design as being developed by CED. Some of the important aspects are listed herewith:

1. Entrainment separation - a better method of removing the Brinks elements and of examining the elements should be devised.

2. Water system for removing heat of reaction. This will be replaced with the more positive Therminol FR2 system since a good monitoring procedure is available for determining when Therminol leaks contaminate the product. Aroclor 5442 could be considered as the heat removal medium.

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3. An alternate to the flash distillation system would be the Contro or Luwa systems. Mr. Gibbs will explore the possibility of distilling Aroclor 5460 in the Pilot Plant Contro unit.

Color Improvement

Gerry Miller reviewed the process work which the Plant Investigation group has carried out in making a better color Aroclor 5460.

1. The use of adsorbents did not improve the color.

2. No color profile has been observed during the distillation period. Some gain may be made in double distillation, i.e., 2 NPA to 1-3/4 NPA.

3. Treating Santowax R with metallic sodium, 2% by weight and holding at 200°C for two hours gave a final color of less than 1 NPA. Composition of the materials changed as follows due to this treatment:

Santowax "R" Before	Santowax "R" After
11% Ortho terphenyl	6% Ortho terphenyl
50% Meta terphenyl	50% Meta terphenyl
25% Para terphenyl	27% Para terphenyl
14% Quarter phenyl	17% Quarter phenyl

Sodium treatment will cost 40¢/100 lb. product with a yield loss of 5%.

4. Fractionation of 5460 has not been tried.

5. Color improvement is noted in the use of $RAlCl_3$ in place of $FeCl_3$, a 1.5 NPA vs. 2.0 NPA.

6. Mr. Paton estimated that better color material might be a factor in 1.5 to 2.3 M pounds per year of production. He will check whether our customers in this area would pay a premium price to get lower color material.

7. Mr. Gibbs will take steps to distill 5060 in an 8 plate laboratory column. Will distillation result in any improvement of the final Aroclor 5460 quality?

Biphenyl Level

Ed Emery reviewed the work he has done in developing tests for detecting chlorinated biphenyl in Aroclor 5460.

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1. An effective chromatograph test has been developed for detecting chlorinated biphenyl. Two lots of Santowax R and corresponding 5460 have been analyzed as follows:

	Santowax R	5460
AK189	0.9% Biphenyl	1.5% Chlor. Biphenyl
AK261	0.2% Biphenyl	0.9% Chlor. Biphenyl

Additional tests are recommended by Mr. Emery, one requiring a topping distillation of finished 5460, spiking with chlorinated biphenyl and checking on the mass spectophotometer and check should be made of current production runs of Santowax "R" and Aroclor 5460. Mr. Miller will assemble additional samples for these tests.

2. Because of the good test for chlorinated biphenyls, CED will stay with the FR2 Therminol heat removal system now used on the No. 9 chlorinator system.

3. A sample of Aroclor 5460 used in the feeding studies has been found and analyzed. 1.3% chlor biphenyl has been found in this sample which is more than was thought present originally.

4. No method has been devised for determining the quarter phenyl content in 5460. We believe that this might be a factor in FDA approval. We can expect some significant time before FDA approval, i.e., 3 months to 2 years.

5. The best way to meet the biphenyl minimum in Aroclor 5460 is to control the biphenyl content in the Santowax "R". We do not know whether chlorinated biphenyl is produced in the chlorination or whether all originates from biphenyl in the Santowax "R".

R. S. Yates

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