J. R. Savage - St. Louis

October 23, 1970

FRACTIONATED AROCLOR

Mr. F. MacDonald Newport
Mr. D. Danna
Mr. R McCutchan WQK Plant

Mr. R.L.K. Witheridge
Newport

We do not presently fractionate Aroclor anywhere. However, design is in progress to install a fractionator at Krummrich Plant to remove higher chlorinated biphenyls. The resulting product is presently named MCS-1016. Our motive is to eliminate the components most persistent in the environment and in food chains, although there is evidence that we will see some improvement in stability.

I recently suggested to E. V. Weekes that we should begin preparation of a project scope for a similar fractionator at Newport. He agreed and asked that I send the Research Report and our scope to Fred MacDonald, so that work could begin on this at Newport. I have done so and this information is all that we presently have formalized, although we can certainly answer any questions you might have. We have made semi-commercial quantities of MCS-1016, and customers are now testing it. To summarize the design parameters, this will be a 30 plate sieve tray column running at 4:1 reflux in the first half and 6:1 in the last half of a chain-feed run. Feed will be crude Aroclor 1142.

I don't know what led you to believe that Anniston fractionates, but on a guess (hope!) that you are looking for ways to improve stability, here is some background. I realize that Newport has been working this art a long time but perhaps I will mention something you haven't considered.

A. Factors known to affect stability

1. Catalyst concentration. This is well-known, but we have found that catalyst activity can be lost by failure to mix well into the batch or by catalyst-killing contaminants, notably sulfuric acid. Free Cl_2 in off-gas is a symptom.

2. Low chlorination temperature. Krummrich has demonstrated better stability if chlorine is not added below 150°C. This does lead to some biphenyl carryover in the off-gas early in the batch. Temperature should be increased during the cycle.

3. Bromine in chlorine. Krummrich has documented the amount of bromine (about 100 ppm) that is tolerable. Bromine might be found in chlorine made from solar salt or low grade KCl.

4. Contaminants. You have recently demonstrated the effect of PVC. The list is endless, but lubricating oil from pump stuffing boxes or the air compressor that supplies the blowing operation seems most likely.

B. Factors <u>believed</u> or <u>suspected</u> to affect stability

1. Highly chlorinated biphenyls. Krummrich's big improvement in stability coincided with conversion from batch to multi-stage continuous. In theory, the batch system should give a more narrow homolog distribution than a backmixed staged system. However, 4 stages is a pretty close approach to plug flow. In the batch system, a substantial part of the batch is left in the chlorinator when it is pumped out, held up on the packing and in circulating piping. It then mixes with the next batch and is chlorinated further.

2. Porocel vs batch earth treatment. This change also coincided with the improvement at Krummrich, and some people believe it to be the reason. I don't.

3. Distillation technique. Our plant people have seen much evidence that distilling too rapidly or attempting to recover too much from the Montar leads to poor stability (which seems to correlate with color). Both plants use entrainment separators in the still vapor lines which seem to give a plate or two of fractionation.

4. Type of lime used. There are two kinds of lime available in the U.S., depending on the kind of kiln used. The kind called "vertical hydrate" seems much more active in dehydro-chlorinating addition compounds.

5. Mechanical configuration of chlorinator. Much talk and some money has been expended on better chlorine distribution, larger circulating pumps, shapes of iron packing, etc. No unequivocal benefits have been demonstrated.

MONS 098737

J. R Savage