

INTER-OFFICE MEMO **TENNECO CHEMICALS, INC.**

TO J.W. Poarch AT Burlington DATE September 29, 1975

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SUBJECT PROCESS ENGINEERING REPORT  
September, 1975

LOP 1056 - DUAL CATALYST IN COPOLYMER

Dual catalyst evaluation has proceeded in polymerization of T/314 and T/315. Trials are being limited to reactor #1. Results are as follows:

| Type | Batch | Date | Catalyst<br>LP/EHP | MVC Chg<br>Plus H.U. | Time at Temp<br>To 35 psig | Recovered<br>Monomer |
|------|-------|------|--------------------|----------------------|----------------------------|----------------------|
| 314  | 3316  | 9/4  | 12/2               | 1.3                  | 9.7                        | 1 M                  |
| 314  | 3387  | 9/8  | 13/2½              | 1.0                  | 8.3                        | 1 M                  |
| 314  | 3215  | 8/29 | 14/0               | 1.3                  | 9.4                        | 0 (CON)              |
| 315  | 3497  | 9/16 | 11/2½              | 1.3                  | 7.2                        | 1 M                  |
| 315  | 3515  | 9/17 | 12/2½              | 1.1                  | 7.3                        | 1 M                  |
| 315  | 3539  | 9/19 | 12/2½              | 1.3                  | 7.4                        | 1 M                  |
| 315  | 3488  | 9/15 | 13/0               | 1.3                  | 7.3                        | 0 (CON)              |
| 315  | 3530  | 9/18 | 13/0               | 1.3                  | 7.3                        | 0 (CON)              |
| 315  | 3505  | 9/16 | 13/0               | 1.3                  | 8.4                        | 1 (CON)              |
| 315  | 3482  | 9/15 | 13/0               | 1.3                  | 8.0                        | 1 (CON)              |
| 315  | 3474  | 9/14 | 13/0               | 1.3                  | 8.0                        | 1 (CON)              |
| 315  | 3459  | 9/13 | 13/0               | 1.2                  | 7.5                        | 1 (CON)              |

The use of recovered monomer is having a significant effect on kinetics and is complicating the comparison. Additional charges are needed to confirm results. Production will charge a virgin T/315 with 12/2½ ratio of LP/EHP for comparison purposes. The draw-down on the jacket water comparison has been further complicated with the high pressure water cleaning of the copolymer jackets during the week of 9/22/75.

VCM UNLOADING - Flemington/Burlington Car Heel Estimation

A report estimating VCM heel in rail cars not degassed was issued on 9/22/75.

COLORITE 011119

The estimations were based on unloading data for the year 1974. The recommended VCM heel credits are as follows:

| <u>Location</u> | <u>Period</u>    | <u>Est. Storage Pressure</u> | <u>Heel lbs. VCM</u> |
|-----------------|------------------|------------------------------|----------------------|
| Flemington      | Jan-Dec          | 75                           | 3,630                |
| Burlington      | Jan-Mar, Nov-Dec | 14                           | 1,300                |
|                 | Apr-May, Sep-Oct | 26                           | 1,830                |
|                 | June-Aug         | 39                           | 2,310                |

#### LOP 1073 - USE OF IONOL IN COPOLYMER

LOP 1073 was written and is circulating for approval. Under this LOP 1 lb. of Ionol (initially) will be sucked into the stripper prior to transfer of the batch from the reactor. Recent PVC experience (IOR type) with this procedure resulted in Ionol carry-over into the recovery of near 80 ppm with no detrimental effect on kinetics. Prior experience with 5 lbs. Ionol prior to steam stripping resulted in too much Ionol carry-over and batches "dying out" before reaching dump pressure.

It is hoped that a controlled amount of Ionol carry-over will help alleviate the buildup problem in the copolymer recovery receivers. This buildup has become more pronounced with the higher thermal stripping temperatures and longer stripping times. Additional benefits looked for are better resin color, better initial heat stability and lower residual VCM levels. The latter is possible if the Ionol helps prevent polymerization which seals the resin particle during thermal stripping.

#### SOLVENT STRIPPING OF COPOLYMER SLURRY

The Pilot Plant has completed evaluation of a T/315 series of solvent strippings utilizing MVAc. The acetate solvent was introduced into the bottom of the stripping vessel. This procedure appears promising and they have requested a plant evaluation. In previous trials the acetate solvent was introduced into the top of the vessel.

An LOP will be written for this evaluation. A maintenance work order will be submitted to pipe (3/4 inch) the #2 weigh scale to the bottom of the strippers. A 0-10 gpm rotameter will be placed in the line. The MVAc solvent usage will be based on 5% of the total slurry weight added over 30 minutes.

#### RESIDUAL VCM LEVEL IN SUSPENSION SLURRY

Two slurry samples from the Homopolymer and two from the Copolymer Plant are being taken daily to characterize the residual VCM levels in the slurry for our current stripping cycle. This program has encountered a delay due to the program for the characterization various plant problem streams which currently discharge monomers into the atmosphere. This is due to the load limit on lab testing capability. The following table summarizes results to date:

| <u>TYPE</u>               | <u>314</u> | <u>315</u> | <u>390</u> | <u>391</u> | <u>10R</u> | <u>175</u> | <u>501</u> |
|---------------------------|------------|------------|------------|------------|------------|------------|------------|
| # tested                  | 14         | 8          | 4          | 2          | 16         | 2          | 12         |
| Avg. ppm, VCM             | 109        | 224        | 165        | 63         | 17         | 400        | 45         |
| Range: High               | 200        | 490        | 240        | 95         | 50         | 500        | 195        |
| Low                       | 52         | 80         | 150        | 30         | 4          | 300        | 9          |
| S.S.: To °F               | 190        | 190        | 190        | 190        | 210        | 190        | 210        |
| Hold, Min.                | 0          | 0          | 0          | 15         | 60         | 0          | 15         |
| Cool to °F                | 180        | 180        | 170        | 180        | 190        | 170        | 190        |
| H <sub>2</sub> O Add, Gal | 200        | 200        | 0          | 200        | 300        | 0          | 500        |

There is a wide variability in results. This could be due to recovery procedure, sample procedure, and testing variability.

#### LOP 1063 - EVALUATION OF SHORTSTOPS

A 1 lb. Ionol add to the stripper prior to steam stripping 10R was evaluated in the September run of this product. Ionol carry-over into the recovery stabilized to near 80 ppm after four days. No detrimental effect on kinetics was noted. No significant change in resin color or heat stability was noted. Residual VCM in finished product ranged below 2 ppm. A report on this run will be assembled.

#### LOP 1074 - NEW DEFOAMER EVALUATIONS

Colloids Defoamer 991 (formerly X-6891-40) was evaluated in BR-501 processing. The base for this defoamer is 987 to which 20% silicon was added. Defoamer 987 was evaluated in Plastisol and the Pilot Plant. Both reported satisfactory results (1973).

Performance of 991 in BR-501 appeared equal/better than GE-60. Resin samples from Lot 455025 (and lots -20, -23 for controls) has been forwarded to R&D for chemical foam application evaluation. If product tests in R&D are satisfactory, no problem is foreseen in AMPing the use of 991 and eliminating the GE-60 defoamer across all the PVC line. The summarized cost savings based on GE-60 usage for the first 5 months of 1975 are as follows:

|              | <u>Annual<br/>Usage, lbs.</u> | <u>Cost<br/>Cents/lb.</u> | <u>Total<br/>Dollars</u> | <u>Annual \$<br/>Savings</u> |
|--------------|-------------------------------|---------------------------|--------------------------|------------------------------|
| GE-60        | 60 M                          | 1.81                      | 108,600                  | -                            |
| Colloids 991 | 60 M                          | 1.05                      | 63,000                   | 45,600                       |

#### SPECIAL REACTOR RECOVERY EVALUATIONS

Special reactor recovery procedure was evaluated in both the Ho and Co plant during the period from 8 a.m. on 9/8 to 8 a.m. on 9/11/75. In this procedure the reactor jacket temperature was set to 190°F at the start of the batch transfer to the stripper. At completion of transfer, the reactor was isolated from the dump line, recovered for 1/2 hour, recovery shut off and then cooled for 5 minutes prior to breaking of vacuum with nitrogen.

After elimination of results inconsistent with the recovery procedure as refined during the evaluation, a summary is as follows:

| Plant | Types                        | Avg.  | PPM VCM |  | Low   | Average of Bendix<br>Area level counts of PPM |       |         |         |
|-------|------------------------------|-------|---------|--|-------|-----------------------------------------------|-------|---------|---------|
|       |                              |       | High    |  |       | >1                                            | >5    | >25     | >100    |
| Ho    | 10R, 175, 501                | 2,010 | 5,540   |  | 600   | 95                                            | 5     | 0.8     | 0.3     |
|       | Bendix: Before 4 days/7 days |       |         |  |       | 62/69                                         | 7/12  | 0/0.7   | 0/0     |
|       | After 4 days/10 days         |       |         |  |       | 69/100                                        | 7/15  | 2.1/2.2 | 0.5/0.4 |
| Co    | 390, 391                     | 2,590 | 3,730   |  | 1,720 | 55                                            | 8     | 0.5     | 0       |
|       | Bendix: Before 4 days/7 days |       |         |  |       | 91/109                                        | 17/17 | 2.5/1.9 | 0.3/0.1 |
|       | After 4 days/10 days         |       |         |  |       | 69/100                                        | 14/16 | 2.5/1.5 | 0.3/0.4 |

The Bendix control data was for the best 4 days before and after the special 4 day run (in the period 9/1 to 9/21/75). In Copolymer the area excursions above all levels was significantly reduced. In viewing the 4 day period there doesn't appear to be a significant reduction in the Homopolymer excursions, but in viewing the 7 days previous and 10 days following the run the difference is there.

A report summarizing the data is near complete and should issue the week of 9/29/75. Two Special Plastisol recoveries were conducted in September with the following results:

| Date          | Tower      | °F         | Rec. Time<br>Hours | Recovery<br>Method | ppm VCM/Point |         |
|---------------|------------|------------|--------------------|--------------------|---------------|---------|
|               |            | Jkt. Temp. |                    |                    | Top           | Bottom  |
| 9/25          | 14         | 140        | Std + 1 hr.        | Top                | 3,140         | 5,040   |
| 9/26          | 8          | 180        | Std + 1 hr.        | Bottom             | 870           | 1,650   |
| 9/25          | 11         | -          | Std recov.         | Std                | 18,100        | 385,000 |
| 9/16-<br>9/17 | (3 Towers) | -          | Std recov.         | Std                | 17,28M        | None    |

A dramatic difference in monomer content was noted between the top and bottom samples from the tower. This occurred despite a 10 (+) minute wait period after breaking vacuum with nitrogen (before sampling). The nitrogen for breaking vacuum is introduced into the top of the reactor and diffusion of the monomer and nitrogen molecules appears very poor. It is not known if this phenomenon is present in the agitated suspension reactors.



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LM/gs