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

TO W. Miringoff AT Burlington DATE April 30, 1975

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SUBJECT PROCESSING ENGINEERING MONTHLY REPORT
APRIL, 1975

I. BURLINGTON

A. Dispersion Resin

1. Testing of Fryma Equipment for VCM Stripping (J.W. Poarch)
Tests were conducted in Rhinefelden, Switzerland on the Fryma deaeration machine using Wacker prepared latex during the weeks of April 14 and 21. Using this equipment it was possible to remove Vinyl Chloride from latex containing 9,000 to 13,000 PPM VCM down to levels below 500ppm. A complete report is being assembled and will be issued by May 5.

2. Dispersion Stripping Trials, Burlington Plant (L. Schappell)
Table I contains a summary of stripping conducted during the month. The last two batches shown were stripped under conditions which production adopted on April 16. Without nitrogen sparging the VCM removal rate becomes very slow after the third hour. With nitrogen sparging the rate of removal is more rapid.

3. Study of Oxygen Levels During Prolonged Stripping (R. Donovan)
With the above stripping procedure of two hours at full recovery followed by three hours of steam jet evacuation, a study has been made which shows that the oxygen level in the discharge of the compressor will reach 3% in 3 hours at a vacuum of 26"Hg. This is primarily due to the air leakage rate at seals and flanges becoming significant at low VCM flow rates.

4. B. Plant Production of 1742-LOP 1051 (R. Donovan, L. Schappell)

Type 1742 resin was produced for the first time in B plant. Close attention was given to the different process conditions which exist in B plant and their effect on properties. As expected, the pressure drops across the three stages were lower in B plant (see table III) than in A plant, especially the third stage. The rheology of the base resin in B plant was significantly lower than A plant base resin. (see Table II). After blending with tridecyl alcohol and additive resin the 1742 product properties show less significant reductions in rheology.

5. Additive Resin Control System (L. Schappell)

Prior to production of 1750 resin the week of 3/31/75, a new positioner was installed at the additive feed screw and the ratio control system reconnected. Also the feed screw assembly was mounted to the additive bin. The fluctuation in weight indicated was reduced from ± 10-20 lbs. to ± 5-10 lbs. from the actual weight. The additive data indicated that the ratio controller system could produce a product with more in-spec additive levels than if the additive feed rate were constant.

The AR-901 additive weights were analyzed for the production of 1742 between 4/11 and 4/16. Of 160 pallets bagged, 133 had additive levels of 4 - 8%. For the 1732 run that followed there were 124 pallets of 135 bagged which contained 4 - 8% AR-901. One reason for the better control during the 1732 run was the close monitoring at the start of the run to zero-in on the required set-point. Also the set-point was fixed for the entire run.

6. Tridecanol Additive Control System (L.A. Schappell)

The ratio control system is not functioning properly. The output signal to the control valve is oscillating frequently and appears to be over-shooting the desired set-point. The amounts added per pallet fluctuate ± 50% from the specified amount of 30 lbs. for 1732 and 1742 resins. To reduce the output response first the controller gain will be reduced.

7. VCM Material Balance - 1742 "B" Plant (R. A. Donovan)

Material balance samples were taken for characterization of 1742 in "B" Plant. These samples were taken to see the extent of VCM removal from the blend tank through the bagger. The results obtained are as follows:

Sample Point	VCM Content (ppm)
Blend Tank	4740
Cake Breaker	3240
Primary Collector	69
Fine Product Bin	21
Bagger	9.7

8. Dispersion Plant Charging (R.A. Donovan)

In following charging procedures of dispersion latex some insight was gained on one possible cause of sloppy latex. On one batch of 1750 the cuno filter became some what plugged thus reducing the charging rate by 24%. The pressure drops at the orifice plates were likewise reduced and a sloppy latex resulted.

B. Suspension Resin

1. Type 10.5R Special - LOP 1050 L.A. Schappell)

This LOP was issued on 3/31/75 to allow the production of 250,000 lbs. of 10.5R resin for Nixon containing less than 2 ppm VCM. It was necessary to increase the stripper hold time at 210°F to one hour and to increase the blend tanks hold time from two to six hours in order to meet the " less than 2ppm requirements".

The resin color varied considerably from lot-to-lot. Table IV indicates the color results and process conditions per lot. The major reasons were variations in batch hold time in the reactor, hold time at 210°F during stripping, mixing time in the blend tank and dryer temperature. It is essential for consistent resin color that the batch hold time in the reactor be less than two hours, and the hold time during stripping be no more than sixty minutes.

To produce less than 2 ppm VCM content 10R resin, the mixing time must be six hours after addition of the fifth batch in the blend tank, the hold time during stripping must be sixty minutes and dryer outlet temperature should be 170°F or higher.

2. Suspension Resin Stripping

A review of suspension stripping conditions and results is attached as Table V.

3. Copolymer Type 315 - CBS Complaint (R. Donovan, L. Schappell)

A review was made of the past years formulation sheets and the past months reactor data sheets in response to a complaint by CBS of a change in the quality of records pressed from Tenneco resin. After comparing quality control results of the resins in question with previously accepted resins we found no significant differences in resin quality. The problem was then found to be due to a faulty weigh scale in the CBS plant.

C. Miscellaneous

1. Sand-Filtration Pilot Test (R.A. Donovan)

Tests as to the feasibility of a dual media filtration column as a final treatment for the effluent water have been made. Results of the test have not been determined as of yet, the removal of total suspended solids and the effect on BOD are of prime concern.

2. Vent Condenser (R.A. Donovan)

Reading taken from VCM vent condenser for the month of April showed an average of 300 lbs. per day of VCM being vented to the atmosphere. This calculation is based on a 26% concentration of VCM in the exhaust Stream.

II. FLEMINGTON

A. Suspension Resin Production

1. Flemington Plant Start-Up (L. Medeiros)

The Flemington Copolymer Plant is now in full operation. Water to monomer ratio has been reduced to 1.46 with a 4600 gallon charge (at reaction temperature). No further changes in this area are now contemplated.

To obtain a particle size distribution with Quality Control specifications, reactor rpm was reduced from 108 to 88.2. A very narrow particle size distribution was being obtained at the higher rpm, with gelatin reduced to as low as 22 lbs. Current t/315 product is processing in control at a gelatin level of 36 lbs. (All "A" type). Tenneco type 314 was introduced into the product mix. It processed with acceptable particle size control at a gelatin level of 42 lbs.

Current processing problems are in the area of optimizing the total reactor cycle time and drying. Drying area breakdowns due to either the centrifuge or bulk transfer system has caused slurry back-up. Vibrators installed on the centrifuge wet cake chutes has helped alleviate pug-up problems in this area. The problem with the "A" centrifuge breaking shear pins is still being looked into. Several bulk transfer blowers on the "A" dryer system were burnt out. Modifications to the system appeared to have helped. These bulk transfer blowers generate air temperatures near 200°F. Production is installing cooling fins on the piping after these blowers to prevent degrading the copolymer resin (especially during a plugged line situation). Burnt resin has been found in the system.

Work on characterizing the total reactor cycle time is being pursued. Full catalyst loading optimization will not be possible until the refrigeration system is in service. (estimated in July). The River water temperature fluctuates daily, running to as high as the mid 50's. Production has started high pressure water cleaning the reactor jackets. Excessively long pressure drops were observed on T/314 polymerization. Quality Control reported Phenol inhibitor in the recovery system at acceptable levels of 40 - 50 ppm. To verify the effect of recovery on Kinetics two major batches were charged.

RESULTS WERE AS FOLLOWS:

REACTOR	BATCH	CATALYST	RX TIME AT TEMP.	MINIMUM JACKET	RECOVERED
4	258	19.0	7.3	85	None
	250	19.0	9.5		1000 lbs.
	241	18.5	9.3	102	1000 lbs.
7	259	19.0	8.3	78	None
	251	18.5	9.8	90	1000 lbs.
	242	18.5	9.3	90	1000 lbs.

Conclusions are difficult to draw with certainty on this limited data, but it appears that recovery is having an effect on kinetics. The phenol content in the recovered monomer is being monitored closely. Production has instituted an add procedure to reduce this level below 40 ppm. Previous belief was that it would take 150 - 300 ppm inhibitor to significantly affect reaction kinetics.

2. Alternate Suppliers Evaluation for "A" Gelatin (L. Medeiros)

Processing Control history on particle size with "A" and "B" types (Atlantic and Hormel) gelatins at Burlington was researched and compared to Flemingtons use of "A" type Atlantic gelatin. Results are summarized in a memo report dated 4/25/75.

Currently both plants utilize an all "A" gelatin suspension system. Atlantic is our only supplier of this gelatin. Processing history on 315 shows Flemington producing a slightly narrower particle size distribution. It is expected that the Hormel "A" gelatin may broaden the distribution. It was recommended that the "A" type Hormel gelatin be evaluated in Flemington. An LOP will be issued for this purpose.

III. GENERAL

Two days were spent by the whole process group in the Engineering Seminar April 1 and 2.

J. W. Poarch

JWP:km

TABLE I

DISPERSION STRIPPING TRIALS

Residual VCM (PPM)

Series	Type	1 hr.	2 hr.	3hrs.	4 hrs.	5 hrs.	6 hrs.	8 hrs.	Conditions
109	1750		8574		1371			535	24-26" Hg. VAC., 5 SCFM N_2 Sparge
110	1755		26210		16165		6519		24-26" Hg. VAC., 10 SCFM N_2 Sparge
112	1730	9000		6540		6238			24-26" Hg. Vac.
113	1742	13735		10770		10185			24-26" Hg. Vac.

L.A. Schappell
4/28/75

COLORITE 010779

TABLE II

1740 - "A" Side

DATE	BROOK VISC	SEVERS VISC
9/24/74	43	400
11/15/74	54	218
11/25/74	43	222

1740 - "B" Side

DATE	BROOK VISC	SEVERS VISC
4/11/75	33	146
4/14/75	29	155
4/15/75	31	141

R.A. Donovan
4/28/75

TABLE III

Q.C. PROPERTIES - 1742

"A" PLANT

LOT NO.	ΔP 1st Stage	ΔP 2nd Stage	ΔP3rd Stage	ΣΔP	BROOK VISC	SEVERS VISC
935010	174	172	203	547	83	82
935011	168	171	205	545	62	79
935012	180	173	203	556	66	100
935013	183	181	200	564	55	84
935014	186	181	108	555	56	101
935015	185	179	190	554	62	103
935016	196	181	188	565	50	85
935017	194	183	185	562	46	78
935018	192	177	182	551	52	90

"B" PLANT

935022	182	170	150	505	65	70
935023	183	174	136	493	65	64
935024	187	175	148	510	75	74
935025	188	170	151	509	61	78

R.A. Donovan
4/28/75

TABLE IV

SPECIAL T-10R PROCESS CONDITIONS

Lot Number	Hold Time in Reactor, min*	Hold Time @ 210°F min	Fill Time Blend Tank, hrs	Mix Time Blend Tank, hrs	Drying Time, hrs	Dryer Outlet Temperature, °F	Residual VCM, ppm	Color L	Color a	Color b
495012	0	46	11.0	2.6	9.0	163.5	6.7	88.75	.16	4.16
495013	46	49	12.5	6.0	7.2	164.3	2.7	88.2	.35	4.70
495014	187	57	11.75	6.2	7.8	170.0	1.4	88.0	.36	5.40
495015	48	60	13.0	7.5	5.8	174.7	1.4	88.3	.20	4.85
495016	72	60	13.0	4.8	5.5	165.6	2.1	88.7	.14	4.80
495017	115	70	12.0	5.9	5.7	169.6	0.2	87.6	.60	5.40

*Time in reactor after pressure dropped below 120°F mark on recording chart.

L.A. Schappell
4/17/75

TABLE V

BURLINGTON STRIPPING DATA 3/26-4/25

PRODUCT	AVG. VCM PPM	ONE SIGMA VALVE PPM	RANGE PPM	DATA POINTS	STRIPPING CONDITIONS
175	340	± 144	210-580	7	190°, 300 gal.
10.5/R	2.9	± 2.6	N.D.-17	53	210°, 30 min. 190°, 500 gal.
250-3	116	± 29	70-140	6	some @210°,60 min. 165°, 200 gal.
BR-501	2.43	± 2.52	N.D.-12	45	210°,15 min. 190°, 500 Gal.
314	66	± 28	35-90	3	190°, 180° 200 gal.
315	111	± 47.5	18-280	71	190°, 180° 200 gal.
390	57.5	± 25.6	14-170	43	190° 180° 200 gal.
391	57.4	± 21.8	22-96	14	190°, 180° 200 gal.

FLEMINGTON STRIPPING

315	53	± 30	--	17	190°, 15 min,cool
	121	± 90	--	22	195°, 15 evap.,cool
314	60	± 13	--	4	195°, 15 evap.,cool

J.W. Poarch
4/30/75