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TO Distribution List AT DATE January 31, 1974

FROM Dr. R. T. Gottesman AT Piscataway COPY TO

SUBJECT MONTHLY SUMMARY - JANUARY 1974

Attached are copies of the Monthly Summary reports for January 1974 covering the activities of the Piscataway laboratories and associated pilot plants at Piscataway and Flemington.

R. T. Gottesman

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TO Dr. R. T. Gottesman AT Piscataway DATE January 31, 1974

FROM Dr. F. J. Buono AT Piscataway COPY TO

SUBJECT

MONTHLY SUMMARY - JANUARY 1974

[illegible] of Tenneco Chemicals, Inc.

I. COATINGS INDUSTRY

A. Microbiocides

1. Biocide and Compatibility Screening (E. DiBella, P. Minieri, H. Sidi, G. A. Trautenberg, G. Tirpak)

(a) TID Candidates

Biocide screening was completed on twenty-six TID candidates. The following four were active and are undergoing paint compatibility (#1-4) and/or can preservative (#1,2) evaluations:

(1) Paraformaldehyde (Heat inactivated)
(2) H.M.W. (High Molecular Weight) Paraformaldehyde
(3) N-2,4,6-Trimethylphenyl maleimide
(4) N-(2-Hydroxymethyl-2-nitro)n-butylpiperidine

* The following maleimide fungicide candidates continue to show promise (compared to Super Ad-It) after test fence exposure for five months in Puerto Rico, Florida, and Texas.

(1) Maleimide,N(2,6-diethyl)phenyl (0.5%)
(2) Maleimide,N(2,6-diisopropyl)phenyl (0.7%)
(3) Maleimide,N(2 methyl-6-chloro)phenyl (0.5%)

B. Loss-of-Dry Inhibitors (G. Kagan, M. Landau)

* 1. Canadian Loss-of-Dry Inhibitor

Shelf stability on a plant production sample of the calcium-based loss-of-dry inhibitor (CX475) is worse than the laboratory preparation (LN962). Hard settling which could not easily be reincorporated and a purple discoloration were observed with CX475 which were not present in LN962. One month aged thru-dry times with the plant material were slightly longer but still acceptable compared to the laboratory preparation. In view of the promising functional performance of this product, the Process Development Laboratory will evaluate the Canadian process for CX475 in an effort to provide a more stable product.

C. Polyester Accelerator

Attempts to develop a proprietary across-the-board polyester accelerator using varying combinations of Cobalt 254 and Cobalt 12% were unsuccessful. However, the results of these studies indicated that Cobalt 254 is an efficient accelerator and the data collected will be used by R & D and Marketing to prepare a new product bulletin for the promotion of Cobalt 254 for this application. A report has been issued covering this work.

D. Pigment Dispersant

At the last paint show, several questions arose regarding the stability of Nuosperse HOH in paints with zinc oxide and the effect of paint pH on stability. To answer these questions, Nuosperse HOH was evaluated versus Tamol 731 in a zinc oxide-based acrylic formulation and the two products were compared in a zinc-free acrylic formulation at pH levels of approximately 8.0, 9.0, and 10.0. The results indicated that Nuosperse HOH shows significantly better viscosity stability in the zinc oxide paint than Tamol 731 after aging for one month at 120°F. In the pH study, Nuosperse HOH showed superior viscosity stability after aging than Tamol 731 at pH levels of 8.0 and 9.0, and was equivalent to the competitive product at pH 10. Similar studies are underway in PVA paints.

II. LUBRICANTS

* A. Crankcase Lubricant (M. H. Knapp, R. G. Smith)

Test results (L-38) on the experimental 10W/40 candidate (R-495) submitted to Southwest Research Institute in December were received. This oil, which utilized a Lubrizol engine oil additive package, did not meet the requirements for "SE" in that it failed to provide sufficient corrosion/wear protection. This result was unexpected in light of our past field experience with the same Lubrizol package in ANDEROL 472.

Shortly after the failure of the Lubrizol package, a second candidate was submitted to SWRI. This candidate (R-509) utilizes an Oronite package which was developed by Chevron for T.O.P. Based on laboratory bench test results, it is expected that this candidate will show improved performance in the L-38 test and is expected to require minimal optimization.

L-38 Oxidation Test Results (40 Hours)

	"SE" Requirement	R-495
Bearing Weight Loss, mg.	40 Maximum	190 (a)
Sludge Rating	No Requirement	59.5 (b)
Varnish Rating	No Requirement	59.3 (b)

(a) "Failures" in this test range from 40 to 4000 mg.
(b) Exceptionally clean, rating for no sludge or varnish is 60 maximum.

* B. Two-Cycle Engine Lubricants (M. H. Knapp, R. G. Smith)

The Marketing Department completed its survey of this application with the recommendation that the program be re-activated on a high priority basis. A capital appropriation request is being prepared for the purchase of the required laboratory test engines and dynamometers.

C. Novel Base Fluids (M. H. Knapp, R. J. Stanaback)

Four fluids were evaluated for utility as compressor and/or crankcase base oils and were found to be inferior to currently used base oils.

D. RC Engine Lubricant (M. H. Knapp, R. G. Smith)

Both the dynamometer-mounted and car-mounted engine evaluations of Experimental RC Oil R-470 have been temporarily stopped due to the lack of test stand space and an engine seal failure (not lubricant related) in the test car. It is expected that both tests will be re-started as soon as possible.

E. Diesel Engine Lubricant (M. H. Knapp, R. G. Smith)

The two diesel engine field tests are continuing satisfactorily with accumulated test hours at 300 and 600 hours respectively. Both tests are continuing.

F. J. Buono

FJB/amp

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

TO	Dr. R. T. Gottesman	AT	Piscataway	DATE	January 31, 1974
FROM	Dr. A. J. Deinet	AT	Piscataway	COPY TO	
SUBJECT	MONTHLY SUMMARY - JANUARY 1974				

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I. CHEMICALS/SPECIALTIES

* A. Fuel Oil Additives (A. Fischer)

Current work aimed at a manganese 12% fuel oil additive has stressed the double decomposition (DD) route over the manganese fusion process because of better compatibility with Elizabeth plant capabilities. Runs utilizing manganese sulfate and an acid mixture (based on n-hexanoic, 2-ethyl hexanoic and neodecanoic acids) were prepared in which various solvents (e.g. mineral spirits, mineral seal oil, kerosene and Coray 40) either alone or in various combinations were evaluated. The use of mineral seal oil or a Coray 40 - kerosene mixture gave products that met or were close to customer requirements. Final formulation will be dependent on pricing and raw material availability data which has been requested from Purchasing.

B. Neodecanoates (S. Hoch)

A process was developed and a Laboratory Process Proposal issued for the preparation of Lithium Neodecanoate (2% Li) based on the use of lithium hydroxide and neodecanoic acid. This product finds utility as a lead replacement in alcoholysis catalysis.

C. Catalysts (M. Q. Ceprini, S. Hoch)

A sample of Nuodex Copper 8% submitted to Nalco Chemical Co. was found suitable and a 24 drum quantity has been requested. A Laboratory Process Proposal for its preparation has been issued.

II. PLASTICS INDUSTRY

A. Additives

1. Tin Stabilizers (J. A. Gerrity, H. Gould, S. Hoch, M. Spalding)

Samples of NUOSTABE V-1562, V-1902 and V-1562 +5% "TRIS" prepared with thioglycolate esters using various alcohols e.g. 1. Alfol 610, 2. 2-ethylhexanol-isooctyl alcohol blend, 3. Alfol 610 - 2-ethylhexanol blend, 4. C_6-C_{13} blend and 5. 2-ethylhexanol, were evaluated at Flemington. The conclusion was that all alcohols used could be substituted for the isooctyl alcohol, with the 2-ethylhexyl thioglycolate ester showing exceptional color, e.g. blue retention. This series was prepared in anticipation of an isooctyl alcohol shortage.

* Studies of the ester/tin ratios in BD-603 types at Flemington indicated a 2.2/1.0 ratio to be optimum in color and stick time. Subsequently a Laboratory Process Proposal was issued (as AG-837) and two pilot plant batches were prepared and found to be satisfactory in tests at Nixon Baldwin. An initial 16,000 lb. plant batch meeting specifications has now been satisfactorily completed at Elizabeth with R&D assistance and shipped to Nixon-Baldwin. Two laboratory preparations evaluated at Flemington in which Alfol 610 and an Alfol 610/2-ethylhexanol mix respectively were substituted for isooctyl alcohol in preparing AG-837 showed both systems to be satisfactory substitutes should isooctyl alcohol become unavailable.

Samples of the following I-167 types were prepared with various alcohols and used in the preparation of V-1528 types using V-1562's made from thioglycolate esters containing the corresponding alcohols:

No.	Alcohol Used	% Sn
D-046:4A	Alfol 610	21.7
D-046:21A	2-Ethylhexanol	21.6
D-046:21B	Alfol 610/2-Ethylhexanol	21.6

All final samples contained 5% "TRIS" and were submitted to the Flemington Laboratory for evaluation against the standard isooctyl alcohol derived product.

A sample of 50% dimethyltin dichloride (Argus) has been evaluated as a raw material source by conversion to dimethyltin bis(isooctyl thioglycolate). Yield (98.4%) and tin content were satisfactory and the product has been submitted to the Flemington Applications Laboratory for evaluation.

* Analytical work on M&T's T-136 indicate the presence of butyl and isooctylthioglycolate moieties in an organotin sulfide structure with an S:Sn ratio of 3:1. Based on this information synthesis efforts are underway which as an initial approach involve the reaction of various organotin chlorides with sodium sulfide or sodium sulfhydrate.

2. Stearates (S. Hoch)

Isostearic acid was evaluated as a replacement for stearic acid in the preparation of the calcium and zinc salts. The resultant products were gummy rather than filterable powders and indicated this material to be of no immediate interest.

3. Liquid Stabilizers (S. Hoch)

*

Laboratory work is in progress aimed at a Lubrizol 2106 replacement. As an initial approach samples of barium phenate and barium phenate-nonyl phenate mixtures in both isooctyl alcohol and Alfol 610 have been prepared and submitted for evaluation. A patent survey on Lubrizol 2106 is underway to enable us to clarify this situation and guide our approach.

A sample of I-91 (barium phenate-nonyl phenate) prepared in Alfol 610 instead of the usual isooctyl alcohol or 2-ethylhexanol was evaluated in the Flemington Laboratory in two stabilizer formulations (V-1255 and V-1575) and found to be equivalent in functionality. A Laboratory Process Proposal based on this substitution will be issued.

4. Powder Stabilizers (S. Hoch)

*

Additional runs of cadmium pelargonate, containing chloride impurities, were made and converted to I-248 and I-237 using barium stearate (I-126). Evaluation at Flemington showed that the materials were equivalent to previous blends (as well as to standard I-248 and I-237) where the cadmium pelargonate was washed free of chloride. Since cadmium pelargonate shows some water solubility it is preferrable to minimize product washing. Based on these results a Laboratory Process Proposal will be written that does not call for washing the product and permits a chloride content of approximately 0.7%.

Westvaco's diacid 1550 was utilized in the preparation of zinc (14.7% Zn), cadmium (21% Cd), Calcium (9.2% Ca) and barium (24.3% Ba) soaps. These have been submitted to Flemington Applications Laboratory for evaluation.

5. Flame-Retardants (E. P. DiBella, G. Kagan, M. Reale)

LOI values on a PVA film prepared with 20 PHR hexachlorobutene-2 and 20 PHR antimony oxide indicated that this chloro analog of HBB-2 was significantly less effective than HBB-2 itself. The thermal decomposition temperature of hexachlorobutene-2 (HCB-2) was also found to be significantly lower than that of HBB-2 and no additional work is planned for HCB-2.

Flexible polyurethane foams incorporating Chemtron's fire-retardant additives C-1, C-2 and C-3 (chlorinated aliphatic hydrocarbons) at 10 PHP and antimony oxide at 5 PHP were not rendered self-extinguishing and will be repeated at a level of 25 PHP. Proprietary mixtures based on the various combinations (1:1 ratios) of HBB-2, Nuogard 23P, Nuogard DCP and diphenyl dichloro propyl phosphate (DPDCP) were evaluated in flexible foams at 10 and 25 PHP

levels. Of these only Nuogard DCP/DPDCP and Nuogard 23P/DPDCP were effective fire-retardants at 25 PHP. Functional evaluation in large buns is underway. Similar evaluations of mixtures incorporating tetrabromobutene-2 will also be carried out. Evaluation of Ulexite (A Tenneco Oil borate) in a polyurethane foam at 30 PHP was ineffective and was also found to nullify the fire-retardant properties of FR-2 when both were incorporated at 30 PHP. This material exhibited some promise with respect to LOI value in a PVA paint, but was found to increase paint viscosity to an unacceptable level.

Flexible PVC sheets were prepared by replacing part of the DOP plasticizer with fire retardant mixtures, and the oxygen index of the formulation determined. The results are as follows:

Additive	Level (PHR)	LOI	Remarks
Control	---	22.3	
HBB-2	5	27.2	Dry Spew
Sb_2O_3	2.5		
HBB-2	2.5		Dry Spew
Nuogard DCP	2.5	26.5	
Sb_2O_3	2.5		
Nuogard DCP	5	24.7	
DPDCP	5		
Nuogard DCP	5	27.5	
DPDCP	5		
Sb_2O_3	5		
HBB-2	2.5	23.6	Dry Spew
Nuogard DCP	2.5		

Previous work indicated that incorporation of 7.5 PHR DPDCP in PVC raised the LOI to 25.0. Therefore, it would appear that blending Nuogard DCP with it is detrimental. Although the HBB-2/Sb_2O_3 system shows synergism, the dry spew precludes further work. Functional evaluation of binary mixtures with HBB-2 is also underway.

* The evaluation of two paper flame-retardants, Flame-Proof MP and FP Chain #450 (from Nippon Senka), indicated these to be ineffective in imparting self-extinguishment either when incorporated individually into paper at the pulp stage or when applied in combination as an add-on at a 15% level to paper sheet.

Tetraethyl 1,4-xylylene diphosphonate and N-(2-hydroxyethyl)-1,8-naphthalimide were synthesized and submitted for evaluation (the latter for possible use as a smoke-suppressant in polyurethanes).

A. J. Deinet

AJD/srf

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

TO	Dr. R. T. Gottesman	AT	Piscataway	DATE	January 31, 1974
FROM	Mr. I. Huppert	AT	Piscataway	COPY TO	

SUBJECT MONTHLY SUMMARY - CHEMICAL DEVELOPMENT
JANUARY 1974

I. CHEMICALS/SPECIALTIES

A. Phosphates

* 1. TOF (J. DeGaetano, J. A. Gerrity, L. Schinasi)

The TOF campaign at Fords was successfully completed. Yields averaged 86.4% based on $POCl_3$, and 86.2% based on net 2-ethylhexanol consumed over the first eleven batches. Later individual batches equaled the Pilot Plant yields of 91.3% on $POCl_3$ and 88.7% on 2-ethylhexanol. No processing problems were encountered and the quality of the TOF was within the tentative specification range. The details of this "TOF - Plant Start-Up" are presented in Report No. 1010-10, January 22, 1974. Efforts will be made to decrease the wash volume in order to increase productivity.

Samples of Tenneco Pilot Plant produced "plasticizer" grade TOF (R-489, 73-10B) and a portion of TOF distilled from it (R-490, E012-102-1) were evaluated by FMC with the following results:

	R-489	R-490
Interfacial Tension, dynes/cm	12+ (7.70 Tenneco value)	19+ (15.57 Tenneco value)
Sodium, ppm	189	57

Although significantly improved, R-490 still did not fit FMC's functional need with respect to their "Special Grade" application. Because of the discrepancies in interfacial tension (IFT) determinations, an exchange of samples for comparison of analytical findings was made and the results are shown below:

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	74-G-8 Special Grade		74-G-8 Plasticizer Grade		74-G-10 1:1 Mixture	
	FMC Det.	Tenneco Det.	FMC Det.	Tenneco Det.	FMC Det.	Tenneco Det.
Interfacial Tension, dynes/cm	19.5	16.88	9.9	9.48	14.7	13.09
Sodium, ppm	--	9.0	--	65.3	--	38.2
Acid Number	--	0.11	--	0.12	--	0.20

A procedure from FMC to upgrade TOF is presently being evaluated. This procedure involves treatment with phosphoric acid at a specific pH, followed by passage through a coalescing filter and then an alumina column (Type F-1). Initial results generally showed significant improvement in IFT values, but water content and acid number control will require development work. A summary follows:

E-012:	Column	Ht. In.	#Passes	IFT Dynes/cm	Sodium ppm	Acid No.	Rate cc/min.
Control	None	0	0	7.70	189	0.3	--
H_3PO_4 Only	None	0	0	16.34	2.4	0.7	--
125	Basic Alumina	23	4	16.97	3.3	0.08	30
125B	Basic Alumina	23	1	16.70	3.5	0.42	30
121	Neutral Alumina	10	1	17.33	6.3	0.04	2
127-2	IR-45	13	2	17.06	2.3	0.05	15

The control used was R-489. All columns were one inch ID and treatment consisted of H_3PO_4 wash and drying prior to column treatment.

Batch treatment using 2 to 3% of MgO, CaO, Celite 545 and Super Cel filter aid showed no significant improvement in IFT. Samples of E-012-125, E-012-125B ("high" acid no.) and E-012-127-2 were sent to FMC for evaluation.

2. BD-307 (R. Caruso, L. Schinasi, S. Cinco)

The BD-307 laboratory simultaneous addition process was verified in the Pilot Plant. To facilitate better temperature control when using tempered water as coolant, the reaction temperature was reduced from 110-120°C to 95-110°C. No processing problems were encountered. Thirty day corrosion tests at 50°C on BD-307 showed that carbon steel and Lithcote Linings LC-34 and LC-C-34 are suitable materials for construction for the shipment and storage of this phosphate. Lithcotes LC-19, LC-24, LC-73 and LC-C-24 may be used as alternates, but only for limited service.

B. Para Acid (I. H. Cooper, J. DeGaetano)

The first batch of p-hydroxy benzoic acid has been carried through the carboxylation stage in the Pilot Plant without any processing problems. Aliquot work-up shows near laboratory yield but imcomplete isomerization due to a hot oil system failure at isomerization temperature which prevented desired reaction time.

C. Pigment Dispersant (R-125)(J. A. Gerrity)

A demonstration batch of R-125 was prepared in the Pilot Plant for Garfield personnel, to familiarize them with the process prior to start-up at Garfield (ca. February 1, 1974). A batch of 45% Pigment Dispersant was also prepared for possible spray drying trials at a later date.

D. Fuel Oil Additives (M. Q. Ceprini)

Due to United Aircraft's requirement for Pensky Martens Closed Cup determinations of flash point (150°F minimum) for the 7% Chromium product they wish to purchase, additional work was done to give formulations with a greater margin above the minimum value. A flash point of 180°F was obtained when mineral seal oil was used as diluent for the concentrate, which was originally made in kerosene. When excess kerosene solvent was "back-stripped" to just 7% chromium a flash point of 163°F was obtained. Use of a 3:1 molar ratio of 2-ethylhexanoic (2-EH) to isononanoic acids gave results similar to a 1:1 molar ratio of 2-EH and n-hexanoic acids by the latter procedure (flash point, 166°F). In all cases the kinematic viscosity at 70°F was less than ca. 250 centistokes (500, maximum specification).

II. PLASTICS INDUSTRY

A. Plasticizers

1. Trimellitates (O. Fuchs)

Laboratory Process Proposals were written for the preparation of tris(n-hexyl)trimellitate (Report No. 1505-23, January 17, 1974) and tris(Alfol 610)trimellitate (Report No. 1505-24, January 23, 1974). Evaluation of these materials by the Flemington Applications Laboratory indicated that the T610TM ester is a better choice as a TIOTM (TOTM) substitute than TNHTM.

2. Phthalates (O. Fuchs)

Six mixed phthalate coesters were prepared for evaluation at Flemington as possible replacements for DOP. A summary of the alcohols used and their mole ratios follows:

COLORITE 011683

Sample No.	Mole % 2-Ethylhexanol	Mole % Isodecanol	Mole % Tridecanol
042-41	50	0	50
042-43	25	0	75
042-45	75	0	25
042-47	0	75	25
042-59	0	50	50
042-51	0	25	75

3. Nuoplaz 1537 Replacement (O. Fuchs)

The benzoate ester of Neodol 23 alcohol was prepared and submitted to Flemington for evaluation as a Nuoplaz 1537 replacement.

* B. Tin Compounds - Self-Manufacture (O. Fuchs)

Initial investigations into the disproportionation procedure for the preparation of alkyltin halides were undertaken. Reaction of stannic chloride (M & T) with high purity tetrabutyltin (Schering) at 220°C (four hours) produced dibutyltin dichloride of 98.2% purity (93.2% net yield) after vacuum distillation. Conversion to dibutyltin oxide is in progress.

C. Stearates (J. A. Gerrity, S. Cinco)

Water Dispersible Zinc Stearate (R-439) and Water Dispersible Calcium Stearate (R-485) were prepared in 75 pound quantities in the Pilot Plant and sent to the Garfield Sample Room for subsequent sampling to customers for evaluation.

I. Huppert

IH/sgf

1-184

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

TO Dr. R. T. Gottesman AT Piscataway DATE January 31, 1974

FROM Mr. H. R. Johnson AT Piscataway COPY TO

SUBJECT MONTHLY SUMMARY - JANUARY 1974
ANALYTICAL SERVICES

METHODS DEVELOPMENT

1. Mercury Analysis (N. Eider)

In connection with improving our capabilities to determine parts per billion levels of toxic pollutants, a Coleman MAS-50 mercury analyzer has been purchased and installed at Piscataway. This equipment is now operational and available for the determination of mercury in plant effluents and in raw materials and products.

H. R. Johnson

HRJ/sgf

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

TO	Dr. R. T. Gottesman	AT	Piscataway	DATE	January 31, 1974
FROM	Mr. R. S. Miller	AT	Piscataway	COPY TO	
SUBJECT	MONTHLY REPORT - JANUARY 1974				

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PLASTICS INDUSTRY

Additives

1. PVC Processing Aids (D. Goodman, M. Koral, M. K. Rosen)

* Two experimental Supercryl 100 batches were made at 84 RPM in the Fords plant. Both runs produced haze-free product from latex samples taken from the reactor and lab dried. The first batch made at a reduced (70%) batch size to achieve a higher HP/gallon ratio was isolated. Haze-free samples were obtained from the dryer chamber but occassionally hazy samples were observed from bagged product which appear to be contaminated with residual regular production in the downstream collecting and bagging system. The second batch was made at full batch size and produced haze-free latex. The latex was intermixed and dried with regular production to avoid lost production so no spray dried product was isolated. The plant is preparing to made three consecutive 84 RPM batches in early February as the continuation of the experimental program. This should provide sufficient latex to purge the drying system and isolate a reasonable quantity of bagged product.

A laboratory program has been started to develop higher solids Supercryl 100 and 100H latexes during polymerization to increase productivity and capacity of the Fords plant. Initial laboratory runs at 40% solids have had some kinetic control problems which are being resolved.

2. Impact Modifiers (M. L. Feldman, D. Goodman)

Introduction and orientation of Dr. Feldman to the impact modifier program is in progress. This self-development program is on hold until the JSR licensing is finalized.

PVC Resins

1. Trichloroethylene (TCE) Replacement (D. Goodman, M. Koral, J. Stanaback)

A series of twenty candidates were evaluated in laboratory bottles as substitute chain transfer agents for TCE in vinyl chloride polymerization. Included in this study were a family of Dow brominated chain transfer agents and internally available TOP candidates. The Tenneco 150 homopolymer formulation was used for initial screening and showed that the following candidates were more efficient than TCE at equivalent weight loading and gave satisfactory particle size distribution:

bromodichloromethane

Dow CT121 (85% bromoform, 15% dibromochloromethane)

Dow CT122 (30% bromotrichloromethane,
15% dibromodichloromethane,
10% trichlorobromomethane,
45% carbon tetrachloride)

In addition, 1,2-dibromo-1,1,2,2-tetrachloroethane was equivalent to TCE.

The following candidates were more efficient than TCE but yielded unsatisfactory particle size distribution:

dibromodichloroethane
bromoform
pentabromoethane
1,2-dibromotrichloroethane
Dow CT222 (95% 1,2-dibromo-1,1-dichloroethane)

A similar screening program is in progress using the T-389 copolymer formulation to evaluate potential TCE replacement candidates. In view of the sudden availability of TCE for TOP's 1974 requirement this work will only be brought to a level of technical completeness to provide a contingency plan should TCE shortages occur again.

2. Vinyl Acetate Replacement (D. Goodman, M. Koral, J. Stanaback)

The following monomers are being screened in laboratory bottles in the T-389 copolymer formulation as possible total or partial replacements for vinyl acetate:

methyl; ethyl; butyl and 2-ethylhexyl acrylate
dibutyl maleate
dibutyl fumarate
dibutyl itaconate

Based on preliminary data dibutyl maleate, dibutyl fumarate and dibutyl itaconate are unfavorable candidates because of unsatisfactory particle size formation using the gelatin suspending system.

3. Gelatin Replacement (J. C. Fisher, M. K. Rosen)

* The development of a suspending system for standard copolymer suspension resins is in progress in the pilot plant to provide an alternate for the present use of 50/50 Gelatin A/Gelatin B. Although Gelatin is somewhat tight in supply, there are four potential suppliers and a good future supply. Gelatin B is in very tight supply now with a poor projection for future supply.

Pilot plant studies during January concentrated on evaluation of an all Gelatin A system in T-389 type formulations with very promising results. A pre-blended mixture of A & B gelatins supplied by Atlantic did not perform as well as all Gelatin A. An evaluation of Gelatin A in T-315 formulations is in progress and if equivalent performance to T-389 is achieved the all A system would appear worthy of plant trials.

4. Dispersion Resins (J. C. Fisher, M. K. Rosen)

10% Ionol in heptane was evaluated as an emergency dispersion resin shortstop in the pilot plant tower and found to coagulate the latex. This program is continuing to find a suitable shortstop that will be effective at the maximum exotherm and yield processable latex and only 300 gallon pilot plant runs appear to provide accurate information.

5. Pasadena PVC Process (J. C. Fisher, M. K. Rosen)

* A program to characterize the effects of Ionol versus bisphenol A shortstops on Shin-Etsu type polymerization was continued in the pilot plant. Using the LE, single catalyst system equivalent shortstopping efficiency was obtained for the two shortstops in both 1100SD and 1200SD formulations. As this investigation was extended to the higher molecular weight 1200 SD formulation a significant increase in dry blend time (DBT) for the same pressure drops (-7 psig) was obtained as shown below:

Product Type	Shortstop	Dry Blend Time, min.
T-225	Ionol	6.1
T-225	Ionol	7.2
TK-1100SD	Ionol	8.2
TK-1200SD	Ionol	10.7
TK-1200SD	Ionol	11.6
TK-1200SD	Ionol	13.9
TK-1200SD	Bisphenol A	14.0
TK-1200SD	Bisphenol A	11.8

Further work is in progress to define the process requirements for a satisfactory DBT for TK-1200SD type product. The LE/LB dual catalyst system will also be evaluated in this pilot plant program with the higher molecular weight resins.

A contract was executed with Hazards Research Corp. to provide a technical critique of the reactor coating procedure.

6. Chemical Foam Blending Resins (M. Feldman, D. Goodman)

Dr. Feldman was oriented and trained in the processing, testing and status of the BR-501 work during the month.

COATINGS INDUSTRY

1. I-57 Intermediate for Nuosperse 657 (D. Goodman, M. Koral)

Intermediate I-57 and the resultant Nuosperse 657 were prepared in the laboratory substituting Pentek with glycerine as requested by Nuodex Espanola, S.A. Paint functionality tests are not yet completed.

R. S. Miller

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