I-184 (50M)

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

TO Distribution List* AT DATE May 31, 1973

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

SUBJECT MONTHLY SUMMARY - MAY

Attached are copies of the Monthly Summary reports for May 1973 covering the activities of the Piscataway laboratories and associated pilot plants at Piscataway, Flemington and Reading.

R. T. Gottesman

RTG/ec

Attachments

Distribution List*

Mr. M. Freifeld
Dr. D. Keyworth
Dr. P. A. Lobo
Dr. T. E. Maggio
Dr. M. Rosen (2)
Mr. G. I. Rozand
Mr. C. G. Thompson
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~~Mr. M. Wilkenfeld~~
Mr. T. T. Zuhl

F-16

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

TO Dr. R. T. Gottesman AT Piscataway DATE May 31, 1973

FROM Dr. F. Buono AT Piscataway COPY TO

SUBJECT

MONTHLY SUMMARY - MAY 1973

I. COATINGS INDUSTRY

A. Microbiocides

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

(a) TID Candidate Compounds

Fifty eight TID compounds underwent initial biocide screening this month. Fourteen of these, which included several maleimide and morpholine derivatives, showed significant broad spectrum biocidal activity at 2%. Paint incompatibilities, other than moderate pH changes, were not apparent. Lower level testing has been initiated.

An additional eight compounds, of the formaldehyde-releasing type, were found to have excellent bactericidal activity. These materials will be evaluated for paint stability and, if warranted, will undergo can preservative evaluation.

* Paint compatibility studies on the following four TID compounds have been completed:

(1) β-Dimethylaminopropiophenone hydrochloride
(2) O-anisaldehyde, N-methylhydrazone
(3) N-hydroxymethyl-5-chlorobenzotriazole
(4) Morpholine, N-(methylbenzimidaz 1-yl)methyl: Ethylene Glycol

The first three candidates failed to pass paint compatibility tests (pH, yellowness, and/or viscosity problems) either initially or after aging one month at 120°F in both latex systems. Morpholine, N-(methylbenzimidaz 1-yl)methyl: Ethylene glycol gave a high initial pH in the PVA test paint but exhibited no other adverse responses. It will be exposed for outdoor fungicidal activity.

(b) Tenneco Pasadena Laboratory Candidate Compounds

Four candidates (shown below) submitted by the Pasadena Laboratory are undergoing paint compatibility.

(1) 1-Phenyl-2,3-dibromo-2-propene-1-one
(2) 1-Phenyl-2-butyne-1-ol
(3) 4-Phenyl-3-butyn-2-one
(4) 1-Phenyl-2-butyn-1-one

Evaluation in the acrylic test paint indicates that only 1-Phenyl-2,3-dibromo-2-propene-1-one and 1-Phenyl--2-butyn-1-one at 0.1% gave an acceptable performance. Testing in the PVA is in progress.

* (c) Chevron Candidate Compounds

Chevron compounds NU-74-3 and NU-4-5 are being evaluated in vinyl films. Initial zone of inhibition tests indicate both compounds are superior to Fungitrol 11. Weatherability and surface fungal resistance evaluations are underway.

* 2. Competitive Products (G. Trautenberg, G. Tirpak, G. Kagan, M. Landau)

(a) Troy Chemical Corporation

Paint compatibility studies of three competitive biocides, Troysan 142, 174 and an experimental Troy product coded 192 at 0.1, 0.2, and 0.4% in PVA and acrylic paint have been completed. Troysan 142 imparts an objectionable odor at all levels and yellows the paints to an unacceptable degree at 0.2 and 0.4% after aging for one month at 120°F. Troysan 174 increases initial pH to an unacceptable level in the PVA and also shows unacceptable yellowing on aging in the PVA and at 0.4% in the acrylic. Troysan 192 imparts a high initial pH level in the PVA and acrylic but does not appear to have any other adverse effects on either paint.

Can preservative evaluations of the Troy products indicate that both 142 and 192 are superior to Nuosept 77 (at an equal biocide level). Nuosept 77 outperforms Troysan 174.

Based on the paint performance and excellent biocidal activity of Troysan 192, this experimental product would effectively compete with Nuosept 77.

(b) Witco Chemical Corporation

Keycide X-10, 12% bis(tributyltin)oxide, was found to be identical to Mildewcide X-10, previously manufactured by Key Chemicals. This material was previously evaluated and was not considered to be competitive to either Super Ad-It or Fungitrol 11. In addition, the material did not show efficacy as a can preservative.

* 3. Fungitrol 11 (G. Kagan, M. Landau)

Dispersion Studies
Stability tests of Fungitrol 11 dispersions in Nuosperse 657 and mineral spirits have indicated that two systems look promising from the standpoint of viscosity stability after aging for two weeks at 120°F. These systems which contain 50 and 55% Fungitrol 11 compound on total dispersion also exhibit acceptable viscosity stability after aging at -20°F and room temperature. A system with 60% Fungitrol 11 shows unacceptable viscosity stability after aging for two weeks at 120°F. Additional preparations of the 50 and 55% Fungitrol 11 dispersions have been made to gain more experience with the preparation and viscosity stability characteristics of these systems. In addition, comparative fungicidal efficacy (after aging) of the dispersions vs. the powdered form will be determined.

* 4. Fungitrol-22 (G. Trautenberg, G. Tirpak)

Initial zone tests and surface fungal resistance evaluations indicate no biocidal advantage by addition of bis(trichloromethyl)sulfone (the additive in Vinyzene BP-10) or dodecyl dimethyl benzyl ammonium naphthenate (Nuodex 100VT) to Fungitrol-22.

5. ASTM - Can Stability Test (G. Trautenberg, G. Tirpak)

Our portion of the "round-robin" testing of various can preservative bacterial cultures has been completed. The Pseudomonas culture used by most laboratories appears to be the "best" (good viability and viscosity loss) Gram (-) microorganism and the three Tenneco Bacillus species are the best Gram (+) microorganisms. These results will be reported at the June ASTM committee meeting.

B. Driers (G. Kagan, M. Landau)

* 1. Loss-of-Dry Inhibitor

Blends of 1.2% Cobalt/2.1% Calcium/3.2% Zinc at 2% on vehicle solids and 0.6% Cobalt/2.1% Calcium/3.2% Zinc at 2% and 3% on vehicle solids provided non-staining films, acceptable initial drying times and loss-of-dry inhibition after one month aging when compared to Nuact and Mooney's Lead-Free Feeder Drier.

A number of preparations of a red and a black enamel have been made to corroborate these results. Several experimental systems, including a green trim enamel, a white enamel and a white linseed oil house paint for which loss-of-dry is anticipated, are being included in the program. Preliminary cost calculations indicate that both the above blends would be competitive to Nuact.

2. Water Dispersible Driers

Previous evaluations in a black baking enamel of Cyclodex Cobalt 6%, Lead 24%, Zirconium 12%, and Calcium 4 and 6% showed functional equivalency comparable to Cincinnati Milacron Advacar water dispersible driers. Evaluation of the above driers (room temperature and aged samples) in air dry formulations indicates that the Cyclodex materials are comparable to the Advacar line in viscosity, pH, hardness, gloss, and drying time. Aging studies of the paints for one month at 120°F are underway. (An orange air dry enamel used to evaluate manganese driers flocculated after one month at 120°F with and without driers).

II. LUBRICANTS

A. Plastics Compatible Lubricants (M. Knapp)

Eleven fluids have been evaluated for their effect on stressed polystyrene by Tenneco Functional Method FL-9. None of the fluids (three TMP, six succinate, one acetate, and one phthalate derivative) showed acceptable plastics compatibility.

* B. Lubricant Additives (M. Knapp)

Nine extreme pressure additives from U.S.D.A. have been screened for both load-carrying and high temperature performance. Of these, one compound, 2-(2-ethoxyethoxy)ethyl 9,10-epithiostearate, shows promise and will be investigated further.

B. Lubricant Additives (M. Knapp) - continued

Three EP additives from Keil Chemical have been screened for load carrying only and performed well. However, it is suspected that these materials will be found to have poor oxidation stability because of their high degree of chlorination. These tests are underway.

* C. Competitive Product Evaluation (M. Knapp)

Fiske Brothers' Lubriplate AC-3 compressor lubricant was evaluated to determine if it could be competitive to ANDEROL 500. It was found to have several deficiencies (poorer stability, lower flash point, poorer demulsibility) as shown below:

LABORATORY EVALUATION OF LUBRIPLATE AC-3 COMPRESSOR OIL

Property	Lubriplate AC-3	ANDEROL 500
Base Fluid Type	Petroleum	Diester
Color	Dark Amber	Light Amber
Viscosity @100°F, cSt	153.3	106
Viscosity @210°F, cSt	14.2	9.3
Viscosity Index	98	61
Pour Point, °F	+14	-30
Flash Point, °F	450	510
Evaporation, 22 Hours @210°F, %	0.3	0.8
Demulsibility @130°F, ASTM D1401		
ml oil/ml water/ml emulsion (min.)	0/0/80 (60)	39/38/3 (60)
Oxidation/Corrosion, Tenneco Method FL-8,		
24 Hours @190°C		
Viscosity Change, %	+16.9	+5.5
Acid Number Change	+0.65	+0.3
Sludge, mg/gm oil	1.6	0.1
Effect on: Copper	Corrosion	Light Tarnish
Steel	Light Tarnish	Light Tarnish
Aluminum	No Change	No Change
Magnesium	No Change	No Change
Silver	Corrosion	No Change
Four-Ball Wear, 40 kg, 1200 rpm,		
167°F, 1 Hour, mm	0.8	0.8
Four-Ball EP, Weld Point, kg	170	100
Falex EP, Failure, lbs.	900	1150

* D. Two Cycle Engine Lubricants (M. Knapp)

Two five gallon samples of experimental two cycle engine oils (R-414 and R-415) have been shipped to Bradford Petroleum Division (Witco) for evaluation in a two cycle engine. These two experimental products, which differ only in additive levels, have the following properties:

TWO CYCLE ENGINE OILS

	R-414	R-415
SAE Viscosity	30	30
Viscosity @210°F, cSt	14.4	12.7
Viscosity @100°F, cSt	184.6	153.9
Viscosity Index	80	78
Pour Point, °F	-20	-30
Flash Point, °F	500	510
Fire Point, °F	560	585
Evaporation, 22 Hours @210°F	0.3	0.2
Four Ball Wear, 167°F, 600 rpm,		
1 Hour, mm w/load of: 1 kg	0.2	0.3
10 kg	0.4	0.4
20 kg	0.6	0.6
40 kg	0.6	0.6

Testing is expected to begin as soon as the samples are received.

F. Buono

F. Buono

FB/amp