

GRACE CONFIDENTIAL

CONSOLIDATED MONTHLY SUMMARY

JULY 1971

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W.R. GRACE & CO.
RESEARCH DIVISION



Washington Research Center, Clarksville, Maryland 21029

August 14, 1971

MONTHLY REPORT FOR JULY 1971
CONSOLIDATED EDITION

GRACE CONFIDENTIAL

NOT TO GO OUTSIDE U.S.

This report contains information on the following activities
at the Washington Research Center.

INORGANIC RESEARCH

- I-1 AUTO EMISSIONS CATALYST
- I-2 SEA WATER SCALE INHIBITOR
- I-3 CERIUM HYDRATE FOR SILOXANE STABILIZATION
- I-4 INORGANIC EXPLORATORY RESEARCH
- I-5 FUSION BONDED VERMICULITE BOARD
- I-6 APPLICATIONS OF VERMICULITE BOARDS
- I-7 BOUND ENZYMES - FRUCTOSE PRODUCTION
- I-8 WETTABILITY OF COCOA POWDER
- I-9 LEAF AUTOMATION
- I-10 RECYCLE FUELS
- I-11 UNIT OPERATIONS
- I-12 ELECTRONIC SUBSTRATES
- I-13 EXPLORATORY

ORGANIC RESEARCH

- O-1 WET STRENGTH AGENTS FOR PAPER
- O-2 PAPER COATINGS - DEVELOPMENT OF AQUEOUS DIELECTRIC COATINGS
- O-3 HAMPSHIRE PROJECT - GLYCINE/LACTAMIDE PROCESSES
- O-4 TEXTILE ADDITIVES - HAMPSHIRE
- O-5 "DARAMIC" EXTRACTION RESEARCH
- O-6 NTA AS SO₂ SCAVENGER
- O-7 CAN END FASTENING SYSTEM
- O-8 OVERSTRIPE RESIN FOR CONOWELD SIDESEAM
- O-9 SYNTHETIC TACKIFYING RESINS
- O-10 PACKAGING MATERIALS - NON-HALOGENATED BARRIER MATERIALS
- O-11 DEEP DRAW THERMOFORMING
- O-12 POLYSTYRENE FOAM
- O-13 HEAT-CURABLE SEALANTS
- O-14 PHOTODEGRADABLE POLYSTYRENE
- O-15 PHOTOACTIVATION OF CONVENTIONAL CURING REACTIONS

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CLP TASK FORCE RESEARCH

- C-1 CLP LITHOGRAPHIC PRINTING PLATE
- C-2 CLP INK FEASIBILITY STUDY
- C-3 LETTERFLEX - ADDITIONAL QUALITY CONTROL STUDIES
- C-4 CURABLE LIQUID POLYMERS - SOLID LETTERFLEX PLATE
- C-5 CLP PHOTORESISTS PROJECTS - 1372 and 1387
- C-6 Q-43 STRATEGIES ANALYSIS
- C-7 CLP MATERIALS TECHNOLOGY

AGRICULTURAL & CONSTRUCTION MATERIALS RESEARCH

- A-1 SLOW RELEASE FERTILIZER STUDY FOR ACG
- A-2 SILICATE CONSTRUCTION MATERIALS
- A-3 CHATTANOOGA PHOSPHATE PROBLEM
- A-4 FLORIDA EXPERIMENTAL STATION
- A-5 FORMULATION AND EVALUATION OF MONO-KOTE

BIOCHEMICAL RESEARCH

- B-1 ADAPTED RUMEN MICROBES ("CHRON-X" AND "ADAPT")
- B-2 AMMONIUM ISOBUTYRATE AS POULTRY FEED ADDITIVE
- B-3 AMMONIUM ISOBUTYRATE AS SILAGE AND GRAIN PRESERVATIVE
- B-4 ANTI-VIRAL COMPOUND
- B-5 PARTICLE BOUND ENZYMES
- B-6 SCOURS PREVENTATIVE

OTHER ACTIVITIES

- OT-1 GRACE CANE SUGAR PROCESS

These items are included in the various editions of the report as shown below:

ACG Edition	A-1 thru A-5; B-1 thru B-6
Consolidated U.S. Edition	All Items
Consolidated Foreign Foreign Edition	All Items except I-9 thru I-13, and Appendix A.

A-3 CHATTANOOGA PHOSPHATE PROBLEM (Project 4860)

The Davison Division is concerned regarding the ultimate disposal of phosphate waste from the rare earth pollution control system now being installed. It is planned, at least for an interim time of two or perhaps three years, to dispose of the waste by storage in holding ponds. Ultimately, other arrangements must be found as space is limited and local political authorities have suggested that this is not a completely satisfactory solution to the problem. The use of the material as phosphate feed supplements for animals seems to be out of the question because of lead content. However, it appears possible that the material could be used to manufacture either normal or triple superphosphate in a manner analogous to the use of phosphate rock. The phosphate content of the material made experimentally at Chattanooga analyzes 31-33% P_2O_5 , in the same range as rock. Small laboratory samples of both single and triple were made at WRC during the month. Samples of triple superphosphate prepared from Chattanooga phosphate show 48% total P_2O_5 , 1.25% insoluble P_2O_5 , and an available of 46.75% P_2O_5 . The normal superphosphates made thus far have been under-acidulated to give high CI's and are being repeated with additional acid.

A meeting will be held with ACG and Davison to discuss possible use of the phosphatic material at ACG's Nashville, Tennessee fertilizer plant.

(Kolbe, Legal)

A-4 FLORIDA EXPERIMENTAL STATION (Project 4850)

Arrangements have been made through WRC effort for CPD to underwrite the cost (\$600.00) of a commercial planting device to be used in research work with Jiffy-Mix/Redi-Earth planting medias for commercial field planted tomatoes. Mr. Norman Hayslip, at the Station, has obtained excellent results using a mixture of Redi-Earth or Jiffy-Mix with MagAmp and tomato seeds planted in a manner to form a so-called "plug mix". This is a method whereby the mixture is rammed into the previously prepared soil. Experimental work has been carried out over the past three or four years and approximately 1,000 acres were planted commercially, but by hand, in 1970. Commercial acceptance by three growers is excellent. A potential for increased use of the planting mixture is attractive as there are approximately 50,000 acres of tomatoes, 20,000 acres of peppers, plus other crops grown annually in Florida.

(Legal)

A-5 FORMULATION AND EVALUATION OF MONO-KOTE (Project 2659)

CPD is presently marketing two types of Mono-Kote - MK-3 and MK-4 and both have problems. MK-3 contains asbestos which is considered a health hazard because of asbestosis and its use is being banned in the larger cities. MK-4 which was developed to substitute for MK-3 is not completely acceptable because of poor fire rating tests. CPD has given highest priority to the development of a suitable Mono-Kote formulation, which will pass

the Underwriters Laboratories tests, and have requested assistance from WRC on this project.

The objective of the work at WRC is to assist CPD in (1) developing an asbestos-free Mono-Kote equivalent to their MK-3 product for protective coating of steel decks, beams, and columns, and (2) developing a "super" Mono-Kote with superior qualities.

It has been demonstrated both at WRC in laboratory testing and at Traveler's Rest with larger panels that the properties of Mono-Kote can be changed drastically by the addition of certain types of chemicals. A factorial design has been completed at WRC which indicates that formulations incorporating specific combinations of compounds may meet the performance standards.

The results of recent laboratory work at WRC to develop a nonasbestos Mono-Kote formula was critically reviewed with CPD on July 29. The work was carried out using a factorial design to determine the individual effect and interactions of (1) vermiculite/gypsum ratio, (2) water content, (3) Cement "C", and (4) reinforcing fiber. In all, 52 tests were made. Twelve experimental compositions basis these results were selected for further testing. It is intended that these tests will enable the selection of optimum composition for further testing on a larger scale at Traveler's Rest. At the moment, it appears that the optimum composition will probably include 6% Cement "C" and 1% fiberglass.

The results of the past five months' test work using 4' x 4' test panels at Traveler's Rest were reviewed. One composition containing 0.5% NTA manufactured by the Hampshire Chemical Company gave outstanding performance. The fire test extended to over 5 hours test time without failure. It is believed that the NTA attaches itself to the zinc surface of the galvanized steel due to chelating type action resulting in superior adhesive properties.

The tests in progress at WRC will be completed by the middle of September. The most promising candidates will be tested at Traveler's Rest and possibly at U. S. Gypsum Laboratories if results are favorable. CPD is planning to continue work with the NTA type formulas both at U. S. Gypsum with 7' x 9' panels and Ohio State Laboratories using 8' x 6' panels. The objective is to be ready with a commercial product to meet the UL three-hour test for a blended deck by January 1, 1972.

Test results from the small scale procedures at WRC will be correlated closely with the larger scale tests with the intent of arriving at procedures which will reduce the overall testing time in selection of optimum Mono-Kote formulations. There is a general feeling of optimism that present procedures will accomplish this at least with Traveler's Rest 4' x 4' panel results. As yet, there has been no opportunity to check correlation with 7' x 9' blend deck performance.

(Kraus, Legal)

W.R. GRACE & CO.
RESEARCH DIVISION



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August 14, 1971

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AGRICULTURAL CHEMICALS GROUP EDITION

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