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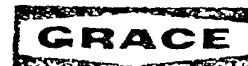
CONSOLIDATED MONTHLY SUMMARY

SEPTEMBER 1971

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W. R. GRACE & CO.
RESEARCH DIVISION



Washington Research Center, Clarksville, Maryland 21029

October 12, 1971

MONTHLY REPORT FOR SEPTEMBER 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 FUSION BONDED VERMICULITE BOARD
- I-4 APPLICATIONS OF VERMICULITE BOARDS
- I-5 GASOLINE LEAD ADSORBENT
- I-6 ESTER GUM REPLACEMENTS
- I-7 LEAF AUTOMATION
- I-8 NPD 71-6674-B, SPECIAL NUCLEAR MATERIAL
- I-9 RECYCLE FUELS
- I-10 SPECIALTY METAL PARTS
- I-11 METAL SUPPORT FOR CATALYST

ORGANIC RESEARCH

- O-1 WET STRENGTH AGENTS FOR PAPER
- O-2 PAPER COATINGS - DEVELOPMENT OF AQUEOUS DIELECTRIC COATINGS
- O-3 GLYCINE/LACTAMIDE PROCESSES
- O-4 TEXTILE ADDITIVES
- O-5 HAMPSHIRE/REXOLIN PROJECTS
- O-6 DARAMIC EXTRACTION RESEARCH
- O-7 LOW COST CATIONIC POLYELECTROLYTES
- O-8 ENDURA PROJECTS
- O-9 SEA WATER SCALE INHIBITORS
- O-10 CAN END FASTENING SYSTEM
- O-11 OVERSTRIP RESIN FOR CONOWELD SIDE SEAM
- O-12 BLOCKED AMINE CHEMISTRY
- O-13 PACKAGING MATERIALS - NON HALOGENATED BARRIER MATERIALS
- O-14 PHOTODEGRADABLE POLYSTYRENE
- O-15 POLYSTYRENE FOAM
- O-16 STRIPPABLE COATINGS

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CLP TASK FORCE RESEARCH

- C-1 CLP LITHOGRAPHIC PRINTING PLATE
- C-2 LETTERFLEX - IMPROVED PRINTING QUALITY
- C-3 CLP INKS
- C-4 SOLID LETTERFLEX PLATE
- C-5 Q-43 CROSSLINKING AGENT AND β MERCAPTOPROPIONIC ACID
- C-6 DRY FILM PHOTORESIST

AGRICULTURAL & CONSTRUCTION MATERIALS RESEARCH

- A-1 WELLMAN-POWER GAS SO_2 RECOVERY
- A-2 FORMULATION AND EVALUATION OF MONO-KOTE
- A-3 SILICATE CONSTRUCTION MATERIALS
- A-4 FLORIDA EXPERIMENTAL STATION, FT. PIERCE, FLA.
- A-5 VERMICULITE-MOSS PLANTING DEVICES

BIOCHEMICAL RESEARCH

- B-1 ADAPTED RUMEN MICROBES
- B-2 AMMONIUM ISOBUTYRATE AS POULTRY FEED ADDITIVE
- B-3 AMMONIUM ISOBUTYRATE AS GRAIN AND SILAGE PRESERVATIVE
- B-4 ANTI-VIRAL COMPOUND
- B-5 ANIMAL GROWTH PROMOTERS
- B-6 CELLULASE ENZYMES IN ANIMAL FEEDS
- B-7 IMPROVEMENTS IN PICKLE MANUFACTURE

OTHER ACTIVITIES

- OT-1 GRACE CANE SUGAR PROCESS

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AGRICULTURAL & CONSTRUCTION MATERIALS RESEARCHA-1 WELLMAN-POWER GAS SO₂ RECOVERY (Project 4834)

At the request of Mr. J. A. Doyle, the possibility of the Washington Research Center (WRC) conducting research on the Wellman-Power Gas SO₂ recovery system was discussed with Wellman representatives. They are meeting considerable success in commercializing their sodium sulfite SO₂ recovery system but are in need of data and information concerning the effect of certain sulfur and nitrogen compounds on the chemistry of their process. The required data are not available in the literature and Wellman is not equipped with laboratory facilities for this type of activity. In view of the close association which ACG has with Wellman, we have been asked to determine the basis upon which we would gather the desired information.

Basically, the work would be divided into three phases. Phase I would be a study of the static system chemistry; Phase II, a study of the dynamic system chemistry; and Phase III, which would be considered later, would be a study of anti-oxidants in the dynamic system. Time and costs for conducting this research has been estimated to be as follows:

Phase I	8 weeks	-	\$16,000
Phase II	<u>10 weeks</u>	-	<u>\$20,000</u>
TOTAL	18 weeks	-	\$36,000

These cost estimates have been forwarded to Mr. Gerald Smith, Wellman-Power Gas, along with details of the proposed program as outlined by Wellman. We will await their reply and authorization of funds before proceeding on this project.

(Legal, Kraus, Kolbe)

A-2 FORMULATION AND EVALUATION OF MONO-KOTE (Project 2659)

CPD is encountering marketing problems with their MK-3 and MK-4 Mono-Kote, fireproofing materials. Asbestos, which is used in the MK-3 formulation is a suspected health hazard and steps have been taken in some areas to prohibit its use in fireproofing formulations. Mk-4, which does not contain asbestos, is inferior to MK-3 because of its poor fire rating. To date, attempts to develop suitable replacements for MK-3 and MK-4 have been unsuccessful, based on Underwriters Laboratories' type test for flat deck panels. Accordingly, a recent decision was made by CPD to shift the immediate objective of the project. Although the basic objective of developing an asbestos-free

Mono-Kote with 100% total equivalency to MK-3 remains the same, an attempt now is being made to pass UL type tests with a blend deck rather than a flat deck. A blend deck is a combination of corrugated and flat deck and accounts for the greater portion of the commercial market. January, 1972, has been set as a goal for attainment of a commercial non-asbestos product meeting UL requirements on a blend deck.

Laboratory work has shown Mono-Kote properties can be changed drastically by the addition of certain types of chemicals. Several formulations developed both at WRC and Traveler's Rest show promise of success. Larger scale fire tests of promising formulations are underway at Ohio State University and U. S. Gypsum Laboratories, Chicago, Illinois. These decks are all blend construction, which CPD plans to start fire testing in September and will continue into October.

Seven compositions, derived from the last several months of research at WRC, appear promising based on lab test data. The best result (performance score of 69) was obtained with a composition containing 6% Cement "C" and 1% fiberglass. This compares favorably to a performance score of 50 for MK-3 and 25 for MK-4. Mono-Kote formulations containing portland cement, substituted for gypsum, gave relatively poor performance scores (for the most part <30) and, at this point, appear inferior to gypsum base formulations. However, work with the portland cement system is to continue, at CPD's request, until a better understanding of the relationship between bond performance and the fire endurance tests is gained.

Results of recent data will be reviewed with CPD at Cambridge on September 27, 1971. Samples of material used to prepare larger scale tests will be tested and rated at WRC to determine the meaning or import of the WRC performance score compared with the fire endurance rating of the larger scale tests.

(Kraus, Legal)

A-3 SILICATE CONSTRUCTION MATERIALS (Project 2662)

All test compositions in the sodium silicate-sodium silico-fluoride experimental plan have been prepared and partially evaluated.

New data obtained during this report period show that (1) low values in the fire cup test generally coincide with greater than 4% shrinkage during curing and (2) 5% fiberglass or de-oiled mineral wool added to a low water formulation improves the compressive and tensile strengths. The strength improvement with fiberglass is slightly greater than with mineral wool but costs about 10% more for equal coverage.