W. R. GRACE & CO.

RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

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CONSOLIDATED MONTHLY SUMMARY

DECEMBER 1970

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January 22, 1971

MONTHLY REPORT FOR DECEMBER 1970

CONSOLIDATED EDITION

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NOT TO GO OUTSIDE U.S.

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

INORGANIC RESEARCH

ORGANIC RESEARCH

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CLP TASK FORCE RESEARCH

C-1 LETTERFLEX-B QUALITY CONTROL
C-2 LETTERFLEX SUPPORT - COMPETITIVE PLATES
C-3 ULTRAVIOLET CURABLE INKS
C-4 CLP INK FEASIBILITY STUDIES
C-5 CURABLE LIQUID POLYMERS - PHOTORESISTS
C-6 CURABLE LIQUID POLYMERS - NEW APPLICATIONS FOR CLP MATERIALS
C-7 CURABLE LIQUID POLYMERS - CLP PRESSURE SENSITIVE ADHESIVE
C-8 CURABLE POLYMERS - DARK STABILITY
C-9 CLP MATERIALS TECHNOLOGY - HIGH M.WT., SOLID SYSTEMS
C-10 LOW COST POLYTHIOLS FOR CLP TECHNOLOGY
C-11 INSTRUMENTATION FOR CLP's
C-12 CLP OFFSET LITHOGRAPHIC PLATES

AGRICULTURAL RESEARCH

A-1 WASTE WATER CLEAN-UP AND BY-PRODUCT RECOVERY
A-2 REFORMULATION AND EVALUATION OF MONO-KOTE
A-3 VERMICULITE-MOSS PLANTING DEVICES

BIOCHEMICAL RESEARCH

B-1 ADAPTED RUMEN MICROBES (ARM)
B-2 "CHRON-X"
B-3 SALTS OF ISOBUTYRIC ACID AS POULTRY FEED ADDITIVE
B-4 AMMONIUM ISOBUTYRATE AS SILAGE PRESERVATIVE
B-5 FERMENTATION SCREENING PROGRAM
B-6 L-DOPA

GOVERNMENT CONTRACT OPERATIONS

G-1 NEW PROPOSAL - OIL RECOVERY SYSTEM USING SORBENT MATERIALS
FEDERAL WATER QUALITY ADMINISTRATION - WASHINGTON, D. C.
(RFP-WA-71-531)

OTHER R & D

OT-1 THE GRACE SUGAR PROCESS
OT-2 SYNOPAL

AGRICULTURAL RESEARCH

A-1 WASTE WATER CLEAN-UP AND BY-PRODUCT RECOVERY (Project 4810)

The possibility of Olin Corporation licensing the Grace process for controlling water pollution and recovering calcium fluoride and calcium phosphate by-products was discussed with Olin's personnel at Houston, Texas. Sufficient technical information was presented to Olin to indicate the type of process to be used and the results to be expected. The Houston people are interested in further discussing the terms under which the details of the Grace process can be learned, and agreed to bring this to the attention of their top management. This information has been passed along to Mr. W. R. Fullem. It is expected that the Agricultural Chemicals Group (ACG) would decide the terms of any business arrangements to be made. Meeting details and arrangements with personnel in Olin are being handled by Mr. Gordon Palm, Consultant.

(Legal)

Grace representatives from the Natural Resources Group, the Ore and Mining Division, and the Washington Research Center discussed the Chemico/Buss HF processes with personnel from Chemico/Buss Ltd. at Chemico's New York offices on December 21, 1970. Buss offers both the traditional hydrogen fluoride process of treating fluorspar with sulfuric acid and a new process for converting fluosilicic acid (H_2SiF_6) to hydrogen fluoride (HF). The processes were described in the January 6th issue of Chemical Week. According to Chemico, hydrofluoric acid can be produced from fluosilicic acid considerable cheaper than from fluorspar despite a substantially higher capital investment. Chemico believes there are about 12 phosphate producers in the U.S., including Grace, of sufficient capacity to make conversion of H_2SIF_6 to HF economically attractive. More specific details on economics of the process to be furnished by Chemico will be sent to ACG for consideration.

The possible use of the synthetic fluorspar, potentially recoverable from Bartow waste water, was discussed with Buss. The main concern, as previously recognized, would be the effect of the P_2O_5 during acidulation to produce the HF. Buss has no direct knowledge of P_2O_5 reactions but offered to test samples of the synthetic fluorspar produced at WRC.

They pointed out, however, these laboratory tests would be indicative only, and that large scale tests would be required for precise data. Provided the laboratory tests are favorable and Grace wished to pursue the development, Buss could arrange a full scale plant test which would require about 50 tons of synthetic fluorspar. A pilot plant operation at Bartow would be required to produce this quantity of material.

(Legal, Myrick)

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

Eleven Mono-Kote (MK-3) formulations containing the various additives selected at the meeting with CPD on November 9th were

REFORMULATION AND EVALUATION OF MONO-KOTE (Project 2659)

Eleven Mono-Kote (MK-3) formulations containing the various additives selected at the meeting with CPD on November 9th were evaluated for bond strength using the Veltman-Kraus firecup test at 800°F. Four of the additives, $COSO_4$, Na_2AlO_2, KOH and $MgCO_3$ increased the bond strength over the basic formulation. The addition of 1% $Na_2B_4O_7$ to the Mono-Kote formulation (MK-4) increased bond strength to a level approaching that of MK-3. These tests are being repeated to determine reproducibility and tests will be made on other additives, especially phosphate rock, to the MK-4 formulation.

(Kraus)

A-3 VERMICULITE-MOSS PLANTING DEVICES (Project 4815)

The Keyes Fibre Company, Graybar Bldg., New York, has expressed a desire to discuss possible arrangements for licensing the Grace vermiculite-moss planting device technique. Mr. Chester Cobb, Vice President-Market Development, states that their study shows that Planting Devices would be valuable as an adjunct to their present business. In their opinion, the devices could not support a sales effort by itself but, as we already know, Keyes is planning to bring out a loose type potting earth similar to Redi-Earth for this current season. They would like to be in a position to start marketing the compressed product for the 1972 season. As considerable time is required to arrange for the purchase and delivery of the compression equipment, it is not too soon to start developing the basis for the licensing arrangement now. Mr. Cobb stated that he would like to meet with Grace within the month.

(Legal, Kolbe)

BIOCHEMICAL RESEARCH

B-1 ADAPTED RUMEN MICROBES (ARM) (Project 4623)

A review of the results of the ARM feeding tests in Phase I of the program led to the conclusion that it would not be feasible to submit a New Drug Application (NDA) to FDA because of the inconsistencies in performance of the treated cattle. Phase II of the program which involves treating 2000 head was slow in starting because of the slowdown in movements of large herds of feeder cattle to feedlots. We are advised by Parr Better Feeds that movements are expected to increase substantially after the first of the year.

Our objective is to have at least 1000 head of feedlot cattle on ARM feeding tests by January 31st and 2000 head by the end of February.

Arrangements have been made for two ARM feeding tests in early January at the High Plains Feedlot and Moody Farms, respectively. A total of 390 head will be treated (390 controls).

(Myrick, Hahn and Jessup)

B-2 "CHRON-X" (Project 4640)

Four statistically significant feedlot tests have been completed on the use of ARM for getting "chronics" back on feed.