GRACE CONFIDENTIAL

CONSOLIDATED MONTHLY SUMMARY

MARCH 1972

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RESEARCH DIVISION

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MONTHLY REPORT FOR MARCH 1972

CONSOLIDATED EDITION

GRACE CONFIDENTIAL

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

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I-2 EXPLORATORY
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ORGANIC RESEARCH

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N-2 SPINEL POWDER - COORS SUBCONTRACT
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PHOTOPOLYMER RESEARCH

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P-2 LETTERFLEX - IMPROVED PRINTING QUALITY
P-3 SOLID LETTERFLEX PLATE
P-4 DRY FILM PHOTORESIST
P-5 SOLDER PHOTORESIST

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AGRICULTURAL & CONSTRUCTION MATERIALS

A-1 WELLMAN-POWER GAS SO_2 RECOVERY PROCESS
A-2 REFORMULATION AND EVALUATION OF MONO-KOTE
A-3 SILICATE CONSTRUCTION MATERIALS
A-4 CHATTANOOGA POLLUTION CONTROL
A-5 FLORIDA EXPERIMENTAL STATION, FT. PIERCE

BIOCHEMICAL RESEARCH

B-1 ADAPTED RUMEN MICROBES
B-2 AMMONIUM ISOBUTYRATE AS GRAIN AND SILAGE PRESERVATIVE
B-3 SCOURS PREVENTATIVE
B-4 ANTIBIOTIC AGAINST GRAM NEGATIVE BACTERIA
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B-6 METHANE INHIBITION IN RUMINANTS

OTHER ACTIVITIES

OT-1 GRACE CANE SUGAR PROCESS

A-1 WELLMAN-POWER GAS SO_2 RECOVERY PROCESS (Project 6381)

The Research Division is currently investigating certain aspects of the SO_2 Recovery Process for Wellman-Power Gas.

Previous laboratory work has shown that NO_x in the SO_2 gas stream is the most important factor in accelerating oxidation, and p-aminophenol and p-phenylenediamine act as antioxidants in the SO_2 absorber. The objectives of the current research work are (1) evaluation of selected chemicals for their ability to remove or control NO_2 in gas streams containing SO_2, (2) determination of SO_2 oxidation rates at oxygen and NO_2 levels found in power plant stack gas, and (3) determination of the aging effects on antioxidant efficiency in a dynamic sulfite system maintained at 5% sodium sulfate.

Part 1 has been completed and results show $FeSO_4 \cdot H_2SO_4$, when used as a prescrubber, reduced the NO_2 content of the gas stream from 530 ppm to 380 ppm and was the most effective method of reducing sulfite oxidation rate.

A 10% urea solution, when used as a prescrubber, reduced the NO_2 content of the gas stream from 720 ppm to 170 ppm but was not quite as effective as the iron sulfate solution in reducing sulfite oxidation in the scrubber solution itself.

Sucrose, oxalic acid, and benzoic acid were not effective in reducing sulfite oxidation when added to the scrubber solution at 1000 ppm level or when used as a 10% prescrubbe solution.

These data were reviewed with Wellman-Power Gas at Lakeland, Florida, March 22. It was agreed that the favorable factors, i.e. $FeSO_4 \cdot H_2SO_4$ and urea, will be investigated further as well as continuing with Parts 2 and 3 above.

(Legal, Kraus, Kolbe)

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

Objectives of the Mono-Kote program at the Washington Research Center (WRC) are threefold:

(1) To search for and test new Mono-Kote compositions that will adhere to galvanized steel and show good fire endurance.

(2) To obtain laboratory data at WRC and correlate with results of pilot-scale fire tests at Traveler's Rest.

(3) To extend the correlation of data to large-scale tests made by CPD at Underwriters' Laboratories (UL) and U.S. Gypsum.

A visit was made to Travelers's Rest, South Carolina on March 1 to witness the application of Mono-Kote via the so-called "dry hose" technique. In this system, dry Mono-Kote is conveyed through a hose using air pressure to a nozzle fitted with a steam orifice. Mono-Kote coatings up to 10" thick were produced by continuous application and it was possible to reduce water usage by 75% less than the usual slurry/pump method.

The Construction Products Division (CPD) at Traveler's Rest is planning further action on dry-hose application using a Universal nozzle. A work program is being prepared.

March 21, Mr. R. M. Vining of CPD reviewed reviewed results of the Mono-Kote program at WRC. His main interest was with the future program, especially on methods of cost reduction of raw materials and the need to initiate research on the dry-hose technique for applying Mono-Kote.

CPD believes they have accomplished objective (1) basis the recent successes at UL. They will continue to test new and modified Mono-Kote compositions. However, the emphasis has been removed on developing new Mono-Kote formulations. It is CPD's opinion that there is no need for WRC to continue correlation work with Traveler's Rest-CPD formulations.

Work on the experimental design to study curing behavior of Mono-Kote versus environmental conditions was initiated March 2. Some data are available. Increasing relative humidity from 55%-95% at 75°F decreases drying rate from 37% down to 7.5% during a seven-day interval. Increasing Duponal level from 0.1% to 0.3% retards set time to 200 min. from 180 min. The significance of these measurements regarding commercial application relating to shrink-crack and adhesion has not yet been determined.

(Kraus, Legal)