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UNION CARBIDE

INTERNAL CORRESPONDENCE

cc: RLF
JLM
RLS

METALS DIVISION

270 PARK AVENUE, NEW YORK, NEW YORK 10017

PLAINTIFF'S EXHIBIT
UC-3142

To (Name) Mr. J. W. Rawlings
Division Metals
Location 38th Floor
Floor Number

Date February 12, 1976
Originating Dept.
Floor Number
Answering letter date

Copy to Mr. F. C. Kroft, Jr.

Subject ASBESTOS SPU ACTION PLAN

INTRODUCTION

Union Carbide's asbestos business (product trademark Calidria) is based upon a vast, short fibert crysotile deposit located in the Diablo Mountains of central California and a 34,000 ton per year mill located about 50 miles away in the Salinas Valley at King City. The Asbestos SPU will have sales of $4.5MM in 1975 and achieve a 4.3% ROS.

The Calidria ore deposit is geologically extraordinary with the only known similar ore body being the Stragari deposit in Yugoslavia. Unlike the ore bodies in Eastern Canada, which are the major source of asbestos fiber for the U.S., the Calidria deposit contains no long fiber. This precludes its use in many of the classic commodity markets including friction materials, gaskets, and asbestos cement pipe and building products. However, the Calidria ore contains 50-60% fiber as compared to 5-10% from a typical Canadian deposit.

Ore reserves on 197 unpatented lode and placer claims are so large that it has never been necessary to make an accurate assessment. However, we conservatively estimate that, even with an eight-fold mill capacity expansion, the reserves on only 48 of these claims would last for more than 100 years. Furthermore, Union Carbide has developed a novel wet milling process for beneficiating the ore which provides a very pure, highly-liberated fiber, with excellent recovery of fiber from the ore. Thus, the essence of building a successful asbestos business has been the development of custom markets for this special type of fiber. Consonant with this marketing philosophy, we have built a small but highly profitable market for a specially treated fiber called RG-244 sold primarily as a viscosity agent for polyester and other resins and have recently introduced a new treated fiber called RG-600 which is an effective reinforcement agent for thermoplastics.

It is the purpose of this communication to outline our action plan to use these specialty products as the vehicle for expanding the earnings and improving the earnings quality of the Asbestos SPU.

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MARKETS SERVED AND SALES HISTORY

Calidria asbestos products serve a broad spectrum of short fiber markets ranging from vinyl asbestos floor tile where the asbestos filler sells for $74 per ton (41% direct margin) to the polyester resin market where the specially-treated RG-244 asbestos sells for $1520 per ton (51% direct margin). Intermediate grades of asbestos fiber, selling anywhere from $90 to $500 per ton, are used in such applications as oil well drilling muds, tape joint compounds for dry wall construction, caulks and sealants, paints, and roofing compounds.

As the business has grown, the sales strategy has been to achieve capacity operation with the most favorable product mix possible. To date, this has required committing a significant fraction of capacity to lower margin grades of product. Freight costs vis-a-vis Canadian fiber, limit our participation in the floor tile and other markets east of the Mississippi and we have not yet developed sufficient volume in higher margin fiber products to remove ourselves from the floor tile business. However, the thrust of marketing and technology has been to continue to upgrade the product mix.

Since the mill was first put into operation in late 1963 sales have grown steadily reaching $1 million in 1966, and a breakeven level of $2.4 million in 1971. Capacity operation was achieved in 1973 and the plant remained sold out through mid-1974 when it was hit early and hard by the recent recession fostered mainly by the severe retrenchments in Japan and in the U.S. construction and automotive industries. The recessionary effects continued well into 1975 until abetted by a strike at the plants of 5 asbestos producers in Quebec. This situation resulted in a return to capacity operations for the second half of 1975 and slight improvement over 1974 performance. Resumption of the growth trend is expected in 1976. As summarized below, the Asbestos SPU enjoyed a 11.5% ROA and 9.1% ROS in 1973 and experienced earnings of even better quality in 1974 prior to the onset of the recession.

	1971	1972	1973	1974	1975
Net Sales ($M)	2376	2630	3802	3791	4342
Net Income ($M)	2	56	346	87	132
ROS (%)	--	2.1	9.1	2.3	3.0
ROA (%)	--	4.0	11.5	2.6	2.9

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THE RG-244 STORY

In keeping with the long standing sales strategy of upgrading the quality of the product mix, Union Carbide developed in 1966-67 a special high purity asbestos fiber on which a silica coating was generated by chemical treatment. This silica-coated fiber, called RG-244, is an excellent viscosity control agent in the layup of polyester resins, in vinyl plastisol sealants, and in epoxies where it competes not against other asbestos fibers but rather against fumed silica (eg. Cab-O-Sil sold by Cabot Corp. and Aerosil sold by Degussa). Typically 0.5 to 2% RG-244 imparts the desired properties to the end product. The new product was introduced to the market in early 1968. Sales were nil in the ensuing two years of market development, but then grew to a level of 220 tons in 1970 and 997 tons by 1974. In that year, product was sold to about 200 customers in quantities ranging from a few hundred pounds to 50 tons. This sales level was essentially the capacity of the special circuit at the King City mill in which RG-244 is produced. On November 12, 1973, the Management Committee approved a Capital Budget Proposal submitted by the Mining & Metals Division to double the capacity of the RG-244 circuit to 2100 tons per year. This project was completed on April 1, 1975 and although sales for 1975 were less than 1974, we expect a resumption of the growth trend in 1976 and achievement of capacity operation from the expanded RG-244 circuit by 1980. In 1974, while accounting on a tonnage basis for only 4% of the volume, RG-244 contributed 34% of the sales revenues and 59% of the direct margin dollars. Similar values in 1975 for RG-244 are 2.3% of tonnage, 25% of sales revenues and 44% of direct margin dollars.

RG-244 is covered by U.S. Patent 3,471,438 which expires in 1986. No other asbestos producer markets a comparable product.

The major tempering consideration in the RG-244 sales projections is the impact of federal, state and city regulations on the handling and use of asbestos as well as the emotional response of certain customers to the unfavorable publicity on the asbestos/health issue. We have found through extensive air sampling at customer's plants that the airborne concentrations of RG-244 fibers should permit its use in compliance with the OSHA regulations. As a frame of reference current OSHA regulations require that after July 1, 1976 the ceiling airborne asbestos dust count be less than 10 fiber per cc and the time-weighted average dust count be less than 2 fibers per cubic centimeter (f/cc). In October 1975, OSHA proposed a change in the regulations to levels of 5 f/cc ceiling and 0.5 f/cc time-weighted average at an unspecified future date. The data in Table I show that our customers should have no major problems in meeting this requirement. However, our customers have been deterred by the asbestos/health stigma and other portions of the OSHA regulations such as requirements for periodic medical examinations and periodic atmospheric monitoring. Dispelling these concerns is a major facet of the selling activity.

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Historical and projected RG-244 sales levels in tons are summarized below:

1969 - 56	1975 - 714	Act.	
1970 - 220	1976 - 872	Budget	1228 Actual
1971 - 435	1977 - 1000	Current LRP	1420 Budget
1972 - 644	1978 - 1500	" "	
1973 - 926	1979 - 1500	" "	
1974 - 997	1980 - 2000	" "	

To achieve these sales levels, a general increase in the intensity of the RG-244 sales activity will be required coupled with a continuing effort to put the health hazard spectre in perspective for our customers. Since much of our other business in 1976 will be provided through sales contracts and since the main portion of the plant is projected to be sold out, the attention of the asbestos sales group can be oriented more toward RG-244 sales. Other special solutions to the asbestos/health issue such as developing a wetted product or setting up a network of regional or local master batchers should be explored in 1976 if money and manpower permit.

TABLE I

SUMMARY OF RG-244

ASBESTOS FIBER COUNTS

COMMERCIAL LOCATIONS

Operation	Number of Companies Tested	Airborne Asbestos Concentrations (Fibers/cc > 5u) Measured Ceiling Level Range	Measured Ceiling Level Average	Estimated (1) TWA Level Range	Estimated (1) TWA Level Average
Primary Resin Manufacturing (80-450 lb. dumps)	16	0.6-5.3	1.6	0.11-0.46	0.17
Resin Compounding (1-30 lb. dumps)	21	0.1-2.0	1.0	0.10-0.46	0.18
Spraying of Liquid Resin (0.5-1.5% RG-244)	8	0.1-0.6	0.3	0.10-0.40	0.21
Sanding and Grinding (0.05-2% RG-244)	8	0.0-3.5	0.4	0.10-0.27	0.15

(1) 0.1 fiber/cc > 5u background assumed for all TWA calculation except where specific data were available.

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THE RG-600 STORY

"Calidria" asbestos RG-600 is a high-purity, highly liberated chrysotile fiber pretreated with a proprietary coupling agent. It gives unique combinations of properties to thermoplastics - specifically polyolefins, styrenics, and vinyls. It also has potential applications in aliphatic polyesters, polyamides, and acetals.

RG-600 provides significantly greater increase in stiffness and strength than conventional asbestos. In many cases, RG-600 gives properties comparable to those obtained from additions of chopped fiberglass. For example, high-density polyethylene containing RG-600 can be formulated so that overall properties are comparable to high-impact polystyrene.

RG-600 also gives higher heat-distortion temperatures than conventional asbestos. In polypropylene, for example, 30% RG-600 increases the heat-distortion temperature from 58 to 123 deg. C.

This product is the outgrowth of several years of R/D work carried out at Bound Brook under the leadership of F. Ancker. The work was funded initially by Chemicals & Plastics and more recently by the Metals Division. All claims in our patent application relating to this development have been allowed and the patent should issue shortly.

As noted above, RG-600 is being promoted as a cost effective replacement for fiberglass in thermoplastics. This fiberglass market is currently (1974) estimated at 15,000 tons and should grow at a rate of 10% per year resulting in a 1980 requirement of about 26,000 tons. Unlike RG-244 where each customer uses only a few tons annually, potential RG-600 customers would require tens to hundreds of tons annually. To provide additional perspective on this market, we would need to replace only slightly more than 10% of the fiberglass market in 1980 to achieve the objectives built into the 1976-80 Long Range Plan.

Test marketing of RG-600 was ~~introduced~~ at the May 1974 SPE meeting in San Francisco. A high level of ~~initial~~ interest was generated by a technical paper presented by C & P, a press conference and mention in several trade journals. During the period May to December 1974, approximately 700 inquiries were received.

In spite of the initial market interest created by the introduction of RG-600, markets have not yet developed. This is not inconsistent with our experience in developing markets for RG-244. As noted earlier, there was a 2 to 2-1/2 year gestation period between product introduction and development of an interesting level of sales. Applying this experience factor to RG-600 with an extension to overcome the health hazard stigma existing with many potential customers, it is unlikely that significant RG-600 sales would be expected before mid-1977. Thus, July 1, 1977 has been selected as a reasonable check point to

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examine the market development situation and present to the management a detailed status report on RG-600. Based upon current forecasts, we should have achieved cumulative sales of 1100 tons by that date and this has been adopted as the performance standard against which progress will be measured. Sales experience and projections are as follows:

1974	-	3 tons	(Actual)
1975	-	5 tons	(Est. Actual)
1976	-	600 tons	(Budget)
1977	-	1000 tons	(Current LRP 76-80)
1978	-	2000 tons	" " "
1979	-	2500 tons	" " "
1980	-	3000 tons	" " "

These Long Range Plan targets will serve as additional check points in the 1978-80 period against which continued market penetration will be measured. A detailed action plan and schedule covering the RG-600 market development program through the end of 1976 is appended to this memorandum but certain items are highlighted here. Particularly noteworthy are the following points:

1. In the first quarter of 1976, we will have most of Calidria sales people in residence at Bound Brook for training in plastics fabrication technology.

2. Also in the first quarter, we will compound a quantity of RG-600 with high density polyethylene in order to have available for fabricators material which is compounded with the best available procedures. This will eliminate the need for fabri ators to have material custom compounded under non-optimum conditions and should overcome initial concerns about asbestos toxicity.

3. The intensity of the selling activity will be increased in 1976 and Bound Brook efforts will be redirected from an R/D to a Technical Service mode.

4. We will attempt to augment our selling activity by using a portion of the Chemicals & Plastics sales team.

As is the case with RG-244, air sampling data suggest that once RG-600 has been compounded, it can be used even in compliance with the proposed stringent level of 0.5 f/cc TWA. However, some care will be required during compounding to achieve the 0.5 f/cc level. Since dust counting data on RG-600 are limited, one of the facets of the action plan is to obtain more data in field situations. Currently available information is summarized in Table II attached.

The coupling agent technology developed specifically to create a superior asbestos reinforcement for thermoplastics may also provide a vehicle for pentrating other markets. ~~Specifically~~, For example it appears that, with some modifi-

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cations, the phenolic coupling agent can be applied to the type of asbestos used in drilling muds in order to produce a thickening agent for oil-base muds. Here the problem is to convert the normally hydrophyllic or water-seeking surface of asbestos to a hydrophobic or oleophyllic surface. Laboratory test work has demonstrated that this technical objective can be achieved. It appears that with limited incremental investment a field test can be conducted in 1976 and the steps required to achieve this objective are included in the detailed RG-600 action plan. We will rely in large measure on support from Montello, our world-wide distributor for drilling mud grades of asbestos, to verify the laboratory properties of the treated asbestos and to conduct the field test.

RG-600 is currently produced at Niagara Falls in a pilot plant having an annual capacity of 750 tons based upon a two shift per day five day work week. Engineering has determined that the main circuit at King City can be modified to include RG-600 production at a cost of $400 M based upon project authorizations on 1/76 and start-up on 2/77. The design production rate would be about 60% that of our High Purity grade (i.e. 1.9 tons/hour). However, money for this project is not included in the 1976 Working Budget.

FINANCIAL PERFORMANCE

The historical and projected financial performance of the Asbestos SPU based upon the 1976 Budget and 1976-80 Long Range Plan is displayed below and compared to the same business assuming no sales of RG-600 (i.e. worst case situation where the projected markets do not materialize):

			Budget	Long Range Plan			
		1975	1976	1977	1978	1979	1980
Sales	($M)	4342	5563	6677	8724	8650	10217
Net Income	($M)	132	302	807	1576	1362	1958
ROS	(%)	3.0	5.4	12.1	18.1	15.7	19.2
ROA	(%)	2.9	5.7	24.1	28.8	14.8	19.7
		Same Basis But No RG-600 Sales					
Sales	($M)	4342	5563	5975	7242	6701	7774
Net Income	($M)	132	302	544	1043	669	1096
ROS	(%)	3.0	5.4	9.1	14.4	10.0	14.1
ROA	(%)	2.9	5.7	9.3	17.2	11.5	19.0

It is apparent that even without development of a major market for RG-600, the asbestos business is still a quality proposition with ROA's ranging from 9 to 19% and ROS's ranging from 9 to 14% (assuming that RG-244 sales goals are met). Probably the most important factor involved in reaching these sales goals will be our ability to deal with the asbestos/health issue both emotionally and from the standpoint of regulatory compliance.

"ORIGINAL SIGNED BY
W. C. THURBER".

W. C. THURBER

WCT:jl
Atts.

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TABLE II

SUMMARY OF RG-600

ASBESTOS FIBER COUNTS -

TESTING LOCATIONS

Operation	No. of Samples	Airborne Asbestos Concentrations (Fibers/cc >5u) Range	Average
Handling RG-600 Resin Dry Blend	7 Personal	<0.1-0.5(1)	0.3
	8 Area in or close to equipment	<0.1-2.2	1.2
Compounded Resin Operations	1 Personal	<0.1-0.1	<0.1
	4 Area	<0.1-0.1	<0.1
Cutting, Chopping & Grinding Operations	4 Personal	0.2-0.4	0.3
	11 Area	<0.1-0.3	0.1

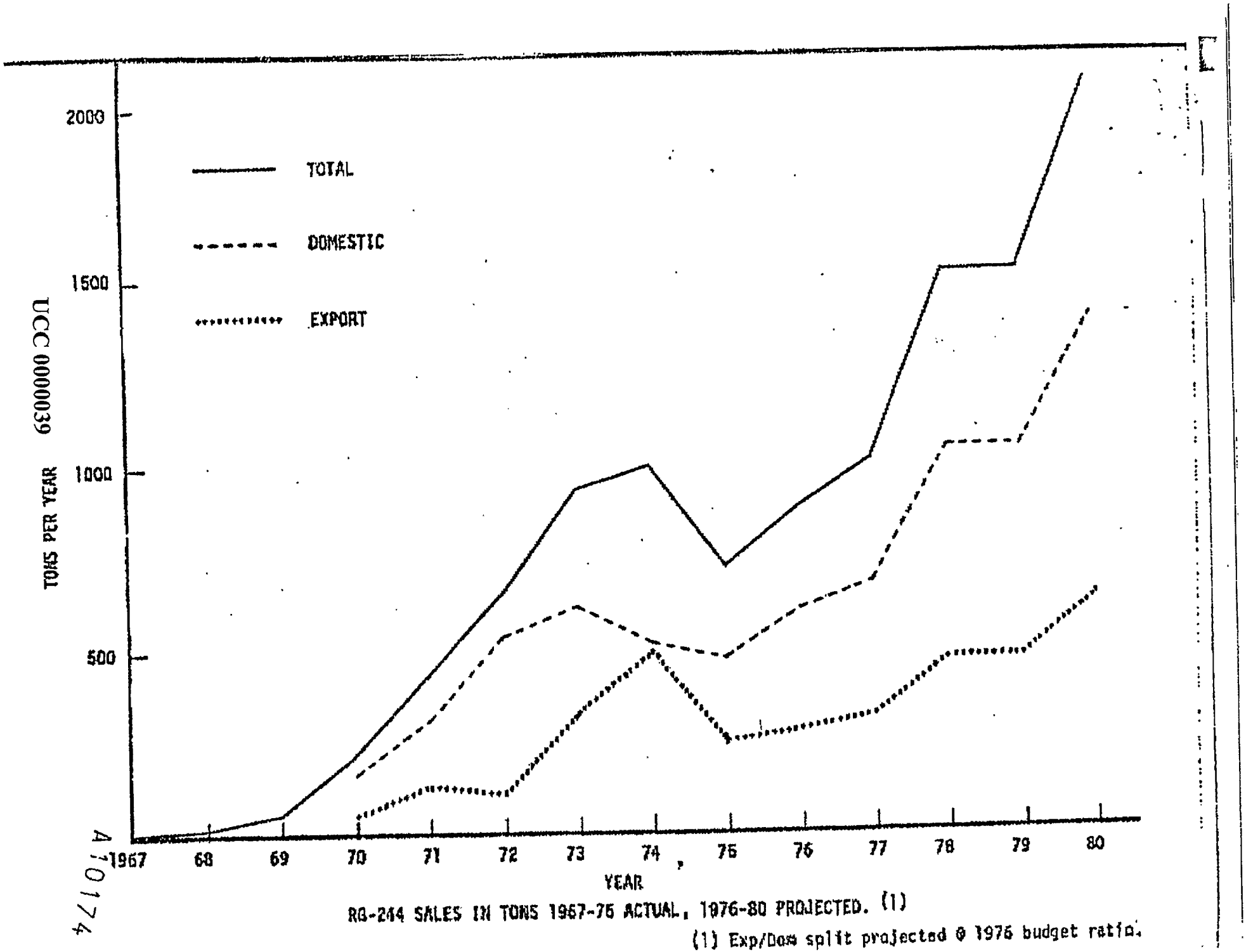
(1) One sample at 4.5 fibers/cc found at leaky Banbury.

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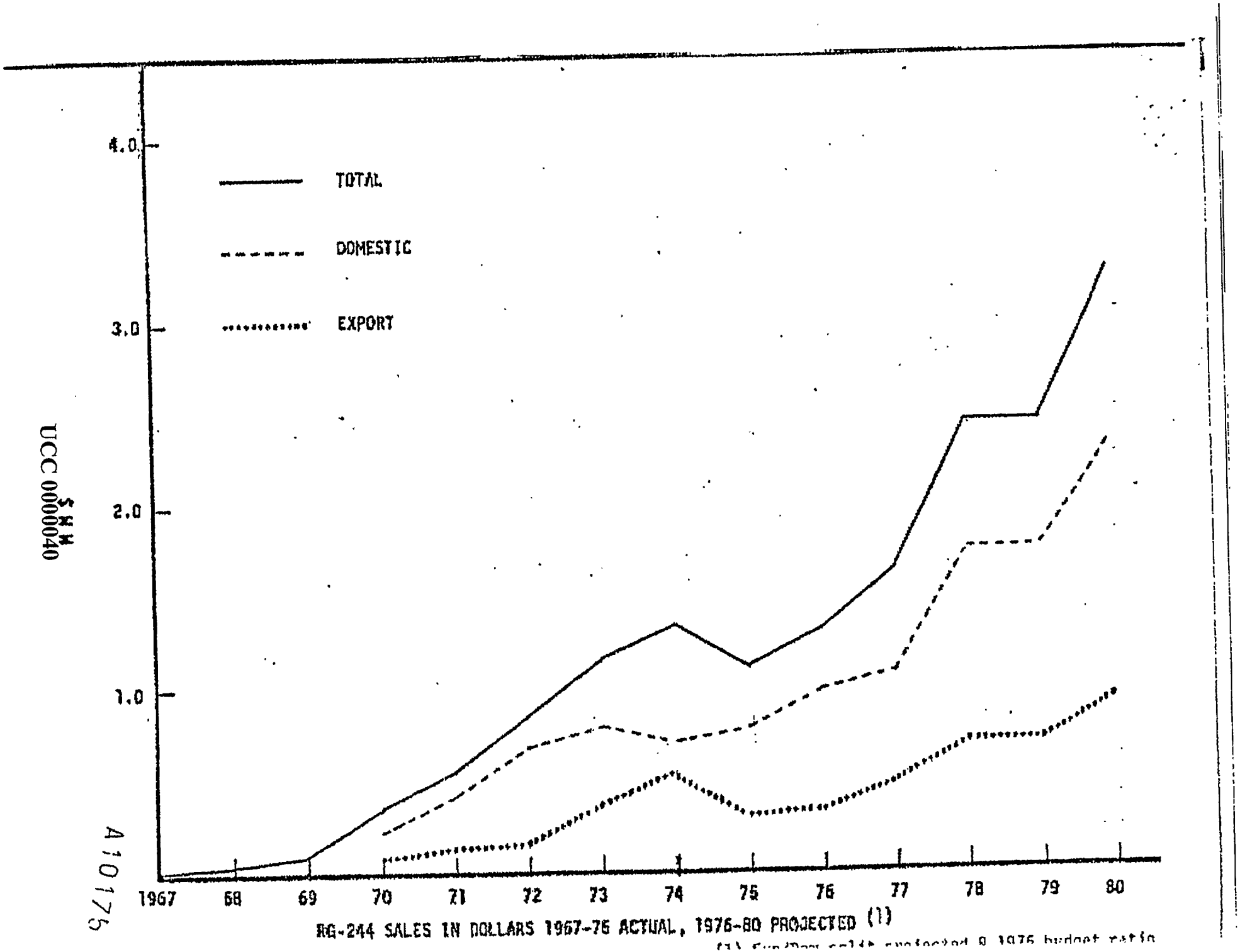
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RG-244 SALES IN TONS 1967-75 ACTUAL, 1976-80 PROJECTED. (1)

(1) Exp/Dom split projected @ 1976 budget ratio.

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RG-244 SALES IN DOLLARS 1967-76 ACTUAL, 1976-80 PROJECTED (1)

(1) Fundings called projected a 1976 budget ratio

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RG-600 ACTION PLAN

I. THERMOPLASTIC REINFORCEMENT

A. Demonstrate that ecology grade DMBP dispersion can produce equivalent properties to DMBP syrup when used as coupling agent for asbestos reinforced thermoplastics

1. Evaluate effects on state of DMBP advancement on end product properties.

(a) Produce DMBP dispersion in various states of advancement; min quantity 30 gal. each higher & lower advancement.

Responsibility: M. Leung/BB Pilot Plant

Schedule: October, 1975.

(b) Produce RG-600 at Niagara Falls pilot plant using (1) above.

Responsibility: R. E. Byrne/J. E. Skvarla

Schedule: November 1, 1975 completion.

(c) Evaluate asbestos-reinforced composites using material produced in (2) above.

Responsibility: M. Leung

Schedule: January 1, 1976 completion.

Need to check agains stability use of settling solvents

2. Produce RG-600 in Niagara Falls Pilot Plant as required to meet 1976 sales.

Responsibility: J. E. Skvarla

Schedule: Continuing

Use CMW Dispersion for all future pilot plant work.

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B. Obtain price quotes and commitment from Bound Brook pilot plant to produce DMBP dispersion for near term (i.e. 1976) requirements.

Responsibility: M. Leung

Schedule: October 15, 1975.

C. Obtain tentative commitment and planning purpose pricing from C & P operations to meet longer term (i.e. beyond 1976) commitments.

Responsibility: F. Ancker

Schedule: July 1, 1976

D. Resolve molding problems with RG-600 reinforced polyethylene structural foam.

Responsibility: M. Sauers

Schedule: 4th Quarter 1975

E. Establish whether or not C & P is interested in producing and marketing HDPE compounded with RG-600 to structural foam licensees or other natural markets.

Responsibility: W. C. Thurber/R. E. Byrne

Schedule: 4th Quarter 1975

F. Complete engineering studies, cost and schedule for integrating DMBP treatment facilities into King City Plant.

Responsibility: D. Furlani/O. J. Malacarne

Schedule: 3rd Quarter 1975

NOTE: Work has been completed and reported in Design Memo No. 1, File 1175 "RG 600 Blending Facility" dated August 28, 1975. This facility is estimated to cost $400 M based upon project authorization 1-76, equipment delivery 10-76, and start-up 2-77. Money for this program has not been included in the 1976 Working Budget.

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G. Develop and implement vigorous marketing program for RG-600. Sales goals are summarized in Table A.

1. Domestic marketing.

(a) Initial Customer visits

i) Major polyolefin producers.

Responsibility: R. E. Byrne

Schedule: May 1, 1976 completion.

ii) Compounders

Responsibility: R. E. Byrne

Schedule: July 1, 1976 completion.

iii) End Users

Responsibility: R. E. Byrne

Schedule: September 1, 1976 completion.

2. Advertising & Sales Promotion.

(a) Trade journal advertisements

Responsibility: J. Crane

Schedule: April-May 1976

(b) Direct mail follow-up to advertising

Responsibility: J. Crane

Schedule: June-July 1976

(c) Prepare technical paper on RG-600 processing characteristics and property benefits.

Responsibility: F. Ancker

Schedule: July 1, 1976

3. Sales Training

(a) Work with Boundbrook to provide in residence training re plastics for one or more Calidria sales people.

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Responsibility: R. E. Byrne/F. Ancker

Schedule: 1st Quarter 1976 completion

After SPE in Feb. Week of Feb. 23

4. Export Sales

(a) Japan

i) Supply Tomoe with advertising/sales promotion information.

S.F. Follow-up w/ Mitsui

Responsibility: R.E. Byrne/J. L. Myers

Schedule: June 1, 1976

ii) Visit Japan for sales training & customer calls.

Responsibility: R. E. Byrne/J. L. Myers

Schedule: July 1, 1976

(b) Europe

i) Obtain decision from U.C. Europe as to whether they will handle RG-600 marketing.

Responsibility: W. C. Thurber

Schedule: 4th Quarter 1976

ii) Develop alternate sales agent if required

Responsibility: R. E. Byrne/W. C. Thurber

Schedule: As Required.

iii) Provide sales training for European sales agent.

Responsibility: R. E. Byrne

Schedule: 1st Quarter 1976

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H. Implement Bound Brook technical support program to complement marketing ~~working~~ activities.

1. Develop processing information in various resins particularly polyolefins.

   Responsibility: F. Ancker

   Schedule: 1st Quarter 1976

2. Develop cost comparison and cost benefit data vis-a-vis fiberglass and other fillers.

   Responsibility: F. Ancker

   Schedule: 1st Quarter 1976

3. Provide technical service manpower to support sales calls.

   Responsibility: F. Ancker

   Schedule: Continuing

4. Extend coupling technology to polar polymers (eg. nylon) as time permits.

   Responsibility: F. Ancker

   Schedule: 1976-1977

5. Prepare 2000-5000 pounds of HDPE compounded with RG-600 for customer trials.

   Responsibility: F. Ancker

   Schedule: 1st Quarter 1976

I. Develop additional field data on airborne asbestos fiber dust counts during processing of RG-600 and prepare revised literature on subject for

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presentation to customers.

Responsibility: H. B. Rhodes

Schedule: 1st Quarter 1976

II. DETERMINATION OF PERFORMANCE OF CK-2103 TREATED ASBESTOS AS AN OIL BASE DRILLING FLUID ADDITIVE.

A. Determine the merits of the product in complete mud formulations on a laboratory scale.

1. Assemble and present the information needed to motivate Montello to undertake laboratory evaluation.

(a) Establish projected pricing for commerical quantities.

Responsibility: W. C. Thurber

Schedule: November 1975

(b) Establish projected costs for 10 ton batch for field trial.

Responsibility: J. E. Skvarla

Schedule: November 1975

(c) Prepare technical information package.

Responsibility: H. B. Rhodes

Schedule: November 1975

(d) Technical and business presentation to Montello.

Responsibility: H. B. Rhodes

Schedule: By December 15, 1975

(e) Coordination and encouragement of Montello efforts.

Responsibility: H. B. Rhodes

Schedule: Continuing

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(f) Market size estimates
Responsibility: H.B. Rhodes et al...
Schedule: February 1, 1976

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2. Preparation of 25 lb. laboratory batch for customer testing.

(a) Preparation of CK-2103 butyl-cellosolve syrup.

Responsibility: M. Leung

Schedule: December 30, 1975

(b) Preparation of 25 lb. of treated product.

Responsibility: B. L. Ingalls

Schedule: January 1976

3. Laboratory verification of properties of sample batch.

(a) Test room temperature rheology properties.

Responsibility: B. L. Ingalls

Schedule: January-February 1976

(b) Test high temperature thermal stability.

Responsibility: M. Leung

Schedule: January-February 1976

B. Determine whether a higher performance $CaCl_2$ brine-leached product should be offered.

1. Define possible manufacturing conditions and then effect on product properties.

(a) Measure effect of brine concentration, time, temperature, shear and working and filtration procedures on product properties at room temperature.

Responsibility: B. L. Ingalls/H. B. Rhodes

Schedule: 1st Quarter 1976

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(b) Check thermal stability on selected products.

Responsibility: M. Leung

Schedule: 1st Quarter 1976

2. Preparation of preliminary cost estimates.

(a) Flow sheet and estimate of incremental cost to add leach step to process.

Responsibility: Engineering

Schedule: 2nd Quarter 1976

3. Decision for Action.

Responsibility: W. C. Thurber

Schedule: June 1976

C. Obtain an on-site well test of treated product.

1. Manufacture 10 tons of product.

(a) Preparation of syrup.

Responsibility: M. Leung

Schedule: 3rd Quarter 1976

(b) Preparation of product.

Responsibility: J. E. Skvarla

Schedule: 3rd Quarter 1976

2. Coordination and observation of the test to be set-up by Montello.

Responsibility: H. B. Rhodes

Schedule: 4th Quarter 1976

3. Measure dust exposure during test.

Responsibility: H. B. Rhodes

Schedule: 4th Quarter 1976

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