

PLAINTIFF'S EXHIBIT

GP-1299

PRODUCT DEVELOPMENT &
TECHNICAL SERVICES

SIX MONTH REPORT

January through June 1973

SGP 0014570

TABLE OF CONTENTS

	Page
<u>SIX MONTH SUMMARY</u>	
Summary.....	1
Analysis of Sales & Profits.....	3
 <u>PRODUCT DEVELOPMENT SECTION</u>	
Drywall & Panel Adhesive.....	4
Firedoor Filler.....	4
Wall Texture.....	4
Ready Mix.....	5
Less Expensive Thickener.....	5
Easier Sanding Ready Mix for Acme.....	5
High Molecular Weight Polyvinyl Alcohol.....	5
SRA Joint Compounds.....	6
Speed Set.....	7
Low Consistency Molding Plaster.....	7
 <u>MARKETING SERVICES SECTION</u>	
Pre-Dec Shear Tests.....	8
APA Fire Test.....	9
One-hour Metal Stud Wall.....	10
New Pre-Dec Colors.....	10
Comparison of Luan Paneling & Pre-Dec.....	10
Fast Method of Joint Finishing.....	10
Miscellaneous.....	10

MANUFACTURING SERVICES SECTION

Wallboard.....	11
Trouble Shooting.....	11
Rock Washing at Grand Rapids.....	11
Water Repellent Paper.....	11
Reducing the Cost of Sheathing.....	11
By-product Gypsum.....	11
Less Expensive 5/8" Type X Firestop.....	12
Miscellaneous.....	12
Pre-Dec.....	12
Underwriters Label Service Procedure.....	12
Fort Dodge Start-up.....	12
Pre-Dec for Walls.....	12
Rubber Applicator Rolls.....	13
Joint System.....	13
Milford Start-up.....	13
Continuous Viscosity Measurement.....	13
Faster Mixing.....	13
De-aeration.....	13
Communications.....	13
Analyses.....	14

PATENTS & LICENSING SECTION

Firestop.....	15
Shaft Wall.....	15
Round Edge Wallboard.....	15

SIX MONTH SUMMARY

In the first six months of 1973 there has been a re-direction of our activities to put more emphasis on plant related projects. In recent years, the economics of wallboard manufacture has been significantly improved through faster machine speeds, lower wallboard weights, and lighter weight paper. While these changes have been beneficial, they have narrowed the margin for error which has resulted in more requests for technical assistance to maintain a satisfactory level of quality. Our product development projects are being confined to commodity items or cost savings, most of which are brought about by business conditions or competitive situations.

Six months sales and profits for new products which were developed during the past five years totaled \$1,976,604 and \$478,749. Texture sales and profits were up 95% and 840% over the same period during 1972. We believe the increase in texture sales and profits is a direct result of our reformulation of the textures. In addition to these advantages, asbestos, classified as a hazardous material, was eliminated from our textures. We successfully concluded the field and market testing of an alternate thickener for Ready Mix. The savings will amount to 9¢ per pail and after all plants make the switch, the total savings will be \$160,000 annually.

At Acme we are marketing an All Purpose without asbestos and which will also save \$50,000 a year in raw material costs. Our objective is to find substitutes for asbestos in all joint system products. The stringent requirements being imposed by the Occupational Safety and Health Administration (OSHA) may result in asbestos elimination being the only practical solution.

Another important project is a continuing effort to evaluate factors which influence the bond between the paper and the core of gypsum wallboard. The increased speeds and reduced weights have caused the bond to be a vulnerable area. A task group consisting of representatives from our paper manufacturing, gypsum manufacturing, and laboratory has been formed to jointly investigate all aspects of the gypsum/paper bond.

Georgia-Pacific, through the various representatives to the Gypsum Association, has proposed the establishment of an industry wide fire and sound testing program. Our proposal was accepted by the Gypsum Association and the program is just getting underway. If an effective program can be maintained, our fire and sound test costs will be reduced by approximately \$20,000 per year. Another important

matter being considered by the Gypsum Association is the question of rail car loading. The American Association of Railroads (AAR) has had such bad experience with damaged shipments of gypsum board they plan to require loading methods which would prove costly to the industry. Through the Materials Handling Committee, we are attempting to seek a compromise which will satisfy the railroads, without a significant increase in loading costs.

During our preparation to license other gypsum companies under our Firestop patent 3,616,173, one of the companies revealed information that undermines the validity of our patent. This development necessitated a change in our future plans and strategy. Instead of licensing, we will emphasize cost reductions and other improvements in Firestop which will put us in a better competitive marketing position. Firestop products continue to gain in importance as evidenced by sales increasing 44% for 1/2" and 31% for 5/8" comparing the first six months of 1972 with the first six months 1973. The first objective under the new program will be to reduce the raw material cost of 5/8 Type X Firestop. The goal is an annual savings of about \$100,000.

The Tigard Lab is hiring and training some quality supervisors for the operating divisions. It seems to work out well for new technical personnel to be drawn from the large reservoir of applicants furnished by our Personnel Department in Portland, and to receive laboratory training prior to assuming the plant responsibility. In February, Chuck Hilton completed his training program and was transferred to our new Milford plant as the quality superintendent. We have plans to hire another quality trainee for the plant organization.

A decision has been made to relocate Gene O'Neill from Tigard to the Marietta, Georgia, joint system plant. This is being done to establish closer contact between the laboratory and the joint system manufacturing and sales. With all the plants producing joint compounds in the East and Midwest, and the lab on the West Coast, we have not been able to maintain the desired continuity between the lab and plant activities.

A more detailed description of all the activities of the Product Development and Technical Service Department is included in the body of this report.

ANALYSIS OF SALES & PROFITS

<u>UNIT</u>	<u>PRODUCT</u>	<u>SALES VOLUME</u>	<u>LIST SALES AMOUNT</u>	<u>GROSS PROFIT AMOUNT</u>
MSF	1/4" Sound Deadening Board	4,447	\$ 171,135	\$ 48,396
MSF	Pre-Dec Wallboard (All)	30,885	1,772,347	424,606
Tubes	Drywall Adhesive	4,656	2,504	(32)
Tubes	Panel Adhesive	--	--	--
MSF	Shaft Liner Panel	--	--	--
MLF	Metal T Splines	32	6,140	577
MLF	L Runners & J Channels	11	1,231	8
Tons	Ram Process Plaster	41	3,906	1,940
Bags	Polystyrene Texture	6,601	19,341	3,254
			\$1,976,604	\$ 478,749

TEXTURES COMPARISON - TOTAL SALES & PROFIT - YTD THRU JUNE

<u>PRODUCT</u>	<u>1972</u>		<u>1973</u>	
	<u>SALES</u>	<u>GROSS PROFIT</u>	<u>SALES</u>	<u>GROSS PROFIT</u>
Wall Textures	\$ 87,951	\$ (5,875	\$ 99,625	\$ (2,593
Ceiling Textures:				
1) Perlite	3,959	1,029	2,662	411
2) Vermiculite	12,090	2,321	151,603	49,174
3) Polystyrene	36,065	7,887	19,340	3,254
	\$140,065	\$ 5,362	\$273,230	\$ 50,246

COMPARISON OF FIRESTOP BOARD SALES - YTD THRU JUNE

<u>PRODUCT</u>	<u>1972 SALES</u>	<u>1973 SALES</u>
1/2" Firestop	29,136 MSF	42,114 MSF
5/8" Firestop	74,757 MSF	97,549 MSF

SGP 0014575

PRODUCT DEVELOPMENT SECTION

SGP 0014576

PRODUCT DEVELOPMENT1. Drywall and Panel Adhesive

The manufacture of drywall and panel adhesive from the Tigard pilot plant was discontinued in February after more than 5,000 cases of adhesive had been sold. Four thousand four hundred cases of drywall adhesive were manufactured at Akron and sold, including 1,300 cases recently manufactured to use up the remaining raw material inventory. It was decided to abandon the adhesive project because construction of a plant in a central location could not be justified by the volume of adhesive which could be sold. It is possible that the manufacture of adhesives can be considered at some future time in conjunction with another product, such as Ready Mix. A technical report was prepared and submitted covering our pilot plant operation and field experience with adhesives.

2. Firedoor Filler

Dale Greve from the Western Region Operations developed a method of manufacturing Firedoor material similar to that used in manufacturing particle board. Instead of the usual pouring process, the ingredients are formed under pressure. There are also some differences in the formula from the previous Firedoor material. This product is stronger and has sufficient water resistance to withstand the hose stream, which is the crucial part of the test for fire rated doors. The first slabs prepared were shipped to Walled Lake Door Company in Indiana, who are a large potential customer. The slabs were off-size and had to be sanded several times. In the process of the sanding they cracked and no doors could be made. Through further formulation work, we have been able to make the Firedoor slabs less brittle while still retaining good compressive strength and have improved our techniques so they can be pressed closer to the final 1½" thickness. In July another set of Firedoor slabs will be prepared for a second trial at Walled Lake. If this trial is successful and the pilot fire tests are also favorable, another Underwriters' fire test will be recommended.

3. Wall Texture

During the past year and a half, revisions have been made to all of our texture products to improve the acceptance of these products and to reduce the raw material costs. An attendant objective was to

develop products which did not have asbestos in the formula. The increasing concern of hazards of asbestos fiber and the fact that the textures are spray applied, persuaded us to try to accomplish both goals simultaneously. The project was successfully concluded for the fine, medium, and coarse ceiling textures, and this left the wall texture to be reformulated. The casein wall texture has good market acceptance and a comparable formula proved difficult to develop. However, the formula is so expensive that we are losing money on every bag sold. We first tackled the gypsum textures at Acme and finally were able to develop an acceptable product. At Chicago the texture business is small, hardly justifying inventorying raw materials. It was decided to furnish Acme's gypsum wall texture to Chicago. Quite a number of field tests were conducted in the markets serviced by Marietta before an acceptable formula was found. The formula contains a talc which turned out to be in short supply, so that has delayed our progress. The same formula is now being field tested in the markets served by the Akron plant. When our shipments of talc arrive and the trials at Akron are concluded, we will have a profitable product that is not subject to the OSHA limitations on asbestos.

4. Ready Mix

Several Ready Mix projects have been undertaken. These are:

a) Less expensive thickener--We had been using a guar gum water retention agent as a substitute for the hydroxyethyl cellulose. The guar gum imparts some better working properties in addition to being quite a bit less expensive than the hydroxyethyl cellulose. There were some manufacturing problems which were all resolved. Also, the market testing has shown that the product is completely acceptable. The guar gum has been listed as an acceptable alternate thickener and, as mentioned earlier, will save \$160,000 annually based on the first six months Ready Mix sales.

b) Easier sanding Ready Mix for Acme--For some reason the Ready Mix with gypsum filler being produced at Acme is harder to sand than its limestone counterpart produced at the other locations. This characteristic is inhibiting the expansion of our Ready Mix sales in the market served by Acme. We tried to tie in the elimination of asbestos fiber with the sanding problem but this proved to be too big a step. Currently a formula with asbestos, but with a reduced amount, is being tested in Houston and other markets.

c) Higher molecular weight polyvinyl alcohol--The Sales Department advised us that we had incurred an unusual number of Ready Mix bond complaints during the winter of 1972-73. The complaints covered both

Chicago's and Akron's Ready Mix. These complaints are undoubtedly caused by the product being used when the temperatures are lower than 45°. Under these conditions, polyvinyl acetate, which is the primary binder, loses its effect as a binder. Our first thought was to install water heaters to be sure that the Ready Mix leaving the plant was the proper temperature. This will also help control variations in the viscosity of the product. However, this still does not solve the problem when the material is used at low temperatures. One possible solution is to use a higher molecular weight polyvinyl alcohol as the secondary binder. This will impart better binding efficiency, especially at low temperatures since polyvinyl alcohol is not adversely affected by the temperature. The initial results show that better bond properties can be achieved with higher molecular weight alcohol. Field trials are in progress to be sure there is no change in the working characteristics. We are moving this project slowly, but it is important that it be concluded before winter.

5. SRA Joint Compounds

In an effort to find a solution to the skyrocketing price of casein, we accelerated our evaluation program of joint compounds formulated with a synthetic resin furnished by Dow Chemical Company. The early trials were very successful and the contractors particularly liked the working properties of the SRA joint compounds. We received a batch of Dow resin which got us into some bonding difficulties, but this was attributed to the resin being too low in molecular weight. Subsequent shipments seemed to correct the problem and, in view of the continuing shortage of casein and sharp increase in price, we were inclined to proceed with the marketing of the SRA products. All of a sudden we began to have complaints that SRA joint material was failing to adhere to the metal corner beads. Since this condition developed after the joint compounds were applied, and in many cases after the paint was applied, we had large volumes of SRA joint compounds scattered throughout the area serviced by the Chicago plant before we realized the severity of the problem. Our only recourse was to settle the complaints which had been lodged and return all possible SRA material to the plant. We returned to the old formulas and fortunately the price of casein had fallen to about 44¢ per pound from a high of about 72¢ per pound. There were several factors that caused the SRA compounds to not bond properly to corner beads. The most significant was the tendency the material had for requiring large quantities of water when it was mixed very vigorously. This caused a dilution of the adhesive content and, therefore, a weakening of the bond properties.

Even though casein has come down in price, we are still in need of a substitute binder. Casein will probably increase in price in the future and may again reach a level where it will be prohibitive to use it.

6. Speed Set

An improved Speed Set formula has been developed to take advantage of a larger market for this product. The accelerator system has been changed to cause the set to proceed rapidly once it starts. This is especially important for factory home builders who need the shortest possible set but still need enough time to apply the material. There are some market tests in progress to thoroughly evaluate the new Speed Set before we make a change.

7. Low Consistency Molding Plaster

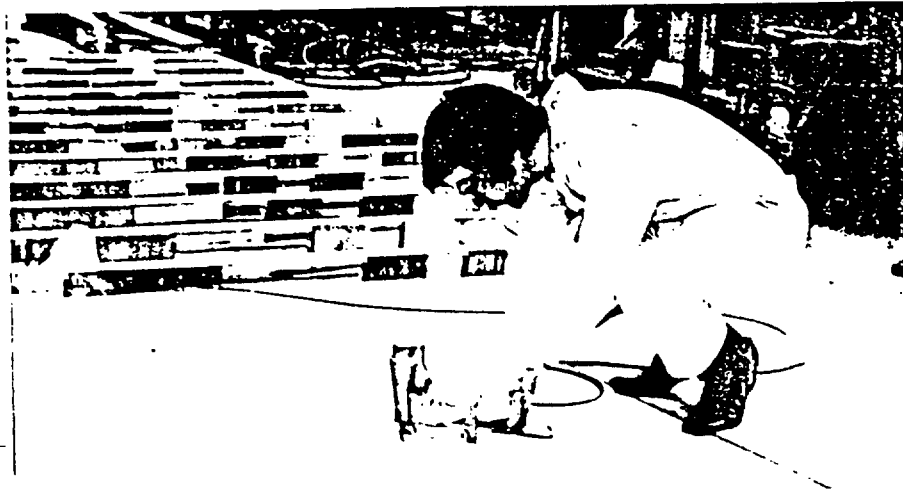
As a result of the demand for Densite and Denscal, we would like to be able to substitute molding plaster for Densite or Denscal wherever possible. One possibility is to use a powerful dispersing agent which will lower the water requirement of the molding so it can be used at least as a part replacement for Densite or Denscal. The first effort is to formulate Dens-Cote plaster without Denscal. This would free up about 1000 tons of Denscal per year. Another possibility is to use low consistency molding plaster in oil well cement.

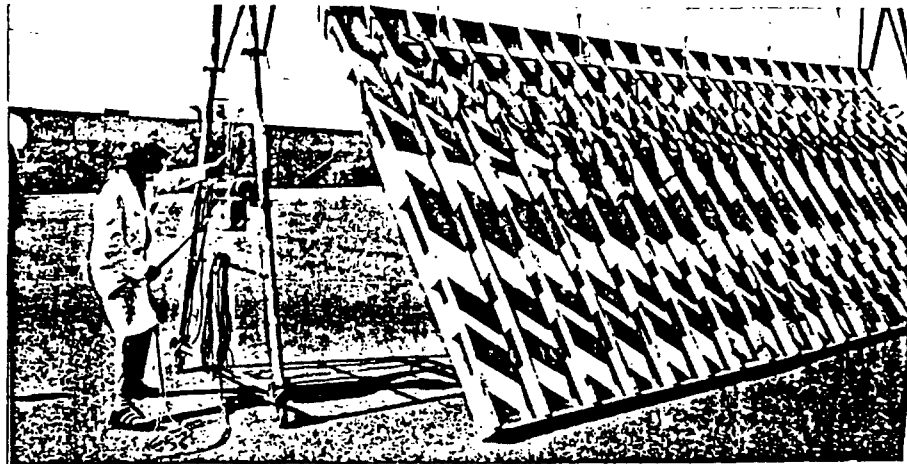
MARKETING SERVICES SECTION

SGP 0014581

MARKETING SERVICES1. Pre-Dec Shear Tests

Sales has requested that we develop structural ratings for mobile home ceiling sections in which our Pre-Dec is used. It was necessary to construct 12' x 28' full size coach sections for these tests. The preparation was more difficult and time consuming than the tests. It was necessary to construct equipment to handle these huge sections as well as providing space and devising methods and equipment to conduct the tests. Two different constructions were tested, one using the conventional rosette fasteners and staples, and the other using special power driven fasteners and adhesive. The structural sections had to withstand a load of 255 pounds per linear foot as well as a total load of 2,940 pounds for 12 hours. Both constructions easily provided the desired load values. We will be able to have a combination fire hazard/structural U.L. label for our Pre-Dec. There may be some advantages in this combination label, and it will be up to Sales to give us guidance along these lines. The following photographs show the handling of the assemblies and the testing.





2. APA Fire Test

With help from our marketing management, GP 5/8" XXX Firestop board was used in the American Plywood Association's test of their glued floor/ceiling system. We participated in the design of the final construction and made several recommendations to make the construction more economical. The one-hour test passed with flying colors, so it should provide some promotional value for our plywood and our Firestop. Another gain was the credibility established at APA so that in future tests they may come to us instead of going to our competition.

3. One-hour Metal Stud Wall

After considering all the possibilities of testing a metal stud wall with 1/2" Firestop for one hour, it was decided that our best bet would be to purchase it from our licensee, Westroc Industries. Westroc narrowly passed the test on about the third try, so it was decided that it would be better to pay them \$500 than to risk \$2000 or more in a test of our own.

4. New Pre-Dec Colors

A series of new Pre-Dec colors specifically for the wall Pre-Dec were developed and submitted for evaluation. It was decided that we would retain our present colors until such time as the volume of wall Pre-Dec would warrant switching to some new shades.

5. Comparison of Luan Paneling and Pre-Dec

Due to a shortage of Luan paneling, we began to offer wall Pre-Dec as an alternative for mobile home construction. For a time it appeared that if the shortage of Luan were to persist, the market for wall Pre-Dec might expand. In order to offer the Pre-Dec as an alternative, it was necessary to furnish some comparative test data on both products. We conducted a series of tests primarily comparing the strength. The Pre-Dec came out a poor second, but the information was passed along and presumably was used in some fashion by our marketing people.

6. Fast Method of Joint Finishing

A method of applying wallboard and finishing joints without tape was developed which appears to have merit. We talked to some companies in the factory-made home business, but so far we have not been able to interest anyone enough to try the method. We are reluctant to begin promoting anything that has not been field tested, so the project is stalled until we can get a trial.

7. Miscellaneous

- We have responded to several requests to investigate wallboard complaints, joint system complaints, and car loading problems.

MANUFACTURING SERVICES1. Wallboard

a) Trouble shooting--There were several requests from Brunswick, Akron, and Grand Rapids for assistance to help them with problems relating to the quality of the board. The problems varied from high kettle maintenance expense to core splits.

b) Rock washing at Grand Rapids--At the request of Management, we undertook the project of coordinating a program to discontinue rock washing at Grand Rapids. This program was started on the basis that the amount of salt in the current supply of rock in the new mine was sufficiently low in salt content to not require the washing process. A system of frequent salt checks was started to be sure we could pick up any sharp increases in salt that might be detrimental. The program was started in early May, so two months have passed since the rock washing was stopped. We had a scare when the plant began to experience some severe humid splitting, but this was fortunately traced to a faulty starch shipment.

c) Water repellent paper--In the previous Six Month Report, we reported some excellent trials of a water repellent bond liner paper treatment. Subsequent trials have been unsuccessful, but thus far we are unable to pinpoint the reason. Instead of providing an improved bond, there have been streaks in the board which are complete peelers. We obtained improved bonds with sharp reductions in starch in the earlier trials, so there is some potential; but it is a case of determining whether we can achieve the benefits without subjecting the board manufacturing operation to other problems.

d) Reducing the cost of sheathing--It costs about \$6/M square feet to waterproof sheathing. Even with this high cost, the waterproofing is somewhat erratic. We are investigating all of the factors in waterproofing the core, including a synergistic effect between polyvinyl alcohol and asphalt wax emulsion discovered by Dale Greve. This will require quite a number of tests to be made using various amounts of the ingredients and subjecting them to water absorption tests. Our sheathing business continues to grow and could be extremely profitable if it were not for the high waterproofing costs.

e) By-product gypsum--A number of industries that manufacture chemicals and have leftover sulfuric acid must find some way to

neutralize the acid rather than discharging it into the rivers and streams. An effective way to handle the acid is to react it with lime or limestone which yields a high purity gypsum. These chemical manufacturers have to find some way to dispose of the gypsum because they cannot afford to have it pile up endlessly. NLS Industries has indicated that they will have up to 700 tons of gypsum per day from their neutralization processes. We are evaluating all available sources for waste gypsum in the event that we will find a source located close to one of our plants.

f) Less expensive 5/8" Type X Firestop--Inasmuch as our licensing will be greatly diminished because of the expiration of our Firestop patents, we are seeking cost reductions in Firestop. The former United States licensees have to depend on their own abilities to develop new formulas and ratings. This means that it will behoove us to develop as many new low cost formulas and ratings as possible to gain some competitive advantages.

g) Miscellaneous--A board loading seminar was held for the loading superintendents of the Western Operating Region.

2. Pre-Dec

a) Underwriters' label service procedure--We have made several requests to Underwriters to liberalize the label service procedure with respect to raw materials and methods of manufacture. Several raw materials are in short supply, so it will be advantageous to have some acceptable substitutes. An alternate method for producing the Pre-Dec paint was approved by Underwriters which excludes the necessity to pre-blend the dry ingredients. This will benefit Brunswick and Fort Dodge because they have no means to pre-blend their filler and have had to rely on the joint system operations for paint filler.

b) Fort Dodge start-up--We provided assistance in the initial runs of Pre-Dec at Fort Dodge, as well as arranging to have Fort Dodge included in the label service procedure.

c) Pre-Dec for walls--At the request of Sales, a 1/4" thick Pre-Dec is being manufactured for application on walls of mobile homes. We have been concerned that this product would be so weak that it would not perform satisfactorily. In order to overcome this, the glass fiber content in the core of the wall Pre-Dec was increased. Other possibilities such as stronger chip board paper, kraft back paper, and lamination of a second layer of paper to the back side of the board have been considered. Thus far, no clear-cut method for increasing the strength without upsetting the economics has been found.

MANUFACTURING SERVICES SECTION

SGP 0014587

Another aspect of the wall Pre-Dec which has been evaluated is the surface washability. It is more desirable to have a washable finish on a product that is used for walls than ceilings because the wall surface is more vulnerable to smudges, fingerprints, etc.

d) Rubber applicator rolls--The plants have had problems with inconsistencies in the rubber coating rolls received from Rubatex Corporation. Several efforts have been made in the past to see if Rubatex could furnish us with an improved roll. We can afford to pay more for the rolls if they are more consistent in quality and last longer. Rubatex is furnishing us with more rolls of supposedly higher quality and Armstrong Cork Company is also sending some rolls to the plants for evaluation. Also under investigation is a foamed polyethylene material.

3. Joint System

a) Milford start-up--We participated in the start-up at Milford which proceeded smoothly after a few initial problems. This is the only Ready Mix operation not using pre-blended filler.

b) Continuous viscosity measurement--The present Brabender method of measuring viscosity takes up valuable production time because of the delay while the test is being accomplished. Another method where the electrical load on the mixer is measured and recorded provides a continuous measurement of the viscosity and it eliminates any delays for testing. The continuous viscosity measurement will be a more accurate viscosity and provide a product of more consistent quality.

c) Faster mixing--It has been found that the mixer speeds can be increased to as much as 100 revolutions per minute without adversely affecting the product. This will permit shorter mixing times and, therefore, increase production.

d) De-aeration--Some experiments were conducted using a vacuum pump on our Ready Mix mixers to eliminate all the entrained air from the product. This appears to make a superior working product, but there is some question whether the improvement is sufficient to justify the expense of the de-aeration process.

- f) Communications--As mentioned in the Summary, we are arranging to have Mr. Eugene O'Neill transfer to Marietta in order to maintain closer contact between the laboratory developments and the joint system operations. A small laboratory has been built over the existing quality control lab in the Marietta plant for Mr. O'Neill. Another communication aid is a monthly bulletin which will go out to all of the joint system plants to keep everyone informed of the various activities at other locations.

4. Analyses

We are continuing to conduct analyses for those plants that request it or where some special work may be in progress that makes it advisable to know the purity. The Akron plant is experiencing a decline in their rock purity, so we are analyzing samples weekly. The increased production at many plants has put pressure on the calcining capacities, and in many instances we have analyzed kettle samples. Included in the analyses were complaint samples, specimens of by-product gypsum, and chloride determinations from Grand Rapids' samples.

PATENTS & LICENSING SECTION

SGP 0014590

PATENTS & LICENSING1. Firestop

After the expiration of our 2,744,022 United States patent, we began to offer licenses under 3,616,173. Among the former licensees contacted was National Gypsum Company, and their response contained a statement that our patent was invalid. Through our patent counsel we requested further information on this statement claiming invalidity, and subsequently National Gypsum Company did produce evidence which raised considerable concern about the enforceability of the 3,616,173 patent. In the meantime, two companies accepted a license on the 3,616,173 patent. In view of the evidence extracted from National Gypsum, we will disclaim the patent and advise all of the licensees that we are unable to offer them a license.

2. Shaft Wall

The patent examiner has been unwilling to allow some new arguments and it has been necessary to file a continuation application. This has been done and we are hopeful of a patent issuing based on the latest information presented to the examiner.

3. Round Edge Wallboard

The patent examiner has refused to be persuaded that our round edge board is distinctly different from the round edge board patented by U.S.G. in spite of some sound arguments in opposition to his view. We have, therefore, received a final rejection of all our claims. Our patent attorneys believe that the examiner has made an incorrect appraisal of our situation, and that we have a better than 50% chance by filing an appeal. Since we manufacture 36 million square feet of round edge board annually, we have a lot at stake and have instructed our patent attorneys to proceed with the appeal.

SGP 0014591