C-143-2

INTERNAL CORRESPONDENCE

UNION CARBIDE EXPLORATION CORPORATION • 751 RYLAND STREET, RENO, NEVADA 89502

To (Name) Mr. J. W. Rawlings
Division Mining & Metals
Location 270 Park Avenue - 38th Floor
New York, N. Y. 10017

Date July 20, 1971

Originating Dept. Reno, Nevada - UCEX

Answering letter date

Copy to Mr. W. H. Kohler

Subject Process for Improving Pressed-Wood Panel by Surfacing

Dear Mr. Rawlings:

At the recommendation of Mr. W. H. Kohler, I am forwarding to you a letter and an information bulletin sent to me by Mr. R. P. Villeneuve of North Bend, Oregon. The information bulletin describes a patent for improving pressed-wood panel by surfacing with a compound of thermosetting resin and asbestiform material. Mr. Villeneuve is inquiring as to the possible interest of Union Carbide in this process.

Mr. Villeneuve also sent me several samples of plywood panels which have been produced and tested under a variety of conditions and temperatures. If you feel that these samples would be of use in determining Union Carbide's possible interest in this process, I will gladly send them to you. If you have no interest in the samples, I will return them to Mr. Villeneuve, as he requested.

Will you please communicate directly with Mr. Villeneuve. If there is anything that I can do to assist you with this, please call on me.

Very truly yours,

J. E. Morgan

J. E. Morgan

JEM:rs

Enc.

RECEIVED
JUL 23 1971

Roger Paul Villeneuve
Post Office Box 562
North Bend, Oregon 97459

July 9, 1971

Jim Morgan
Union Carbide Exploration Corporation
751 Ryland Street
Reno, Nevada 89502

Dear Jim:

Approximately two years ago I brought to your attention a ply board made from asbestos product. Please find under separate cover some of that board.

Additional tests are being carried on on the board and so far the board can resist 3000 degree heat. The boards can be made in attractive different colors and patterns.

After your company looks at the board, might it be possible to return the samples to me.

The owner of the board feels that a major timber company such as Weyerhaeuser Company or Georgia Pacific could produce the board jointly with Union Carbide. Union Carbide could supply the asbestos and chemical; the timber company could supply the plant facility and wood.

If your company becomes interested in this matter the owner is very willing to come to an understanding with Union Carbide.

Hoping to hear from you at your earliest convenience, I remain

Sincerely yours,

Roger Paul Villeneuve

RPV:pl

INFORMATION BULLETIN

January 1, 1971

ASBESTOS PRODUCTS, Inc.
3677 Pine Street
North Bend, Oregon 97459

THE PATENT -

The principal property of this corporation is a patent (Ser. No. 657697), developed by LeRoy Fellows and E. R. Hannon of North Bend, Oregon. This patent covers raw material and processes for improving a pressed-wood panel (can be plywood, fiberboard, particleboard, etc.) by surfacing one or more sides with layers (1/8-inch thick or more) of a compound consisting of a thermosetting resin (phenol-formaldehyde, melamine-formaldehyde, etc.) and tremolite asbestos.

The tremolite is mixed with a thermosetting plastic binder at a ratio of 90% mineral fiber (tremolite) to 10% resin. It is spread on the panel core and placed in a hot press, where, under the influence of heat and pressure, the resin is "set" and cured. The resulting composite panel consists of a pressed-wood core, sandwiched between laminates of asbestos-like plastic material. This material is [illegible] (can be bent without warping or cracking). It can be drilled without chipping. It has a hard smooth resinous finish that [illegible] useful as a form panel for reinforced concrete.

This panel is water resistant, rot-resistant, termite-resistant and fire-resistant. With a plywood core, the panel has great structural strength that constitutes a useful material for the building and construction industry. The panel can be easily sawed or worked with ordinary hand tools or portable electric tools.

This panel can be constructed with an ordinary plywood type hot press. Any manufacturing plant possessing such a hot press can manufacture this panel with very little capital investment.

Basic raw materials are utilized in its manufacture which are quite common and in natural abundance: Tremolite asbestos and thermosetting plastic material, principally phenol-formaldehyde. These materials can be produced at a minimum of cost due to the fact that the raw materials are readily available and in abundant supply. Further - the only machinery required is a plywood type hot press, a piece of equipment readily available.

The invention is based on the well-known principal that when refractory mineral fillers are added to phenolic resins, they act as very good flame retardants. Plastic materials are organic compounds and most of them will burn. Inerting fillers or reinforcing mineral fibers have long been used in the plastics industry as fire-proofing additives. In recent years numerous applications have been made of

the unusual fire-resistive qualities of asbestos-base-phenolic resin laminates, constructed of long-fiber chrysotile asbestos felt impregnated and pressure-molded with phenolic resin. A superior heat-resistant product is thus obtained, which has found applications as nose cones and heat shields for the very high temperatures encountered in space flight. When a molded sample is subjected to the flame of a bloutorch for a short period of time, the heat is concentrated in a small area. Thermal degradation sets in at the surface, but because of the poor heat conductivity of the material, the extent of degradation does not go much below the surface. Although the resin below the surface shows signs of carbonation, the structural unity of the sample remains intact. This carbonaceous surface insulates the inner structure from high temperatures and decreases the rate of decomposition. When the entire sample is subjected to temperatures above 2012° F over a long period of time, the material will eventually lose its structural unity. In this material both the resin and the fiber contribute to the heat resistance of the laminate.

The use of long fiber chrysotile asbestos in a mass-produced composite panel would be prohibitively expensive. It has long been felt that only chrysotile asbestos would fill this roll since this variety of mineral fiber has great mechanical strength (ten times the strength of nylon), whereas other varieties, though inexpensive, tend to be weak and brittle.

Mr. Fellows and Mr. Mannon, in their experiments, have found a solution to this problem by the use of a pressed wood structure as a core to give the required structural strength to the composite board. In addition, it was found that at high temperatures - 800° F - the resin is not completely destroyed, but is converted to a carbonaceous material which in itself acts as a binder for the asbestos fibers. On heating the fibers become coated and interwoven into a solid mass. Thus the mechanical bond of the fibers is supplemented by the chemical bond of the phenolic resin, producing a new and superior bond. When thermal degradation sets in, the resin is converted to a carbonaceous type binder with unusually high heat resistance. The residue may, in effect, be considered a "skeleton" of the resin molecule. It has very little strength in itself, but as a coating over the fibers it adds additional bonding-strength properties to the intertwined fibers. Thus even a low-strength asbestiform mineral, such as tremolite can be compounded with phenolic resin to form a good heat shield for otherwise combustible pressed-wood panels. This can be done at a price well within the reach of the building-construction industry due to the natural abundance of the materials used.

Many previous applications of asbestos-base phenolic-resin material, used a larger proportion of resin than is used under our patent (1)), in order to obtain a hard, smooth, resinous surface. Thermal decomposition of the resin in fire tests caused production of smoke and toxic gases. It is our belief that the reduction in resin to 10% of the total weight of the surface laminate results in a diminution of these undesireable byproducts. In applications where surface texture is desireable, it has been found that a thin surface dressing of finely ground tremolite, mixed with 30% resin, results in a superior surface finish. If color is desired in the surface finish, clear melamine-formaldehyde resin with color pigments can be used in the surface dressing.

Processes to date for flame-proofing lumber and plywood, such as fire-proofing paint, which produces a combustible char when heated, or pressure-impregnating with soluble salts, - these processes all have one weakness: they are subject to rapid deterioration by weathering and are not approved for locations subject to moisture.

Our processes result in the construction of composite panels which are waterproof as well as fire-resistive. Thus they have special application to functions in locations subject to moisture and weathering. It is our belief that they have an important future in the construction of low cost fire-resistive buildings and homes.

We also have plans for developing panel boards which are primarily decorative and only secondarily flame-resistive in design. With the use of textured forms in the hot press on surface laminates up to 1/4-inch thick, using clear resin in more abundant quantities and coloring pigments, a composite panel may be constructed to resemble brick, tile, etc.. The possibilities for development are numerous and will be pursued.

In addition, we plan to develop a low-cost panel that would substitute for ordinary plasterboard as an interior sheathing. This type panel would probably have one or more layers of paper between a core, with outer laminates similar to those described above, except that one side would be finished in white. Such a panel would be lightweight, could be produced at a moderate price, and would have fire-resistive qualities far superior to plaster or gypsum board. It could be sawed with an ordinary skillsaw without producing dust. Joints could be taped and patched in a manner similar to present practices with calcareous material.

MARKETING PLANS -

It is the intention of this firm not to go into the manufacturing business, but to act as a franchising firm, allowing qualified manufacturers to produce these panel boards for a basic consideration of $25,000 plus a royalty based upon the quantity of the board produced. The size of the royalty has not yet been determined. Since our patent has been granted in the United States, this firm has applied for patents in Canada and Japan. Our activities in this field will be international in scope, and we will undoubtedly apply for patents in additional countries.

DEVELOPMENT PLANS -

Larger franchise-holders will probably wish to control all stages of manufacturing, from the mining or quarrying of tremolite to the mixing of resins. However, smaller companies will probably want some assistance, in the form of preparation of raw materials as well as in fabricating the finished products. One product we do plan to produce is a dry mixture of tremolite and resin, packaged in weighed units, so that the contents of one package will cover one side of a panel board. We also plan to produce resin-impregnated tremolite felts or mats, which can be handled in the same manner as veneer. By reason of these capabilities, there will be no reason, due to lack of technology, for any qualified manufacturer, regardless of size, to fail in the

manufacturing process. In connection with this business, it will be imperative for us to maintain a well-equipped laboratory where frequent sampling of products produced by franchise-holders may be tested for quality control. We will also need a staff of technicians and inspectors to make frequent inspections of the actual manufacturing processes.

It is our intention to build a pilot plant in the city of North Bend, Oregon, where we will carry on development and experimental work. We intend to build, in connection with the above, a small plant for processing raw tremolite rock, - a plant which can be expanded if the demand for this service increases.

To fabricate a small sample of such a composite panel in the inventor's laboratory is a matter of little difficulty. What remains to be done is to develop mass production techniques, suitable for use of modern industry, so that these products can be manufactured swiftly, with ease, and at no great expense. In addition, we shall want to have our various panels thoroughly tested and carry the approval of recognized testing laboratories, such as Underwriters' Laboratories, Inc..

RAW MATERIALS -

There are many acceptable processes for manufacturing [illegible] powdered phenolic and other thermosetting resins. Most manufacturers carry an inventory of several hundred different "molding compounds" and "varnishes" of this material. We have selected as our chief advisor in selecting and compounding plastic and asbestos materials, Reichhold Chemicals, Inc.. This corporation has great technical capability in this very technical field, and we have eight men working with Dr. Klein and David Preiss of Reichhold Chemicals.

Since other varieties of asbestos almost completely fill the mineral field, the local production of tremolite will have to be encouraged. This firm has made a search of a three state area (Idaho, Washington and Oregon), and we have found plentiful supplies available in all three states with only a market for the material wanting. We have appointed a consulting engineer to our staff who will pursue this search for additional sources of tremolite rock. Since tremolite is a low-cost mineral, transportation costs enter very directly into the total cost of the material. The development of numerous local sources of this material will help to reduce the total cost. It is our hope that we may develop a whole new mining industry, based on the production and utilization of this very promising asbestiform mineral.

Although it is not our present intention to enter directly into the mining end of this business, we must be prepared to mine the tremolite ourselves, if need be, in order to provide our franchise-holders with a plentiful supply of this material at a reasonable cost.

The above descriptive material is offered to the public as information only about this corporation and its products, and is not to be construed as an offer to sell securities.

D. A. Ogden
Secretary of the Corp.