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Subject:	Alternatives to Vermiculite		Date: January 14, 1976

Attached is a copy of preliminary report on alternatives to vermiculite as requested in conference of January 9th, 1976.

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January 14, 1976
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ALTERNATIVES TO VERMICULITE IN TRIONIZED

Introduction

There appear to be four basic approaches as alternatives to the use of vermiculite in Trionized products. These are:

1. Substitute another carrier(s) for vermiculite.
2. Conversion of Trionized processes to Polyform.
3. Build a major SREF facility and use Trionized for limited production of combination products.
4. Conversion to physical blended production with or without an inert carrier added.

The first two approaches are briefly discussed as being the most feasible at this time. Timing and costs given are only estimates without any detailed study completed.

The building of a SREF facility having a capacity of 25 tons/hour would probably cost in the neighborhood of $15 million. The major problems are that the technology has not been developed for SREF-combination products and the potential writeoff of the Trionized Plant along with the loss of fertilizer capacity.

The fourth approach would require a major change in Scotts' business philosophy of quality products. Capital monies would also be required.

In all approaches it is assumed vermiculite will be replaced with one or more alternate carriers in pesticide control products. Considerable work has already been done in this area, however principally toward the goal of backup for corncobs. Although timing is affected by formulation work, agronomic testing and EPA registration, it is probably less critical than the alternatives for the Trionized processes. While some capital and operating costs would be required, these would be the same for all alternatives and not considered in this report.

Alternative 1 -- Substitution of Vermiculite with Another Carrier

The present projected vermiculite ore requirement for 1976 production in the Trionized processes is 31,315 tons (at $62/ton, this is $1,942K). This quantity includes fertilizer and fertilizer combination products but not pesticide control products. For perspective this is equivalent to 94.9 tons per day (330 days/year).

It would seem that the major factors to be considered in finding a replacement for vermiculite would be the following:

1. Availability in quantity required
2. Absorbative capacity
3. Cost
4. Bulk density

Some minor factors which would also come into play would be the following:

1. Compatibility with pesticides
2. pH
3. Friability
4. Dust
5. Handling
6. Pre-processing
7. Product flowability characteristics
8. Non-flammability

Absense of asbestos is ofcourse understood.

We do not now know of anything that would have all four of the major characteristics indicated comparable to the properties of vermiculite. The probability of finding such a material appears doubtful. It may, therefore, be necessary to place a priority rating on these characteristics.

It would seem that the number one factor is that the required quantity of material be available. However, it may be possible, but not as desirable, to use more than one material either by blending or using a specific carrier for a specific product.

We are now in the process in identifying any material that may be applicable. Initially, some materials under consideration for further investigation, with very limited information, are:

1. Mica
2. Pearlite
3. Urea formaldehyde foam Ca (1:1 ratio)
4. Mead Paper Sludge/Clay - 150 ton per day availability
5. Seaweed Product Wastes (extruded) a company considering building facilities which would have 150 ton/day availablity

A tentative schedule for development of an alternate carrier is given in Table 1. Costs would probably be in the range of $300,000 operating money and some capital dollars would probably also be necessary. However, timing and costs for this alternative is very much dependent on the specific materials selected and the variance in physical and/or chemical characteristics from vermiculite.

TABLE 1 -- SCHEDULE FOR ALTERNATE CARRIER FOR VERMICULITE

		Completion Date
A.	Survey of potential carriers in quantities needed.	March 1, 1976
B.	Small scale evaluation of candidate materials for use in fertilizer manufacture.	June 1, 1976
C.	Small scale evaluation of candidate materials for use in combination products (Pesticide stability, etc.). Begin agronomic evaluation.	September 1, 1976
D.	Preliminary Pilot Plant testing of primary candidate carrier in major fertilizer and combination products.	January 1, 1977
E.	Agronomic evaluation of major products in field studies.	November 1, 1977
F.	Completion of field testing of all products (2 years for major products and one year for minor products).	November 1, 1978
G.	EPA Registration completed (if necessary).	November 1, 1978 and 1979

Alternative 2 -- Conversion to Polyform

The major positive factor of this approach appears to be the raw material cost reduction for vermiculite which is now estimated to be $1.9 million in 1976. This approach would also eliminate the problem of asbestos pollution standards, worker safety, or future reduction in air quality requirements with respect to asbestos. Product flexibility would be reduced and other methods developed (process modifications, for example) in order to keep certain products in the product lines or use certain pesticides in the future. An example is the present fertilizer /PCNB products which can now only be made with Trionized products.

The timing for this alternative as given in G. Higinbotham's report of January 13, 1976 on this same subject, is estimated to be 18 to 24 months. If the decision were made soon, another 6 to 8 months would be required to develop the design information for the thin film evaporator.

The estimated capital cost is also given in G. Higinbothan's report mentioned above. This estimate is $5,600K $\pm$ $1,400K. Should it be decided to add HD plants to these processes, the estimated cost given is $4,000K per process or $8,000K.