1. Attached hereto (Appendix A) is an Invention Report (copy of one submitted by letter of to Division Research Grants, the National Institutes of Health). This Report was filed as required by the Department of Health, Education and Welfare in connection with discoveries or inventions developed under Public Health Service Research Grants and Awards. This Report sets forth all of the pertinent details concerning the making of the invention, the parties involved, the research support for the work which led to the making of the invention, the importance of the discovery, and how it is believed the results of this discovery can best be utilized to the benefit of the public.

2. Permission is requested for the Inventor to assign the subject Invention to the Wisconsin Alumni Research Foundation. The Wisconsin Alumni Research Foundation has attempted to serve the public through the commercial development of worthwhile inventions made in the course of the research programs at the University of Wisconsin. The Foundation was established, deliberately, as an organization completely separate from the University in order that commercial dictates would neither direct nor alter the course of the basic quest for knowledge which should motivate research at the University level. Furthermore, royalty income obtained from Foundation licensees as the result of the licensee's successful commercial utilization of inventions voluntarily brought to the Foundation has been invested and the income from that investment returned to the University of Wisconsin in the form of unfettered grants for the support of basic research in the natural sciences.

It is widely recognized that this arrangement has worked well and has served at least two desirable purposes:

(a) It has been instrumental in making it possible to develop some inventions into commercially available products of outstanding importance and value to the public. In at least two cases such products have been, literally, life-saving drugs, and

(b) It has provided many millions of dollars over the years to support basic research at the University.

3. Discoveries made during the course of University research are embryonic in relation to the degree of understanding necessary to their commercial utilization. Consequently, the Foundation invests many thousands of dollars in the development of inventions thought to have either:

(a) genuine value to the public regardless of commercial potential, i.e., certain drugs;

(b) genuine value to the public as well as good commercial possibilities, i.e., rodenticides, vacuum pumps.

The great majority of the inventions in which such investment has been made have not enjoyed any appreciable commercial success. A small percentage have, however, proven to be not only of benefit to the public, but, through a licensing relationship between the Foundation and industry, have proven to be commercially successful and have commanded a royalty return which has been used to support the continuing research effort at the University.

Net income to the Foundation from any given invention has traditionally been shared with the inventor(s), the Foundation receiving 85%. Where multiple inventors are involved, the inventor's 15% is shared among them.

4. It is proposed that, if the Surgeon General entrusts development of this invention to the Foundation, a commercial partner will be sought. The Foundation will be responsible for the development of a patent position and the commercial firm will be responsible for carrying out the several steps which are preparatory to the marketing of a pesticide in the U.S. today.

5. It is the licensing practice of the Foundation to grant its commercial partner an option for a commercial license during the period of product development and to require diligent effort by such partner during the option period.

6. It is proposed, that, in view of the substantial investment required, the licensee should be granted an exclusive license for a period of five (5) years beginning with the date of first marketing.

7. The royalty rate will not be more than 10% based on net sales of the licensee (a rate generally considered as reasonable in this trade), but will be negotiated with the licensee after the product merits are better understood.

8. These arrangements should make it possible to secure an aggressive program of evaluation, development, registration and sale of myristicin as a synergist for carbamate insecticides. Without the incentives which these arrangements would provide, it is almost certain that a commercial company would not give full and adequate consideration to any proposal that it market myristicin for the suggested purpose and that, therefore, any potential benefit which would accrue to the public would not be realized.

9. In the event that a favorable determination is made under Sec. 8.2(b), the Foundation agrees:

(a) That the government will have a nonexclusive, irrevocable, royalty-free license to practice under the invention in all aspects for governmental purposes including use of the invention on behalf of any foreign government pursuant to any non-existing or future treaty agreement with the U.S.

(b) That any and all sales to the government will be royalty-free.

(c) That royalty rates will not be in excess of normal trade practices under competitive conditions on similar products.

(d) That development work by licensees relating to the invention will not be supported in any way by Public Health Service Funds.

(e) That after the period of exclusivity has expired, it will hold itself ready to negotiate nonexclusive licenses with properly qualified companies at appropriate and applicable royalty rates of such licenses in the industry.

10. Lichtenstein has discovered that an extract of the food crop, parsnips, has an insecticidal activity of considerable promise. The fact that this activity has been part of the diet of man for many years is good evidence of either a low level or complete lack of mammalian toxicity when ingested in reasonable quantitites. Prior to his identification of the active ingredient as myristicin, Lichtenstein established that the compound was an active insecticide, a knock-down agent, and a repellent to some species, as well as a synergist for carbamate insecticides.

11. It is interesting to note that after identification of the active agent as myristicin, Lichtenstein found a literature reference*

*Kerr, R. W., Australia, Commonwealth Sci., Ind. Res. Organ. Bull. 261. (1951)

to the use of nutmeg oil, which contains myristicin, as a synergist forpyrethrin in tests with houseflies. In spite of this early disclosure, no companies, as far as is known, have seen fit to develop and market insecticidal combinations containing myristicin.

12. It has been established that the synergistic activity of myristicin with carbamate insecticides may be of considerable commercial interest and appears to be a patentable discovery.

13. Preliminary discussions with Union Carbide Corporation which presently markets the carbamate insecticide most widely used in the U.S., have indicated that this company has a desire to proceed with the further evaluation of myristicin as a carbamate synergist and would hope ultimately to be able to register such use. However, Dr. Richard Wellman of Union Carbide, has stated "If an exclusive position under patent protection is not available, Union Carbide will not undertake to develop this or any invention."

14. The work required to secure registration of this material as a synergist for carbamate insecticides will include the following steps:

(a) Produce quantities of myristicin.

(b) Confirm and replicate the Lichtenstein observations.

(c) Determine species and sex selectivity.

(d) Determine range of conditions best suited for the control of each susceptible species.

(e) Conduct toxicity tests of myristicin, alone and in combination with other ingredients. (Some tests may run two years in duration.)

(f) Conduct formulation studies to prove stability of products expected to move through commercial channels of sales and nationwide distribution.

(g) Initiate and correlate field studies and results.

(h) Obtain registration.

A university should not, and in some instances, cannot perform these functions.

15. The work outlined in paragraph 14 represents the expenditure of substantial sums of money. Furthermore, it is the nature of such new product development work that events may necessitate the abandonment of the project, at any time during the program. Many industrial estimates have been made of the cost and risks of such programs. In a paper presented to the 18th Annual Pesticide Conference with Industry, Madison, Wisconsin, January 8-9, 1964, Dr. John P. Frawley, Chief Toxicologist, Hercules Powder Company, presented the experience of his company in this area. A table used in his presentation is attached as Appendix B.

This chart indicates that myristicin as a synergist, which is now at the point of secondary screening, has one chance in 150 of being successful. This success can only be achieved by the expenditure of nearly $1,000,000.

Dr. John A. Field of the Union Carbide Company confirms these numbers in his paper which is attached as Appendix C.

16. These costs reflect the requirements for increasing amount of information which must be submitted to support allegations of safety of a particular insecticidal compound and are a measure of the increasing caution concerning the use of pesticides in the U.S. today. The President's Science Advisory Committee Report of May 1963 called for safe and more precise methods of insect control. Myristicin

In the actual statement of basic policy itself, the President's memorandum stipulates in Section 1, that, where certain categories of situations exist, the Government shall normally acquire or reserve the right to acquire the principal or exclusive rights to all inventions made by a Government contractor. But Section 1(a) also provides that, even in those situations where the Government normally might expect to take title:

> "Greater rights may also be acquired by the contractor after the invention has been identified, where the invention when made in the course of or under the contract is not a primary object of the contract, provided the acquisition of such greater rights is consistent with the intent of this Section 1(a) and is a necessary incentive to call forth private risk capital and expense to bring the invention to the point of practical application."

In the memorandum of October 10, 1963, the President also said

> "---------the Government has a responsibility to foster the fullest exploitation of the inventions for the public benefit."

It is the position of this University that discoveries made by its personnel while working with government research support will not regularly be fully exploited to the point of public benefit, unless a pattern is found by which the results of this research are permitted to flourish through the judicious application of the patent system. It is the experience of this University that the Wisconsin Alumni Research Foundation is competent to secure the industrial investment while at the same time committed to the protection of the public welfare in its practice of invention development and licensing.

18. In view of the substantial reasons set forth above, it is urged that an early and favorable determination be made in response to this petition.

Respectfully submitted,