Laboratories for Natural Products,
Medicinal and Aromatic Plants

August 20, 2002

Memorandum

To: Ms. Sharon L. Lick, S/C, Registration Unit, DEA

From: Lyle E. Craker, Department of Plant and Soil Sciences, University of Massachusetts

Subject: Application for registration

As per our telephone discussions, the application for registration (DEA Form 225) is enclosed along with answers to your questions. Please note, I decided to resubmit the application originally submitted on June 25, 2001 (dated as received by DEA on June 28, 2001), as I could see no differences in this application form and the new application form you mailed. The previous form had all the necessary University approval signatures. You had indicated that this would be okay, but if you now see a problem, let me know and I will complete and send the new form.

The answers to your questions are on the enclosed pages. Again, if you see any problems, please let me know and I will provide more detail.

I do wish to thank you for your help. I am sorry for the three week delay in responding, but I did have commitments in Toronto that took most of this time. I trust that everything is now correct and a decision on the application can be made within a reasonable time period.

Response to Bulk Manufacture Questions

1. What is the purpose of the bulk manufacture of the controlled substances (schedule I & II only)?

   The plant material will be grown for federally-approved uses only, including analytical, pre-clinical, and clinical research. Absolutely no material is intended for illegal use or for medical marijuana patients whose use may be legal under state, but not federal law.

   The production costs for the University of Massachusetts at Amherst facility would be underwritten by a grant from the Multidisciplinary Association for Psychedelic Studies (MAPS, www.maps.org), an IRS-approved 501 (c) (3) research and educational organization. MAPS is seeking to develop the marijuana plant into an FDA-approved prescription medicine. The growth of plants at the University is a necessary step for supplying quality marijuana for use in MAPS' drug development process. MAPS will sponsor research at other institutions using smoked marijuana and marijuana delivered through a vaporizer device that heats, but does not burn the plant material, thus reducing the products of combustion normally found in smoked marijuana.

   Researchers conducting MAPS sponsored research would receive supplies of the plant material free, while other researchers would either receive the marijuana free or through a donation to MAPS. Consideration would be given to supplying the seven remaining patients that receive marijuana from NIDA as part of the FDAs compassionate access program, but additional supplies of plant material would need to be grown (along with additional funding to support the plant growth) for this use.

2. Please describe the production process for these controlled substances (CS) from start to finish.

   For production of the plant material, seeds for growing the marijuana plants would be secured from a federally approved domestic (USDA, NIDA, or other) or foreign (Netherlands, Canada, or other) source and sown in a greenhouse potting mix (peat, perlite, and vermiculite) contained in flats. The flats would be watered regularly to initiate germination and seedling growth. As the seedlings reach about two inches in height, the young plants would be transplanted into plastic pots (6-12 inches in diameter) filled with the same potting mix. The plants would be watered and fertilized as necessary to maintain vigorous growth until harvest of buds or other tissues. At harvest, the selected tissue(s) would be removed by hand and air or oven dried. The remaining plant tissues would be removed from the pots and destroyed by incineration or other federally approved manner. The harvested and dried tissues would packaged and shipped (via Federal Express) to federally approved (registered) research laboratories.

All plant growth, from seedling to harvest, would be done in an enclosed growth room, environmental chamber, or greenhouse (depending upon the security requirements of federal and state agencies) in which temperature and/or light could be controlled. The room or chamber would also be used in drying and packaging of plant materials. All packages would be weighed and logged to certify the quantity and disposal of all materials produced. Depending upon the licensing agencies (federal and state) requirements, the growing facility could be locked and under 24 hour guard with access video taped and limited to only those needing entry for maintenance of the plant material.

Production is anticipated to involve different selections of marijuana to develop plant materials containing different levels of THC. As such, some plant selecting and crossing could be done as part of the production process to raise or lower the levels of THC in plant tissues. All of these activities would occur in the production facility.

3. What material will be used to manufacture the CS and what quantities will be used?

The materials used in growing the plants will be those commonly used to grow other plants in environmentally controlled facilities. This will involve a commercial potting mixture, consisting of peat, perlite, and vermiculite, an secure growth facility (an enclosed growth room, environmental chamber, or greenhouse), containers for packaging dried plant materials, and other miscellaneous items such as pots, harvesting knives, pot stakes, water, and fertilizer. The quantities of these will be limited to that necessary to grow the plants.

4. Please provide the name, address, and methods of shipment an delivery for the suppliers from which your firm intends to procure materials for manufacturing the CS.

The materials used to grow the plants (potting mix, fertilizer, flats, pots, stakes, packaging materials) would be purchased locally from garden stores or from regional distributors.

5. Does your company have a firm commitment form the suppliers of the raw materials?

The University of Massachusetts has contracts with various garden centers and other distributors for purchase of plant growing supplies. No commitment from suppliers of marijuana seed supply has been secured, but will be obtained once licensing to grow the plants is approved.

6. What quantities of CS does your company anticipate producing and who are the interested customers?

The goal for the first year is a maximum of 25 pounds dry weight of manicured buds in an FDA-approved dosage form. This amount would be from several different strains

to ensure researchers a range of potencies from about 7-15 % THC. All material would be distributed to federally-approved researchers, such as Dr. Donald Abrams, UC San Francisco, for use in FDA-approved clinical trials, and Chemic Labs, Canton, MA, an analytical lab for research the constituents of marijuana vapor produced by experimental vaporizer devices. Customers would include both MAPS-sponsored research and research sponsored by other organizations.

The amounts to be produced in subsequent years will depend upon the success of the initial clinical trials. If initial trials are promising, the larger quantities required to support Phase III research studies would be grown (in the same facilities and under the same conditions). Production could eventually increase further if prescription use of the marijuana plant, via vaporizers or method, is approved by the FDA.

7. When does your company anticipate selling a commercial product?

A time period of six to nine months (after approval by federal and state agencies) is expected to be required for growth of the initial plant material. The dried plant material could then begin to be made available to approved researchers. To generate the data on safety and efficacy required by FDA needed for the submission of a New Drug Application (NDA) by researchers would probably require growth of the plants over a five year period. The sale of supplies for prescription use would thus be at least five to six years from the start of production, if ever.

8. If your firm has any current Drug Enforcement Administration registrations, please include this information your response.

Applicant (principal investigator) has no current or previous registrations and is unaware of any registrations ever previously granted to the University of Massachusetts.

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