June 17, 1991

Richard E. Michelle
Office of Pesticide Programs
Registration Division
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Dear Richard:

This letter is in response to questions you raised concerning a Section 18 application submitted for untarped Methyl Bromide use on potatoes.

I have discussed your inquiries with several people from TRICAL and with John Radewald. By the way, since he has retired, John has requested that he not be listed as a reference on this Section 18 application.

A. THE PEST PROBLEM

You requested details on distribution of the nematode pests in potato growing areas of California. The information available is largely based on soil sampling of suspected problem areas to help determine if preplant treatment is necessary. Unbiased surveys of California potato or, for that matter, most other cropping areas have never been undertaken.

Within the Tulelake/Klamath Basin (largely Modoc and Siskiyou counties) potato growing areas, root knot has been the primary problem for a number of years particularly *Meloidogyne chitwoodi*, and *M. hapla.* These nematodes are of particular concern because their presence causes a blemish on tubers which makes them unmarketable for fresh market or chip use. Typically, an entire field can be rejected if only 5% of the tubers have blemish. Other uses such as for potato starch are much less profitable.

Stubby root (*Paratrichodorus* sp.) is also common and is causing increasing concern because of its potential for virus transmission. The virus transmitted, corky ring spot, also causes a blemish which makes tubers unmarketable, again with as few of 5% of the tubers showing blemish.

The lesion nematode *Pratylenchus neglectus* is common in fields but we have not been able to associate its presence with yield losses or tuber blemish. *Pratylenchus penetrans* , another nematode which causes blemish on tubers, has been found in this area a number of times, but does not seem to be of concern to growers at the present time.

In the Kern County area, the primary pest at the present time is again root knot nematode but with *M. incognita* predominating. *M. javanica* , *M. arenaria* , and *M. hapla* are probably present in some fields as well. Stubby root, *Paratrichodorus* sp., is present in this area as well.

For both areas, I would estimate that 50 to 60 percent of the growing area would be infested with one or more pest species. Statewide, losses could probably be estimated at 10% which, on the surface, may not sound too critical. In reality though, without treatment, some growers would not experience any loss while individual growers would exprience a disastrous 100% crop loss as a result of tuber blemish. Unfortunately, it is difficult to predict which growers will exprience a loss and which will not, making it necessary to treat all acres known to be infested with root knot or stubby root nematode.

To my knowledge, needle nematode (*Longidorus africanus* ) is not known to cause problems on potatoes in California.

B. CROP OR SITE

You questioned how the figure of 30,000 acres needing to be treated was arrived at. I would estimate that the acreage infested is closer to 50 to 60 percent rather than the 30 to 40 percent estimate in the application. For example, Cooperative Extension Area IPM Advisor Pete Goodell (telephone 209-891-2500) conducted a survey last summer of cotton growing areas in Kern county and found at least 50 percent of the area was infested with root knot nematode. I think the same would hold true for the county's potato growing areas. Applying these estimates to the 47,200 acres grown in 1988 would provide an estimate of 23,600 to 28,320 acres. Still not 30,000 acres but closer.

C. ALTERNATIVES

During the past year, when 1,3-D was not available, growers either (1) did not plant potatoes, (2) treated with ethoprop, or (3) treated with metam-sodium. I believe the first two options were the most frequently used, although my knowledge is largely based on the Tulelake area. Farm Advisor Harry Carlson in Tulelake estimates potato acreage in that area decreased from approximately 16,000 acres to 13,000 acres. The Section 18 application which is written from a Kern county perspective indicates that metam-sodium is used more frequently than ethoprop in that area. Perhaps CDFA could contact Agricultural Commissioners in Modoc, Siskiyou, and Kern county to obtain more detailed information on pesticide usage during the past year.

Whether or not growers using an alternative chemical experienced damage has not been documented as far as I know. The damage experienced during a particular year from nematodes is related to soil temperature. In a warm year, nematodes will go through an extra generation or two and more damage will be experienced than in a cool year. I believe last year was pretty much an average year with respect to soil tempertures. The fact that potato growers waited almost a year after the suspension of 1,3-D to proceed with a Section 18 application, might indicate that they tried the alternatives and found them unsatisfactory.

In the past, growers in the Tulelake area typically used 1,3-D in combination with ethoprop. This is because 1,3-D tended to miss the nematodes in the top 2 to 3 inches which were then taken care of by ethoprop. The fact that Rhone-Poulenc only recommends the use of ethoprop in combination with 1,3-D for *M. chitwoodi* is probably indicative of the lack of confidence they have in its performance as an alternative. Because of the inconsistent efficacy of metam-sodium and ethoprop, the use of either would probably not greatly decrease losses experienced by growers. The overall percent loss might decrease somewhat but individual growers would still suffer losses of entire fields.

Efficacy data available for ethoprop and metam-sodium in the Tulelake area indicate that neither material can routinely provide the type of efficacy that has been provided in the past by 1,3-D plus ethoprop. For example, see the enclosed 1990 Tulelake Field Station progress report. Although efficacy data for Methyl Bromide on potatoes is not available, on other crops this material has traditionally provided nematode control equal to or better than 1,3-D.

As you know, chloropicrin is also registered as a nematicide on potatoes. Its history as a nematicide is no better than metam-sodium. I think if TRICAL, which holds a registration on this product, had confidence in its efficacy the company would not be supporting a request for a Section 18 registration on another one of its products.

D. ECONOMIC EFFECTS INFORMATION

The cost of production would likely increase for two major reasons: (1) growers would either be forced to fallow fields for one to two years, to allow time for nematodes to starve to death, with subsequent loss of income; or (2) growers would have to plant rotation crops which were not susceptible to nematodes. With the wide host range of both root knot and stubby root nematodes, there are few nonhost options available to growers. Also, the nonhost crops available are typically of lower value which is why growers would prefer to plant potatoes.

E. PROPOSED PROGRAM

The application is for untarped, broadcast treatments. I am concerned about the specification of an 18-66 inch shank spacing. Traditionally, fumigation has been conducted with 6-18 inch shank spacings. TRICAL assures me that measured gas concentrations at the wider spacings are sufficient for nematode kill. The University of California does not have efficacy data to support this wider spacing. I hope TRICAL will work with narrower spacings until data documenting actual nematode kill at the wider spacings is available. I also have concerns that "efficacy" of untarped applications is largely based on gas measurements. Hopefully, we will have some data in the future demonstrating nematode kill in untarped applications.

Sincerely,

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Extension Nematologist

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