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American Cyanamid Company  
Agricultural Research Division  
P.O. Box 400  
Princeton, NJ 08540  
(609) 799-0400

November 20, 1985

Mr. William H. Miller  
Product Manager (16)  
Insecticide-Rodenticide Branch  
Registration Division (TS-767)  
U.S. Environmental Protection Agency  
Crystal Mall, Building No. 2  
1922 Jefferson Davis Highway  
Arlington, VA 22202

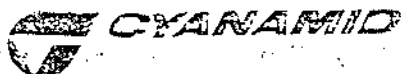
Dear Mr. Miller:

The attached memo of November 20, 1985 from Dr. G. Mangels to Ms. Carolyn K. Offutt pertains to their meeting of December 6, 1985 to discuss EEC's for terbufos generated using the SWRRB and EXAMS models. As we discussed it is not necessary for participation of Registration Division personnel at this meeting. Ms. Carolyn Offutt will communicate the results of the meeting to you after its occurrence.

Very truly yours,

William A. Steller, Manager  
U.S. Plant Industry Registrations

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Attachment



American Cyanamid Company  
Agricultural Research Division  
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November 20, 1985

To: Carolyn K. Offutt  
Chief Environmental Processes and Guidelines Section  
Exposure Assessment Branch  
Hazard Evaluation Division (TS-769)

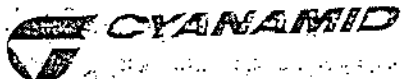
From: Dr. Gary D. Mangels  
Senior Environmental Projects Leader  
Agricultural Research Division  
American Cyanamid

Subject: Modeling of Terbufos Estimated Environmental  
Concentrations

We recently received copies of EEC's for terbufos generated using the SWRRB and EXAMS models. There are several important parameters which we feel need to be addressed for a more accurate prediction of the EEC's. The labeled use rate for terbufos is 2.4 oz. a.i./1000 linear feet of row with 7" band treatment over the row. The rows are spaced 30" apart, giving a maximum application rate of 2.57 lb a.i./acre. The EEC's previously reported were generated based on 20" row spacings, giving an application rate of 3.92 lb a.i./acre. The current label rate specifies the 30" row spacing, not a 20" row spacing as previously permitted. If one assumes uniform incorporation of the maximum application rate (2.57 lb a.i./A) of terbufos in the top 5 cm of soil in a corn field, then 0.514 lb a.i./A (20 % of 2.57 lb a.i./A) will be incorporated in the top 1 cm of the soil, which will be available for runoff. Using data by Erback and Tollefson, approximately 15% of the applied dose should remain on the soil surface, with the remaining 85% incorporated in the top 5 cm of the soil. The top 1 cm will contain 32% of the applied dose ( 15% on the surface and 17% in the top 1 cm ), which is equivalent to 0.822 lb a.i. A (32% of 2.57 lb a.i./A). This value should be used as the loading on terbufos for the SWRRB model.

Several of the chemical properties of Terbufos should be reevaluated. The water solubility used in the modeling was 10-15 ppm. Three sources, (R. Peterson, ACCO, C-1433, 1978), (Bowman and San, J. Environ. Sci. Health B14(6)625-634, 1979), and (Felsot and Dahm, J. Agric. Food Chem, 27(3)551-56, 1979) reported water solubilities of 4.5, 5.5, and 5.07 ppm. We feel that a water solubility of 5 ppm is an accurate value.

The octanol/water partition coefficient (Kow) used was 167. The n-octanol/water partition coefficient was reported by ACCO (PD-M:17-13;1-12) as 595. Since this value is significantly greater than the used value of 167, the new value should be used.



November 20, 1985

No value was used for the Koc, but data from Allan Felsot (A.C.S. 2nd Congress of North American Continent, August 24-27, 1980, Las Vegas, Nevada) can be used to determine the Koc. The adsorption of terbufos onto 6 soils was studied. The Kd's ranged from 8.5 to 26.1, with the % organic carbon ranging from 1.16 to 7.46%. The Koc's ranged from 276 to 881, with an average Koc of 447. Additionally, the value of Koc was calculated by Kenega (Ecotoxicology and Environmental Safety, 4, 26-38, 1980) to be 1,100.

The aerobic soil half-life used was 1848 hr or 77 days. The number appears to have come from ACCO report PD-M-10,484-583. The value of 77 days referred to in this report is the half-life of carbon-14 labeled residues, not terbufos. The SWRRB model uses a half-life of 11 days (0.0038/hr), which is well supported by the literature. Since this value was used for the SWRRB model, it should also be used for the EXAMS model for consistency.

The aerobic soil bacteriological decay rate used was  $3.75E-9$ . We have not been able to determine the source of this value and feel that this value should be reexamined.

The mass of terbufos calculated by SWRRB to be in the run-off was not used as the loading into the EXAMS model. The loadings were similar to the run-off masses, but were always greater than the calculated run-off. If there is a reason for adjusting the loadings upward, such as a safety factor, it is important for us to know the basis for this adjustment so that we can also consider using such a factor in our in-house modeling systems.

I am looking forward to meeting with you and your staff to discuss the ramifications of the changes in the inputs into the models. If you would like to discuss any aspect of this modeling effort with me before our meeting, feel free to call me at 609-799-0400 ext 2549.

Sincerely,

*Gary D. Mangels*

Dr. Gary D. Mangels