Shaugh. No. 098301

EAB Log Out Date: JAN 13 1987

Init.:

To: M. Brannagan
Product Manager 65
Registration Division (TS-767)

From: Carolyn K. Offutt
Chief, Environmental Processes and Guidelines Section
Exposure Assessment Branch, HED (TS-769)

Attached, please find the environmental fate review of:

Reg./File No.: 177-004

Chemical: Aldicarb

Type Product: I/N

Product Name: Temik

Company Name: Union Carbide

Submission Purposes: Comments on letter from Lovell to Auerbach on details on Union Carbide's proposal for national monitoring for aldicarb

Action Code: 870

Date In: 7/11/86

EFB#: 6747

Date Completed: 8/4/86

TAIS (Level II) Days

2

Deferrals To:

_____ Ecological Effects Branch

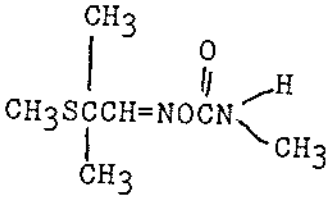
_____ Residue Chemistry Branch

_____ Toxicology Branch

EVALUATION OF ALDICARB GROUND WATER MONITORING PROTOCOL

1. CHEMICAL:

Chemical name: 2-Methyl-2(methylthio)propionaldehyde O-(methylcarbamoyl)oxime
Common name: Aldicarb
Trade name: Temik
Structure:



2. TEST MATERIAL:

not applicable

3. STUDY/ACTION TYPE:

Letter from J.S. Lovell to J. Auerbach supplementing Union Carbide's Mar. 27, 1986 proposal for nationwide monitoring for aldicarb.

4. STUDY IDENTIFICATION:

Title: EPA Correspondence No. 156-86
Author: J.S. Lovell
Submitted by: Union Carbide Agricultural Products Company, Inc.
P.O. Box 12014
T.W. Alexander Drive
Research Triangle Park, N.C. 27709
Issue Date: July 9, 1986
Identifying No: 098-301

5. REVIEWED BY:

Matthew N. Lorber, Agricultural Engineer _____ Date 10/6/86
Environmental Processes and Guidelines Section/EAB/HED

6. APPROVED BY:

Carolyn K. Offutt, Chief
Environmental Processes and Guidelines Section/EAB/HED _____ Date 1/12/87

7. CONCLUSIONS:

There are serious problems with Union Carbide's proposed method to locate areas in which to monitor for aldicarb - see Discussion Section below. Their "Recommended Action..." proposals are rational and appropriate.

8. RECOMMENDATIONS:

A meeting should occur between key EPA personnel including Jan Auerbach and other members of the Ground Water Team and the Special Review Branch in order to agree on the type of monitoring which will be required for aldicarb. Concurrently, Union Carbide needs to submit convincing information showing why they believe that adequate degradation data can lead to reliable predictions of aldicarb ground water concentrations. This should then be followed by a meeting with Union Carbide representatives to discuss these monitoring ideas. Without these meetings Union Carbide will continue to develop plans which appear inappropriate at this time. Finally, it should be noted that any large monitoring program should have a valid statistical basis so that representativeness of results from sampled wells can be quantified for other wells in the area.

9. BACKGROUND:

Union Carbide submitted an initial plan for a national survey on 3/27/86. Jan Auerbach then called and requested further details. This letter is in response to Jan's request.

10. DISCUSSION

It is not appropriate to determine areas to monitor with the use of existing models alone as is discussed in the letter in the two paragraphs following the section entitled, "Selection of Sampling Sites". Too much weight is placed on the PRZM model and soil information to locate counties where aldicarb is expected to reach ground water. Not enough weight is placed on other aspects of hydrogeology. Using the PRZM model in this type of task assumes that accurate knowledge exists on the rate of aldicarb degradation and sorption tendencies in different soils and different climate regimes. This is only true for a dozen or so sites. It is felt that the use of PRZM in making decisions of this nature (in contrast to tasks such as screening, evaluation of alternatives, supporting decisions where hard data is also available, etc.) may only be appropriate where there is prior field data in which to first validate the model and show that chosen degradation rates and sorption coefficients are reasonable for that location. It also assumes that there is uniform agreement on the appropriate

type of PRZM output to examine to determine counties with susceptible ground water. This is also not the case.

Most importantly, it assumes that EPA would like only hydrogeologically sensitive counties to be monitored. Without going into depth, EPA envisions a statistically valid survey (similar to the national survey for pesticides) which oversamples hydrogeologically sensitive areas, but also samples counties of moderate and low vulnerability.

It should be noted that the sentence, "Our project scientist has discussed the procedures used in this study with EPA modelers." is probably in reference to discussions with personnel in the EPA Athens, Georgia, laboratory including most prominantly Bob Carsel. It is certainly not in reference to myself, or anyone else in OPP. I might also caution that discussions between Bob Carsel and Union Carbide does not represent endorsement of Union Carbide's ideas by OPP. Any discussions between Union Carbide and the Athens lab have not been shared with personnel from OPP.

It would be more appropriate to locate hydrogeologically sensitive aldicarb use counties (or similar large areas) with the use of a screening methodology such as DRASTIC. Indeed, for the National Survey, DRASTIC was applied to every county in the U.S. on a screening basis. The results of this effort are probably adequate to characterize aldicarb use counties for the purposes of initial county selection in a survey, and we would be more than willing to share these results with Union Carbide.

The procedure Union Carbide's proposes to further refine the county list once hydrogeologically vulnerable counties have been located is also inappropriate. They state that counties where reliable saturated zone degradation rates are available need not be extensively monitored because the impact on drinking water supplies can be reliably predicted. There are three things wrong with that proposition:

1) The concept of a "reliable" saturated zone degradation rate is difficult to endorse. Even the process of extracting ground water from its natural environment for testing changes the conditions of natural degradation. The example which comes to mind is the saturated zone degradation work on aldicarb in Florida. The presence of natural aquifer limestone material in laboratory testing changed the nature of the degradation process - it caused the reduction of aldicarb sulfoxide to aldicarb sulfide, which hadn't been noted in testing in Florida ground water without the limestone material.

2) The concept of a "reliable" predictive methodology for the saturated zone suffers from the same problem, only worse, as depending on PRZM to adequately model the unsaturated zone in order to select counties for monitoring. I know of only one example, and that was done by Union Carbide modelers, of an

adequate field data base (also developed by Union Carbide) which was adequately validated with a ground water model such that predictions can be considered reliable for the particular setting of the field data base. In other words, the science of predicting pesticide movement to and through an aquifer is not yet developed (and may never be) to the point that decisions can be made only on the basis of their predictions and no other hard data.

3) The most important problem with Union Carbide's strategy is that they are assuming that the regulatory strategy for aldicarb will be to solely protect current drinking water wells. In other words, if aldicarb transport can be reliably predicted, then appropriate well setbacks can be determined and monitoring is not necessary. The EPA has not determined that the objective of a regulatory strategy for a leaching pesticide is to protect drinking water wells, much less determined that the appropriate means to assign well setbacks is with a model. The current OPP policy is to protect potable supplies of drinking water. Therefore, the overall objective of any monitoring program is not to assure safety of current drinking water wells, but rather to estimate the occurrence of residues in potable supplies of ground water or in currently used drinking water wells.

In summary, the problems with Union Carbide's plans are:

1) Some measure of hydrogeologic vulnerability is preferable to PRZM modeling for characterization of aldicarb use counties, or, hydrogeologic vulnerability should at least be used in addition to PRZM analysis.

2) Saturated zone modeling with a "reliable" saturated zone degradation rate is inappropriate at this time as a means to determine well setbacks and hence protect potable drinking water supplies.

3) In a survey design consistent with the National Survey and other surveys overseen by EAB (alachlor, etc), no counties will be left out of consideration for sampling due to hydrogeologic insensitivity or existence of a "reliable" saturated zone degradation rate.

It is clear from reading this letter from Union Carbide that the aldicarb special review team must meet to come to an understanding of the type of monitoring program that we will require, and then have a meeting with Union Carbide representatives to discuss a program with them.

The second section of this letter, "Recommended Drinking Water Monitoring Program", was designed on the premise of the first section, "Selection of Sampling Sites". As such, comment on this section is not warrented at the present time. The first priority is to come to agreement with Union Carbide on an overall objective and survey design.

The third section entitled, "Recommended Action When Residues Are Found in Drinking Water", is short and succinct. When a confirmed residue is found, determinition of its source and monitoring of nearby areas is a sensible strategy. Determination of mitigating measures for these situations is also sensible. What Union Carbide fails to mention in this section is <u>who</u> will foot the bill and <u>who</u> will do all this work.