098301

A, N, D

Shaughnessy No. 098301

Date Out EFB: FEB 9 1983

To: Frank Sanders
Product Manager 12
Registration Division (TS-767)

From: Emil Regelman, (Acting) Head
Review Section No. 1
Environmental Fate Branch
Hazard Evaluation Division (TS-769)

David Severn

Attached please find the environmental fate review of:

Reg./File No.: 264-330

Chemical: Aldicarb

Type Product: Insecticide/Nematicide

Product Name: TEMIK

Company Name: Union Carbide

Submission Purpose: Groundwater analysis results and plans for additional monitoring in Florida

ZBB Code: other

Date In: 1/25/83

Date Completed: FEB 9 1983

ACTION CODE: 435

EFB # 170

TAIS (level II)	Days
67	4

Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

1. INTRODUCTION

1.1 Union Carbide (UCC) has submitted to the Agency an extremely brief (7 paragraphs) description of their 1983 plans to work jointly with Florida in monitoring aldicarb use and groundwater contamination. The extent of the program and the locations to be sampled with regard to new sites are not provided in this submission.

1.1.1 The Florida Department of Environmental Regulation (DER) will monitor TEMIK use and aldicarb residue movement in areas where TEMIK was previously used and will again be applied.

1.1.2 The Health and Rehabilitation Services Department and UCC will continue a drinking water well sampling program in at least 7 counties.

1.1.3 The above will include incorporation of the data in mathematical models by UCC and University of Florida's Institute of Food and Agriculture Services in addition to characterization of the groundwater residues by the Florida Department of Agriculture.

1.2 This submission also includes the results of Florida's aldicarb groundwater monitoring of late 1982.

2. THE JOINT STATE OF FLORIDA - UCC ALDICARB MONITORING PLANS

2.1 Sampling plans provided to the Agency are provided in paragraphs 1 - 7, below:

1. DER will complete placement of new test wells at Indiantown and will sample these before January 14 (Patton). UCC (Minter) will again resample the five shallow test wells in the [redacted] grove with Dr. Patton's approval. Analytical results from all should be available on January 14.

2. DER with UCC will resample the Alcoma site test wells and DER will assist UCC in selection and hydrologic description of a second test area on the Ridge. Analyses of the second Alcoma series will be by DER, UCC, and by DACS, the latter characterizing the residues. (McNeal, Patton, Jones, and Minter)

3. DER will check hydrology of the Oveido site already initiated by UCC. Test wells will be modified if needed. DER/UCC will supervise sampling of these wells before application, supervise the application, and plan the schedule for post-application sampling. (Minter, McNeal, Jones, Pattor)

4. DER/UCC will install test wells at the second Ridge site prior to the 1983 Temik application. Samples will be taken upon conditioning these wells before application and a schedule for post-application sampling will be set. (Patton, McNeal, Jones)

5. DER/UCC will cooperate on well installation at a Volusia County Site and on subsequent sampling. Dates and details to be worked out by Patton and Bertwell.

6. DER will direct expansion of test wells at the Alcoma site and will keep UCC informed. UCC will assist as needed in project (McNeal, Patton, Jones, Minter). Sampling schedules will be developed jointly.

7. HRS and UCC will jointly continue their existent programs for sampling drinking water wells in the state (Mutter and Back). HRS program for 1983 will total about 200 samples from wells sampled quarterly in 7 counties. UCC will sample about 200 wells in 10 or more counties after Labor Day.

3. DISCUSSION OF SUBMITTED SAMPLING RESULTS

3.1 A map of Florida was submitted indicating that 180 sites in 17 counties were sampled in September. However, an incomplete copy of the summary table (only 2 out of 9 pages) accompanying the map was submitted and included the results of only 2 counties (Polk and St. John's) sampled by UCC. A key to the table explaining foot notes and abbreviations, weather data and a description of the analytical method was not included. The portion of the summary table submitted, (Table 1, on the next 2 pages, below) appears to show no residues detected.

Table 1

SUMMARY OF ANALYSES OF FLORIDA DRINKING WATER WELLS FOR ALDICARB RESIDUES IN HIGH TEMIK USE AREAS LISTED BY COUNTY AND SAMPLE

Sampled September 1981
Union Carbide Agricultural Products Co.
Printed October 6, 1982
Revised October 11, 1982

1982 WELL WATER DATA										TEMIK USE DATA					ALDICARB RES.			
DATE	SAMPLE	WELL	PEOPLE	TRTD	DEPTH	W.T.	pH	CONST	USE	DIST	ACRES	LB ai/A	YEAR	MONTH	S ppb MOA SEN	MA*F	N*	IR*
St. Johns County																		
09-13	1	Pvt	-	No	85	3	7.5	2.0 case	D	80	200	2.2	4	F	ND, ND			84*
09-13	2	Pvt	8	No	80	-	7.4	2.2 case	DI	-	450	2.2	4	J	ND			
09-13	3	Pvt	6	No	82	12	7.4	2.0 galv.	DI	300	75	3.0	4	J	ND			
09-13	4	Pub	300	-	-	-	8.0	-	D	300	-	2.2	-	JF	ND			
09-13	5	Pvt	6	No	80	-	7.1	-	DI	80	100	2.2	4	J	ND			
09-13	6	Pvt	10	No	50	-	6.6	-	DI	50	100	2.2	4	JF	ND			
09-13	7	Pvt	40	No	85	10	7.8	2.0 case	D	100	70	3.0	4	J	ND			
09-13	8	Pvt	4	No	80	10	8.0	2.5 case	D	300	40	2.2	4	B	ND			
09-14	9	Pvt	10	No	60	-	7.2	1.2 case	D	0	450	3.0	4	J	ND			
09-14	10	Pvt	4	No	68	-	7.2	4.0 galv.	D	100	1200	2.5	4	JF	ND		50*	10*
09-14	11	Pvt	2	No	-	-	7.8	6.0 Art	D	400	1200	2.5	4	JF	ND			
09-14	12	Pvt	2	No	480	10	7.6	4.0 PVC	DI	100	1200	2.5	4	JF	ND, ND			
09-14	13	Pvt	16	Yes	90	-	7.2	2.0 PVC	D	20	800	3.0	4	J	ND		88*	8*
09-14	14	Pvt	2	No	65	-	7.4	2.0 galv.	D	20	160	2.8	4	J	ND			
09-14	15	Pvt	5	No	60	-	7.4	1.2 case	D	80	300	2.6	4	J	ND			
09-15	16	Pvt	10	No	65	-	7.3	2.0 galv.	D	10	160	3.0	4	J	ND			
09-15	17	Pvt	4	No	230	200	8.0	2.0 galv.	D	180	1100	3.0	4	JF	ND			
09-15	18	Pvt	40	No	80	-	7.1	2.0 galv.	D	0	1100	3.0	4	JF	ND			
09-15	19	Pvt	3	No	97	80	7.4	1.5 galv.	D	50	200	3.0	4	JF	ND			
09-15	20	Pvt	80	No	84	4	7.1	2.0 galv.	D	180	105	3.0	4	JF	ND			
09-15	21	Pvt	6	No	65	-	7.2	2.0 galv.	D	20	110	3.0	4	JF	ND			
09-15	22	Pvt	6	No	85	-	7.2	2.0 galv.	DI	150	35	3.0	4	M	ND			
09-15	23	Pvt	2	No	60	-	7.1	2.0 galv.	DI	150	40	3.0	4	J	ND			
09-15	24	Pvt	6	No	60	8	7.7	1.2 galv.	DI	660	1000	-	4	AP	ND			
09-15	25	Pvt	8	No	86	8	7.2	2.0 case	D	600	1000	-	4	AP	ND			
09-16	26	Pvt	3	No	55	10	7.2	2.0 galv.	D	30	10	3.0	4	J	ND			
09-16	27	Pvt	2	No	55	-	7.4	1.2 galv	D	15	35	3.0	4	JF	ND, ND			
09-16	28	Pvt	20	No	80	-	6.9	2.0 galv.	D	300	80	3.0	6	JF	ND			
09-16	29	Pub	1000	Yes	280	-	7.4	8.0 case	D	700	70	3.0	4	JF	ND			
09-16	30	Pvt	?	No	89	-	7.1	2.0 galv.	D	800	160	2.8	4	J	ND			

Table 1 (con't)

SUMMARY OF ANALYSES OF FLORIDA DRINKING WATER WELLS FOR ALDICARB RESIDUES IN HIGH TEMIK USE AREAS LISTED BY COUNTY AND SAMPLE

Sampled September 1982
Union Carbide Agricultural Products Co.
Printed October 6, 1982
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1982 WELL WATER DATA										TEMIK USE DATA					Aldicarb Res.			
DATE	SAMPLE	WELL	PEOPLE	TRTD	DEPTH	M.T.	pH	CONST	USE	DIST ACRES	LB ai/A	YEAR	MONTH	2 ppb MOA SEN	UV*F	RF*	IB*
Polk County																	
09-09	1	Pvt	6	No	300	40	7.9	4.0 case	D	30	10	10	2	M	NO			
09-09	2	Pvt	4	No	225	10	8.1	4.0 case	D	600	50	10	2	M	NO			
09-09	3	Pvt	4	No	360	10	8.2	4.0 case	D	400	50	6	1	May	NO, NO		10	
09-09	4	Pvt	4	No	360	12	7.8	6.0 case	DI	400	50	10	1	M	NO			
09-09	5	Pvt	25	No	300	10	8.0	4.0 case	D	50	30	10	1	M	NO			
09-09	6	Pvt	12	No	400	15	7.8	4.0 case	D	200	50	10	2	M	NO		6	
09-09	7	Pvt	4	No	300	12	8.0	4.0 case	D	100	15	10	1	M	NO			
09-09	8	Pvt	4	No	310	10	8.2	4.0 case	D	100	50	5	1	May	NO			
09-10	1	Pvt	6	No	178	15	7.7	4.0 case	D	150	35	5	1	May	NO		1.8	
09-10	2	Pub	25	Yes	350	15	8.1	4.0 case	D	80	35	6	1	May	NO			
09-10	3	Pvt	2	No	300	15	7.8	4.0 case	D	250	5	10	1	MA	NO			
09-10	4	Pvt	2	No	300	15	7.9	4.0 case	D	300	6	10	1	MA	NO			
09-10	5	Pvt	4	No	300	18	7.4	4.0 case	D	1 mile	10	5	1	May	NO			
09-10	6	Pvt	4	No	450	15	7.7	4.0 case	D	150	10	6	1	May	NO			
09-10	7	Pvt	6	No	300	10	-	4.0 case	DI	330	6	5	1	May				
09-10	8	Pub	60	Yes	1000	30	7.9	4.0 case	D	1300	2200	6	2	MA	NO, NO			
09-15	1	Pvt	3	No	300	30	8.1	2.0 pipe	D	300	45	10	1	M	NO		2	
09-15	2	Pvt	6	No	700	30	7.3	2.0 case	DI	0	10	10	1	M	NO			
09-15	3	Pvt	3	No	300	30	7.5	4.0 corn	D	60	10	10	1	M	NO			
09-15	4	Pvt	3	No	-	-	7.6	10.0 case	DI	0	20	10	1	M	NO			
09-15	5	Pvt	-	No	600	20	7.8	12.0 case	DI	0	80	10	1	M	NO			
09-15	6	Pvt	10	No	400	20	7.0	8.0 case	DI	0	5	10	1	M	NO			
09-15	7	Pvt	10	No	750	100	8.0	4.0 case	DI	10	95	6	1	M	NO			
09-15	8	Pvt	2	No	251	140	8.2	4.0 case	D	300	95	5	1	M	NO			
09-15	9	Pub	6	Yes	300	-	7.4	Municipal	DI	300	95	5	1	M	NO			
09-18	10	Pvt	4	No	30	10	7.4	4.0 case	D	600	10	5	1	M	NO			
09-21	1	Pvt	2	No	200	12	7.8	2.0 case	DI	0	10	10	3	M	NO			

3.2 A table was submitted showing the results of analyses performed by the State of Florida (Office of Laboratory Services) on drinking water samples taken from 6 counties during October - November 1982. Aldicarb was not detected in any sample; however, it is not clear from the table if only parent aldicarb was looked for or if the method was a total residue method. Also, the table was not complete in that the well depths and water table depths were not always provided, the application rate was not given correctly, etc. Refer to Table 2.

3.3 A table was submitted showing results of December 1982 groundwater sampling in Alcoma Grove at Lake Wales in Polk County, performed by the Florida DER. Total aldicarb residues found ranged from non-detect to 93 ppb. The Florida Department of Agriculture and Consumer Services further characterized some of the water samples and found them to contain 3 - 5 times more sulfoxide than sulfone. Presumably, no analysis was conducted for parent aldicarb. The table, however, did not include aldicarb use history, weather data or a description of the method used. A detailed description of the hydrology, topography and well construction is included. Refer to Table 3.

3.4 A table was submitted giving the locations of 23 sampling sites along St. Anne Shrine Road in Polk County. The samples were taken by UCC on December 20, 1982, but results were not yet submitted. Aldicarb use history, weather data, etc., has also not been submitted. Refer to Table 4.

4. CONCLUSIONS/RECOMMENDATIONS

4.1 The 1983 joint Florida State agencies - UCC groundwater monitoring plan that was submitted was very brief. Please note that from the Agency's perspective, the groundwater monitoring plan must be able to provide information on the geographical extent of aldicarb groundwater contamination resulting from aldicarb use and at what level (ppb) the contamination (if any) will be. Also, in private communication with Mr. F. Sanders, PM-12, on February 7, 1983, Mr. Sanders stated that UCC will be analyzing 2,000 samples taken by the State of Florida. Is that sampling in addition to that of the 1983 joint plan?

4.2 The Florida state agencies' results, as submitted, are sketchy and incomplete. In contradiction to the January 24, 1983 memo from F. Sanders to D. Severn, EFB files show no prior record of receiving or reviewing those results.

Based on the limited data submitted, it appears that residues of aldicarb are contaminating Florida groundwater. The geographical extent and level of contamination that will result from continued use of aldicarb cannot be determined from this submission. It is, therefore, essential that we receive complete data if we are to make regulatory decisions and contributions regarding this aldicarb groundwater issue.

4.3 Submission of results of groundwater monitoring must include information on pesticide use history, weather data, soil profiles, description of the wells, chemical characteristics of the groundwater, hydrology and topography of the area, sampling technique, analytical method, etc.

4.4 A response to our evaluation of the 1981 Groundwater Monitoring Program dealing with the Florida groundwater monitoring has not been received. (See May 10, 1982 EFB evaluation, sections 3.3, 4.1 and 4.9.2.)

4.5 The persistence and leachability of aldicarb residues in Florida is of particular interest since UCC has taken the position that aldicarb will degrade faster in areas of higher temperature (such as in Florida in comparison to Long Island, NY). If aldicarb persists and leaches in Florida that is both warm and has been experiencing (relative) drought conditions over the past 20 years, will it also persist and leach in other warm areas where aldicarb use is proposed? When drought conditions end in Florida (later this year), will the rains result in increased levels and incidences of groundwater contamination?

Samuel M. Creeger
February 7, 1983
Section #1/EFB
Hazard Evaluation Division

Table 2

State of Florida
Office of Laboratory Services Services
Dr. E. C. Hartwig
904-354-3961

obtained at 12-21-82 FPTC mtg

Chemical Analysis of Drinking Water

Total Aldicarb Residue (Temik)

Samples Collected and Analyzed for Period October and November 1982

ample umber	County	Well Depth	Water Table	Distance from Application	Date of Application	Application Rate (ai/A)	Date of Sample	Aldicarb Concentration (ppb)
1289	Brevard	—	—	—	—	—	10/11/82	* BDL
1290	Brevard	—	—	—	—	—	10/11/82	BDL
1291	Brevard	—	—	—	—	—	10/11/82	BDL
1327	Polk	620'	110'	Surrounding grove	3/82	40 lbs.	10/13/82	BDL
1328	Polk	—	—	—	—	—	10/13/82	BDL
1350	Lake	>200'	200'	50'	6/1/82	33 lbs.	10/13/82	BDL
1351	Lake	130'	30'	a few feet	5/1/82	5 lbs.	10/19/82	BDL
1352	Lake	300'	—	>100'	1982	33	10/19/82	BDL
1353	Lake	>200'	—	100'	6/4/82	33	10/20/82	BDL
1399	Martin	—	—	—	—	—	10/25/82	BDL
1400	Martin	—	—	—	—	—	10/25/82	BDL
1401	Martin	—	—	—	—	—	10/25/82	BDL
1402	Martin	—	—	—	—	—	10/25/82	BDL

Table 2 (con't) Chemical Analysis of Drinking Water

Total Aldicarb Residue (Temik®)

Samples Collected and Analyzed for Period October and November 1982

Sample Number	County	Well Depth	Water Table	Diatance from Application	Date of Application	Application Rate (ai/A)	Date of Sample	Aldicarb Concentration (ppb)
1421	Polk	—	—	20'	4/6/82	40	10/26/82	BDL
1422	Polk	531'	73'	300'	3/18/82	40	10/26/82	BDL
1423	Orange	165'	—	300'	4/82	33	10/27/82	BDL
1424	Orange	186'	—	75'	—	—	10/27/82	BDL
1425	Orange	290'	—	600'	—	—	10/27/82	BDL
1448	Manatee	125'	12'	60'	4/82	67	11/2/82	BDL
1449	Manatee	125'	6'	300'	4/82	67	11/2/82	BDL
1450	Manatee	80'	—	900'	4/82	67	11/2/82	BDL
1451	Manatee	125'	12'	1400'	4/82	67	11/2/82	BDL
1543	Polk	900'	—	Surrounding grove	—	—	11/17/82	BDL
1544	Polk	310'	—	900'	—	—	11/17/82	BDL

* BDL - below detection limit of 2 ppb as the sulfone

Table 3

FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
TOTAL ALDICARB RESIDUE ANALYSES

ALCOMA GROVE GROUNDWATER TESTING SITE

LAKE WALES, POLK COUNTY

DECEMBER 1982

Lab Sample ID #	Monitor Well ID #	Water Table, Depth Below Ground Surface, Ft	Well Screen, Depth Below Ground Surface, Ft	Water Stratum, Depth Below Water Table, Ft	Sampling Procedure	Total Aldicarb* Residue, ug/l
17915	SW-1	24	36 - 41	12 - 17	Pump	N.D.
17916	SW-1	24	36 - 41	12 - 17	Bailed	N.D.
17917	SW-2	17	23 - 28	6 - 11	Bailed	41
17918	----	Field Blank	---------	----------	------	N.D.
17919	OW-1	37	252 - 257	(Artesian)	Bailed	Sample Invalidated
17920	SW-3	18	23 - 28	5 - 10	Bailed	93
17921	SW-4	18	28 - 33	10 - 15	Bailed	<1
17922	SW-5	27	32 - 37	5 - 10	Bailed	49
17923	SW-5	27	32 - 37	5 - 10	Pump	47

ALL MONITOR WELLS LOCATED WITHIN PERIMETER OF A 20 ACRE CITRUS GROVE.

ALDICARB CONTAMINATION PLUME INDICATED IN UPPER 10 FT STRATUM OF GROUNDWATER.

* TOTAL ALDICARB RESIDUE CALCULATED AS THE SULFONE, UNCORRECTED FOR SPIKE RECOVERY.

Table 4

ST. ANNE SHRINE RD WATER SAMPLES
Taken 12-20-82 by Romero, Run 12-21 by RTP.
Letters Sent 12-21 to Homeowners
Reported to TTF 12/21/81

# People	Name	Depth	Street #	Inst. Date	Const.	WT	Rx
		380					
		305			4" Galv.		N
		220		'76	2" Galv.	40	N
		330				25	N
		>300			1"	25	N
		>400					Filtered
		>400			Unk.	20	N
		30			Brown	25	
		30			2" Galv.	25	N
		< 100				25	N
		25			2" Galv.	2	N
		150				18	N
		30				18	N
		30			1¼ Galv.		N
		>300				20	N
		405			1¼ x 4" Cased		N
		>400					N
		30			Galv. Sandpoint		N
		520					N
		460					
		490					
		220					
Lake >50 people		Surface Lake				Lake	

PRIVACY ACT EXEMPTION