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098301

Date Out EFB: 30 AUG 1983

To: Jay Ellenberger
Product Manager 12
Registration Division (TS-767)

From: Richard V. Moraski, Ph.D., (Acting) Head
Review Section No. 1
Exposure Assessment Branch
Hazard Evaluation Division (TS-769)

Attached please find the environmental fate review of:

Reg./File No.: 264-331

Chemical: Aldicarb

Type Product: Insecticide/nematicide

Product Name: TEMIK

Company Name: Union Carbide

Submission Purpose: Compilation of all Union Carbide Florida groundwater data

ZBB Code: ?

Date In: 5/16/83

Date Completed: 30 AUG 83

ACTION CODE: 400

EFB # 3375

TAIS (level II)	Days
67	20

Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

1. INTRODUCTION

1.1 Union Carbide (UC) has submitted a report containing all the aldicarb soil, surface water, and groundwater monitoring studies and their results conducted in Florida by UC. This submission also contains some UC comments on monitoring data conducted in Florida by Florida state agencies.

1.2 This report, with no accession number, is titled "TEMIK® ALDICARB PESTICIDE RESIDUES IN FLORIDA" and is divided into the following six sections:

(1) EPA Studies in Florida, 1979-1980.
(2) Field Soil and Water Studies in Florida, 1980-1981.
(3) Drinking Water Well Surveys for Aldicarb in Florida.
(4) Drinking Water Wells with Detectable Aldicarb Residues.
(5) Non-Drinking Water Sources with Detectable Aldicarb Residues.
(6) Miscellaneous Additional Residue Monitoring in Florida.

2. DISCUSSION OF DATA

2.1 EPA Studies in Florida, 1979-1980. Tab 1.

2.1.1 A UC memo dated September 17, 1979, from R.C. Back, states that Regior IV (EPA) sampled and analyzed wells near Stoneville, MS, in northern Alabama, in Georgia, and in Florida. No detectable (ND) residues were found. The geography, hydrogeology, analytical method and aldicarb use history were not part of the memo. Therefore, no comment can be made at this time regarding the potential for aldicarb to contamiante groundwater in the above-mentioned areas. The limit of detection is assumed to be 1 ppb

The memo additionally states that 10 wells encircling a potato growing area in Hastings, FL were sampled with all results showing ND. (Analyses were conducted by the Hastings, FL Expt Station). Well depths and distance to Temik use areas were:

Depth (ft)	Distance (ft)
25	300 - at the Exp. Sta.
86	150
400	30
80	120
85	60
56	60
85	75
76	150
80	60
150	45.

2.1.2 A U.S. EPA memo dated Feb. 26, 1980, from M. P. Halper to D. Campt provides the results of sampling and analyses of soil, surface water, and groundwater in Washington County, MS and Hillsborough County, FL. A description of the fields and the following results were submitted:

Residues of Aldicarb in Samples From Florida and Mississippi

Washington County, Mississippi	Aldicarb Conc., ppb
Soil, 0-3"	ND
Soil, 1 ft	ND
2 ft	ND
3 ft	ND
4 ft	ND
5 ft	ND
6 ft	ND
7 ft	ND
8 ft	ND
Water, 7 samples (6 wells, 1 surface) all	ND

Hillsboro County, Florida	
Soil, 0-3"	ND
Soil, 1 ft	ND
2 ft	ND
3 ft	ND
4 ft	ND
5 ft	8
6 ft	20
7. ft	80
8 ft	70
Water, 3 samples (2 wells, 1 surface) all	ND
Water, see page into sampling hole approx. 350 to 375	

ND = Not Detected. Limit of detection was 1 - 2 ppb.

2.2 Field Soil and Water Studies in Florida, 1980-1981. Tab 2.

This material was reviewed in the May 10, 1982 EAB evaluation sections 2.3 and 3.3. Also, some of this material is duplicated in Tab 5 of the submission which is reviewed in section 2.5.5, below.

2.3 Drinking Water Well Surveys for Aldicarb in Florida. Tab 3.

The material in this tab is a combination of resubmitted material (but in a more complete form) reviewed in the February 9, 1983 EAB evaluation and new data.

2.3.1 The results of sampling 180 water sources (155 private wells, 18 community or municipal wells, and 7 recreational lakes) in 17 FL counties that had received aldicarb treatment, report ND residues (<2 ppb) of aldicarb in any sample. Refer to the following 10 pages.

SUMMARY OF ANALYSES OF FLORIDA DRINKING W[illegible]ELLS FOR ALDICARB RESIDUES IN HIGH TEMIK USE AREAS LISTED BY COUNTY AND SAMPLE

Sampled [illegible]er 1982
Union Carbide Agricultural [illegible]ducts Co.
Printed October 6, 1982
Revised October 11, 1982

EXPLANATION OF TABULAR ABBREVIATIONS

-	:	Data not available or not recorded during sampling.
Well	:	Pvt, Pub, or Lake = private well, public well (municipal or community), or lake water (lakes only sampled at specific request of property owner).
People	:	Number of persons served by the well.
Trtd	:	If yes, water is treated by aeration, chlorination, or fluorination.
Depth	:	Depth of well in feet as reported by owner.
W.T.	:	Land surface to water table in feet at well site.
pH	:	Expression of acidity and alkalinity of well water sample, with 7 as neutral, numbers lower than 7 are acid, higher are increasing alkalinity; range 0-14.
Const	:	Well construction: usually driven if shallow and drilled if deep, diameter in inches and nature of casing often given.
Use	:	Use of water: D = domestic (drinking, bathing, washing, etc.); I = Irrigation; R = Recreation.
Dist	:	Distance in feet from well to Temik-treated acreage.
Acres	:	Acres treated with Temik at or adjacent to well sampled.
LB ai/A	:	Pounds of active ingredient aldicarb per acre, applied as a granular solid carrying 10 or 15% active aldicarb.
Year	:	Number of years of record of Temik use.
Month	:	Month in which last applied: J = January; JF = January-February; FM = February through March; M = March; MA = March-April; A = April; AM = April-May; May = May; AP = At Planting; S = Spring, SF = Spring flush.

Aldicarb Residues: Aldicarb residues found as analyzed at 2 parts per billion method sensitivity

ND	=	No detectable residues observed.
DD, DDD	=	Analysis repeated.
WT°F	=	Well water temperature in degrees Fahrenheit
RF"	=	Inches of rainfall recorded between application and sampling
IR"	=	Inches of irrigation water applied between application and sampling.

SUMMARY OF ANALYSES OF FLORIDA DRINKING W[illegible]ELLS FOR ALDICARB RESIDUES IN
HIGH TEMIK USE AREAS LISTED BY COUNTY AND SAMPLE

Sampled S[illegible]er 1982
Union Carbide Agricultural [illegible]ducts Co.
Printed October 6, 1982
Revised October 11, 1982

EXPLANATION OF TABULAR ABBREVIATIONS

-	:	Data not available or not recorded during sampling.
Well	:	Pvt, Pub, or Lake = private well, public well (municipal or community), or lake water (lakes only sampled at specific request of property owner).
People	:	Number of persons served by the well.
Trtd	:	If yes, water is treated by aeration, chlorination, or fluorination.
Depth	:	Depth of well in feet as reported by owner.
W.T.	:	Land surface to water table in feet at well site.
pH	:	Expression of acidity and alkalinity of well water sample, with 7 as neutral, numbers lower than 7 are acid, higher are increasing alkalinity; range 0-14.
Const	:	Well construction: usually driven if shallow and drilled if deep, diameter in inches and nature of casing often given.
Use	:	Use of water: D = domestic (drinking, bathing, washing, etc.); I = Irrigation; R = Recreation.
Dist	:	Distance in feet from well to Temik-treated acreage.
Acres	:	Acres treated with Temik at or adjacent to well sampled.
lb ai/A	:	Pounds of active ingredient aldicarb per acre, applied as a granular solid carrying 10 or 15% active aldicarb.
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Aldicarb Residues: Aldicarb residues found as analyzed at 2 parts per billion method sensitivity

ND	=	No detectable residues observed.
ND, ND	=	Analysis repeated.
WW°F	=	Well water temperature in degrees Fahrenheit
RF*	=	Inches of rainfall recorded between application and sampling
IR*	=	Inches of irrigation water applied between application and sampling.

Duplicate

SUMMARY OF ANALYSES OF FLORIDA DRINKING WATER & ...R ALDICARB RESIDUES IN
HIGH TEMIK USE AREAS LISTED BY COUN... ...O SAMPLE

Sampled Septem... !
Union Carbide Agricultural Prod... o.
Printed October 6, 1982
Revised October 11, 1982

	1982 WELL WATER DATA								TEMIK USE DATA					ALDICARB RES.			
SAMPLE	WELL	PEOPLE	TRTD	DEPTH	H.T.	pH	CONST	USE	DIST	ACRES	LB ai/A	YEAR	MONTH	2 ppb HOA SEN	WW*F	RF*	IR*
...hns County																	
1	Pvt	-	No	05	3	7.5	2.0 case	O	50	200	2.2	4	F	ND, ND			20*
2	Pvt	6	No	00	-	7.4	2.2 case	OI	-	450	2.2	4	J	ND			
3	Pvt	6	No	92	12	7.4	2.0 galv.	OI	300	75	3.0	4	J	ND			
4	Pub	300	-	-	-	8.0	-	O	300	-	2.2	-	JF	ND			
5	PvL	6	No	50	-	7.1	-	OI	50	100	2.2	4	J	ND			
6	Pvt	10	No	50	-	6.6	-	OI	50	100	2.2	4	JF	ND			
7	Pvt	40	No	05	10	7.8	2.0 case	O	100	70	3.0	4	J	ND			
8	Pvt	4	No	80	10	8.0	2.5 case	O	300	40	2.2	4	O	ND			
9	Pvt	10	No	60	-	7.2	1.2 case	O	0	450	3.0	4	J	ND			
10	Pvt	4	No	65	-	7.2	4.0 galv.	O	100	1200	2.5	4	JF	ND		50*	10*
11	Pvt	2	No	-	-	7.0	6.0 Art	O	400	1200	2.5	4	JF	ND			
12	Pvt	2	No	400	10	7.6	4.0 PVC	DI	100	1200	2.5	4	JF	ND, ND			
13	Pvt	15	Yes	90	-	7.2	2.0 PVC	O	20	500	3.0	4	J	ND		50*	8*
14	Pvt	2	Nn	65	-	7.4	2.0 galv.	O	20	160	2.8	4	J	ND			
15	Pvt	5	No	60	-	7.4	1.2 case	O	50	300	2.6	4	J	ND			
16	Pvt	10	No	65	-	7.3	2.0 galv.	O	10	150	3.0	4	J	ND			
17	Pvt	4	No	230	200	8.0	2.0 galv.	O	150	1100	3.0	4	JF	ND			
10	Pvt	40	No	80	-	7.1	2.0 galv.	O	0	1100	3.0	4	JF	ND			
19	Pvt	3	No	97	80	7.4	1.5 galv.	O	50	200	3.0	4	JF	ND			
20	Pvt	50	No	04	4	7.1	2.0 galv.	O	100	105	3.0	4	JF	ND			
21	Pvt	6	No	65	-	7.2	2.0 galv.	O	20	110	3.0	4	JF	ND			
22	Pvt	6	No	85	-	7.2	2.0 galv.	OI	150	35	3.0	4	M	ND			
27	Pvt	2	No	60	-	7.1	2.0 galv.	OI	150	40	3.0	4	J	ND			
24	Pvt	6	No	60	0	7.7	1.2 galv.	OI	660	1000	-	4	AP	ND			
25	Pvt	8	No	66	8	7.2	2.0 case	O	600	1000	-	4	AP	ND			
26	Pvt	3	No	55	10	7.2	2.0 galv.	O	30	10	3.0	4	J	ND			
27	Pvt	2	No	55	-	7.4	1.2 galv	O	15	35	3.0	4	JF	ND, ND			
28	Pvt	20	No	00	-	6.9	2.0 galv.	O	300	80	3.0	4	JF	ND			
29	Pub	1000	Yes	200	-	7.4	8.0 case	O	700	70	3.0	4	JF	ND			
30	Pvt	2	No	69	--	7.1	2.0 galv.	O	500	160	2.5	4	J	ND			

SUMMARY OF ANALYSES OF FLORIDA DRINKING W LLS FOR ALDICARD RESIDUES IN
HIGH TEMIK USE AREAS LISTED b. . ATY AND SAMPLE

Sampled ! r 1982
Union Carbide Agricultura. cts 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	2 ppb MOA SEN	WW°F	RF*	IR*
Flagler County																		
09-15	1	Pvt	10	No	05	8	6.9	2.0 galv.	D	0	265	3	5	JF	ND			
09-15	2	Pvt	10	No	85	8	7.0	2.0 galv.	DI	0	265	3	5	JF	ND		50	
Putnam County																		
09-14	1	Pvt	4	No	68	8	7.6	1.5 galv.	DI	300	80	3	4	JF	ND		50	
09-14	2	Pvt	2	No	86	-	8.0	1.5 galv.	DI	50	80	3	4	JF	ND			
09-14	3	Pvt	20	No	65	-	7.2	1.2 galv.	D	30	150	3	4	J	ND			
09-12	4	Pvt	5	No	140	-	7.3	4.0 galv.	DI	8	165	4	4	J	ND			
Seminole County																		
09-20	1	Pvt	12	No	100	0	7.5	4.0 galv.	DI	10	1.5	7.5	8	S	ND			70
09-20	2	Pvt	12	No	400	-	7.7	4.0 galv.	DI	10	1.5	7.5	8	S	ND			70
09-20	3	Pvt	12	No	250	0	7.7	4.0 galv.	DI	10	1.5	7.5	8	S	ND			70
Brevard County																		
09-02	1	Pvt	3	No	19	19	7.0	2.0 galv.	DI	300	1	10	1	A	ND			
Marion County																		
09-23	1	Pvt	-	No	400	-	7.9	-	DI	20	55	5.2	1	A	ND		49	4
09-23	2	Pvt	-	No	400	-	7.7	-	DI	0	55	5.2	1	A	ND			
09-23	3	Pvt	-	No	300	-	8.0	-	DI	0	30	5.2	1	A	ND		48	8
09-23	4	Pvt	-	No	350	-	8.1	-	DI	0	25	5.2	1	A	ND, ND			
09-23	5	Pvt	-	No	250	-	7.8	-	DI	0	5	5.2	1	M	ND			

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

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

										TEMIK USE DATA					ALDICARB RES.			
		1982 WELL WATER DATA																
DATE	SAMPLE	WELL	PEOPLE	TR70	DEPTH	W.T.	pH	CONST	USE	DIST	ACRES	LB ai/A	YEAR	MONTH	2 ppb MOA SEM	WW*F	RF*	IR*
Orange County																		
09-10	Ocoee	Pub	1500	Yes	500	6	7.4	16.0 pipe	DI	-	-	-	-	-	ND	74		
09-10	W. Garden	Pub	9000	Yes	785	-	7.3	16.0 pipe	DI	-	-	-	-	-	ND	70		
09-09	1	Pvt	-	No	400	30	7.5	10.0 pipe	DI	0	35	5-10	2	SF	ND		49	20
09-09	2	Pvt	-	No	407	31	7.6	12.0 pipe	DI	0	100	5-10	2	SF	ND		49	20
09-09	3	Lake	15	No	Surface	-	7.4	-	RI	50	120	10	2	SF	ND			
09-09	4	Pvt	20	No	254	-	7.0	8.0 cased	DI	300	300	10	1	S	ND		49	
09-09	5	Pvt	2	No	607	50	7.6	12.0 cased	DI	0	110	10	1	S	ND		49	
09-09	6	Lake	-	No	Surface	-	6.3	-	RI	0	110	10	2	SF	ND		49	
09-09	7	Lake	-	No	Surface	-	6.4	-	RI	0	110	10	2	-	ND			
09-09	8	Lake	-	No	Surface	-	7.4	-	RI	0	100	10	1	S	ND		49	
09-09	9	Lake	-	No	Surface	-	6.4	-	RI	0	35	10	1	S	ND		49	
09-09	10	Lake	-	No	Surface	-	5.0	-	RI	0	300	10	1	SF	ND			
09-09	11	Pvt	8	No	347	-	7.5	4.0 cased	DI	0	268	10	1	SF	ND		50	
09-09	12	Pvt	4	No	330	25	7.3	6.0 cased	DI	200	55	5	1	SF	ND			
09-09	13	Pvt	3	No	325	40	7.2	8.0 cased	DI	40	70	5	1	SF	ND			
09-09	14	Pvt	20	No	250	-	7.5	Old & Unk	DI	0	100	5	1	SF	ND			
09-09	15	Pvt	4	No	100	-	7.5	3.0 cased	DI	50	25	5	1	SF	ND			
09-23	16	Pvt	3	No	100	-	8.0	4.0 galv	D	50	10	6.8	2	S	ND		50	
09-23	17	Pvt	2	No	125	-	7.5	-	DI	100	10	6.8	2	SF	ND			

SIMMARY OF ANALYSES OF FLORIDA DRINKING ... LLS FOR ALDICARB RESIDUES IN
HIGH TEMIK USE AREAS LISTED ... ITY AND SAMPLE

Sampled ... r 1902
Union Carbide Agricultu ... icts Co.
Printed October 6, 1982
Revised October 11, 1982

		1902 WELL WATER DATA							TEMIK USE DATA					ALDICARB RES.			
AGE	SAMPLE	WELL	PEOPLE	TRIO	DEPTH	W.T.	pH	CONST	USE	DIST	ACRES	LB al/A	YEAR	MONTH	2 ppb MOA SEN	WW*F	RF*	IR*
Lake County																		
0-09	RDZ679	Pvt	4	No	150	100	-	4.0 case	DI	30	1500	10	2	-	NO, NO			
9-09	1	Pvt	-	No	560	00	7.7	10.0 steel	DI	50	120	10,5	3	SF	NO			
9-09	2	Pvt	10	No	210	60	7.4	4.0 galv.	D	0	600	10,5	3	SF	NO			
9-09	3	Pvt	-	No	635	90	7.7	8.0 steel	DI	0	150	5	2	SF	NO			
9-09	4	Pvt	-	No	590	70	7.5	10.0 steel	DI	0	40	5	2	SF	NO			20
9-09	Tavares	Pub		Yes	-	-	7.3	Drilled	DI	-	-	-	-	-	NO			
9-09	Leesbg	Pub	16000	Yes	94	35	7.4	Drilled	DI	-	-	-	-	-	NO	74		
9-10	Mlneola	Pub	1200	Yes	470	-	7.1	10.0 cased	DI	-	-	-	-	-	NO	71		
9-10	Clermont	Pub	5600	Yes	818	-	7.3	12.0 cased	DI	-	-	-	-	-	NO			
9-10	Mascotte	Pub	409	Yes	210	-	6.8	8.0 steel	DI	-	-	-	-	-	NO			
9-10	Groveland	Pub	2600	Yes	750	-	7.1	8.0 cased	DI	-	-	-	-	-	NO			
9-20	5	Pvt	12	No	275	40	7.5	4.0 case	DI	15	100	5	1	SF	NO			
9-20	6	Pvt	1	No	300	96	7.8	4.0 case	DI	0	20	5	2	M	NO			
9-20	7	Pvt	4	No	110	7	7.2	4.0 galv	DI	200	200	5	3	SF	NO			
9-20	8	Lake	-	No	-	-	7.1	-	RI	10	200	5	3	SF	NO			
9-23	9	Pvt	2	No	128	12	7.8	4.0 case	DI	15	60	5	1	S	NO			
9-23	10	Pvt	2	No	110	12	8.4	4.0 case	DI	15	52	5	1	SF	NO			
9-23	11	Pvt	-	No	450	60	8.0	-	DI	0	60	5.2	2	SF	NO			
9-23	12	Pvt	-	No	530	116	7.9	-	D	0	20	5.2	1	SF	NO			
9-23	13	Pvt	2	No	200	90	8.4	-	DI	15	10	5.2	1	SF	NO		45	
9-23	14	Pvt	-	No	300	-	7.9	-	DI	0	60	5.2	1	SF	NO			
9-23	15	Pvt	-	No	130	28	8.0	-	DI	25	14	5.2	1	SF	NO	Groves above well		
9-23	16	Pvt	-	No	429	0	8.4	-	DI	0	16	5.2	1	SF	NO			
9-23	17	Pvt	3	No	195	-	0.0	4.0 case	DI	15	40	5.2	1	SF	NO			
9-23	18	Pvt	-	No	185	70	8.1	-	DI	0	24	10	2	SF	NO			
9-23	19	Pvt	-	No	300	-	0.0	8.0 case	DI	0	35	5.2	1	SF	NO			
9-23	20	Pvt	-	No	300	-	8.1	10.0 case	DI	0	50	2.6	1	SF	NO			

SUMMARY OF ANALYSES OF FLORIDA DRINKING W[illegible] LLS FOR ALDICARB RESIDUES IN HIGH TEMIK USE AREAS LISTED B[illegible]NTY AND SAMPLE

Sampled [illegible]r 1982
Union Carbide Agricultural [illegible]ucts 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	2 ppb MOA SEN	WW*F	RF*	IR*
Polk County																		
9-09	1	Pvt	6	No	300	40	7.9	4.0 case	D	30	10	10	2	M	NO			
9-09	2	Pvt	4	No	225	10	8.1	4.0 case	D	600	50	10	2	M	ND		10	
9-09	3	Pvt	4	No	360	10	8.2	4.0 case	D	400	50	5	1	May	ND, ND			
9-09	4	Pvt	4	No	360	12	7.8	6.0 case	DI	400	50	10	1	M	NO			
9-09	5	Pvt	25	No	300	10	8.0	4.0 case	D	50	30	10	1	M	NO		6	
9-09	6	Pvt	12	No	400	15	7.8	4.0 case	D	200	50	10	2	M	ND			
9-09	7	Pvt	4	No	300	12	0.0	4.0 case	D	100	15	10	1	M	ND			
9-09	8	Pvt	4	No	310	10	8.2	4.0 case	D	100	50	5	1	May	ND			
9-10	1	Pvt	6	No	170	15	7.7	4.0 case	D	150	35	5	1	May	ND		1.5	
9-10	2	Pub	25	Yes	350	15	8.1	4.0 case	D	50	35	5	1	May	ND			
9-10	3	Pvt	2	No	300	15	7.8	4.0 case	D	250	5	10	1	MA	NO			
9-10	4	Pvt	2	No	300	15	7.9	4.0 case	D	300	5	10	1	MA	ND			
9-10	5	Pvt	4	No	300	15	7.4	4.0 case	D	1 mile	10	5	1	May	ND			
9-10	6	Pvt	4	No	450	15	7.7	4.0 case	D	150	10	5	1	May	ND			
9-10	7	Pvt	6	No	300	10	-	4.0 case	DI	330	6	5	1	May				
9-10	8	Pub	60	Yes	1000	30	7.9	4.0 case	D	1300	2200	5	2	MA	NO, ND			
9-15	1	Pvt	3	No	300	30	8.1	2.0 pipe	D	300	45	10	1	M	NO		2	
9-15	2	Pvt	6	No	700	30	7.3	2.0 case	DI	0	10	10	1	M	NO			
9-15	3	Pvt	3	No	300	30	7.5	4.0 core	D	50	10	10	1	M	NO			
9-15	4	Pvt	3	No	-	-	7.6	10.0 case	DI	0	20	10	1	M	NO			
9-15	5	Pvt	-	No	600	20	7.6	12.0 case	DI	0	80	10	1	M	ND			
9-15	6	Pvt	10	No	400	20	7.0	8.0 case	DI	0	5	10	1	M	NO			
9-15	7	Pvt	10	No	750	100	8.0	4.0 case	DI	10	95	5	1	M	NO			
9-15	8	Pvt	2	No	251	140	8.2	4.0 case	D	300	95	5	1	M	NO			
9-15	9	Pub	6	Yes	300	-	7.8	Municipal	DI	300	95	5	1	M	NO			
9-15	10	Pvt	4	No	30	10	7.4	4.0 case	D	600	10	5	1	M	ND			
9-21	1	Pvt	2	No	200	12	7.8	2.0 case	DI	0	10	10	3	M	ND			

SUMMARY OF ANALYSES OF FLORIDA DRINKING W[illegible]LLS FOR ALDICARB RESIDUES IN HIGH TEMIK USE AREAS LISTED BY [illegible]UNTY AND SAMPLE

Sampled [illegible] r 1982
Union Carbide Agricultural P[illegible]ucts Co.
Printed October 6, 1982
Revised October 11, 1982

			1982 WELL WATER DATA							YEMIK USE DATA					ALDICARB RES.			
AIE	SAMPLE	WELL	PEOPLE	TRTD	DEPTH	W.T.	pH	CONST	USE	DIST	ACRES	LB ai/A	YEAR	MONTH	2 ppb MOA SEN	WW*F	RF*	IR*
ndian River County																		
9-17	1	Pvt	0	No	600	6	6.3	Art.	1	0	60	10	3	F	NO		40	
9-17	2	Pvt	3	No	50	5	5.8	Driven	0	50	60	10	3	F	NO		40	
9-17	3	Pvt	10	No	600	5	6.1	Art.	10	0	50	10	3	F	NO		50	
9-16	6	Pvt	20	No	60	3.5	6.9	Drilled	01	25	90	7.5	3	F	NO		50	
9-16	7	Pvt	0	No	600	3.5	6.8	Drilled	01	0	90	7.5	3	F	NO		50	
9-16	8	Pvt	0	No	600	3.5	7.5	Drilled	01	0	90	7.5	3	F	NO		50	
9-07	8	Pvt	30	No	900	4	7.8	Drilled	01	0	230	5	2	M	NO		40	
9-16	9	Pvt	5	No	60	6	7.0	Drilled	01	100	5	6.7	1	May	NO		45	
t. Lucie County																		
9-13	1	Pvt	3	No	80	6	7.0	Driven	01	200	10	5	1	M	NO		40	
9-13	2	Pvt	3	No	1000	6	7.7	Art.	1	300	10	5	1	M	NO		40	
9-13	3	Pvt	3	No	00	6	7.6	Driven	01	50	10	5	1	M	NO		40	
9-13	7	Pvt	0	No	1000	5	7.0	Drilled	1	25	20	5+10	1	A	NO		40	
9-13	8	Pvt	10	No	40	5	7.1	Driven	0	200	20	5+10	1	A	NO, NO		40	
9-13	4	Pvt	15	No	60	6	7.1	Driven	0	50	50	6.7	1	May	NO		40	
9-13	5	Pvt	0	No	1000	6	7.0	Drilled	1	50	50	6.7	1	May	NO, NO		40	
9-13	6	Pvt	0	No	1000	6	7.8	Drilled	1	300	50	6.7	1	May	NO		40	
9-13	9	Pvt	2	No	1000	5	7.6	Art.	1	15	22	5	1	A	NO		40	
9-13	10	Pvt	2	No	60	5	7.4	Drilled	01	500	10	5	1	May	NO		40	
9-16	1	Pvt	10	No	60	5	7.7	Drilled	01	50	84	6	1	A	NO		40	
9-16	2	Pvt	0	No	1000	5	7.8	Drilled	1	0	04	6	1	-	NO		40	
9-16	3	Pvt	5	No	30	5	7.1	Drilled	01	50	100	6	1	A	NO		40	
9-16	4	Pvt	5	No	30	5	7.0	Drilled	01	50	100	6	1	A	NO		40	
9-16	5	Pvt	4	No	60	5	7.1	Drilled	01	0	80	6	1	A	NO		40	
9-14	3	Pvt	5	No	100	6	6.9	Drilled	01	150	20	6.7	1	M	NO		40	

SUMMARY OF ANALYSES OF FLORIDA DRINKING W[illegible]LS FOR ALDICARO RESIDUES IN HIGH TEMIK USE AREAS LISTED B[illegible]UNTY AND SAMPLE

Sampled [illegible] 1982
Union Carbide Agricultural [illegible]cts Co.
Printed October 6, 1982
Revised October 11, 1902

			1982 WELL WATER DATA							TEMIK USE DATA					ALDICARO RES.			
DATE	SAMPLE	WELL	PEOPLE	TRTD	DEPTH	W.T.	pH	CONST	USE	DIST	ACRES	LB ai/A	YEAR	MONTH	2 ppb MOA SEN	WW*F	RF*	IR*
Martin County																		
19-07	1	Pvt	25	No	60	3.5	7.2	Drilled	OI	100	1800	5	1	AM	ND		31	
19-07	2	Pvt	25	No	60	3.5	6.8	Drilled	OI	100	1000	5	1	AM	ND		31	
19-07	3	Pvt	4	No	30	3.5	7.2	Driven	OI	200	1800	5	1	AM	ND		31	
19-07	5	Pvt	-	No	60	3.5	7.3	Drilled	OI	700	1000	5	1	AM	ND		31	
19-07	7	Pvt	-	No	30	3.5	7.3	Driven	OI	-	450	5	1	AM	ND		31	
19-07	4	Pvt	10	No	600	3.5	7.1	Drilled	OI	1320	1000	5	1	AM	ND, ND		31	
19-07	6	Pvt	2	No	15-30	3.5	5.2	Driven	OI	1100	1800	5	1	AM	ND		31	
19-10	1	Pvt	210	Yes	103	3.5	7.3	Drilled	DI	100	1800	5	1	AM	ND		32	
19-10	2	Pub	2400	Yes	115	5	7.3	Gra. Packed	DI	1 mile	2500	5	1	AM	ND		31	
9-14	1	Pub	12000	Yes	105	5	7.3	Driven	OI	-	200	10	5	-	ND		32	
9-14	2	Pvt	5	No	60	5	7.1	Drilled	DI	50	1800	5	1	AM	ND		40	
Palm Beach County																		
9-15	4	Pvt	10	No	00	4	7.1	Drilled	OI	100	50	5	1	F	ND		32	
9-15	5	Pvt	5-10	No	40	4	6.3	Drilled	O	150	215	6.7	2	FM	ND		40	
9-15	6	Pvt	5-10	No	40	4	6.8	Drilled	D	150	215	6.7	2	FM	ND		50	
9-15	7	Pvt	5-10	No	40	4	6.9	Drilled	O	150	215	6.7	2	FM	ND		50	
Glade County																		
9-15	1	Pvt	0	No	20	4	7.0	Drilled	I	500	4	7.5	1	May	ND, ND		50	
9-15	2	Pvt	5	No	15	4	7.4	Drilled	OI	25	10	10	3	May	ND		50	
9-15	3	Pvt	5	No	15	4	7.3	Drilled	DI	25	10	10	3	May	ND [illegible]		50	

SUMMARY OF ANALYSES OF FLORIDA DRINKING W[illegible]LS FOR ALDICARB RESIDUES IN HIGH TEMIK USE AREAS LISTED BY [illegible]Y AND SAMPLE

Sampled S[illegible] 1982
Union Carbide Agricultural [illegible]cts Co[illegible]
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	2 ppb MOA SEN	WW*F	RF*	IR*
Hardee County																		
09-21	1	Pvt	2	No	1000	30	8.1	10.0 case	DI	5	35	10	1	-	ND			
09-21	2	Pvt	1	No	83	30	7.7	4.0 case	D	200	35	10	1	-	ND			
09-21	3	Pvt	6	No	80	30	8.0	4.0 case	D	300	40	10	1	M	ND			
09-21	4	Pvt	10	No	1000	30	8.0	10.0 case	DI	0	40	10	1	M	ND			
09-21	5	Pvt	10	No	1000	30	7.9	10.0 case	DI	-	40	10	1	M	ND			
Highlands County																		
09-13	1	Pub	14	No	30	20	5.8	4.0 case	DI	300	300	5	2	A	ND			
09-13	2	Pub	3	No	20	20	5.9	4.0 case	DI	30	300	5	2	A	ND			
09-13	3	Pub	6	-	40	20	5.8	4.0 case	DI	3	300	5	2	A	ND			
09-13	4	Pvt	-	No	190	20	5.4	6.0 case	DI	2	20	5	1	A	ND			
09-13	5	Pvt	4	No	190	20	5.5	4.0 case	D	100	20	5	1	A	ND, ND			
09-13	6	Pvt	4	No	180	20	6.2	6.0 case	DI	-	5	5	1	M	ND			
09-13	7	Pvt	6	No	160	30	6.1	6.0 case	DI	2	7	10	3	-	ND			
Hendry County																		
09-20	1	Pvt	20	No	100	4	8.0	2.0 case	D	200	400	5	2	M	ND			
09-20	2	Pvt	3	No	200	5	7.8	2.0 case	D	300	400	5	2	M	ND			
09-20	3	Pvt	4	No	100	5	7.8	2.0 case	D	10	400	5	2	M	ND			
09-20	4	Pvt	4	No	170	5	7.7	2.0 case	-	100	400	5	2	M	ND			
09-20	5	Pvt	5	No	70	5	7.9	2.0 case	D	750	400	5	2	M	ND			
09-20	6	Pvt	5	No	70	-	7.6	2.0 case	DI	750	400	5	2	M	ND			
09-20	7	Pvt	9	No	170	5	7.8	2.0 case	D	10	400	5	2	M	ND			
09-20	8	Pvt	20	Yes	200	5	7.6	2.0 case	D	300	400	5	2	M	ND			
09-20	9	Pvt	6	No	300	5	7.8	2.0 case	D	300	400	5	2	M	ND			

This material did not address the issues raised in the February 9, 1983 evaluation such as: Was the method only for parent compound (aldicarb)? What is the hydrogeology of the subject areas?

2.3.2 Drinking Water Well Sampling in Northeast Florida, 1983.

Potatoes are grown throughout 20,000 acres in the tri-county area of St. Johns, Putnam and Flagler counties, just east of the St. John's River. The soil is reported to be pH 5.5 - 6.5. About 78% of the wells in the area are <100 feet deep and about 2/3 of the fields had been treated annually with Temik for at least 5 years. In 83% of the wells sampled, the wells were within 500 feet of Temik-treated land.

Over 150 well sites were sampled (with some duplicate sampling) by Florida state agency personnel and 112 of the samples were analyzed by UC. UC found no detectable residues (<1 ppb) in any of the samples provided to them.

As part of this report, a paper titled "A Summary of Potato Production and Use of Nematicides in Northeast Florida", by D. P. Weingartner (a pathologist with the Agricultural Research Center, Hastings, FL), was included. This paper stated that an estimated 100% of the 20,000 acres planted to potatoes is treated with Temik at 3 lb ai/A and that an advantage of using Temik is "Heavy rains and cool soil temperatures do not prohibit use of Temik" and it can be used effectively during cool, wet weather.

Conclusions

(1) A description of the analytical method, the method of storage of the samples between sampling and analysis and the results of analysis of the other samples are needed.

(2) The paper included with this report provides evidence that Temik is used in Florida potato production during periods of heavy rains, cool soil temperatures, and cool wet weather. These conditions maximize potential for groundwater contamination.

2.3.3 Drinking Water Well Sampling in the Central Ridge Citrus Growing Area, Florida 1983.

In February 1983, sampling was done at 252 wells in Marion, Lake, Orange, and Polk counties. Wells varied in depth from 23 - 687 feet and pH 4.3 - 10.5 with the pH increasing with the depth of the well and the sampled wells were within 500 feet of treated groves. Groves treated with Temik for 1 year, 2 years, and 3 years were in the ratio of 2:1:1. About 80% of the groves were treated at 5 lb ai/A and most of the rest were treated at 10 lb ai/A. UC states that 175 wells in the area were sampled in September 1982 and all results for aldicarb were negative. Only 1 of the drinking water wells showed positive results (6 ppb) and is discussed in section 2.4.1, below.

It is not known if the 175 wells sampled in September 1982 were resampled among the 252 wells sampled in this study.

2.4 Drinking Water Wells with Detectable Aldicarb Residues. Tab 4.

2.4.1 [redacted]

Only 1 well, [redacted] was found to have detectable residues (6 ppb) and a hydrogeologic investigation by Dames and Moore (consulting hydrologists) revealed that the well can be contaminated with surface runoff water since the well is near the center of a depressed area and the well (1 1/4 inch galvanized pipe) was corroded and not sealed to prevent surface runoff from entering the space between the well and the borehole. [redacted] reported that his home and the well are surrounded by standing water during periods of heavy rain.

Conclusions

It cannot be stated that the aldicarb contamination of the [redacted] well was due to aldicarb groundwater contamination and not due to surface runoff.

2.4.2 [redacted]

This area is a fernery of about 17 acres in size and was treated with Temik 15G yearly for 5 years. The latest treatment was made in October 1982 at 11.25 lb ai/A. A 239 foot deep well (Well 1)is located in the center of the fernery, 15 feet from the Temik use area and was first sampled on February 1, 1983 by Florida state agencies and was resampled on February 16. UC sampled the well on February 18, in addition to 33 other wells (Wells 2 - 34) located adjacent to the fernery which were 100 - 500 feet deep. These wells all showed ND. UC also sampled 4 shallow monitoring wells, designated "North", "East", "SE", and "E" (Wells 35 - 38) at the fernery on February 18 and sampled 5 irrigation wells (Wells 39 - 43) at the fernery on February 23 in addition to taking soil cores at the fernery and sampling the Southeast drainage pond. Five additional irrigation wells at the fernery (Wells 44 - 48), all over 100 feet deep, were sampled on February 23. On February 25, a new well (Well 49) was drilled 97 feet north of the original to a depth of 100 feet with sampling of soil to 5 foot intervals to 50 feet and at 10 foot intervals from 50 feet to 100 feet. This new well was sampled on March 4.

Results

See Table on next page.

Water or soil sample	Depth, feet	pH	Date Sampled	Residues ppb	Analysis done by
Well 1	239		Feb 1	2 - 3	FL Dept Hlth
" "	"		Feb 16	5.3	" "
" "	"		"	3.5	" "
" "	"	7.5	Feb 18	4	UC
" "	"	6.7	Mar 17	3	UC
Wells 2-34	100-500	7.3-8.1	Feb 18	ND	UC
Well 35	shallow	7.6	"	52	UC
Well 36	" "	7.7	"	15	UC
Well 37	" "	4.4	"	130	UC
" "	" "	4.5	Mar 17	17	UC
Well 38	" "	8.8	Feb 18	ND	UC
SE drainage pond			Feb 18	5	UC
Wells 39-43	?	7.2-7.4	Feb 23	ND - 1	UC
Soil cores at the fernery	0 - 1	6.5	Feb 23	66	UC
	1 - 2	6.7	"	14	UC
	2 - 19 in 2' incre.	4.3-5.8	"	ND	UC
Wells 44-48	>100		Feb 23	ND - 1	UC
New well soil cores	5 - 6	5.0	Feb 25	ND	UC
	10 - 11	4.6	"	9	UC
	15 - 16	4.6	"	44	UC
	20 - 21	5.0	"	19	UC
	25 - 26	5.0	"	ND	UC
	30 - 31	4.8	"	10	UC
	35 - 36	5.0	"	14	UC
	40 - 101	4.2 - 9.1	"	ND	UC
	drilling mud		"	2	UC
Well 49	100		Mar 4	2	UC

PRIVACY ACT EXEMPTION

Conclusions

Between sampling and analysis, the samples were placed in a cooler. A more detailed description of the storage method used between sampling and analysis is needed.

The page containing the introduction/summary to [redacted] mentions 5 irrigation wells (in paragraphs 6 and 7) being sampled on Feb 23. Is this repetitive or are 10 different wells indeed being described (Wells 39 - 43 and Wells 44 - 48)?

The centrally located well (Well 1) is surrounded with concrete which would prevent seepage around the casing. Therefore, the contaminated groundwater is probably due to leaching of aldicarb and not surface runoff into the well.

2.5 Non-drinking Water Sources with Detectable Aldicarb Reidues. Tab 5.

2.5.1 Indiantown Grove Test Site

This is one of two monitoring sites selected by the Florida DER in 1982; it is west of Indiantown in Martin County. The soil is very sandy with a water table within 2 - 5 feet of the surface. The site is a 20 acre block of oranges with 43 north to south rows of 24 trees per row. It is a flood irrigated, bedded grove and at least the western portion of the grove is underlain by a hard clay layer at 7 - 10 feet below the surface.

In 1982, rows 1 - 4 and 18 - 19 received 50 lb/A of Temik, rows 5 - 7 and 18 - 20 received 15 lb/A and rows 21 - 45 received 40 lb/A of Temik.

Groundwater samples were taken at 5 points among tree rows 1 - 5, at one point between tree rows 20 and 21 and at one point between rows 42 and 43. In addition, ditch water and 5 nearby potable water wells (all about 100 feet in depth) were sampled.

Results

See the following 6 pages.

Comments

Please verify that rows 18 - 19 received a total of 65 lb/A of Temik.

The "Test Design" section claims 45 rows but Fig. 1 shows the grove to have 43 rows. In addition, the well designations are not consistent in that the wells are called "shallow wells", "deep wells", "permanent wells", and "test wells".

2.5.2 [redacted] fernery.

This site, just north of Deland in Volusia County, is a 20 acre tract planted to ferns and is protected from direct sunlight by plastic screening on 8-foot poles. The fernery is heavily fertilized and is watered by both rainfall and sprinkler irrigation. The tract slopes slightly toward a water retaining pond which has a pH of 4.5. The water in the retaining pond is recycled for use in irrigation.

PRIVACY ACT EXEMPTION [redacted] Grove Wa[illegible] Samples
1983

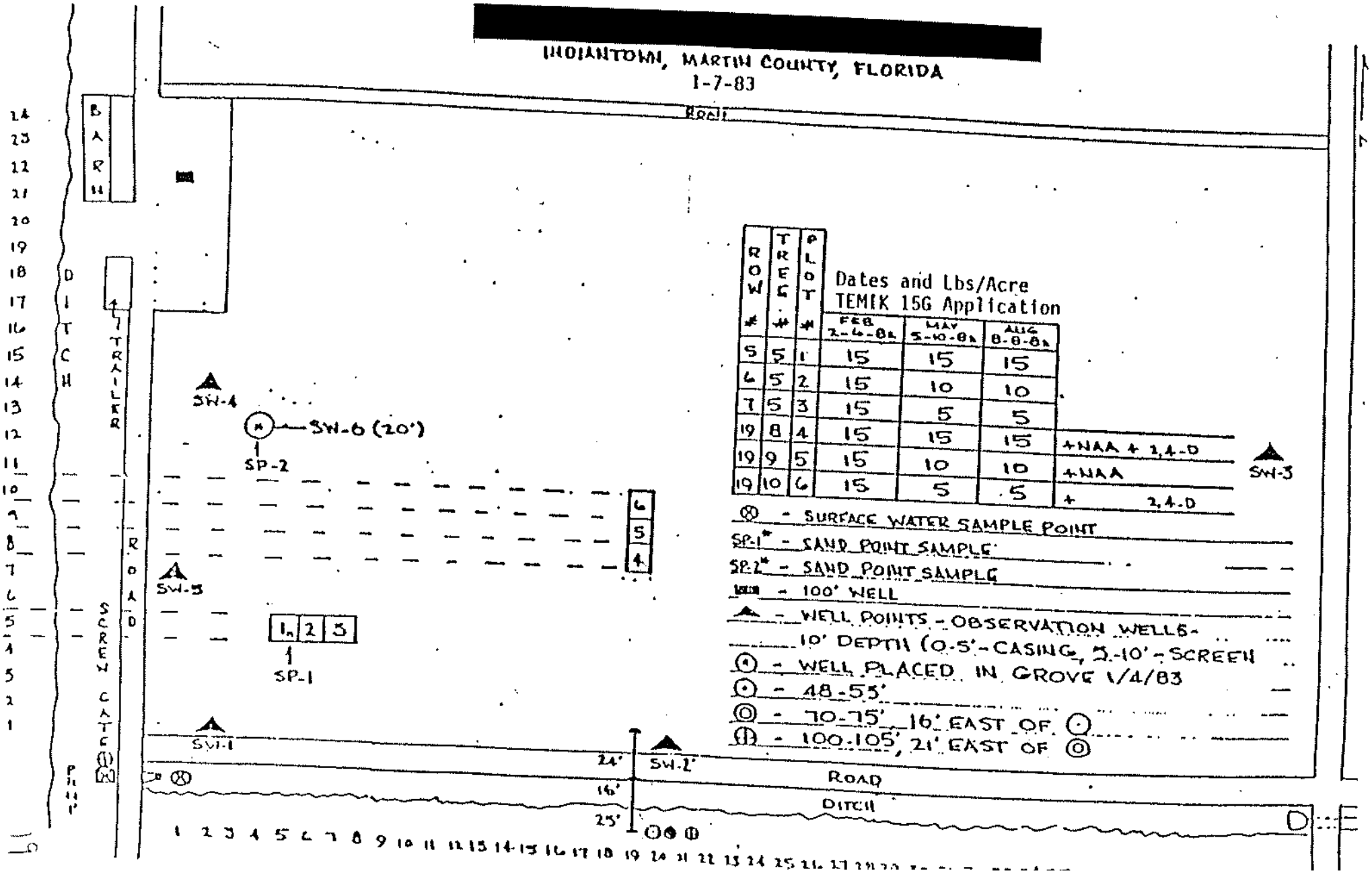
	Sampling Date	Sampler	Depth to Water (feet)	Field Measurements of Sample Water pH	Temperature C	Conductivity (microohms)	Aldicarb Residues (ppb) UCAPC	OER
Shallow Well 1 (10 feet deep)	1/8/83	HFB					ND	
	1/25/83	HFB					231,222	
	2/2/83	HFB					454	
	3/23/83	DER/UCAPC	3'9"	7.7	22	810	140	
Shallow Well 2 (10 feet deep)	1/8/83	HFB					8	
	1/25/83	HFB					3	
	3/23/83	DER/UCAPC	3'1"	7.6	22	1100	452	
Shallow Well 3 (10 feet deep)	1/8/83	HFB					2	
	1/25/83	HFB					ND	
	2/2/83	HFB					1	
	3/23/83	DER/UCAPC	3'3"	7.0	22	1190	2	
Shallow Well 4 (10 feet deep)	1/8/83	HFB					ND	
	1/11/83	DER/UCAPC			22		4	3
	1/25/83	HFB					1	
	3/23/83	DER/UCAPC	5'0"	NS	NS		NS	NS
Shallow Well 5 (10 feet deep)	1/8/83	HFB					10	
	1/25/83	HFB					ND	
	3/23/83	DER/UCAPC	5'7"	7.2	20	1220	49	
Shallow Well 6 (17 feet deep)	1/11/83	DER/UCAPC	5'5"	6.8	23		NO	1
	1/25/83	HFB					2	
	3/23/83	DER/UCAPC	5'3"	7.4	22	1050	ND	
Deep Well 6 (31 feet deep)	1/11/83	DER/UCAPC	3'7"	6.6	24			
	1/25/83	HFB					NO	NO
	3/23/83	DER/UCAPC	2'9"	7.7	23	680	2	
Deep Well 7 (71 feet deep)	1/11/83	DER/UCAPC	4'3"	6.7			ND	
	3/23/83	DER/UCAPC	3'2"	7.2	23	680	ND	ND
Deep Well 8 (105 feet deep)	1/11/83	DER/UCAPC	5'1"	7.1	23		ND	
	3/23/83	DER/UCAPC	3'5"	7.5	24	680	ND	NO
Canal	1/11/83	DER/UCAPC					ND	
	2/2/83	HFB					274	4

1567V

FIGURE 1

[redacted]

INDIANTOWN, MARTIN COUNTY, FLORIDA
1-7-83



ROW #	TREE #	PLOT #	Dates and Lbs/Acre TEMIK 15G Application FEB 2-6-83	MAY 5-10-83	AUG 8-8-83	
5	5	1	15	15	15	
6	5	2	15	10	10	
7	5	3	15	5	5	
19	8	4	15	15	15	+NAA + 2,4-D
19	9	5	15	10	10	+NAA
19	10	6	15	5	5	+ 2,4-D

Test Well Designations, Locations, and Temik Treatments Applied[1/]

Test Well	Location Row	Location Tree	Dates of Application & lbs Temik 15G applied at or near test well site: 1982 Feb. 6	1982 May 10	1982 Aug. 8	1981 Mar-Apr	1980 Mar-Apr
Temporary							
SP-1	5	5	15	+ 15	+ 15	20 + 20	67
SP-2	8	13	50			50	67
Permanent							
1	2	1	50			50	67
2	20	1	15			15 + 15	50
3	43	12	40			50	unt
4	2	13	50			50	67
5	1	7	50			50	67

[1/] Given the rapidity of aldicarb degradation, high water infiltration rates, and shallow depth of groundwater, time after treatment may be more important than dosage or exact well position.

It is notable that SP-1, when sampled only 10 days after last application, showed an average residue of 9 ppb at 2.5', 14 ppb at 5', and 14 ppb at 6.5'. This location had the highest application loading over the preceding three year period: 152 lb TEMIK 15G formulation or 25.33 lb active aldicarb.

[redacted]

Aldicarb residues and water pH as determined by DER and UCC from DER sand points installed, sampled, and removed August 18, 1982, [redacted] grove, Indiantown, FL.

Well Designation	Depth from land surface	ppb total aldicarb DER	ppb total aldicarb UCC	pH of water DER	pH of water UCC
SP-1	2.5'	8	10	6.1	7.2
	5.0'	11	15	7.0	7.4
	6.5'	5	23	6.2	7.6
	7.0'	No water sample[1/]			
	10.0'	No water sample[1/]			
SP-2	7.0' on slope at drip line	1	NS		
	10.0' on bed	129	115	6.3	7.6
Surface water[2/]		1			

[1/] notation from field: dry, clay, no water. See comment in text, page 1.

[2/] 6' lower than water table. This is in ditch at SW corner of grove.

NS = No sample

[redacted]

Aldicarb residues as determined by DER and UCC from Permanent Test Wells installed by DER, So. Fla. Water Mgmt. District, [redacted] on September 8 and 14, 1982, Indiantown, FL.

Test Well 1/ Designation	Water Depth from land surface in inches	Sample Rep. 5/	ppb aldicarb by sampling dates and labs							
			9-11 UCC	9/16 DER	9/16 UCC	10-3 UCC	10-11 UCC	10-25 2/ UCC	11-16 UCC	12-13 UCC
1	49 3/	1	5	3	9	ND	NS	2	NS	1
		2	8		8		2			1
		3	9							
2	32.5 3/	1	2	ND		ND	NS	NS	NS	1
		2	2							1
3	37 3/	1	9	4		ND	NS	4	NS	ND
		2	9							ND
4	52 4/	1		35	55	25	20	16	14	2
		2					20			2
5	74 4/			2	46	ND	NS	NS	NS	ND

ND = No detectable residue at 1 ppb sensitivity
NS = No sample

1/ Wells 1, 2, 3 installed September 8; Wells 4 and 5 installed September 14.

2/ 10-25 samples were drawn the day that flood irrigation waters were discharged.

3/ Water level from ground surface 9-11-82.

4/ Water level from ground surface 9-16-82.

5/ On 9-11, Rep. 1 taken without bailing well. Rep. 2 taken after bailing well dry then allowing it to refill before sampling. Rep. 3 taken after repeating Rep. 2 process. On subsequent sampling dates, all wells bailed twice before sampling.

[redacted]

Water pH from test wells as determined by DER and UCC from permanent test wells installed by DER, So. Fla. Water Mgmt. District, [redacted] on September 8 and 14, 1982, Indiantown, FL.

Test Well No. and depth	pH of water by date and laboratory					
	9-11	9-16		10-3	10-25	
	UCC	DER	UCC	UCC	UCC	
1	7.3	6.7*	7.1	7.6	7.8	
2	7.4			8.2		
3	7.2			7.8	7.8	
4		6.7*	7.8	8.4	7.3, 7.3	
5			7.2	8.2		

*Field water temperature 26°C.

Results

To date, only results from sampling the [redacted] fernery pond are available. However, one drinking water well of unspecified depth and sampled at an unspecified time was found to not contain detectable residues.

Between October 1982 and February 1983, the water retaining pond contained between 58 and 89 ppb residues. The lower value was found in February 1983.

Comments

The dates of aldicarb application are not given and a map showing the location of the wells in relation to the treated area is not provided. Also, a description of the analytical method used was not given.

2.5.3 Alcoma Grove Test Site.

This 20 acre site is loated about 50 miles east of Lake Wales in Polk County, FL and is one of two sites selected for monitoring by the Florida DER in 1982. The other site is at a grove in Indiantown, Martin County.

The grove generally slopes southward (a total of about 25' from the north to south borders). On March 12 and June 3, 1982, 28.1 lb and 34.4 lb/A of (presumably) Temik 15G was applied to the site, respectively. Between September 27 and November 4, 1982, monitoring wells were installed in the grove at depths from 28 - 43 feet by the Florida DER. The depth to the water at the 5 monitoring wells is 16 - 26 feet. In addition, one deep well, 262 feet deep, was drilled into the Floridan aquifer and was screened at 252 - 257 feet.

Twenty-two (22) drinking water wells in the vicinity of Alcoma grove were sampled of which 15 were >220 feet deep, 6 were 25 - 30 feet deep and one was reported as <100 feet deep.

Results

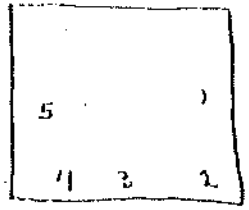
See the next 2 pages.

Comments/Conclusions

Previous Temik use history is needed. If this was the only application of Temik made at this site, then groundwater contamination may not yet have occurred. Soil samples would have been helpful.

Alcoma Grove Water Samples

	Sampling Date	Sampler	Depth to Water (feet)	Field Measurements of Sample Water pH	Temperature C	Conductivity (microohms)	Aldicarb Residues (ppb) UCAPC	DER
Well 1 (83 feet deep)	12/8/82	DER						ND
	12/16/82	UCAPC					ND	
	1/20/83	DER/UCAPC	23'	5.8	21.5	245	ND	ND
	3/24/83	DER/UCAPC	25'	6.0	25	255	100	
Well 2 (28 feet deep)	12/8/82	DER						48
	12/17/82	UCAPC					58,52	
	1/20/83	DER/UCAPC	15'11"	6.6	21	260	54	125
	3/24/83	DER/UCAPC	17'5"	6.1	25	470	153	
Well 3 (28 feet deep)	12/8/82	DER						91
	12/17/82	UCAPC					92,90	
	1/20/83	DER/UCAPC	16'6"	6.4	21	300	100	100
	3/24/83	DER/UCAPC	18'6"	6.1	25	300	179	
Well 4 (33 feet deep)	12/8/82	DER						
	12/17/82	UCAPC					ND	
	1/20/83	DER/UCAPC	17'7"	6.2	22	250	1,1	
	3/24/83	DER/UCAPC	19'1"	6.2	25	320	3	1
							5	
Well 5 (37.5 feet deep)	12/8/82	DER						39
	12/17/82	UCAPC					45,47	
	1/20/83	DER/UCAPC	27'	6.1	22	330	47	65,69
	3/24/83	DER/UCAPC	28'1"	6.0	25	330	34	



3-31-82

67V

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 12/21/82

# 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			1½ Galv.		N
		>300				20	N
		405			1½ x 4" Cased		N
		>400					N
		30			Galv. Sandpoint		N
		520					N
		460					
		490					
		220					
Lake >50 people		Surface Lake				Lake	

PRIVACY ACT EXEMPTION

2.5.4 The [redacted] Grove Well.

This well is in southwest Orange County, FL, off highway 535, north of Lake Buena Vista at the edge of a grove between 2 orange trees. The grove is sandy soil and slopes gently to the north to a small lake. The water table is 3 feet below the surface. The grove was treated during the past 3 years with 67 pounds/A of Temik 15G with last year's (1982) application being split with 33 pounds/A being applied in late July 1982.

The well is 29 feet deep and was first sampled on Feb. 5, 1983 but due to earlier damage by grove equipment, the well was removed and replaced. A monitoring well was also drilled 16 feet from the well to a depth of 29 feet (with screening between 24 and 29 feet), outside the grove area and 8 feet from the dripline.

Results

	ppb aldicarb residues and water pH			
	[redacted] Grove Well		New Monitor Well	
Sample Date	ppb	pH	ppb	pH
February 5, 1983	6	5.4	--	--
February 9, 1983	8	--	--	--
February 22, 1983	-	--	19	5.4
March 3, 1983	-	--	19	5.1
March 17, 1983	9	5.1	7	5.6

2) Results of samples taken in Orange County (the towns of Windermere, Orlando, Ocace, and Wintergarden) were not reported.

Conclusions

The occurrence of residues in this well are probably the result of aldicarb residues leaching through the soil and contaminating the groundwater.

2.5.5 The [redacted] Location

This material was previously reviewed in the April 8, 1981 EAB evaluation (pg. 20 - 25) and in the May 10, 1982 EAB evaluation (sections 2.3 and 3.3) except for some new soil data and old soil data not previously submitted. Therefore, all the data will be summarized in this review.

The [redacted] Grove [redacted] Hillsborough County, FL. Soils in Hillsborough County are commonly fine sand which are readily permeable and acidic but limed to bring the pH up. The top 6 feet of the soil in the [redacted] Grove contain 93 - 98% sand, 0.1 - 1.4% organic matter (which decreases with depth) and pH 4.9 - 5.8 (which decreases with depth). In 1979 and 1980, Temik 15G was applied at 67 lb/A and 65 lb/A, respectively.

Some of this material is duplicated in Tab 2, which is reviewed in section 2.2, above.

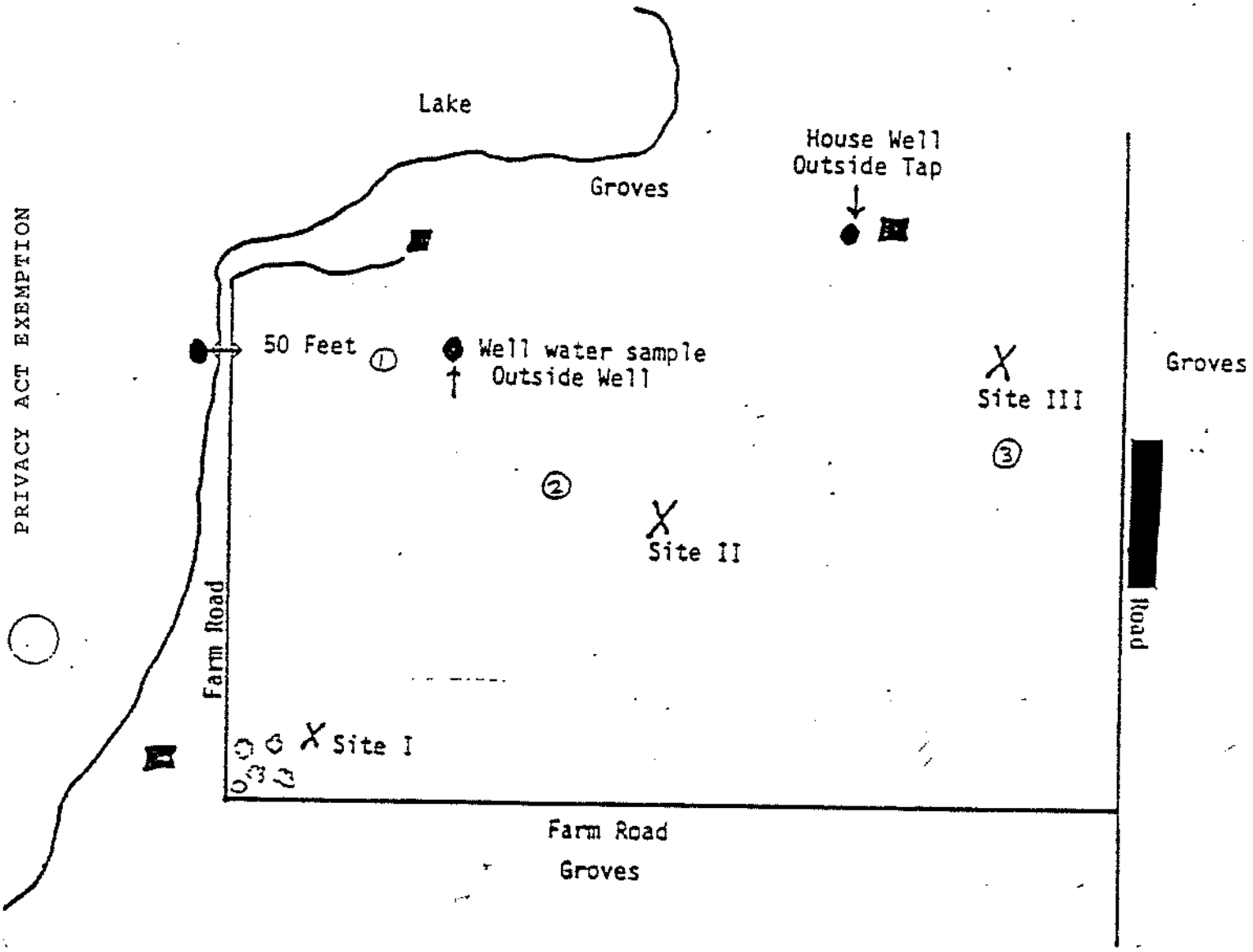
Results

Soil data from the treated grove generally shows aldicarb residues to dissipate from the top 4 feet of soil to levels of 0 - 10 ppb within 1 year. However, as the residue level in the top 4 feet declines, deeper soil strata (4 - 8 feet) show an increase in aldicarb soil residue concentration with time and the residues are still evident at 100 - 200 ppb at 6 months post-application and at about 30 - 40 ppb after 1 year has elapsed.

Analysis of a 150 foot well showed 2 and 8 ppb at 3 and 6 months after an application at 10 lb ai/A. However, UC analysis showed ND. Analyses of other wells of unspecified depths (see page 30) showed either 1 ppb or ND when sampled at various times between June 5, 1980 and November 11, 1981 after yearly late winter applications of 10 lb ai/A.

The report contains a statement that on February 23, 1983, the Florida DER found 315 ppb aldicarb rsidues in a shallow well belonging to [redacted] The location of this well in relation to the treated area, the depth of the well, and whether Temik was applied in 1982 are not provided. Also water wells from the treated grove and in the "vicinity" of the treated grove were sampled on March 8, 1983 and showed ND. All of the 5 wells were greater than 100 feet deep except for 1 which was of undetermined depth and the pH of the well water was between 7.2 and 7.4. Also, 2 wells equipped with cluster sampling at 4 different depths between 8 feet and 13'7" in the treated grove were sampled on March 25, 1983 and showed ND at 8 feet but 18 ppb and 82 ppb at 13'7" and 12'2", respectively.

[redacted] Grove - Location Map



Soil Type: Blanton fine sand.
Surface contour drops to the west and northwest.
Groundwater flow gradient: To the west.
● - Water Sample Site
■ - Residence
X - Soil Sample Site

[redacted] Location-Grove History

Year	Crop	TEMIK 15G/Acre (Lbs.)	Application Method and Timing
1980	Oranges	67	Band applied - March 15.
1979	Oranges	65	Band applied - Late Feb.
1978	Oranges		
1977	Oranges		
1976	Oranges		

Table 31. [redacted] Grove Soil Sample Results, PPB Total Aldicarb Residues

Site No.	Soil Depth (Ft.)	Sampled June 5, 1980	Soil Depth (Ft.)	Sampled September 10, 1980
I	Top 1	676	Top 1	27
	1-2	244	1-2	28
	2-4	6	2-4	48
	4-6	ND	4-6	77
	6-8	ND	6-8	109
II.	Top 1	233	Top 1	31
	1-2	26	1-2	27
	2-4	14	2-4	22
	4-6	ND	4-6	47
	6-8	ND	6-7 1/	122
III.	Top 1	18	Top 1 2/	48
	1-2	ND	1-2	116
	2-4	29	2-4	98
	4-6	67	4-5 1/	212
	6-8	ND	Groundwater	

1/ Core terminated due to groundwater.

2/ Site III, September 10 sampling changed to different tree due to lack of accessability of tree sampled on June 5, 1980.

Table 32. [redacted] Location Water Sample Results, PPB Total Aldicarb Residues

Source Description	Well Depth (Ft.)	Sampled June 5, 1980 IRD	Sampled June 5, 1980 UCC	Sampled September 10, 1980 IRD	Sampled September 10, 1980 UCC
Lake Water		ND	ND	5	NO
Outside Well	150	ND	ND	ND	ND
House Tap	150	2	ND	8	ND

EXPOSURE ASSESSMENT BRANCH REVIEW dated 8-30-83

Page _____ is not included in this copy.

Pages 31 through 32 are not included in this copy.

The material not included contains the following type of information:

___ Identity of product inert ingredients

___ Identity of product impurities

___ Description of the product manufacturing process

___ Description of product quality control procedures

___ Identity of the source of product ingredients

_X_ Sales or other commercial/financial information

___ A draft product label

___ The product confidential statement of formula

___ Information about a pending registration action

___ FIFRA registration data

___ The document is a duplicate of page(s) _____

___ The document is not responsive to the request

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

RESULTS OF SOIL ANALYSES IN HILLSBOROUGH COUNTY

Temik Applications: 10 lb ai/A on 2/25/79
10 lb ai/A on 3/15/80
10 lb ai/A on 3/20/81

	Soil Strata (feet)	Aldicarb Residues (ppb)						
		6/5/80	9/10/80	3/4/81	5/13/81	6/4/81	7/29/81	11/11/81
Site 1	0-1	676	27	6	19	1670	ND	16
	1-2	244	28	ND	ND	92	5	8
	2-4	6	48	33	ND	ND	ND	8
	4-6	ND	77	47	ND	ND	10	ND
	6-8	ND	109	64	ND	ND	19	ND*
Site 2	0-1	233	31	34	ND	226	54	16
	1-2	26	27	5	ND	41	49	8
	2-4	14	22	ND	ND	10	62	ND
	4-6	ND	47	5	ND	ND	118	8
	6-8	ND	122*	45	ND	51	ND	ND*
Site 3	0-1	18	48	ND	1244	2093	34	ND
	1-2	ND	116	ND	8	7	ND	ND
	2-4	29	98	ND	7	ND	27	ND
	4-6	67	212*	ND	ND	ND	109	ND
	6-8	ND		ND	ND	ND	86*	
Average	0-1	309	35	13	421	1330	29	11
	1-2	90	57	2	3	47	18	5
	2-4	16	56	11	2	3	30	2
	4-6	22	112	17	ND	ND	79	2
	6-8	ND	115	36	ND	17	35	ND

*Soil core terminated due to water.

PRIVACY ACT EXEMPTION

[redacted]

MECHANICAL SOIL ANALYSES

Location	pH	Organic Matter* (wt %)	Sand** (wt %)	Clay** (wt %)	Silt** (wt %)	Cation Exchange Capacity (meq/100g)
Hillsborough County [redacted]						
Top Foot	5.75	1.4	93	2	5	5.4
4-6 Foot Layer	4.85	.1	98	2	0	.5
Polk County (First Location)						
Top Foot.	7.65	.8	90	6	4	2.4
4-6 Foot Layer	7.54	.1	92	6	2	.4
Polk County (Second Location)						
Top Foot	5.30	.8	94	4	2	.9
4-6 Foot Layer	4.15	.8	94	4	2	1.2
Indian River County						
Top Foot	5.85	.1	94	4	2	2.8
4-6 Foot Layer	8.2	.2	83	14	3	16
Saint Lucie County						
Top Foot	5.5	1.1	92	4	4	2.8
4-6 Foot Layer	7.65	.1	83	14	3	23

*COD type oxidation (wet)

**Dry soil basis

-331-

INTERNAL CORRESPONDENCE

UNION CARBIDE AGRICULTURAL PRODUCTS COMPANY, Inc.
P O BOX 12014 (W ALEXANDER DRIVE RESEARCH TRIANGLE PARK N C 27709

To (Name) R. L. Bertwell
Division
Location RTP
Floor Number 1148

Copy to R.C. Back
S.L. Harrison
R.L. Jones
G.G. Madgwick

Date March 24, 1983
From (Name & Dept.) R.R. Romine
Registration Analytical Chemistry
Answering letter date

Subject [redacted] Plot Residue Monitoring

FL-DER found residues of 315 ppb in a shallow well on [redacted] Hillsborough County, FL on 2/23/83. We confirmed the finding on that sample and DER indicated they were conducting "holding time" studies using that water (this review was detailed in my 3/16/83 letter).

Additional samples of soil and water were taken from that land and vicinity by Union Carbide on 3/8/83. Results are tabulated.

WATER WELLS

		Depth	pH	Residue
C 704 #1	[redacted]	155 ft	7.4	NO
C 705 #2		100 ft	7.4	NO
C 706 #3		unsure	7.4	NO
C 707		120 ft	7.3	NO
C 708		135 ft	7.2	NO

SOIL CORES

Stratum	Site I		Site II	
	PH	Residue	pH	Residue
0-1 ft	6.2	8 ppb	6.6	NO
1-2 ft	5.4	ND	5.5	ND
2-4 ft	5.4	NO	5.7	ND
4-6 ft	4.8	NO	5.3	NO
6-7 ft (GW)	4.5	ND	(GW-5 ft)	
Groundwater	4.7	3 ppb	5.7	30 ppb

RECEIVED
MAR 2[illegible]
R. C. BACK

R. R. Romine

RRR/sr

PRIVACY ACT EXEMPTION

UNION CARBIDE

INTERNAL CORRESPONDENCE

UNION CARBIDE AGRICULTURAL PRODUCTS COMPANY, Inc.

To (Name)
Division
Location
Floor Number

R.L. Bertwell
RTP
1148

Copy to

R.C. Back
S.L. Harrison
R.L. Jones
G.G. Madgwick

Date
From (Name & Dept.)
Address (Office only)

March 30, 1983
R.R. Romine
Registration Analytical Chemistry

Subject

[redacted] Site
Water Monitoring

PRIVACY ACT EXEMPTION

Two clusters of monitoring wells at the [redacted] grove, [redacted] FL were sampled and shipped by Minter/Kirkland on 3/25/83. Previous results from this site are in my letters of 3/16/83 and 3/24/83.

UCC No.	Sample ID		pH	Residue
C791	Cluster 1	Well 1	4.3	ND
C792	Cluster 1	Well 2	4.3	18 ppb
C793	Cluster 2	Well 1	4.4	ND
C794	Cluster 2	Well 3	4.3	82 ppb

RRR/sr

R. R. Romine

RECEIVED
MAR 3 1
R. C.

Hillsborough County Grove ...er Samples

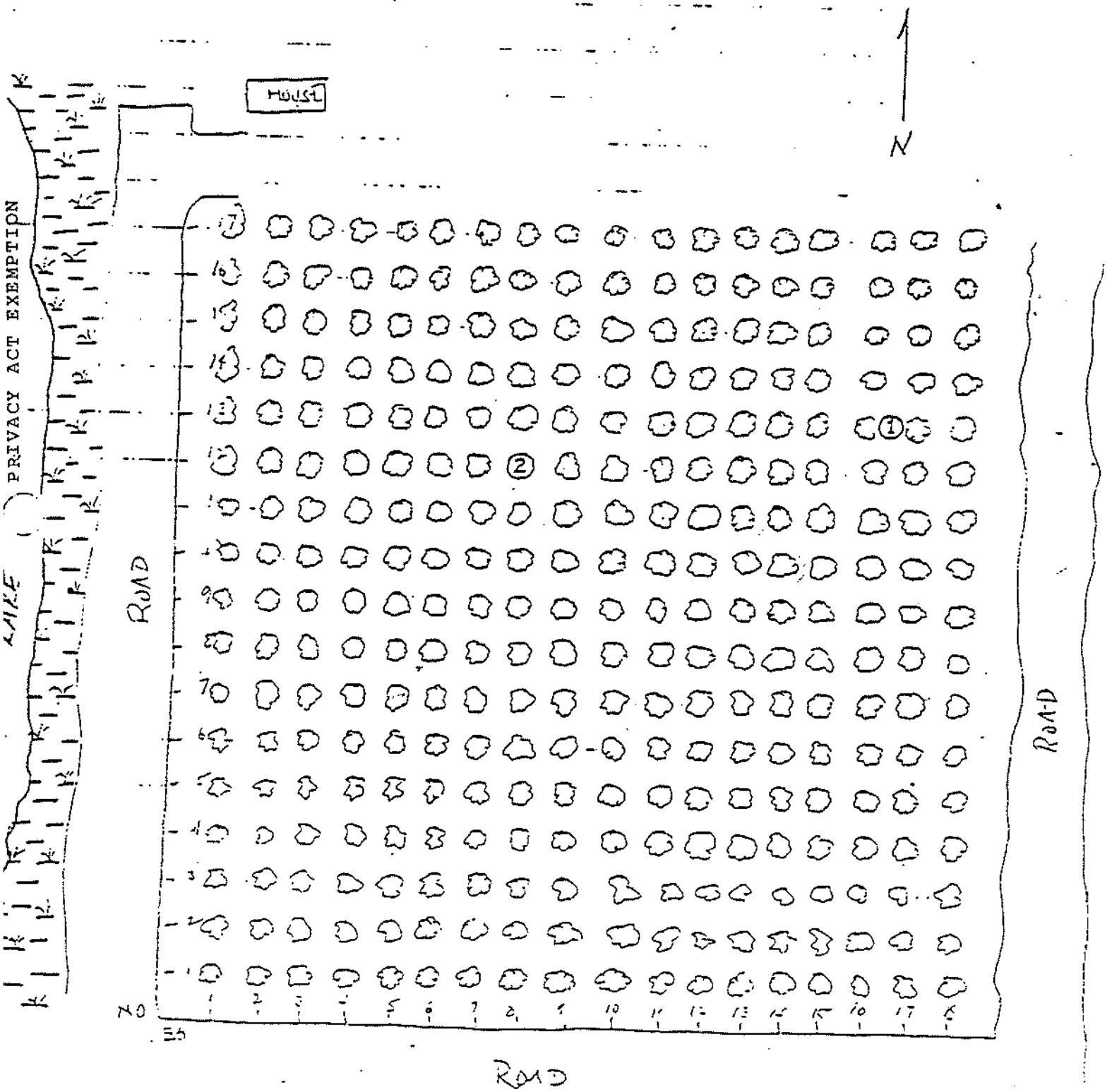
	Sampling Date	Sampler	Depth to Water (feet)	Field Measurements of Sample Water pH	Temperature C	Conductivity (microohms)	Aldicarb Residues (ppb) UCAPC	DER
Cluster 1 Well 1 (8' deep)	3/25/83	DER/UCAPC		4.6	19	420	ND	
Cluster 1 Well 2 (13'7" deep)	3/25/83	DER/UCAPC		4.3	21	790	18	
Cluster 2 Well 1 (8' deep)	3/25/83	DER/UCAPC		4.5	20	520	ND	
Cluster 2 Well 3 (12'2" deep)	3/25/83	DER/UCAPC		4.4	21	790	82	

1361

567V

HILSBORO COUNTY

[redacted] GROVE



CLUSTER 1 N 13.0 E 16.5

CLUSTER 2 N 12.0 E 7.5 / 8.5

2.6 Miscellaneous Additional Residue Monitoring in Florida. Tab 6.

2.6.1 A domestic and irrigation use well in Wintergarden, FL [redacted] which is 200 feet deep in an area where the water table is about 80 feet deep, was sampled 3 times on May 11, 1981 and the samples were frozen immediately. Analysis of the samples in late August 1981 showed ND.

UCC Number	Romero Bottle No.	Description	Residue, ppb
15509	#1	Main Cherry Lake Well	ND
15510	#2	(Same Well) Shop Faucet	ND
15511	#3	(Same Well) Foreman's House	ND

Comments

Use history and hydrogeology is needed.

2.6.2 UC analyzed orange concentrate for the Coca Cola Company and found ND (method sensitive to 10 ppb). This information is not germane to EAB.

2.6.3 Well smples from Polk (4) and Manatee (2) counties on October 27, 1982, showed ND.

Use history and hydrogeology is needed.

UCC No.	Date Sampled	Sample Description	pH	Residue
RB5567	10/27/82	Polk 10-27-82-1	4.7	ND
RB5568	10/27/82	[redacted] -2	4.3	ND
RB5569	10/27/82	-3	8.3	ND
RB5570	10/27/82	-4	7.6	ND
RB5571	10/27/82	Manatee 10-27-82-1	7.4	ND
RB5572	10/27/82	[redacted] -2	8.0	ND

2.6.4 Wells simultaneously sampled by UC and the Florida Dept. of Hlth and Rehab. Services. The UC results showed ND.

UCC No.	Sample Code	Well Owner, Town	Residue
POLK COUNTY			
C525	2-14-83-1	[redacted]	ND
HILLSBOROUGH COUNTY			
C526	2-14-83-1	[redacted] Plant City	ND
C527	-2	Plant City	ND
C528	-3	Plant City	ND
C529	-4	Plant City	ND
C530	(35 ft well)-5	Bowling Green	ND
C531	(20 ft well)-6	Bowling Green	ND,ND

Comments

Use history and hydrogeology are needed.

2.6.5 A well in Orange County, Florida.

UCC No.	Sample Description	Well Depth	Distance from Field	pH	Residue FLORISIL NO	Residue FLORISIL YES
C532	[redacted] Lockhart,FL	65'	100'	8.2	ND,ND	ND,ND
					(4 analyses)	

Comments

Use history and hydrogeology are needed.

2.6.6 Wells in the Ft. Pierce area in St. Lucie and Indian River counties

UCC No.	Watson's Code	Well Owner	Well* Depth	Distance from Treated Area	Residue
ST. LUCIE CO.					
CS14	2-9-83-1	[redacted]	50'	100'	ND
CS15	-2		90'	50'	ND
CS16	-3		150'	¼ mi	ND
CS17	-4		110'	½ mi	ND
CS18	-5		200'	100'	ND
CS19	-6		35'	50'	ND
CS20	-7		30'	100'	ND
INDIAN RIVER CO.					
CS21	2-9-83-8	[redacted]	100'	300'	ND
CS22	-9		45'	100'	ND
CS23	-10		600'	100'	ND
CS24	-11		—	25'	ND

* The water table is a consistent 10' for all samples.

Comments

Use history and hydrogeology are needed.

2.6.7 Three (3) Drinking Water Wells in Orange County, Florida.

UCC No.	Sample ID	Sample Date	Depth	Distance from Field	pH	Residue
C761	# 1-11	2/25/83	Shallow	100 ft.	7.2	ND
C762	# 2-12	2/28/83	180 ft.	200 ft.	7.1	ND
C763	# 3-15	2/28/83	240 ft.	250 ft.	7.3	ND

Comments

Use history and hydrogeology are needed.

2.6.8 [redacted] Grove

This is a 20 acre grove in Hernado County, FL and was treated with aldicarb 10 lb ai/A in the spring of both 1980 and 1982. Someone living adjacent to the grove asked the grove owner to discontinue using aldicarb so as to maintain the integrity of the groundwater. The grove owner asked UC to sample the wells which was done on March 10, 1983. The wells were all within 500 feet of the grove, were all over 200 feet deep and the water table was at 100 feet. No detectable residues were found in any of the 4 wells sampled.

UCC No.	Lanning Sample ID	Depth	pH	Residue
C722	#1 [redacted] - House	285 ft.	7.5	ND
C723	#2 [redacted] - Trailer	400 ft.	6.9	ND
C724	#3 [redacted] - House	600 ft.	7.6	ND
C725	#4 [redacted] House	215 ft.	7.6	ND
C726	#5 [redacted] House	215 ft.	7.4	ND

PRIVACY ACT EXEMPTION

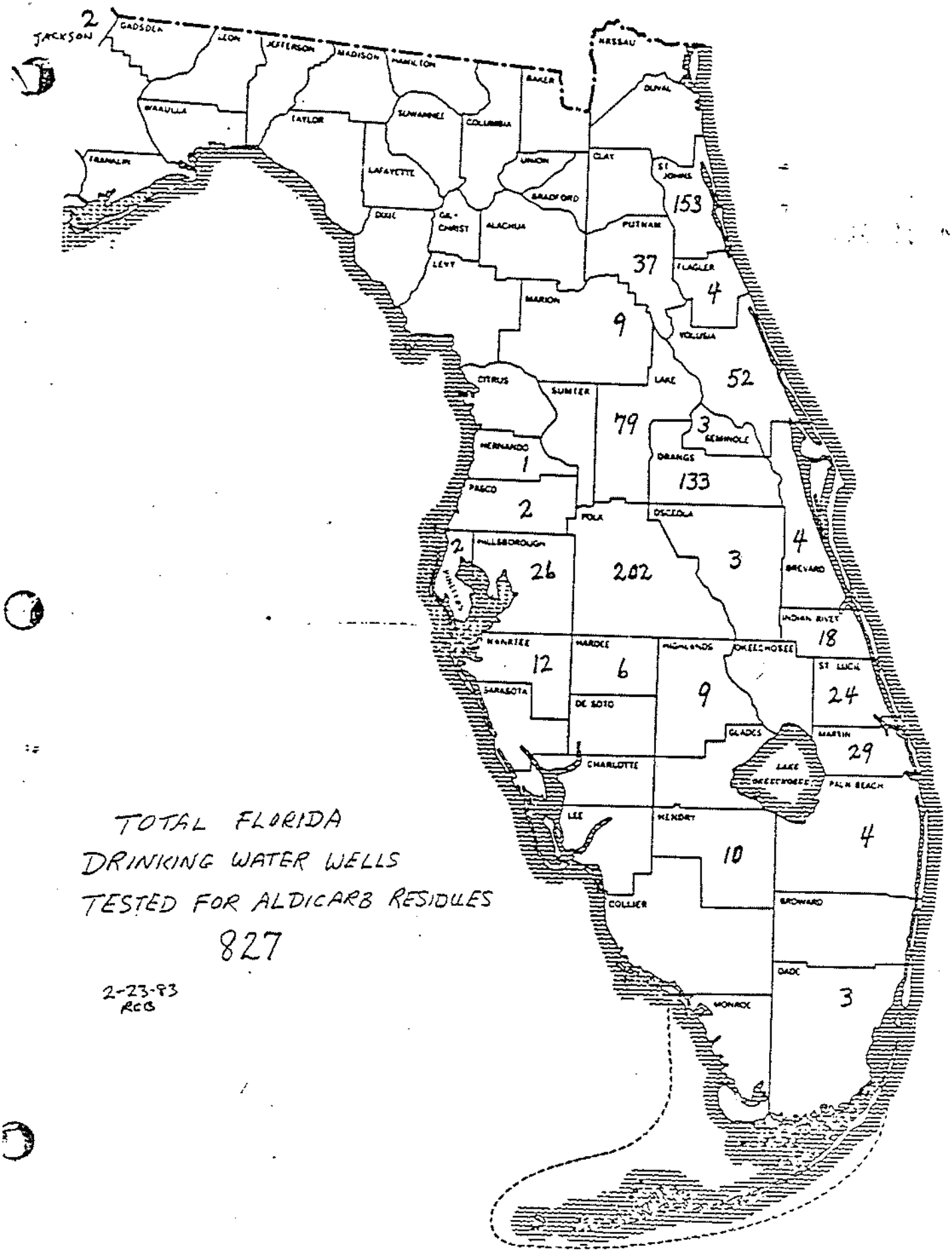
3. CONCLUSIONS/RECOMMENDATIONS

3.1 The only data received by EAB relative to aldicarb and groundwater monitoring in Florida have been submitted by UC. This submission contains the results of analysis of 715 wells (drinking and non-drinking) of which 44 showed positive (> 1 ppb) results for aldicarb residues. However, the last page of Tab 3 of this submission shows a county map of Florida indicating 827 drinking water wells (not including non-drinking water wells) have been tested for aldicarb residues. (See the next page for a copy of the map). This discrepancy needs to be rectified.

3.2 Monitoring reports submitted by UC to date show Florida groundwater contamination with aldicarb to not be widespread. In addition, one of the wells contaminated with aldicarb residues is probably the result of surface water containing aldicarb, running down the side of the well and into the well water through a broken well pipe.

However, there are serious problems and deficiencies with the submitted monitoring data which prevent a conclusion as to the geographical extent, residue levels and temporal trends of groundwater contamination that will result from the agricultural use of aldicarb in Florida. One or more of the following points is not addressed in each of the monitoring reports submitted:

(1) The reports consistently lack details of the hydrogeology of the treated area (direction and velocity of groundwater flow, depth to the water table and not just depth to the well, identity of which aquifer is being monitored, etc.)



TOTAL FLORIDA
DRINKING WATER WELLS
TESTED FOR ALDICARB RESIDUES

827

2-23-83
RCB

(2) Since a groundwater contaminant does not disperse (rapidly) but moves as a plume within the groundwater, there is no guarantee that the wells that were sampled were in the path of the plume of contamination. (See the figure on page .) Justification is needed as to why a well of a certain depth or screened at a certain depth would be expected to pick up the plume of contamination.

(3) Use history of aldicarb in the monitoring sites.

(4) Wells were not sampled over a period of a year or two to determine if levels of contamination were increasing or decreasing.

(5) Maps showing location of wells in relation to treated area and direction of groundwater flow are not submitted.

(6) The analytical method is not described. EAB can only assume that the total residue method (oxidation of the residues to the sulfone) is used.

(7) Soil cores are not always taken. The absence of groundwater residues but the presence of residues in soil just above the water table may mean that the groundwater may become contaminated within the following year.

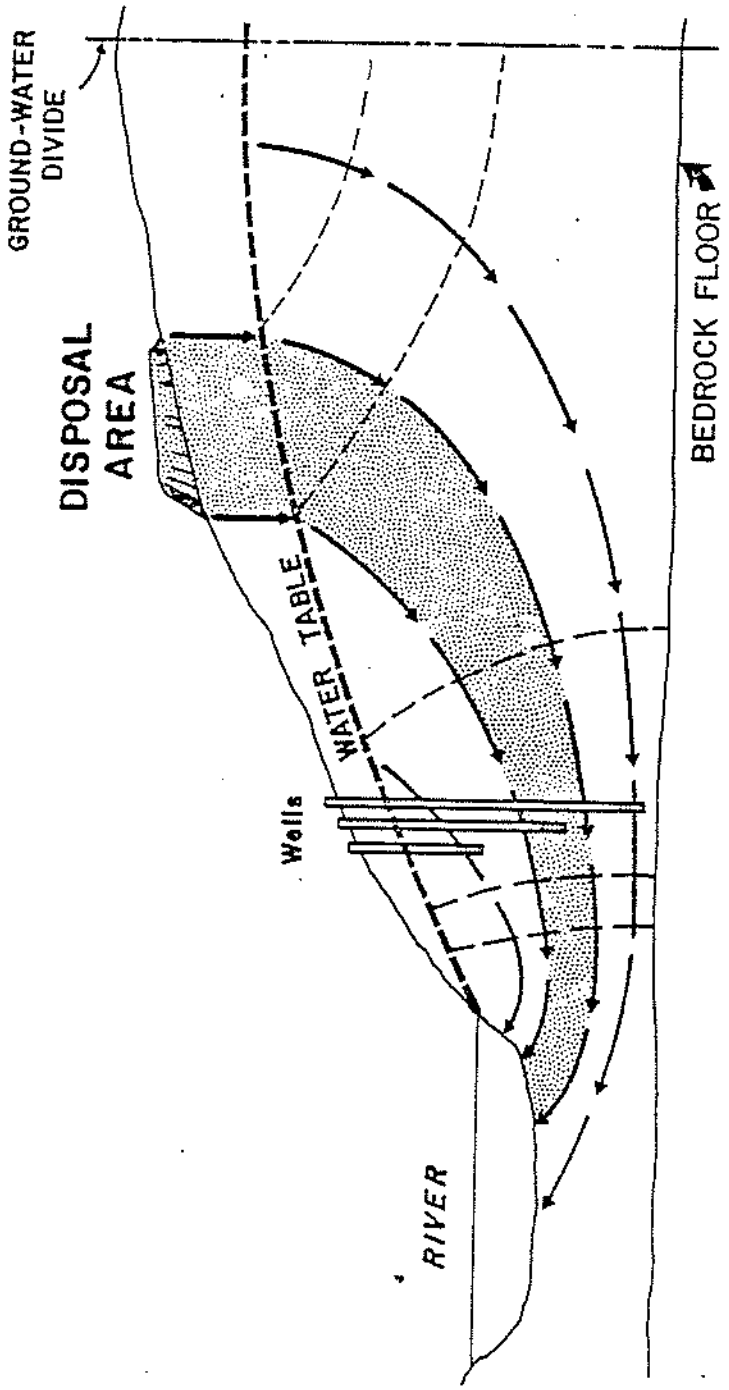
(8) Rainfall/recharge - Rainfall has been less than normal over the past 20 - 25 years.

In addition, it is recommended that the following, which can influence potential for and levels of aldicarb groundwater contamination, be investigated:

(1) Influence of herbicide use in orchards (to remove grass competing for water and nutrients) on pH of soil. A reference[1] shows orchard soil pH to be lower on the bare soil area due to leaching of exchangeable bases (such as Ca and Mg). Persistence of aldicarb residues is favored by acid pH.

(2) Weather and soil conditions. UC has suggested in the past[2] that application a few weeks later in the season can result in faster degradation and less residues leaching due to higher soil temperatures and less rainfall. However, EAB's response[2] showed this to not always be the case. In addition, Dr. Weingartner's statement in section 2.3.2, above, shows that aldicarb is chosen by farmers, in part, due to its advantage in being usable on (potato) fields during periods of heavy rains, cool soil temperatures, and cool wet weather.

(3) Effect of reducing conditions in soil and in groundwater on persistence of aldicarb residues. Several papers[3-7] have recorded the ability of anaerobes (and even aerobes) to reduce sulfoxides to sulfides. Could aldicarb sulfoxide (or even aldicarb sulfone) be reduced to parent aldicarb thereby increasing its persistence? Should aldicarb not be used in fields that are swampy or flooded during part of the year? Are the low populations



Flow of contaminants in a water-table aquifer (humid region) (Miller, 1977).

of microbes in groundwater able to reduce aldicarb sulfoxide (or the sulfone)? Would an iron reducing solution, Fe (II), or other naturally occurring reducers, be able to reduce aldicarb sulfoxide? Note that if an aqueous solution of ferrous iron does not reduce aldicarb sulfoxide (or sulfone), then this is not necessarily an indication that microbes will not reduce it.[8]

(4) How does pumping from wells modify path of movement of aldicarb in groundwater? Will pumping influence choice and location of monitoring wells?

(5) Are aldicarb residues in deep soil and water samples influenced directly or indirectly by exposure to air during sampling and storage?

(6) Is the sample storage method adequate? It is recommended that some groundwater and soil core samples be spiked with a known amount of aldicarb and put through the frozen storage method and analyzed a month later as would be the normal samples.

3.3 Verify the statement in the discussion of the [redacted] location that only 1% of the 257,029 acres planted to oranges in the 4 subject counties are treated with Temik.

REFERENCES

(1) Haynes, R. J. 1981. Soil pH Decrease in the Herbicide Strip of Grassed-Down Orchards. Soil Sci. Vol. 132, No. 4, 274-278.

(2) In: EAB evaluation of aldicarb on field corn (EPA Reg. No. 264-330 and 264-331) dated February 27, 1983; section 4.3.

(3) Walter-Echols, G. and Lichtenstein, E. P. 1977. Microbial Reduction of Phorate Sulfoxide to Phorate in a Soil-Lake Mud-Water Microcosm. J. of Econ. Entomol. 70: 505-509.

(4) Timms and MacRae, 1977. (reduction of fensulfothion to the sulfide). Applied and Environmental Microbiology; 34: 247-250.

(5) Timms and MacRae, 1982. (reduction of fensulfothion to the sulfide). Aust. J. Biol. Sci.; 35: 661-667.

(6) Zinder, S. H. and Brock, T. D., 1978. Dimethyl Sulfoxide Reduction by Micro-organisms. J. Gen. Microbiol. 105: 335-342.

(7) De Bont, J. A. M., Van Dijken, J. P. and Harder, W., 1981. Dimethyl Sulfoxide and Dimethyl Sulfide as a Carbon, Sulfur and Energy Source for Growth of Hyphomicrobium S. J. Gen. Microbiol. 127: 315-323.

(8) Letter from Dr. Martin Alexander of Cornell University to S. Creeger. July 29, 1983.

Samuel M. Creeger Samuel M Creeger Aug 30, 1983
August 30; 1983 Section #1/EAB/HED

098501

TO: WHOM IT MAY CONCERN:

This addicat review replaces the earlier review of same dated Aug. 26, 1983. The Aug. 26, 1983 version should be discarded.

Sue Creger
August 30, 1983