UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 10 1982

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

TO: James D. Felkel
Wildlife Biologist
Ecological Effects Branch
Hazard Evaluation Division (TS-769)

SUBJECT: Estimated Environmental Concentrations (EEC) for Terbufos by the SWRRB and EXAMS Pulse Models

THRU: Carolyn K. Offutt, Chief
Modeling and Guidelines Section
Environmental Fate Branch
Hazard Evaluation Division (TS-769)

THRU: David J. Severn, Chief
Environmental Fate Branch
Hazard Evaluation Division (TS-769)

Your November 10, 1982, memo to Dave Severn requested that the Environmental Fate Branch estimate aquatic concentrations of terbofos in a pond after use on corn at the maximum application rate.

The daily runoff was estimated by the SWRRB model in two different basins, Coshocton, Ohio (COSH 115), and Tifton, GA (Tifton), for corn crops. The maximum application rate of granular terbufos ("Counter" 15G) allowed on corn is 2.4 oz. a.i./1000 linear feet of row with 7" band treatment over the row. The rows were spaced at the 20" apart minimum specified in the label directions for corn (per Dr. E. David Thomas ASIB/BFSD). The maximum application rate is calculated to be 3.92 lb a.i./A. Two applications (May and early June) of this maximum rate (3.92 lb a.i./A) were used to estimate the daily runoff values.

The typical daily runoff estimation is between 0.001 and 0.011 lb a.i./A for COSH 115 and 0.001 and 0.013 lb a.i./A for Tifton for three to five days per year when measurable runoff occurred. (See attached Tables 1 and 2). The daily runoff values for COSH 115 for 1970 (0.005 lb/acre on day 132, 0.009 on day 168, and 0.002 on day 189) were used as typical for this calculation. The daily runoff values of 0.054 lb a.i./A in COSH 115 and 0.067 lbs a.i./A in Tifton were not used because they do not represent typical runoff for any year.

7 pages

The EXAMS--V2.0: Mode 2 (Exposure Analysis Modeling System) pulse version was used for the estimation of the environmental concentration of terbufos in the water column and in the benthic sediment of a pond whose drainage area is 15 hectares. The results are summarized in table and graph forms and are attached for your information.

Under the given assumptions the maximum concentration of terbufos expected on a short-time basis as the result of runoff would be no higher than around 7 ppb dissolved in the water column and around 5 ppb sorbed to the sediments. The concentration of terbufos dissolved in the water column would decline fairly rapidly to less than 1 ppb, while the concentration sorbed to the sediments would decline more slowly to around 2 ppb in 45 days after the last runoff event. In the case of extreme runoff events (0.054 lb/A in COSH 115 or 0.067 lb/A in Tifton), the concentrations would be slightly higher.

I understand that the estimated runoff data from the SWRRB model and estimated environmental concentrations (EEC's) from the EXAMS pulse model Version 2.0: Mode 2 will be used as a part of the Terbufos Registration Standard.

As per our discussions, you agreed that the EEC's could be provided to you by December 10, 1982. If you have any questions please contact me or Carolyn Offutt at (557-7347).

PRDatta

P.R. Datta
Environmental Fate Branch
Hazard Evaluation Division (TS-769)

2

TABLE 1

Application rate
based on 20" row
for corn (3.92 a.i. lb/A)

Basin: COSH 115
Chemical: Terbufos

Daily Runoff values lb/A by SWRRB model

Year	Day	.001 - .004	.004 - .007	.007 - .009	.009 - above
68	132		.004		
	148	.003			
	163	.001			
69	174				.011
	175	.002			
	186				.054
	188			.009	
	208	.001			
70	132		.005		
	168			.009	
	189	.002			

TABLE 2

Application rate
based on 20" row
for corn (3.92 lb/a.i./A)

Basin: Tifton
Chemical: Terbufos

Daily Runoff values lb/A by SWRRB model

Year	Day	.001 - .004	.004 - .007	.007 - .009	.009 above
70	145	.002			
	148				.013
	149	.002			
	185			.008	
71	128		.004		
	168			.007	
	183	.001			
	185	.003			
72					
	171				.067
	172	.002			
	177				.012
	198	.002			
	219	.003			

EXAMS -- EXposure Analysis Modeling System -- V2.0: Mode 2
Ecosystem: POND, AERL DEVELOPMENT PHASE TEST DEFINITION
Chemical: TERBUFOS

TABLE 1.1. SH2 (NEUTRAL MOLECULE, SPECIES #1) INPUT DATA.

MWT= 288.4	SOL = 1.2000E+1	VAPR= 2.6000E-04	HENRY= 0.0000
KVO= 0.0000	ESOL= 0.0000	EVPR= 0.0000	EHEN = 0.0000
KPS= 0.0000	KPB = 0.0000	KOC = 0.0000	KOW = 167.0
KAH1= 6.4200E-03	EAH1= 0.0000	KNH1= 5.3000E-03	ENH1= 0.0000
KAH2= 0.0000	EAH2= 0.0000	KNH2= 0.0000	ENH2= 0.0000
KAH3= 0.0000	EAH3= 0.0000	KNH3= 0.0000	ENH3= 0.0000
KBH1= 3.4000E-03	EBH1= 0.0000	KOX1= 0.0000	EOX1= 0.0000
KBH2= 0.0000	EBH2= 0.0000	KOX2= 0.0000	EOX2= 0.0000
KBH3= 0.0000	EBH3= 0.0000	KOX3= 0.0000	EOX3= 0.0000
KBACW1= 0.0000	QTW1= 0.0000	KBACS1= 3.7500E-09	QTS1= 0.0000
KBACW2= 0.0000	QTW2= 0.0000	KBACS2= 1.8700E-11	QTS2= 0.0000
KBACW3= 0.0000	QTW3= 0.0000	KBACS3= 0.0000	QTS3= 0.0000
KDP= 3.6100E-03	RFLAT= 0.0000	LAMAX= 0.00	
QUANT1= 0.0000	QUANT2= 0.0000	QUANT3= 0.0000	

ABSORPTION SPECTRUM (ABS): 0.0000 0.0000 0.0000

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

System: POND, AERL DEVELOPMENT PHASE TEST DEFINITION
Chemical: TERBUFOS

Time	Water Column			Benthic		
	Ave. Dissolved	Ave. Sorbed	Total Mass	Ave. Dissolved	Ave. Sorbed	Total Mass
(days)	(mg/l)	(mg/kg)	(kg)	(mg/l)	(mg/kg)	(kg)
	Initial Mass: Day 0 .000001 kg					
0	4.999E-08	3.423E-07	1.000E-06	0.000E-01	0.000E-01	0.000E-01
1	4.215E-08	2.886E-07	8.432E-07	6.034E-10	4.131E-09	2.940E-09
2	3.554E-08	2.434E-07	7.110E-07	1.094E-09	7.493E-09	5.332E-09
3	2.997E-08	2.052E-07	5.996E-07	1.491E-09	1.021E-08	7.266E-09
4	2.528E-08	1.731E-07	5.057E-07	1.809E-09	1.239E-08	8.814E-09
5	2.132E-08	1.460E-07	4.265E-07	2.061E-09	1.411E-08	1.004E-08
	Mass: Day 5 .075 kg from 15 hectares					
5	3.749E-03	2.567E-02	7.500E-02	2.061E-09	1.411E-08	1.004E-08
6	3.161E-03	2.165E-02	6.324E-02	4.526E-05	3.099E-04	2.205E-04
7	2.666E-03	1.825E-02	5.332E-02	8.208E-05	5.620E-04	3.999E-04
8	2.248E-03	1.539E-02	4.497E-02	1.118E-04	7.657E-04	5.449E-04
9	1.896E-03	1.298E-02	3.793E-02	1.357E-04	9.289E-04	6.611E-04
10	1.599E-03	1.095E-02	3.199E-02	1.546E-04	1.058E-03	7.531E-04
11	1.349E-03	9.238E-03	2.699E-02	1.693E-04	1.159E-03	8.249E-04
12	1.138E-03	7.794E-03	2.277E-02	1.806E-04	1.236E-03	8.800E-04
13	9.606E-04	6.577E-03	1.922E-02	1.890E-04	1.294E-03	9.210E-04
14	8.108E-04	5.552E-03	1.622E-02	1.950E-04	1.335E-03	9.503E-04
15	6.846E-04	4.687E-03	1.369E-02	1.991E-04	1.363E-03	9.700E-04
	Mass: Day 15 .135 kg from 15 hectares					
15	7.433E-03	5.089E-02	1.487E-01	1.991E-04	1.363E-03	9.700E-04
16	6.268E-03	4.292E-02	1.254E-01	2.829E-04	1.937E-03	1.379E-03
17	5.287E-03	3.620E-02	1.058E-01	3.502E-04	2.398E-03	1.707E-03
18	4.459E-03	3.053E-02	8.920E-02	4.037E-04	2.764E-03	1.967E-03
19	3.762E-03	2.576E-02	7.525E-02	4.456E-04	3.051E-03	2.171E-03
20	3.174E-03	2.173E-02	6.349E-02	4.779E-04	3.272E-03	2.329E-03
21	2.678E-03	1.834E-02	5.357E-02	5.021E-04	3.438E-03	2.447E-03
22	2.260E-03	1.548E-02	4.522E-02	5.196E-04	3.558E-03	2.532E-03
23	1.908E-03	1.307E-02	3.817E-02	5.316E-04	3.640E-03	2.590E-03
24	1.611E-03	1.103E-02	3.224E-02	5.389E-04	3.690E-03	2.626E-03
25	1.361E-03	9.320E-03	2.723E-02	5.425E-04	3.714E-03	2.643E-03
26	1.150E-03	7.875E-03	2.301E-02	5.429E-04	3.717E-03	2.646E-03
27	9.723E-04	6.657E-03	1.945E-02	5.408E-04	3.703E-03	2.635E-03
28	8.223E-04	5.630E-03	1.645E-02	5.366E-04	3.674E-03	2.615E-03
29	6.958E-04	4.764E-03	1.392E-02	5.307E-04	3.634E-03	2.586E-03
30	5.891E-04	4.033E-03	1.178E-02	5.234E-04	3.584E-03	2.551E-03
31	4.991E-04	3.417E-03	9.984E-03	5.151E-04	3.527E-03	2.510E-03
32	4.232E-04	2.897E-03	8.465E-03	5.059E-04	3.464E-03	2.465E-03
33	3.591E-04	2.459E-03	7.184E-03	4.961E-04	3.397E-03	2.418E-03
34	3.051E-04	2.089E-03	6.103E-03	4.858E-04	3.326E-03	2.367E-03
35	2.594E-04	1.776E-03	5.190E-03	4.752E-04	3.254E-03	2.315E-03
	Mass: Day 35 .030 kg from 15 hectares					
35	1.759E-03	1.204E-02	3.519E-02	4.752E-04	3.254E-03	2.315E-03
36	1.485E-03	1.017E-02	2.971E-02	4.824E-04	3.303E-03	2.351E-03
37	1.255E-03	8.591E-03	2.510E-02	4.861E-04	3.328E-03	2.369E-03
38	1.060E-03	7.259E-03	2.121E-02	4.869E-04	3.334E-03	2.373E-03
39	8.961E-04	6.136E-03	1.793E-02	4.854E-04	3.323E-03	2.365E-03
40	7.578E-04	5.188E-03	1.516E-02	4.819E-04	3.299E-03	2.348E-03

System: POND, AERL DEVELOPMENT PHASE TEST DEFINITION (CONT)
Chemical: TERBUFOS

Time	Water Column			Benthic		
(days)	Ave. Dissolved (mg/l)	Ave. Sorbed (mg/kg)	Total Mass (kg)	Ave. Dissolved (mg/l)	Ave. Sorbed (mg/kg)	Total Mass (kg)
41	6.411E-04	4.390E-03	1.283E-02	4.768E-04	3.265E-03	2.323E-03
42	5.428E-04	3.716E-03	1.086E-02	4.705E-04	3.221E-03	2.293E-03
43	4.598E-04	3.148E-03	9.198E-03	4.631E-04	3.171E-03	2.257E-03
44	3.898E-04	2.669E-03	7.798E-03	4.550E-04	3.116E-03	2.217E-03
45	3.307E-04	2.265E-03	6.616E-03	4.463E-04	3.056E-03	2.175E-03
46	2.809E-04	1.923E-03	5.619E-03	4.372E-04	2.993E-03	2.130E-03
47	2.389E-04	1.635E-03	4.778E-03	4.277E-04	2.928E-03	2.084E-03
48	2.034E-04	1.392E-03	4.068E-03	4.179E-04	2.862E-03	2.036E-03
49	1.734E-04	1.187E-03	3.468E-03	4.081E-04	2.794E-03	1.988E-03
50	1.480E-04	1.014E-03	2.962E-03	3.981E-04	2.726E-03	1.940E-03
51	1.266E-04	8.671E-04	2.533E-03	3.882E-04	2.658E-03	1.891E-03
52	1.086E-04	7.433E-04	2.172E-03	3.782E-04	2.590E-03	1.843E-03
53	9.326E-05	6.386E-04	1.866E-03	3.684E-04	2.522E-03	1.795E-03
54	8.032E-05	5.499E-04	1.607E-03	3.587E-04	2.456E-03	1.748E-03
55	6.936E-05	4.749E-04	1.388E-03	3.491E-04	2.390E-03	1.701E-03
56	6.008E-05	4.114E-04	1.202E-03	3.396E-04	2.325E-03	1.655E-03
57	5.221E-05	3.575E-04	1.044E-03	3.303E-04	2.262E-03	1.610E-03
58	4.553E-05	3.117E-04	9.108E-04	3.212E-04	2.199E-03	1.565E-03
59	3.986E-05	2.729E-04	7.973E-04	3.123E-04	2.138E-03	1.522E-03
60	3.503E-05	2.399E-04	7.008E-04	3.035E-04	2.078E-03	1.479E-03

System: POND, AERL DEVELOPMENT PHASE TEST DEFINITION
Chemical: TERBUFOS
Initial Mass: Day 0 .000001 kg
Mass: Day 5 .075 kg from 15 hectares
Mass: Day 15 .135 kg from 15 hectares
Mass: Day 35 .030 kg from 15 hectares