Shaugh. No. 058001

EAB Log Out Date: 31 OCT 1983

Init.:

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

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

Attached, please find the estimated environmental concentration review of:

Reg./File No.: 3125-102, 3125-123

Chemical: O,O-Dimethyl-S-[(4-oxo-1,2,3-benzotriazin-3(4H)-yl)-methyl]-phosphorodithioate

Type Product: Insecticide

Product Name: ®Guthion 2S and ®Guthion 2L

Company Name: Mobay Chemical Corporation

Submission Purposes: EEB wants EEC for Amended Registration Application

ZBB Code: Other

Action Code: 336, 336

Date In: 8/19/83

EFB#: 3497-98

Date Completed: 10/6/83

TAIS (Level II)	Days
64	8

Deferrals To:

X Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

O,O-Dimethyl-S-[(4-oxo-1,2,3-benzotriazin-3(4H)-yl)-methyl]-phosphorodithioate

1. Purpose:

The purpose of this review is to provide estimated environmental concentrations (EECs) of O,O-Dimethyl-S-[(4-oxo-1,2,3-benzotriazin-3(4H)-yl)-methyl]-phosphorodithioate when used as an insecticide on corn. This information was requested by EEB on August 19, 1983, for use in reviewing an application for amended registration to include control of rootworms and borers on corn.

2. Chemical/Physical Characteristics:

See attached form.

3. Directions for Use:

Corn rootworm:
1/2 to 1 pint per acre. Apply a maximum of 12 pints per acre per year during any one crop season. Crop may be fed to animals 45 days following last application.

Borers:
2 to 4 pints per acre. Apply manimum of 12 pints per acre per year during any one crop season. Crop may be used as feed 45 days following last application.

4. Both runoff analyses and water quality analyses were performed.

Runoff analyses:

Watersheds in the river basins at Coshocton, Ohio and Tifton, Georgia were chosen to simulate the possible quantities of O,O-Dimethyl-S-[(4-oxo-1,2,3-benzotriazin-3(4H)-yl)-methyl]-phosphorodithioate (®Guthion) in runoff from its application to corn. These locations were chosen because the model used, Simulator for Water Resources and Rural Basins (SWRRB), contains data for corn crops grown in both these basins.

Table 1 shows the chemistry data, application dates and rates of application. The maximum single application rate (4 pints per acre) and one-half the maximum single application rate were simulated to maximize runoff. The number of applications possible was determined by the limit of 12 pints per acre per year during any one crop season. The years chosen for the simulations are the years in which corn was grown in each basin.

The results of the runoff analyses are shown in Table 2 along with information on rainfall and runoff events following each application. The highest daily pesticide runoff was 0.367

lbs/acre in the year 1969 on the Coshocton, Ohio basin at an application rate of 0.70 lbs/ acre (4 pints/acre) three times during the growing season. At one-half this application rate (1969 with six applications of 2 pints or 0.35 lbs/acre), which was also simulated, the calculated runoff was exactly one-half as much. It should be noted that the year 1969 in the Coshocton, Ohio basin includes an unusually large rainfall of over 5 inches in 24 hours on Julian day 186. As expected, the peak pesticide runoff occurred on this day. EEB might consider the possibility that such a rainfall could disrupt the natural ecosystem, reducing the importance of the pesticide released to the environment on that day.

Table 2 also shows that the SWRRB model simulates daily pesticide runoff only on those days following application when there are actual runoff events in the basin data base. The year 1961 in the Coshocton, Ohio basin provides a case in point. As shown, there are no rainfall runoff events during the remainder of 1961 following the pesticide application, and the model shows no daily pesticide runoff.

Water Quality Analysis:

Water quality analyses were performed using the Exposure Analysis Modeling System (EXAMS) operating in the pulse mode with the Athens ERL pond scenerio. Table 3 shows the input runoff data (last two columns) along with the same information in SWRRB format (first two columns). The input data was taken from the SWRRB run on the Coshocton basin in 1969 at an application rate of 4 pints/acre (0.70 lbs/acre) three times during the growing season. Because the pesticide runoff was associated with an unusually severe rainfall event, a water pulse was added along with each pesticide pulse. The pulses were calculate making the assumption that the runoff area sustaining the pond is ten acres. IMASS is the total quantity of pesticide released to the pond from the ten acres in a 24 hour period. NPSFL is the water pulse to the pond in units of cubic meters per hour. EXAMS simulations were run both with and without water pulses.

The chemistry data used for the EXAMS model simulation with water pulse loads is shown in Table 4, and the same data used in the simulation without water pulses is shown in Table 6. Model outputs with water pulses are shown in Table 5 and Figure 1, and results without water pulses, for comparison purposes, are shown in Table 7 and Figure 2. Model outputs are given daily through Julian day 265 and then at ten day intervals through 365. The first input quantity of 0.000001 kg/10 hectare is entered to provide a better graphic plot of the results (Figures 1 & 2). Pesticide and water pulses occur only on the Julian day

indicated and are returned to background levels (pesticide pulse = 0.0 kg, water pulse = 5.0 m^3/hr) on the following day.

The maximum quantity of O,O-Dimethyl-S-[(4-oxo-1,2,3-benzotriazin-3(4H)-yl)-methyl]-phosphorodithioate found in the water column is 0.206 ppm (Julian day 186) occurring on the day in which the large rainfall of >5 inches is encountered. It should be noted that the same maximum concentration was calculated by the EXAMS model for the runs with and without water pulses. This result indicates that the model does not load the water pulse with the pesticide pulse. If the quantity of water entering the pond along with the pesticide is considered, the maximum quantity of O,O-Dimethyl-S-[(4-oxo-1,2,3-benzotriazin-3(4H)-yl)-methyl]-phosphorodithioate possible is 0.179 ppm (the water pulse is approximately equal to 15% of the water volume in the pond). As noted by comparing Tables 5 & 7, the water pulse load does result in a slight dilution of the pesticide on the day following the pulse. The maximum pesticide concentration in the water column is calculated by the model simply by assuming that the entire pesticide load is instantaneously distributed throughout the entire volume of water in the pond (20,000 m^3). Application of the various, available degradation pathways begins on the next day. The maximum O,O-Dimethyl-S-[(4-oxo-1,2,3-benzotriazin-3(4H)-yl)-methyl]-phosphorodithioate quantity can be seen to drop to the low ppb level in nine days even though there are two additional pesticide pulses during the intervening time period.

Figures 1 & 2 present the EXAMS output in graphical form. Both figures are dominated by the pulse on Julian day 186, and, because the model does not recognize a difference in maximums with and without water pulses, the two figures are practically identical.

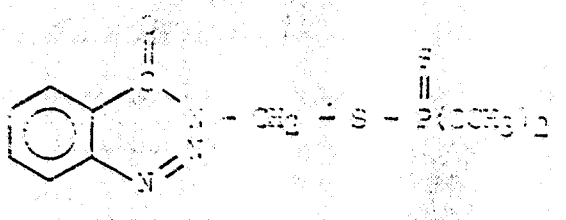
Andrew P. Jovanovich
Chemist
Exposure Assessment Branch

Shaugh. No. 053001

Common Name: Guthion

Chemical Name: O,O-Dimethyl-S-[(4-oxo-1,2,3-benzotriazin-3(4H)-yl)methyl]-phosphorodithioate

Structure:



Chemical Properties: (Additional data provided on following page.)

Molecular Weight: 317.34 Solubility (ppm): 34

Partitioning:	$K_d=K_{abs}K_{ps}$	Soil Type	%OC
K_{ow} Not Available	16.75	Silt Loam	5.0
	7.60	Sandy Loam	2.8
K_{oc} Not Available	9.85	Silty Clay	0.5

Hydrolysis (halflife hrs.)

(pH 4) 960 hr (pH 7) 576 hr (pH 9) 48 hr

K $7.22X10^{-4}$ K_{ah} 0.0 K_{nh} $1.20X10^{-3}$ K_{oh} $7.2X10^{-4}$ K_{oh} $1.44X10^{-2}$ K_{oh} $1.368X10^{3}$

Photolysis (Halflife hrs.)

Water 9.4 hr K_{dp} $7.37X10^{-2}$ Soil 220 hr K $3.15X10^{-3}$

Vapor Pressure: 10^{-7} mm Hg @ 30°C Evaporation: ---

Degradation (halflife hrs.)[a]

Soil[b] (Aerobic) (K_{b2} = $6.56X10^{-11}$ @ 10^{7} cells/ml)[c] 1056 hr K[d] $6.56X10^{-18}$

Soil (Anaerobic) (Cell Population Unavailable) 1632 hr K $4.25X10^{-4}$

Water (Type K_{b2} = $5.16X10^{-9}$ @ 10^{5} cells/ml)[c] 1344[e] hr K[d] $5.16X10^{-14}$

Bacteriological

Soil (Type Not Available) hr K

Water (Type Not Available) hr K

NOTES

a). Following degradation data available from field tests:

Soil Type	Half-Life
Sandy Loam	61 days
Sandy Clay	<30 days
Silt Loam	<<30 days
Sandy Clay Loam	<30 days

Guthion was applied at 4.0 lb/acre. According to reviews, the listed half-lives are for Guthion + metabolites.

b). Soil Composition:

73% Sand
17% Silt
10% Clay
1.4% Organic Matter

c). Assumes 10^7 cells/ml for soil and 10^5 cells/ml for water because these are the cell population levels assumed by the EXAMS2 model. No data was available on the cell populations in the degradation studies.

d). Pseudo-first order constants assuming constant cell populations.

e). No actual water microbial degradation rates are available so an average of the aerobic and anaerobic half-lives was assumed.

Table 1. PESTICIDE RUNOFF SIMULATION, GUTHION

Location (Soil Type)	Appl. Rate (lbs/acre)	Appl. Method	Appl. Dates (yr/Julian day)	K_d Assumed	Wash-off Availabil. (%)	Half-life on Foliage (days)	Decay Const. (/day)	Application Efficiency (frac.)
Coshocton, Ohio (Sandy Clay Loam)	0.35[a]	Ground	1961/163,170, 179,191, 203,208	8.0	100	0.40[b]	0.033[c]	0.80
	0.35	Ground	1965/162,169, 178,196, 201,211	8.0	100	0.40	0.033	0.80
	0.35	Ground	1969/172,178, 183,189, 196,206	8.0	100	0.40	0.033	0.80
Coshocton, Ohio (Sandy Clay Loam)	0.70	Ground	1961/163,170, 179	8.0	100	0.40	0.033	0.80
	0.70	Ground	1965/162,167, 172	8.0	100	0.40	0.033	0.80
	0.70	Ground	1969/172,178, 183	8.0	100	0.40	0.033	0.80
Tifton, Georgia (Sandy Clay)	0.35	Ground	1970/160,167, 174,189, 201,211	9.0	100	0.40	0.033	0.80
	0.35	Ground	1971/151,158, 163,190, 198,206	9.0	100	0.40	0.033	0.80
Tifton, Georgia (Sandy Clay)	0.70	Ground	1970/160,167, 174	9.0	100	0.40	0.033	0.80
		Ground	1971/151,158, 163	9.0	100	0.40	0.033	0.80

NOTES TO TABLE

a). Application rate of 0.35 lbs/acre corresponds to 2 pints/acre formulated product which is 20-22% by weight Guthion. Second run on each basin is at the highest rate specified on the label or 4 pints/acre (0.70 lbs/acre).

b). Half-life on foliage is assumed to be the same as the photodegradation half-life in water.

c). Assumed from field degradation data shown earlier which can be used to calculate a rough half-life of 21 days.

Table 2. RUNOFF SIMULATION RESULTS, GUTHION

Year	Julian Dates		Runoff Dates During Year (Julian)	Appl. Rate (lbs/acre)	Pesticide Runoff		Post-Application	
	Day Applied	Next Rainfalls			Daily (lbs/Acre)	Total Annual (lbs/acre)	Daily Rainfall (Inches)	Daily Runoff (Inches)
Basin: Coshocton, Ohio								
1961	163	165	56,64,67,111,	0.35	0.000	0.001	0.180	0.000
	170	174	115,152,159		0.000		0.450	0.000
	179	183			0.000		0.120	0.000
	191	193			0.000		0.090	0.000
	203	205			0.000		1.360	0.000
	208	209			0.000		0.180	0.000
1965	162	- -	64,146,244,	0.35	- -	0.001	- -	- -
	169	174	255,273,294		0.000		0.150	0.000
	178	179			0.000		0.120	0.000
	196	- -			- -		- -	- -
	201	203			0.000		0.300	0.000
	211	213			0.000		0.500	0.000
1969	172	173	128,153,174,	0.35	0.000	0.232	0.070	0.000
		174	175,186,188,		0.007		1.520	0.173
		175	191,201,208		0.001		0.450	0.038
	178	181			0.000		0.360	0.000
	183	184			0.000		0.050	0.000
		185			0.000		0.410	0.000
		186			0.184		5.090	2.764
		188			0.023		0.750	0.642
	189	191			0.001		0.530	0.013
	196	198			0.000		0.070	0.000
		200			0.000		0.330	0.000
		201			0.004		1.470	0.082
	206	208			0.011		2.450	0.433

Table 2, Continued

Year	Julian Dates: Day Applied	Julian Dates: Next Rainfalls	Runoff Dates During Year	Appl. Rate (lbs/acre)	Pesticide Runoff: (lbs/Acre)	Pesticide Runoff: Total Annual (lbs/acre)	Post-Application: Daily Rainfall (Inches)	Post-Application: Daily Runoff (Inches)
Basin: Coshocton, Ohio								
1961	163	165	56,64,67,111,	0.70	0.000	0.001	0.180	0.000
	170	174	115,152,159		0.000		0.450	0.000
	179	183			0.000		0.120	0.000
1965	162	- -	65,146,244,	0.70	- -	0.001	- -	- -
	167	- -	255,273,294		- -		- -	- -
	172	174			0.000		0.150	0.000
		179			0.000		0.120	0.000
1969	172	173	128,153,174,	0.70	0.000	0.441	0.070	0.000
		174	175,186,188,		0.014		1.520	0.173
		175	188,191,201,		0.003		0.450	0.038
	178	181	208		0.000		0.360	0.000
	183	184			0.000		0.050	0.000
		185			0.000		0.410	0.000
		186			0.367		5.090	2.764
		188			0.047		0.750	0.000
		191			0.001		0.530	0.013
		201			0.002		1.470	0.082
		208			0.006		2.450	0.433
Basin: Tifton, Georgia								
1970	160	164	33,47,80,87,	0.35	0.000	0.004	0.970	0.000
	167	- -	145,148,149,		- -		- -	- -
	174	175	185,220,239,		0.000		0.050	0.000
			292					

Table 2, Continued

Year	Julian Dates: Day Applied	Julian Dates: Next Rainfalls	Runoff Dates During Year	Appl. Rate (lbs/acre)	Pesticide Runoff: (lbs/Acre)	Pesticide Runoff: Total Annual (lbs/acre)	Post-Application: Daily Rainfall (Inches)	Post-Application: Daily Runoff (Inches)
- Basin: Tifton, Georgia -								
		176			0.000		0.110	0.000
		185			0.003		2.480	0.175
	189	190			0.000		0.060	0.000
		192			0.000		0.340	0.000
		193			0.000		0.470	0.000
	201	204			0.000		0.220	0.000
		205			0.000		0.600	0.000
		208			0.000		1.320	0.000
	211	219			0.000		0.550	0.000
		220			0.000		1.710	0.029
1971	151	155	38,85,119,	0.35	0.000	0.008	0.300	0.000
	158	161	120,128,132,		0.000		1.100	0.000
	163	164	168,183,185,		0.000		0.500	0.000
		168	233,306		0.004		1.700	0.078
		183			0.001		1.700	0.040
		185			0.002		1.800	0.152
	190	191			0.000		0.500	0.000
	198	204			0.000		0.200	0.000
	206	210			0.000		1.200	0.000
1970	160	164	33,47,80,87,	0.70	0.000	0.007	0.970	0.000
	167	- -	145,148,149,		- -		- -	- -
	174	175	185,220,239,		0.000		0.050	0.000
		176	292		0.000		0.110	0.000
		185			0.006		2.480	0.175

Table 2, Continued

Year	Julian Dates		Runoff Dates During Year	Appl. Rate (lbs/acre)	Pesticide Runoff		Post-Application	
	Day Applied	Next Rainfalls			(lbs/Acre)	Total Annual (lbs/acre)	Daily Rainfall (Inches)	Daily Runoff (Inches)
Basin: Tifton, Georgia								
1971	151	155	38,85,119,	0.70	0.000	0.015	0.000	0.000
	158	161	120,128,132,		0.000		1.100	0.000
	163	164	168,183,185,		0.000		0.500	0.000
		168	233,306		0.009		1.700	0.078
		183			0.001		1.700	0.040
		185			0.004		1.800	0.152

Table 3. PULSE INPUTS TO EXAMS2
Guthion at Coshocton, Ohio

Julian Date	Pesticide Runoff (lbs/acre)	Daily Runoff (acre-inches)	IMASS (kg)	NPSFL(1) (m^3/hr)
174	0.014	0.173	0.157	12.4
175	0.003	0.038	0.034	6.63
186	0.367	2.764	4.110	123.3
188	0.047	0.000	0.526	5.0
191	0.001	0.013	0.011	5.56
201	0.002	0.082	0.022	8.31
208	0.006	0.433	0.067	23.53

Table 4
COMPOUND CHARACTERISTICS FOR GUTHION ON CORN IN COSHOCTON OH
WITH WATER PULSE LOADS

```
        EXAMS -- EXPOSURE ANALYSIS MODELING SYSTEM -- V2.0: MODE 2
ECOSYSTEM: POND, AERL DEVELOPMENT PHASE TEST DEFINITION
CHEMICAL: GUTHION ON CORN IN COSHOCTON OH
------------------------------------------------------------------------
TABLE 1.1.  SH2 (NEUTRAL MOLECULE, SPECIES #1) INPUT DATA.
MWT=  317.3     SOL =  34.00       VAPR= 0.0000E+00 HENRY= 0.0000E+00
KVO= 0.0000E+00 ESOL= 0.0000E+00 EVPR= 0.0000E+00 EHEN = 0.0000E+00
KPS=  8.000     KPB = 0.0000E+00 KOC = 0.0000E+00 KOW  = 0.0000E+00
KAH1= 0.0000E+00 EAH1= 0.0000E+00  KNH1= 7.2000E-04 ENH1= 0.0000E+00
KAH2= 0.0000E+00 EAH2= 0.0000E+00  KNH2= 0.0000E+00 ENH2= 0.0000E+00
KAH3= 0.0000E+00 EAH3= 0.0000E+00  KNH3= 0.0000E+00 ENH3= 0.0000E+00
KBH1=  1368.     EBH1= 0.0000E+00  KOX1= 0.0000E+00 EOX1= 0.0000E+00
KBH2= 0.0000E+00 EBH2= 0.0000E+00  KOX2= 0.0000E+00 EOX2= 0.0000E+00
KBH3= 0.0000E+00 EBH3= 0.0000E+00  KOX3= 0.0000E+00 EOX3= 0.0000E+00
KBACW1= 5.1600E-14 QTW1= 0.0000E+00  KBACS1= 6.5600E-18 QTS1= 0.0000E+00
KBACW2= 0.0000E+00 QTW2= 0.0000E+00  KBACS2= 0.0000E+00 QTS2= 0.0000E+00
KBACW3= 0.0000E+00 QTW3= 0.0000E+00  KBACS3= 0.0000E+00 QTS3= 0.0000E+00
KDP= 7.3700E-02 RFLAT=  40.00      LAMAX=      0.00
QUANT1=  1.000     QUANT2= 0.0000E+00 QUANT3= 0.0000E+00
ABSORPTION SPECTRUM (ABS):   0.0000E+00   0.0000E+00   0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
```

Table 5

EXAMS -- EXPOSURE ANALYSIS MODELING SYSTEM -- V2.0: MODE 2
ECOSYSTEM: POND, AERL DEVELOPMENT PHASE TEST DEFINITION
CHEMICAL: GUTHION ON CORN IN COSHOCTON OH

TABLE 16. SIMULATION RESULTS -- TIME-TRACE OF CHEMICAL CONCENTRATIONS.

TIME	AVERAGE CHEMICAL CONCENTRATIONS				MASS OF CHEMICAL	
DAYS	WATER COLUMN		BOTTOM SEDIMENTS		WATER COL	SEDIMENTS
	FREE(MG/L)	SED(MG/KG)	PORE(MG/L)	SED(MG/KG)	TOTAL KG	TOTAL KG
IMASS = 0.000001		NPSFL = 5.0				
173.	4.999E-08	3.999E-07	0.000E+00	0.000E+00	1.0000E-06	0.000E+00
IMASS = 0.157		NPSFL = 12.4				
174.	7.848E-03	6.279E-02	5.504E-10	4.403E-09	0.1570	3.111E-09
IMASS = 0.034		NPSFL = 6.63				
175.	7.264E-03	5.811E-02	8.609E-05	6.887E-04	0.1453	4.865E-04
176.	5.000E-03	4.000E-02	1.643E-04	1.314E-03	0.1000	9.284E-04
177.	3.449E-03	2.759E-02	2.160E-04	1.728E-03	6.8994E-02	1.221E-03
178.	2.379E-03	1.904E-02	2.497E-04	1.997E-03	4.7600E-02	1.411E-03
179.	1.642E-03	1.314E-02	2.708E-04	2.167E-03	3.2847E-02	1.530E-03
180.	1.134E-03	9.068E-03	2.834E-04	2.267E-03	2.2676E-02	1.602E-03
181.	7.830E-04	6.264E-03	2.902E-04	2.321E-03	1.5664E-02	1.640E-03
182.	5.413E-04	4.331E-03	2.929E-04	2.343E-03	1.0829E-02	1.655E-03
183.	3.746E-04	2.997E-03	2.930E-04	2.344E-03	7.4941E-03	1.656E-03
184.	2.597E-04	2.078E-03	2.912E-04	2.329E-03	5.1950E-03	1.645E-03
185.	1.804E-04	1.443E-03	2.881E-04	2.305E-03	3.6083E-03	1.628E-03
IMASS = 4.110		NPSFL = 123.3				
186.	0.206	1.64	2.843E-04	2.274E-03	4.113	1.607E-03
187.	0.123	0.984	2.398E-03	1.919E-02	2.461	1.355E-02
IMASS = 0.526		NPSFL = 5.0				
188.	0.111	0.889	3.705E-03	2.964E-02	2.223	2.094E-02
189.	7.666E-02	0.613	4.854E-03	3.883E-02	1.534	2.743E-02
190.	5.289E-02	0.423	5.600E-03	4.480E-02	1.058	3.165E-02
IMASS = 0.011		NPSFL = 5.56				
191.	3.705E-02	0.296	6.069E-03	4.855E-02	0.7411	3.430E-02
192.	2.556E-02	0.204	6.354E-03	5.084E-02	0.5113	3.591E-02
193.	1.766E-02	0.141	6.507E-03	5.206E-02	0.3532	3.677E-02
194.	1.221E-02	9.765E-02	6.570E-03	5.256E-02	0.2442	3.713E-02
195.	8.448E-03	6.758E-02	6.572E-03	5.257E-02	0.1690	3.714E-02
196.	5.856E-03	4.685E-02	6.532E-03	5.225E-02	0.1172	3.691E-02
197.	4.069E-03	3.255E-02	6.464E-03	5.171E-02	8.1391E-02	3.653E-02
198.	2.836E-03	2.268E-02	6.378E-03	5.102E-02	5.6724E-02	3.604E-02
199.	1.985E-03	1.588E-02	6.280E-03	5.024E-02	3.9705E-02	3.549E-02
200.	1.398E-03	1.118E-02	6.175E-03	4.940E-02	2.7959E-02	3.490E-02
IMASS = 0.022		NPSFL = 8.31				
201.	2.092E-03	1.674E-02	6.065E-03	4.852E-02	4.1849E-02	3.428E-02
202.	1.465E-03	1.172E-02	5.965E-03	4.772E-02	2.9303E-02	3.371E-02
203.	1.038E-03	8.301E-03	5.861E-03	4.689E-02	2.0757E-02	3.312E-02
204.	7.426E-04	5.941E-03	5.754E-03	4.603E-02	1.4856E-02	3.252E-02
205.	5.386E-04	4.309E-03	5.645E-03	4.516E-02	1.0775E-02	3.190E-02
206.	3.974E-04	3.180E-03	5.537E-03	4.430E-02	7.9507E-03	3.129E-02
207.	2.995E-04	2.396E-03	5.429E-03	4.343E-02	5.9922E-03	3.068E-02

IMASS = .067 NPSFL = 23.53

208.	3.581E-03	2.865E-02	5.323E-03	4.258E-02	7.1632E-02	3.008E-02
209.	2.439E-03	1.951E-02	5.254E-03	4.203E-02	4.8798E-02	2.969E-02
210.	1.706E-03	1.365E-02	5.175E-03	4.140E-02	3.4136E-02	2.924E-02
211.	1.201E-03	9.604E-03	5.089E-03	4.071E-02	2.4017E-02	2.876E-02
212.	8.513E-04	6.810E-03	4.999E-03	3.999E-02	1.7030E-02	2.825E-02
213.	6.100E-04	4.880E-03	4.907E-03	3.926E-02	1.2204E-02	2.773E-02
214.	4.432E-04	3.546E-03	4.814E-03	3.852E-02	8.8661E-03	2.721E-02
215.	3.278E-04	2.622E-03	4.722E-03	3.778E-02	6.5573E-03	2.668E-02
216.	2.477E-04	1.982E-03	4.630E-03	3.704E-02	4.9557E-03	2.617E-02
217.	1.921E-04	1.537E-03	4.539E-03	3.631E-02	3.8435E-03	2.565E-02
218.	1.534E-04	1.227E-03	4.449E-03	3.559E-02	3.0679E-03	2.514E-02
219.	1.261E-04	1.009E-03	4.361E-03	3.489E-02	2.5234E-03	2.464E-02
220.	1.070E-04	8.562E-04	4.274E-03	3.419E-02	2.1411E-03	2.415E-02
221.	9.339E-05	7.471E-04	4.189E-03	3.351E-02	1.8682E-03	2.367E-02
222.	8.363E-05	6.690E-04	4.105E-03	3.284E-02	1.6730E-03	2.320E-02
223.	7.654E-05	6.123E-04	4.023E-03	3.218E-02	1.5312E-03	2.273E-02
224.	7.125E-05	5.700E-04	3.942E-03	3.154E-02	1.4253E-03	2.228E-02
225.	6.724E-05	5.379E-04	3.863E-03	3.091E-02	1.3451E-03	2.183E-02
226.	6.413E-05	5.131E-04	3.786E-03	3.029E-02	1.2830E-03	2.139E-02
227.	6.165E-05	4.932E-04	3.710E-03	2.968E-02	1.2333E-03	2.097E-02
228.	5.957E-05	4.766E-04	3.635E-03	2.908E-02	1.1917E-03	2.054E-02
229.	5.780E-05	4.624E-04	3.562E-03	2.850E-02	1.1563E-03	2.013E-02
230.	5.626E-05	4.500E-04	3.491E-03	2.793E-02	1.1254E-03	1.973E-02
231.	5.487E-05	4.390E-04	3.421E-03	2.737E-02	1.0977E-03	1.933E-02
232.	5.359E-05	4.288E-04	3.352E-03	2.682E-02	1.0722E-03	1.894E-02
233.	5.297E-05	4.238E-04	3.285E-03	2.628E-02	1.0597E-03	1.856E-02
234.	5.172E-05	4.138E-04	3.219E-03	2.575E-02	1.0347E-03	1.819E-02
235.	5.048E-05	4.038E-04	3.155E-03	2.524E-02	1.0098E-03	1.783E-02
236.	4.923E-05	3.939E-04	3.091E-03	2.473E-02	9.8489E-04	1.747E-02
237.	4.809E-05	3.847E-04	3.029E-03	2.423E-02	9.6197E-04	1.712E-02
238.	4.650E-05	3.720E-04	2.968E-03	2.375E-02	9.3014E-04	1.678E-02
239.	4.563E-05	3.651E-04	2.909E-03	2.327E-02	9.1287E-04	1.644E-02
240.	4.487E-05	3.589E-04	2.851E-03	2.280E-02	8.9754E-04	1.611E-02
241.	4.432E-05	3.546E-04	2.793E-03	2.235E-02	8.8663E-04	1.579E-02
242.	4.349E-05	3.479E-04	2.737E-03	2.190E-02	8.6997E-04	1.547E-02
243.	4.261E-05	3.409E-04	2.682E-03	2.146E-02	8.5241E-04	1.516E-02
244.	4.195E-05	3.356E-04	2.629E-03	2.103E-02	8.3914E-04	1.485E-02
245.	4.100E-05	3.280E-04	2.576E-03	2.061E-02	8.2025E-04	1.456E-02
246.	3.992E-05	3.194E-04	2.524E-03	2.019E-02	7.9857E-04	1.426E-02
247.	3.909E-05	3.127E-04	2.473E-03	1.979E-02	7.8201E-04	1.398E-02
248.	3.831E-05	3.065E-04	2.424E-03	1.939E-02	7.6647E-04	1.370E-02
249.	3.748E-05	2.998E-04	2.375E-03	1.900E-02	7.4968E-04	1.342E-02
250.	3.677E-05	2.941E-04	2.328E-03	1.862E-02	7.3549E-04	1.315E-02
251.	3.614E-05	2.891E-04	2.281E-03	1.825E-02	7.2295E-04	1.289E-02
252.	3.543E-05	2.834E-04	2.235E-03	1.788E-02	7.0874E-04	1.263E-02
253.	3.472E-05	2.777E-04	2.190E-03	1.752E-02	6.9448E-04	1.238E-02
254.	3.402E-05	2.721E-04	2.146E-03	1.717E-02	6.8050E-04	1.213E-02
255.	3.332E-05	2.666E-04	2.103E-03	1.683E-02	6.6661E-04	1.189E-02
256.	3.264E-05	2.612E-04	2.061E-03	1.649E-02	6.5305E-04	1.165E-02
257.	3.135E-05	2.508E-04	2.020E-03	1.616E-02	6.2713E-04	1.141E-02
258.	3.073E-05	2.458E-04	1.979E-03	1.583E-02	6.1477E-04	1.118E-02
259.	3.015E-05	2.412E-04	1.939E-03	1.552E-02	6.0316E-04	1.096E-02
260.	2.961E-05	2.369E-04	1.900E-03	1.520E-02	5.9235E-04	1.074E-02

261.	2.911E-05	2.329E-04	1.862E-03	1.490E-02	5.8232E-04	1.052E-02
262.	2.811E-05	2.249E-04	1.825E-03	1.460E-02	5.6228E-04	1.031E-02
263.	2.767E-05	2.213E-04	1.788E-03	1.431E-02	5.5350E-04	1.011E-02
264.	2.725E-05	2.180E-04	1.752E-03	1.402E-02	5.4513E-04	9.904E-03
265.	2.684E-05	2.147E-04	1.717E-03	1.374E-02	5.3687E-04	9.705E-03
275.	2.264E-05	1.811E-04	1.402E-03	1.122E-02	4.5295E-04	7.924E-03
285.	1.867E-05	1.493E-04	1.145E-03	9.159E-03	3.7340E-04	6.470E-03
295.	1.485E-05	1.188E-04	9.349E-04	7.479E-03	2.9711E-04	5.283E-03
305.	1.164E-05	9.311E-05	7.634E-04	6.107E-03	2.3282E-04	4.314E-03
315.	1.008E-05	8.064E-05	6.233E-04	4.986E-03	2.0164E-04	3.522E-03
325.	8.839E-06	7.071E-05	5.089E-04	4.071E-03	1.7683E-04	2.876E-03
335.	6.340E-06	5.072E-05	4.156E-04	3.325E-03	1.2683E-04	2.349E-03
345.	5.152E-06	4.122E-05	3.393E-04	2.715E-03	1.0306E-04	1.918E-03
355.	4.182E-06	3.346E-05	2.771E-04	2.217E-03	8.3658E-05	1.566E-03
365.	3.201E-06	2.561E-05	2.262E-04	1.810E-03	6.4042E-05	1.279E-03

Figure 1

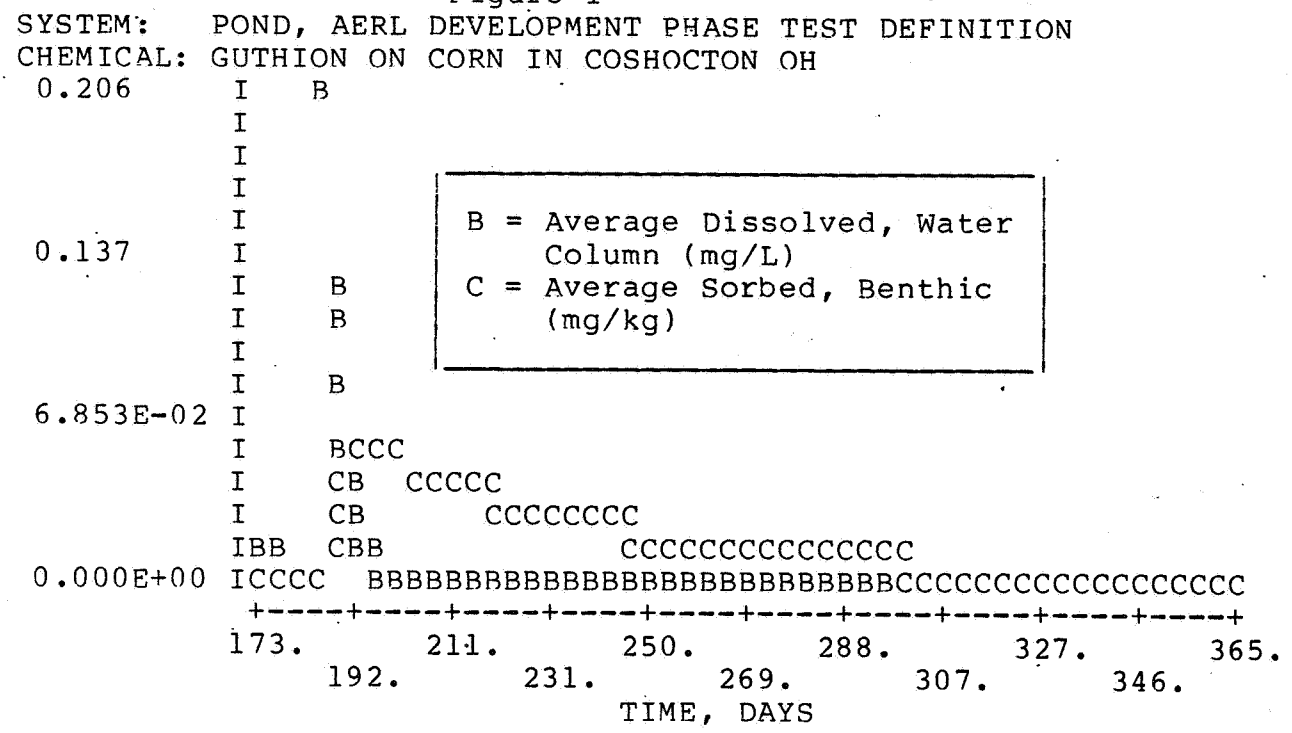

SYSTEM: POND, AERL DEVELOPMENT PHASE TEST DEFINITION
CHEMICAL: GUTHION ON CORN IN COSHOCTON OH
0.206
0.137
6.853E-02
0.000E+00
B = Average Dissolved, Water Column (mg/L)
C = Average Sorbed, Benthic (mg/kg)
173.
192.
211.
231.
250.
269.
288.
307.
327.
346.
365.
TIME, DAYS

Table 6
COMPOUND CHARACTERISTICS FOR GUTHION ON CORN WITHOUT WATER PULSES

EXAMS -- EXPOSURE ANALYSIS MODELING SYSTEM -- V2.0: MODE 2
ECOSYSTEM: POND, AERL DEVELOPMENT PHASE TEST DEFINITION
CHEMICAL: GUTHION ON CORN WITHOUT WATER PULSES

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

```
MWT=  317.3      SOL =  34.00      VAPR= 0.0000E+00 HENRY= 0.0000E+00
KVO= 0.0000E+00 ESOL= 0.0000E+00 EVPR= 0.0000E+00 EHEN = 0.0000E+00
KPS=  8.000      KPB = 0.0000E+00 KOC = 0.0000E+00 KOW  = 0.0000E+00
KAH1= 0.0000E+00 EAH1= 0.0000E+00  KNH1= 7.2000E-04 ENH1= 0.0000E+00
KAH2= 0.0000E+00 EAH2= 0.0000E+00  KNH2= 0.0000E+00 ENH2= 0.0000E+00
KAH3= 0.0000E+00 EAH3= 0.0000E+00  KNH3= 0.0000E+00 ENH3= 0.0000E+00
KBH1=  1368.     EBH1= 0.0000E+00  KOX1= 0.0000E+00 EOX1= 0.0000E+00
KBH2= 0.0000E+00 EBH2= 0.0000E+00  KOX2= 0.0000E+00 EOX2= 0.0000E+00
KBH3= 0.0000E+00 EBH3= 0.0000E+00  KOX3= 0.0000E+00 EOX3= 0.0000E+00
KBACW1= 5.1600E-14 QTW1= 0.0000E+00  KBACS1= 6.5600E-18 QTS1= 0.0000E+00
KBACW2= 0.0000E+00 QTW2= 0.0000E+00  KBACS2= 0.0000E+00 QTS2= 0.0000E+00
KBACW3= 0.0000E+00 QTW3= 0.0000E+00  KBACS3= 0.0000E+00 QTS3= 0.0000E+00
KDP= 7.3700E-02 RFLAT=  40.00     LAMAX=     0.00
QUANT1=  1.000     QUANT2= 0.0000E+00 QUANT3= 0.0000E+00
ABSORPTION SPECTRUM (ABS):   0.0000E+00   0.0000E+00   0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
```

Table 7

EXAMS -- EXPOSURE ANALYSIS MODELING SYSTEM -- V2.0: MODE 2
ECOSYSTEM: POND, AERL DEVELOPMENT PHASE TEST DEFINITION
CHEMICAL: GUTHION ON CORN WITHOUT WATER PULSES

TABLE 16. SIMULATION RESULTS -- TIME-TRACE OF CHEMICAL CONCENTRATIONS.

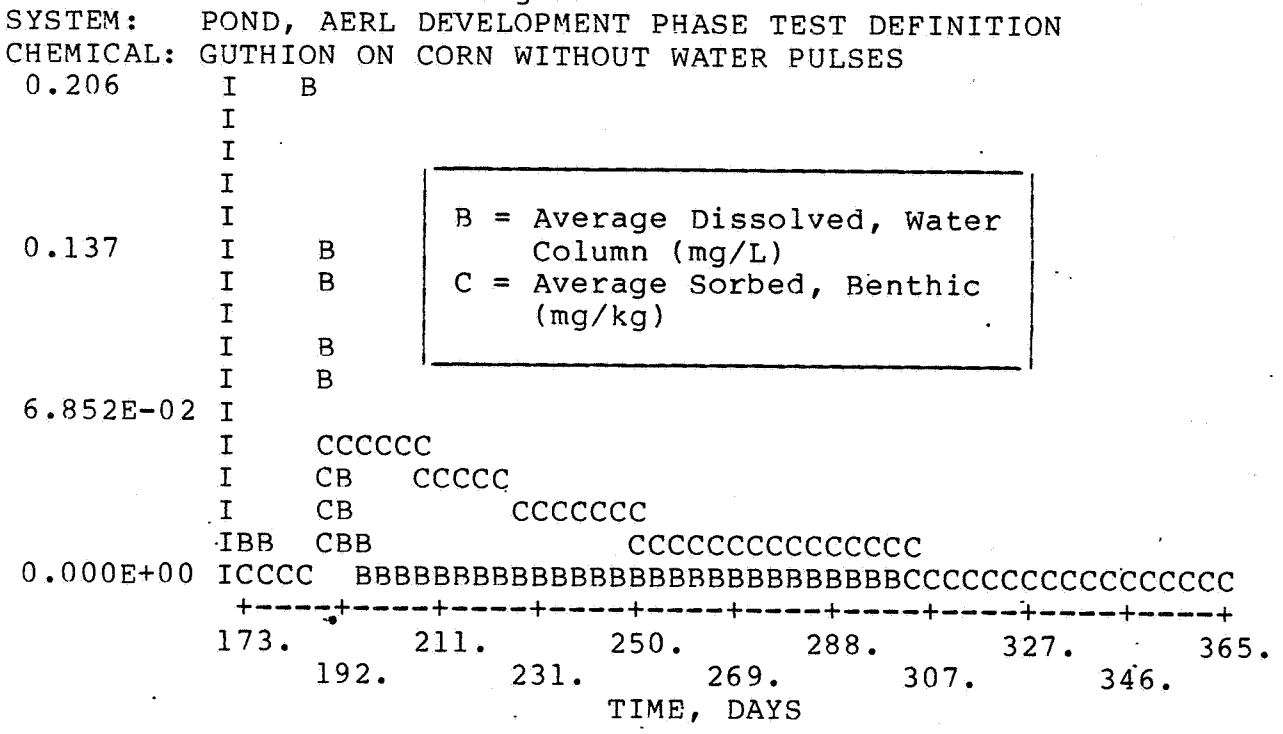
TIME	AVERAGE CHEMICAL CONCENTRATIONS				MASS OF CHEMICAL	
	WATER COLUMN		BOTTOM SEDIMENTS		WATER COL	SEDIMENTS
DAYS	FREE(MG/L)	SED(MG/KG)	PORE(MG/L)	SED(MG/KG)	TOTAL KG	TOTAL KG
IMASS = 0.000001						
173.	4.999E-08	3.999E-07	0.000E+00	0.000E+00	1.0000E-06	0.000E+00
IMASS = 0.157						
174.	7.848E-03	6.279E-02	5.504E-10	4.403E-09	0.1570	3.111E-09
IMASS = 0.034						
175.	7.112E-03	5.690E-02	8.645E-05	6.916E-04	0.1423	4.885E-04
176.	4.905E-03	3.924E-02	1.630E-04	1.304E-03	9.8123E-02	9.214E-04
177.	3.383E-03	2.707E-02	2.138E-04	1.710E-03	6.7682E-02	1.208E-03
178.	2.334E-03	1.867E-02	2.467E-04	1.974E-03	4.6694E-02	1.394E-03
179.	1.611E-03	1.289E-02	2.674E-04	2.139E-03	3.2223E-02	1.511E-03
180.	1.112E-03	8.897E-03	2.798E-04	2.238E-03	2.2247E-02	1.581E-03
181.	7.682E-04	6.145E-03	2.863E-04	2.291E-03	1.5367E-02	1.618E-03
182.	5.311E-04	4.248E-03	2.890E-04	2.312E-03	1.0624E-02	1.633E-03
183.	3.675E-04	2.940E-03	2.890E-04	2.312E-03	7.3520E-03	1.633E-03
184.	2.547E-04	2.038E-03	2.872E-04	2.298E-03	5.0958E-03	1.623E-03
185.	1.769E-04	1.416E-03	2.842E-04	2.274E-03	3.5398E-03	1.606E-03
IMASS = 4.110						
186.	0.206	1.64	2.804E-04	2.243E-03	4.112	1.585E-03
187.	0.142	1.13	2.539E-03	2.031E-02	2.836	1.435E-02
IMASS = 0.526						
188.	0.124	0.993	4.049E-03	3.239E-02	2.482	2.288E-02
189.	8.558E-02	0.685	5.334E-03	4.267E-02	1.712	3.014E-02
190.	5.905E-02	0.472	6.169E-03	4.935E-02	1.181	3.486E-02
IMASS = 0.011						
191.	4.130E-02	0.330	6.694E-03	5.355E-02	0.8262	3.783E-02
192.	2.851E-02	0.228	7.014E-03	5.611E-02	0.5703	3.964E-02
193.	1.969E-02	0.158	7.186E-03	5.749E-02	0.3940	4.061E-02
194.	1.361E-02	0.109	7.257E-03	5.806E-02	0.2724	4.101E-02
195.	9.422E-03	7.538E-02	7.260E-03	5.808E-02	0.1885	4.103E-02
196.	6.531E-03	5.225E-02	7.217E-03	5.774E-02	0.1307	4.079E-02
197.	4.537E-03	3.630E-02	7.143E-03	5.714E-02	9.0765E-02	4.037E-02
198.	3.162E-03	2.529E-02	7.048E-03	5.639E-02	6.3250E-02	3.983E-02
199.	2.213E-03	1.770E-02	6.941E-03	5.553E-02	4.4265E-02	3.922E-02
200.	1.558E-03	1.246E-02	6.825E-03	5.460E-02	3.1164E-02	3.857E-02
IMASS = 0.022						
201.	2.205E-03	1.764E-02	6.704E-03	5.363E-02	4.4119E-02	3.788E-02
202.	1.552E-03	1.241E-02	6.592E-03	5.274E-02	3.1042E-02	3.725E-02
203.	1.100E-03	8.803E-03	6.476E-03	5.181E-02	2.2014E-02	3.660E-02
204.	7.886E-04	6.309E-03	6.357E-03	5.086E-02	1.5776E-02	3.592E-02
205.	5.731E-04	4.585E-03	6.237E-03	4.990E-02	1.1464E-02	3.525E-02
206.	4.239E-04	3.391E-03	6.117E-03	4.894E-02	8.4804E-03	3.457E-02
207.	3.206E-04	2.565E-03	5.998E-03	4.798E-02	6.4128E-03	3.390E-02

IMASS = 0.067

208.	3.598E-03	2.878E-02	5.880E-03	4.704E-02	7.1974E-02	3.323E-02
209.	2.508E-03	2.007E-02	5.801E-03	4.640E-02	5.0176E-02	3.278E-02
210.	1.756E-03	1.405E-02	5.711E-03	4.569E-02	3.5136E-02	3.227E-02
211.	1.237E-03	9.900E-03	5.615E-03	4.492E-02	2.4755E-02	3.173E-02
212.	8.791E-04	7.033E-03	5.515E-03	4.412E-02	1.7587E-02	3.116E-02
213.	6.315E-04	5.052E-03	5.413E-03	4.330E-02	1.2634E-02	3.059E-02
214.	4.604E-04	3.683E-03	5.310E-03	4.248E-02	9.2106E-03	3.001E-02
215.	3.419E-04	2.736E-03	5.208E-03	4.166E-02	6.8404E-03	2.943E-02
216.	2.597E-04	2.078E-03	5.106E-03	4.085E-02	5.1953E-03	2.886E-02
217.	2.026E-04	1.621E-03	5.006E-03	4.004E-02	4.0524E-03	2.829E-02
218.	1.627E-04	1.302E-03	4.906E-03	3.925E-02	3.2550E-03	2.773E-02
219.	1.347E-04	1.078E-03	4.809E-03	3.847E-02	2.6949E-03	2.718E-02
220.	1.149E-04	9.196E-04	4.713E-03	3.770E-02	2.2995E-03	2.663E-02
221.	1.009E-04	8.074E-04	4.619E-03	3.695E-02	2.0189E-03	2.610E-02
222.	9.083E-05	7.267E-04	4.527E-03	3.621E-02	1.8171E-03	2.558E-02
223.	8.343E-05	6.674E-04	4.436E-03	3.549E-02	1.6690E-03	2.507E-02
224.	7.792E-05	6.233E-04	4.347E-03	3.478E-02	1.5587E-03	2.457E-02
225.	7.372E-05	5.898E-04	4.260E-03	3.408E-02	1.4748E-03	2.407E-02
226.	7.043E-05	5.634E-04	4.175E-03	3.340E-02	1.4089E-03	2.359E-02
227.	6.776E-05	5.421E-04	4.091E-03	3.273E-02	1.3555E-03	2.312E-02
228.	6.554E-05	5.244E-04	4.009E-03	3.207E-02	1.3112E-03	2.265E-02
229.	6.364E-05	5.091E-04	3.928E-03	3.143E-02	1.2731E-03	2.220E-02
230.	6.195E-05	4.956E-04	3.850E-03	3.080E-02	1.2393E-03	2.175E-02
231.	6.035E-05	4.828E-04	3.772E-03	3.018E-02	1.2073E-03	2.132E-02
232.	5.896E-05	4.716E-04	3.697E-03	2.957E-02	1.1794E-03	2.089E-02
233.	5.771E-05	4.617E-04	3.622E-03	2.898E-02	1.1544E-03	2.047E-02
234.	5.648E-05	4.518E-04	3.550E-03	2.840E-02	1.1298E-03	2.006E-02
235.	5.529E-05	4.423E-04	3.479E-03	2.783E-02	1.1061E-03	1.966E-02
236.	5.415E-05	4.332E-04	3.409E-03	2.727E-02	1.0833E-03	1.926E-02
237.	5.302E-05	4.241E-04	3.340E-03	2.672E-02	1.0606E-03	1.888E-02
238.	5.191E-05	4.153E-04	3.273E-03	2.619E-02	1.0385E-03	1.850E-02
239.	5.077E-05	4.062E-04	3.208E-03	2.566E-02	1.0156E-03	1.813E-02
240.	4.975E-05	3.980E-04	3.143E-03	2.515E-02	9.9523E-04	1.776E-02
241.	4.876E-05	3.901E-04	3.080E-03	2.464E-02	9.7545E-04	1.741E-02
242.	4.778E-05	3.822E-04	3.018E-03	2.415E-02	9.5578E-04	1.706E-02
243.	4.683E-05	3.747E-04	2.958E-03	2.366E-02	9.3689E-04	1.672E-02
244.	4.632E-05	3.705E-04	2.898E-03	2.319E-02	9.2656E-04	1.638E-02
245.	4.539E-05	3.631E-04	2.840E-03	2.272E-02	9.0803E-04	1.605E-02
246.	4.447E-05	3.557E-04	2.783E-03	2.227E-02	8.8957E-04	1.573E-02
247.	4.355E-05	3.484E-04	2.727E-03	2.182E-02	8.7112E-04	1.541E-02
248.	4.262E-05	3.410E-04	2.673E-03	2.138E-02	8.5267E-04	1.510E-02
249.	4.170E-05	3.336E-04	2.619E-03	2.095E-02	8.3428E-04	1.480E-02
250.	4.111E-05	3.288E-04	2.567E-03	2.053E-02	8.2232E-04	1.450E-02
251.	4.020E-05	3.216E-04	2.515E-03	2.012E-02	8.0421E-04	1.421E-02
252.	3.931E-05	3.145E-04	2.465E-03	1.972E-02	7.8639E-04	1.393E-02
253.	3.844E-05	3.075E-04	2.415E-03	1.932E-02	7.6905E-04	1.365E-02
254.	3.761E-05	3.009E-04	2.367E-03	1.893E-02	7.5244E-04	1.337E-02
255.	3.631E-05	2.905E-04	2.319E-03	1.855E-02	7.2641E-04	1.311E-02
256.	3.557E-05	2.845E-04	2.273E-03	1.818E-02	7.1149E-04	1.284E-02
257.	3.486E-05	2.789E-04	2.227E-03	1.782E-02	6.9746E-04	1.259E-02
258.	3.421E-05	2.737E-04	2.182E-03	1.746E-02	6.8439E-04	1.233E-02
259.	3.284E-05	2.627E-04	2.139E-03	1.711E-02	6.5691E-04	1.209E-02
260.	3.228E-05	2.582E-04	2.096E-03	1.677E-02	6.4572E-04	1.184E-02

261.	3.176E-05	2.540E-04	2.054E-03	1.643E-02	6.3527E-04	1.161E-02
262.	3.126E-05	2.501E-04	2.012E-03	1.610E-02	6.2536E-04	1.137E-02
263.	3.078E-05	2.462E-04	1.972E-03	1.578E-02	6.1570E-04	1.114E-02
264.	3.065E-05	2.452E-04	1.932E-03	1.546E-02	6.1316E-04	1.092E-02
265.	3.015E-05	2.412E-04	1.894E-03	1.515E-02	6.0315E-04	1.070E-02
275.	2.411E-05	1.929E-04	1.546E-03	1.237E-02	4.8225E-04	8.738E-03
285.	2.238E-05	1.791E-04	1.262E-03	1.010E-02	4.4777E-04	7.135E-03
295.	1.685E-05	1.348E-04	1.031E-03	8.247E-03	3.3713E-04	5.826E-03
305.	1.333E-05	1.066E-04	8.418E-04	6.734E-03	2.6664E-04	4.757E-03
315.	1.129E-05	9.036E-05	6.873E-04	5.498E-03	2.2595E-04	3.884E-03
325.	8.631E-06	6.905E-05	5.612E-04	4.490E-03	1.7267E-04	3.172E-03
335.	7.113E-06	5.690E-05	4.583E-04	3.666E-03	1.4229E-04	2.590E-03
345.	6.133E-06	4.906E-05	3.742E-04	2.993E-03	1.2269E-04	2.114E-03
355.	4.581E-06	3.665E-05	3.055E-04	2.444E-03	9.1650E-05	1.727E-03
365.	3.654E-06	2.923E-05	2.495E-04	1.996E-03	7.3099E-05	1.410E-03

Figure 2


SYSTEM: POND, AERL DEVELOPMENT PHASE TEST DEFINITION
CHEMICAL: GUTHION ON CORN WITHOUT WATER PULSES
0.206
0.137
6.852E-02
0.000E+00
B = Average Dissolved, Water Column (mg/L)
C = Average Sorbed, Benthic (mg/kg)
173.
192.
211.
231.
250.
269.
288.
307.
327.
346.
365.
TIME, DAYS