US EPA ARCHIVE DOCUMENT

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AQUATIC EEC

AVERMECTIN

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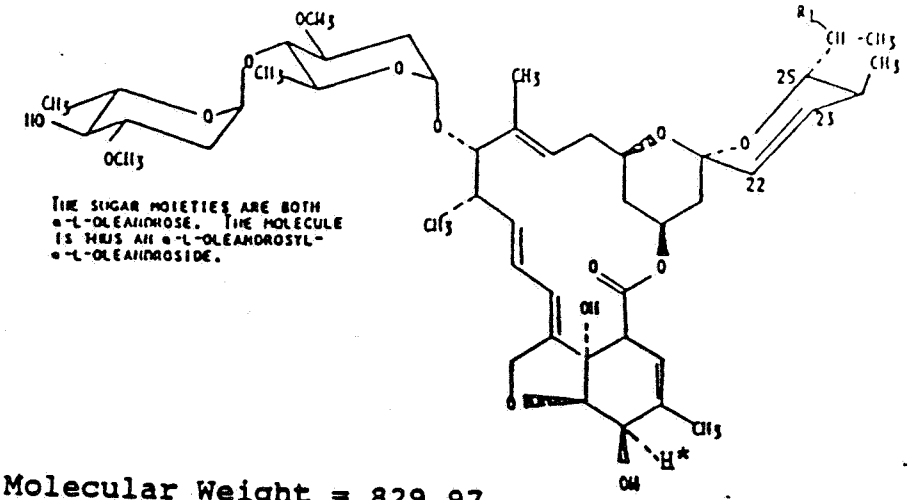
1. CHEMICAL:

Common Name: AVERMECTIN B_1

Other Names: Abamectin, MK-936



$C_{45}H_{65}O_{14}$ Molecular Weight = 829.97
$C_{47}H_{70}O_{14}$ Molecular Weight = 858.56 (R = CH_3)
$C_{48}H_{72}O_{14}$ Molecular Weight = 872.58 (R = C_2H_5)

Chemical Name:
5-O-demethyl-25-de(1-methylpropyl)-25-(1-methylethyl) avermectin A_{1a}

CAS Number: 65195-55-3

Formulation: EC (Emulsifiable Concentration)
1 gallon = 0.15 pounds of Avermectin B_1

Physical Properties:

Physical State:	odorless, off-white to yellow crystals from methanol
Vapor Pressure	1.5×10^{-8} torr
Melting Point:	150-155° C (dec)
Solubility (at 20° C)	
water:	5-10 ppb (= ug/L)
acetone:	100 ppm (= mg/L)
n-butanol:	10 ppm
chloroform:	25 ppm
cyclohexane:	6 ppm
ethanol:	20 ppm
i-propanol:	70 ppm
kerosene:	0.5 ppm
methanol:	19.5 ppm
toluene:	350 ppm

Simulating the Environmental Fate of
Avermectin B_1
in an
Aquatic Ecosystem (Pond-Stream-Stream) with EXAMS II

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2. TEST MATERIAL: Avermectin B_1 Active Ingredient

The potential edge-of-field runoff of the active ingredient, avermectin B_1 (AVM) which is applied to a foliated cotton crop on a 10 hectare field in Williamson County TX, is simulated. Rainfall is simulated for 3 conditions (wettest year, average wet year and dry year) (Cooksey & Eiden, 1990) using the PRZM model [Pesticide Root Zone Model] (Carsel et al., 1984). As a continuation of this modeling effort on environmental fate of AVM, EXAMS II [Exposure Analysis Modeling System v2.94] (Burns & Cline, 1985) is employed to examine the possible fate of AVM which washes from the edge-of-field into a one hectare pond.

The simulation of the fate of AVM is considered using a number of critical assumptions:

A. As a consequence of a single intensive rainfall event shortly after applying AVM at maximum label concentration* to a 10 ha field, avermectin B_1 washes from the field as a substance bound to Branyon soil (clay) from the edge-of-field directly into the pond. Avermectin B_1 has low solubility in water (5 ug/L = ppb) and binds to soils (k_d = 134 for clay). The AVM may either wash from the leaves to the soil or be present as a residue of active ingredient which drifted to the soil at the time of application.

* Maximum Label Concentration (1 gal = 0.15 lb ai)
48 fl oz / acre / y = 0.05625 lb ai / acre / yr
= 3.507 L / ha / y = 0.0631 kg / ha /yr

B. The representative pond-stream-stream scenario is assumed to be a one hectare pond, 2 meters deep, which receives the runoff directly from a ten hectare field. The outflow from the pond is to a small stream, 100 m x 3 m x 0.5 m, which in turn flows into a larger stream, 300 m x 3 m x 0.5 m. Each littoral comparment has a corresponding benthic compartment with the equivalent area and 0.05 meters deep.

C. The introduction of the active ingredient as a single load (5.19×10^{-3} kg/10 ha field) into one compartment (either littoral or benthic) of a 2 compartment pond model is assumed to mix instantaneously throughout that compartment.

D. A principle pathway of AVM degradation is through photolysis with a direct photolysis half-life ($T_{1/2,\ photolysis}$) of 12.5 hours.

E. The field dissipation half-life ($T_{1/2,\ dissipation}$) of AVM is assumed to be either 60 or 120 days.

F. Other assumptions consistent with the functional operation of the EXAMS II model have also been employed.

G. Simulations for surface runoff are undertaken with a daily time step. [See Appendix 1.]

3. STUDY / ACTION TYPE:

SIMULATING ~~THE~~ ENVIRONMENTAL FATE OF AVERMECTIN B_1 IN AN AQUATIC ECOSYSTEM (POND-STREAM-STREAM) WITH EXAMS II

This report is prepared at the request of the Ecological Effects Branch, Environmental Fate and Effects Division, Office of Pesticide Programs, U.S. Environmental Protection Agency.

Simulations are for the fate of avermectin B_1 in an aquatic environment: A small, constant volume pond ("closed ecosystem") with 2 compartments (littoral and benthic), an inflow equal to outflow plus evaporation and with relatively little loss of sediment which has washed in with the inflow. The outflow from the pond is into a small stream which, in turn, flows into a larger stream.

Estimated Environmental Concentrations (EEC's) of avermectin B_1 are reported for up to one year following the catastrophic loading of avermectin B_1 which is assumed to be bound to erodible clay soils.

4. STUDY IDENTIFICATION: Accession No.:
EFGWB / SWS Report 90-05-0003

SIMULATING THE ENVIRONMENTAL FATE OF AVERMECTIN B_1 IN AN AQUATIC (POND-STREAM-STREAM) ECOSYSTEM WITH EXAMS II

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8. CONCLUSIONS:

Based on the appropriate use of EXAMS II, the environmental fate simulation of avermectin B_1 leads to the following conclusions:

No aquatic dissipation rate was available for use in the simulations. The aerobic soil decay rate taken from laboratory studies was used as the "lumped" dissipation rate to encompass other possible pathways of degradation of AVM, e.g. hydrolysis, microbial decay. This lumped dissipation rate was used as a surrogate $T_{1/2,hydrolysis}$ decay rate for the purposes of the simulations.

Since AVM is stable for 30 days at pH 5, 7, and 9, chemical hydrolysis is not expected to be a significant degradative pathway.

Photolysis is expected to be the major degradative pathway for AVM in the upper portions of the littoral compartment of the pond and streams. Photolysis will not be a factor in the degradation of AVM in the benthos.

AVM is expected to persist in the benthos because it does not degrade under anaerobic conditions.

In the catastrophic worst case scenario, it is assumed that the edge-of-field runoff load of 5.19×10^{-3} Kg of AVM from 10 ha adsorbed to erodible clay enters either the littoral or the benthic compartment and immediately mixes with the entire volume of the pond comparment. Under such conditions, AVM immediately reaches its highest concentration in the pond littoral compartment when the load is made directly to that compartment. The total concentrations in the littoral compartment are:

0.519 g AVM Load to Pond
(All values in ng/L = pptr)

	Littoral		Benthic	
	L	B	L	B
T_0	295.5	-	0	Highest
T_{24h}	232	544	3	7496
T_{96h}	168	1784	11	6992
T_{21d}	37	3555	22	5138
T_{30d}	23	3340	21	4472
T_{120d}	5	932	6	1193
T_{360d}	0	28	0	36

The relative distributions of avermectin B_1 in the littoral and benthic compartments of the pond and streams are presented although a high degree of uncertainty exists because verifiable information associated with some key parameters which were used in the simulations could not be ascertained.

In summary, AVM can be expected to persist at 100-300 ng/L (=pptr) for several days in the pond littoral compartment L1 of the aquatic environment (Pond-Stream-Stream) based on a catastrophic worst case runoff event. The concentration then decreases rapidly to less than 50 ng/L (=pptr) after 21 days according to the EXAMS II simulation. Degradation slows so that between 50-250 days AVM remains in the water column (dissolved and sediment associated) at 1-10 ng/L (=pptr). If the loading of AVM is primarily to the Pond Benthic B2, high levels of AVM in the benthic compartments B2 and B4 can be expected to persist beyond 120 days.

The simulations presented herein represent the relative extreme conditions of a catastrophic loading to either the Pond littoral L1 or the Pond benthic B2 compartments. Since the loading probably partitions between the pond littoral and benthic compartments, the relative values would be expected to lie betwen those of the extreme cases presented herein.

Multiple applications and repeated use may be expected to lead to a build-up of AVM in a closed system, e.g. a pond. In the pond benthic compartment, AVM is shown to persist at relatively high concentrations for 120 days. If the sediments become anaerobic, it is likely that degradation will be delayed further (infered from laboratory studies).

[See Conclusions and Discussion sections for more detail.]

9. BACKGROUND

Avermectin B_1 (AVM) is currently under consideration for registration as an emulsifiable concentrate (EC) containing 0.15 lb active ingredient (a.i) per gallon. AVM is a mixture of 2 compounds containing a 16-membered macrocyclic lactone ring connected at the 13 position to the disaccharide unit, a-L-oleandrosyl-a-L-oleandrose. When mixed with water according to label directions for use, AVM will control spider mites (two-spotted, carmine, Pacific and Strawberry) on cotton. At an application rate of 8-16 fl. oz. of EC 0.15 (2% ai) in a minimum of 5 gallons per acre spread to provide thorough coverage, restrictions include:

1. Not more than 48 fl. oz. per acre per year
2. Do not apply within 20 days of harvest
3. Do not graze or feed cotton folliage
4. Do not apply through any type of irrigation system

Environmental Hazards

This pesticide is toxic to fish and wildlife. Do not apply when weather conditions favor drift from target areas. Do not contaminate water when disposing of equipment, wash water or rinsate.

This product is highly toxic to bees exposed to direct treatment or residues on blooming crops. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

The Pesticide Assessment Guidelines Subdivision N: Chemistry: Environmental Fate (EPA-540/9-82-021) include aquatic field dissipation studies for aquatic uses and aquatic impact uses. General requirements for soil sediment and water sampling over time for chemicals used for aquatic crop, non-crop and impact purposes are described. However, there are no specific requirements which provide for all the data for the modeling of environmental fate of the chemical. Thus, such data must be derived from whatever studies the registrant has submitted to EPA or other sources, if available. In some cases, surrogate values may be provided by using good judgement based on the characteristics of the chemical (Lyman et al., 1982) or by relying on the model to provide default values.

A. Environmental Fate of Avermectin B_1

Simulations of the environmental fate of AVM in aquatic environments were undertaken using several suppositions:

1. Hydrolysis

Because chemical hydrolysis of AVM at pH 5.0, 7.0 and 9.0 is not measureable (constant values obtained after 30 days at 25°), hydrolysis is not considered to be a major pathway of degradation in the aquatic environments simulated (EFGWB #82-0130, #89-0143).

AVM is simulated to degrade under aerobic aquatic conditions with a $T_{1/2,aquatic\ aerobic}$ = 60 days and but not under anaerobic aquatic conditions or when AVM is in the hydrosoil. The conservative aerobic soil decay rate of 60 days which was utilized as the hydrolysis rate lies close to midway in the range of values for $T_{1/2,aerobic\ soil\ decay}$ measured in laboratory studies: 2-3 weeks (14-21 d) to 110-120 d. For the EXAMS simulations, only the neutral species was considered; a $T_{1/2,\ hydrolysis}$ = 60 days for the neutral molecule, either free in aqueous phase or bound to soil, was assumed (EFGWB #89-0227/-0225, #90-0710/-0711).

2. Photolysis

Studies on the photolysis of AVM indicate that the $T_{1/2,photolysis}$ is < 19 h with specific studies indicating a values 4.5 h to 12.5 h (EFGWB #89-0143). For the EXAMS II simulations, a $T_{1/2,photolysis}$ = 12.5 h is used. Photolysis is considered the major pathway of degradation of AVM in the littoral compartment of the an aquatic system.

3. Volatilization

Volatilization is not considered a significant pathway for the dissipation of AVM from the aquatic environment because of its high molecular weight (858.56 or 872.58), low vapor pressure (1.5×10^{-9} torr) and its high binding constant for soils (K_d = 134). (In earlier simulations, the molecular weight = 829.97 calculated from the empirical formula with R groups obscured was used.)

4. Aerobic and Anaerobic Aquatic Environments

^{3}-H-avermectin, at levels of 1 ppm in aerobic soil environments under non-sterile conditions, dissipates with a half-life ($T_{1/2,\ dissipation}$) of ca. 14-28, 28-56 and 56 days for Lufkin fine sandy loam, Houston clay and course sand, respectively (Bull & Ivie, 1982; Bull et al. 1984). Under similar conditions, the $T_{1/2,\ dissipation}$ at 0.1 ppm for AVM in Lufkin fine sandy loam and Houston clay is 3-4 weeks (Bull, 1985). Bull (1985) also reported that AVM did not leach and that under aerobic soil conditions with Lufkin fine sandy loam, the major degradates were an equilibrium

mixture.

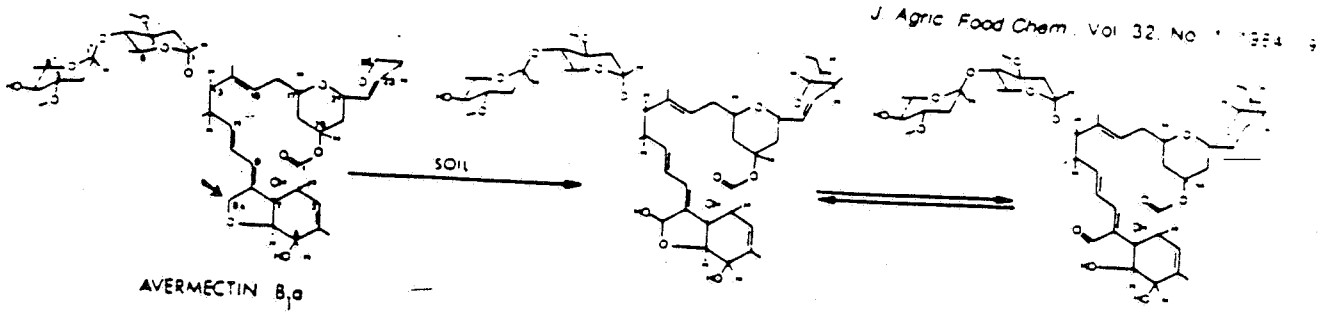


Figure 1. Structures of avermectin B_{1a} and two of its degradation products in soil.

1:2.5) of the 8a-hydroxy derivative and the corresponding ring-opened aldehyde derivative.

The $T_{1/2,\ dissipation}$ at an application rate of 0.02 lb ai / acre for a California sandy loam (Tulare County) was calculated as 40 days (EFGWB #89-0227/-0225). In a field dissipation study on cotton with California muck (high organic matter), the $T_{1/2,\ dissipation}$ = 267 days and in CA sandy loam the $T_{1/2,\ dissipation}$ = 102 or 132 days in top or middle samples, respectively (EFGWB #87-0292). In the same study, a $T_{1/2,\ dissipation}$ = 20 days was reported for application of AVM at 0.1 and 1 ppm under aerobic conditions with a fine, sandy loam.

In a recent residue study for AVM, Wehner (1989) reported a $T_{1/2,\ dissipation}$ = 31 days for a coarse, sandy soil (EFGWB #90-0710/-0711).

In a laboratory aquatic dissipation study, AVM adsorbed to sandy clay loam (35.2% clay) was introduced into simulated ponds of approximately 1000 liters of farm pond water (EEB # 400696-10, Wislocki, 1986). Within one hour of treating the soil with AVM at approximately 0.025, 0.075 and 0.25 lbs ai/acre (1X, 3X and 10X the maximum use rate of 0.25 lbs ai/acre, respectively, in order to facilitate analytical measurements), the soils were introduced into the tanks which were also lined with sandy clay loams (54.4% sand) over clay loam soil (35.2% clay). Soil similarly treated and left undisturbed for 90 hours was also introduced into other tanks.

Although the design of the pond study was meritorious for simulating the dissipation of AVM in an aquatic environment, the results for the immediate runoff study were too erratic for calculating a decay rate with confidence. Undoubtedly, variations in environmental conditions (fluctuations of plankton populations within the tanks, unanticipated visits by small reptiles and mammals and the arrival of Hurricane Danny) were not conducive to undertaking analytical measurements near their level of

detection (EEB #400696-10; Wislocki, 1986). At best, the data indicate the AVM molecule is stable in the aquatic environment.

In summary, no aquatic dissipation rates are available for use in the simulation. A mid-range aerobic soil decay rate determined in laboratory studies ($T_{1/2,aerobic}$) was used as a surrogate hydrolytic rate ($T_{1/2,hydrolysis}$) for the AVM neutral species (either free in the aqueous phase or sorbed to soil particles). [When the coefficient of hydrolysis for the neutral AVM species was derived from the surrogate $T_{1/2,aerobic}$ rate and utilized as the microbial decay rate, the EXAMS model failed to converge because the computation of chemical hydrolysis has priority. Thus, for the simulation, all decay processes are "lumped" as the first order hydrolysis rate constant.]

4. Adsorbtion / Desorbtion

Of the adsorbtion values (K_d) for AVM which have been reported for various soils, the value of K_d = 134 was used for the Branyon clay soil. In addition, the fraction of organic matter was selected as 2%. The selection of these values are consistent with information provided by the DBAPE soils data base (Imhoff et al., 1990) and discussion with extension agents of the Soil Conservation Service in Williamson County TX.

Freundlich constants, $K_{d,adsorption}$ and $K_{desorption}$ for three soils are (EFGWB #89-0534):

	Silt Loam Three Bridges NJ		Clay Loam Houston TX		Sand Lakeland FL	
	Sorb	Desorb	Sorb	Desorb	Sorb	Desorb
Freundlich						
n	1.012	1.047	1.168	1.162	1.253	1.059
K	6.99	7.65	134	125	18.2	75.4

5. Parameter Values Provided by EXAMS II

After changing the geographical coordinates for reference latitude to Three Rivers NJ for the photolysis reference latitude and to Austin TX for pond "site," the EXAMS II model provided mean environmental input data for biologicals, hydrographic parameters, sediments (except bulk density which was set to 1.3 for the Branyon clay and fraction of organic matter which was set to 2%), miscellaneous environmental data, advective and mean dispersive transport fields and mean global parameters. EXAMS II computed the kinetic profile of the chemical and provided mean chemical reactivity of the ecosystem.

6. Summary

In summary, the important aquatic dissipation rate was not available for use in the simulations. The aerobic soil decay rate taken from laboratory studies was used as the "lumped" dissipation rate to encompass other possible pathways of degradation of AVM, e.g. hydrolysis, microbial decay. This lumped dissipation rate was used as the (non-sterile) decay rate for the purposes of the simulations, as described previously.

AVM is not expected to degrade under anaerobic conditions and is expected to persist in the benthos.

Photolysis is expected to be the major degradative pathway for AVM. Photolysis in the upper portions of the littoral compartment of the pond and streams will be the dominant factor in the degradation of AVM. Photolysis will not be a factor in the degradation of AVM in the benthos.

[See Conclusions and Discussion sections.]

B. Other Unresolved Questions of Environmental Fate of AVM

Although not included in these simulations of environmental fate, future simulations should include the environmental fate of the major degradates, an equilibrium mixture (ratio 1:2.5) of the 8a-hydroxy derivative and the corresponding ring-opened aldehyde derivative.

In other simulations, the fate of repeated applications at short intervals should be undertaken in order to check the persistence of AVM or its degradates in the environment. The data submitted for a residue study may be interpreted as the build-up of a daughter degradate in the environment (EFGWB #90-0710/-0711) [See Appendix 2].

C. RECOMMENDATIONS:

Modeling Effort

A proper modeling effort using EXAMS II may represent an effective means of simulating the environmental fate of chemicals in aquatic ecosystems and provide insight into the relative importance of concomitant processes which may be difficult to identify in either field or laboratory studies, such as:

1. Predicting the fate of the chemical in aquatic ecosytems

2. Defining, within reason, the dissipation of the chemical from water, sediment, etc.
3. Defining proper use patterns of an aquatic herbicide with respect to specific hydrological, limnological and environmental parameters
4. Guiding subsequent research and development efforts

When laboratory and field data are integrated into appropriately designed modeling studies, a validation of selected processes (how accurately the modeling effort is simulating the real system) may be made. Within the constraints of the model, the data may provide a fairly comprehensive framework for assessing the environmental fate of AVM. However, neither validation nor sensitivity analysis are discussed in the context of the sparse data sets available for the EXAMS II modeling.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

10.A. Study I.D.

SIMULATING THE ENVIRONMENTAL FATE OF AVERMECTIN B_1 IN AN AQUATIC (POND-STREAM-STREAM) ECOSYSTEM WITH EXAMS II

10.B. Materials and Methods:

EXAMS II (Exposure Analysis Modeling Systems v.2.94) is an interactive model that allows the user to specify and store properties of chemicals and ecosystems, modify either properties or environments and conduct rapid evaluations and error analysis of the probable aquatic fate of synthetic organic chemicals (Burns & Cline, 1985). The loadings, transport and transformations of a chemical are combined by EXAMS II into a set of differential equations using the law of conservation of mass as an accounting principle. EXAMS II accounts for the mass of chemical entering and leaving a system as the algebraic sum of external loadings, transport processes that export the compound from the system and transformation processes within the system that convert the chemical to daughter products. Output tables describe chemical exposure, fate and persistence.

EXAMS II includes process models of physical, chemical and biological phenomena governing the transport and fate of chemicals. Each process algorithm computes the kinetics of chemical transformations and accounts for interactions between chemistry of the compound and environmental forces that shape its behavior in the aquatic systems. This "system independent" approach allows the use of the fundamental chemistry of compounds in the laboratory and other test conditions for evaluating the probable behavior of the compounds in enviroments to which they have not been tested directly.

EXAMS II computes the kinetics of volatilization and transformations attributed to direct photolysis and hydrolysis and biological degradations using standard water quality and commonly measured limnological parameters and datasets often required for EPA regulatory purposes (Ambrose & Barnwell, 1989).

10.C. Simulations

The potential worst case edge-of-field runoff of the active ingredient, avermectin B_1 (AVM), is applied to a foliated cotton crop on a 10 hectare field in Williamson County TX. Rainfall is simulated for 3 conditions (Cooksey & Eiden, 1990) using the PRZM model [Pesticide Root Zone Model] (Carsel et al., 1984) [See Appendix 1]:

Condition	Run-Off (Kg/ha)	Julian Date
wettest year	5.19×10^{-4}	235
average wet year	1.23×10^{-5}	235
dry year	0	234

As a continuation of this modeling effort on the environmental fate of AVM, EXAMS II is employed to examine the possible fate of AVM which washes from the edge-of-field into a one hectare pond. The simulation of the fate of AVM is considered using a number of critical assumptions:

1. As a consequence of a single intensive rainfall event shortly after applying AVM to the field, avermectin B_1 washes from the field as a substance bound to Branyon soil from the edge-of-field directly into the pond. Avermectin B_1 has low solubility in water (5 ppb), binds tightly to soils ($k_{d,clay}$ = 134) and does not volatilize (vapor pressure = $1.5 \times 10^{}$ torr). The AVM may either wash from the leaves to the soil or be present as an active ingredient which may have drifted to the soil at the time of application.

2. The pond-stream-stream scenario is assumed to be a 1 hectare pond, 2 meters deep, which receives the runoff directly from a 10 hectare field. The outflow from the pond is to a small stream, 100 m x 3 m x 0.5 m, which in turn flows into a larger stream, 300 m x 3 m x 0.5 m.

3. The introduction of the active ingredient as a single load into one compartment (either littoral or benthic) of a 2 compartment pond model is assumed to mix instantaneously throughout that compartment. By loading to either compartment of the pond, the distribution of AVM is presented in the extreme cases.

4. The principle pathway of AVM degradation is through photolysis with a direct photolysis half-life ($T_{1/2,photolysis}$) of 12.5 hours.

5. The hydrolysis half-life ($T_{1/2,hydrolysis}$) of the AVM neutral molecule is assumed to be either 60 days. Selected simulations were undertaken using a $T_{1/2,hydrolysis}$ = 120 days.

6. Other assumptions consistent with the functional operation of the EXAMS II model have been employed.

10.D. RESULTS

1. Comparison of Manual, PRZM and EXAMS II

Runoff loads from 10 ha fields as simulated by PRZM were used to calculate the initial concentrations of AVM in a 2 x 10^7 liter pond. These initial concentrations were 160 pptr (ng/L) and 5.46 pptr (ng/L) for the catastrophic extreme case and average years, respectively. These values agree with the initial concentrations of AVM in the pond from the EXAMS II simulations. These calculated results are slightly lower than the manual and EXAMS II calculations because they consider the field runoff as an input volume to the 2 x 10^7 liter pond whereas the EXAMS II calculations do not maintain material balance with respect to the inflow water.

Table 1. Comparison of the Intitial Instantaneous Loadings to the Pond. The compartments receiving the loadings are designated with "*".

Load (kg / 10 ha)		Manual (ng/L	Manual including Runoff =	EXAMS pptr)
5.19 x 10^{-4}	* L1	259.5	160	259.5
	B2	-	-	-
	L1	-	-	-
	* B2	10360		10380
1.123 x 10^{-5}	* L1	5.615	5.46	5.615
	B2	-	-	-
	L1	-	-	-
	* B2	244.6	-	224.6

2. Simulations of Environmental Fate of AVM with EXAMS II

The simulations were conducted with numerous variables maintained as constants (Table 2).

The littoral compartments are disignated as L + an odd number following; the benthic compatments are designated as B + an even number. The pond compartments are L1 and B2, those of the small stream are L3 and B4 while those of the

larger stream are L5 and B6.

Table 2. Variables which are maintained constant throughout the simulations.

Molecular Weight	=	872.58 g $mole^{-1}$
Solubility	=	5 ug L^{-1} (ppb)
Vapor Pressure	=	1.5×10^{-9} torr
$T_{1/2,dissipation}$	=	60 days
$K_{neutral\ hydrolysis}$	=	4.81×10^{-4} h^{-1}
$K_{photolysis}$	=	5.54×10^{-2} h^{-1}
Fraction Org Matter	=	0.02
Bulk Density	=	1.3 g cm^{-3}

Table 3. Chemical and Environmental Parameters for the EXAMS II Simulations of Avermectin B_1 in the Aquatic Environment (Texas Pond-Stream-Stream Scenario)

1. Chemistry

Partition Coefficients

Octanol / Water	K_{ow}	= 9.77×10^3
Biomass	K_{pb}	= 1.81×10^3
Adsorption (clay)	K_d	= 134

Reactivity Coefficients

Dissolved, neutral

$K_{neutral,dissivd}$ = 4.81×10^{-4}

Sorbed, neutral

$K_{neutral,\ sorbed}$ = 4.81×10^{-4}

Hydrolysis

$T_{1/2,hydrolysis}$ = 60 days

Photolysis $K_{photolysis}$ = 5.54×10^{-2}

2. Environmental Parameters

Biological	EXAMS II values
Hydrological	EXAMS II values
Sediment Properties	
Bulk Density	= 1.30
Organic Matter	= 2%

3. EXAMS II Values

Other Environmental Data	EXAMS II values
Chemical Reactivity	EXAMS II values
Geometry (Pnd-Strm-Strm)	EXAMS II values

Although selected sensitivity analyses were undertaken for solubility, $T_{1/2,dissipation}$, fraction of organic matter, bulk density and loadings, the results are not presented here because changes in these parameters did not significantly influence the results under the conditions reported herein.

Variables for which values were either furnished by the EXAMS II model or were computed from other variables are listed in Table 3.

Although 2 loadings were used, simulations demonstrating the results are presented only for those of the worst runoff cases (5.19×10^{-3} kg washing from the 10 ha field into the 1 ha pond).

All results are for Total AVM in either the littoral or benthic compartment where

$$AVM_{Total} = AVM_{dissolved} + AVM_{adsorbed} + AVM_{biosorbed}.$$

The results of simulations are presented graphically in Figures 1-3, summary notes are tabulated (Table 4) and supporting data are tabulated in Tables 5 and 6. The data points represented by the symbols indicate the times of greatest interest for determining ecological effects: 24, 48 and 96 hours for accute effects and 7,14,21 and 30) days for chronic effects. Data of 60,120,240 and 360 days are also included for the longer term simulations. In all cases, the vertical scale [1-10,000 ng/L (pptr)] is the same in all figures.

Case 1. Catastrophic Loading to the Pond Littoral L1 Compartment

The results of simulations of catastrophic loading of 5.19 g of AVM to the pond littoral comparment L1 are presented in Figures 1A and 1B. The shorter term results (1-60 days) are depicted in Figure 1A and those of longer term (1-360 days) are in Figure 1B.

The data fall into 2 distinctive sets of curves: In Figure 1A, the 3 upper curves represent distributions in the benthic compartments of the pond B2, small stream B4 and larger stream B6; the 3 lower curves represent the respective littoral compartments, L1, L3 and L5.

The loading of AVM to the pond littoral L1 shows an initial high loading at 232 ng/L (pptr) with the highest AVM total concentration representing T_{24h}. There is a rapid decline in the L1 total concentrations during the first 14 days probably due to photolysis in the L1 surface waters, rapid

dispersion and settling to the pond benthic B2 and advection to the adjacent small stream littoral L3 compartments; there is a slight delay in advection to the large stream littoral L5. After 60 days, the decline is linear in the pond littoral L1. Note that the AVM total concentrations in the pond L1 and the small stream L3 are greater than 100 ng/L for the first 14 and 4 days, respectively.

The AVM total concentrations in the pond benthic B2 compartment (upper middle curves of Figures 1A and 1B) attain maximum levels (> 3300 ng/L) between 14 and 30 days (middle curve); those of the small stream benthic B4 (upper top curves) attain high AVM total concentration levels (>1000 ng/L) after 2 days, maximum AVM level at 14 days (5310 ng/L); these high levels (>1000 ng/L) persist beyond 90 days. After 120 days, the level in the pond benthic compartment B2 are greater than either of the stream benthic compartments B4 or B6. The 10% of maximum levels for the pond B2 and the small stream B4 compartments are reached at approximately 180 and 150 days, respectively; the 1% of maximum levels are reached between 300-360 days.

Table 4. Summary Index to Figures 1 - 5:
Simulations of Fate of Avermectin B_1
Pond: L1 / B2
Stream 1: L3 / B4
Stream 2: L5 / B6

Figure	Load	X-axis	Results
1A	Littoral L1	60 d	B4 >= B2 > B6 >> L1 > L3 > L5
1B	Littoral L1	360 d	B2 > B4 > B6 >> L1 > L3 > L5
2A	Benthic B2	60 d	B2 >> B4 > B6 >> L1 > L3 > L5
2B	Benthic B2	360 d	B2 > B4 > B6 >> L1 > L3 > L5

Case 2. Loadings to the Pond Benthic (B2) Compartment

Because AVM is believed to bind tightly to the erodible clay soils, loadings to the pond benthic B2 were considered as the other extreme case. Illustrated in Figures 2A and 2B and values in Table 6 are the maximum levels of AVM total concentrations found in the pond benthic B2 which received the load. Furthermore, the higher B2 levels persist throughout the year and the rate of decay is slower than that of the loading to the pond littoral L1. (Compare the AVM levels at day 240 of Figures 1B and 2B.) Note also in

Figure 2A and 2B that the maximal AVM levels are attained at different times:

1-60 days: B2 >> B4 > B6 >> L1 > L3 > L5
60-360 days: B2 > B4 > B6 >> L1 > L3 > L5

Supporting data are attached as Tables 7 and 8 of Appendix 3. Tables 7 and 8 are composites of Tables 15 and 20 of the EXAMS II output, respectively, for days 1,2,4,7,14,21,30,60, 120,240 and 360.

Table 5 (EXAMS II Table 15)

Table 7 summarizes the relative mass balances and distributions of avermectin B_1 in the 3 littoral (Water Column) and 3 benthic (Benthic Sediments) compartments with respect to Total, Dissolved and Sorbed (sediments and biota) chemical at the end of each of the above elapsed days.

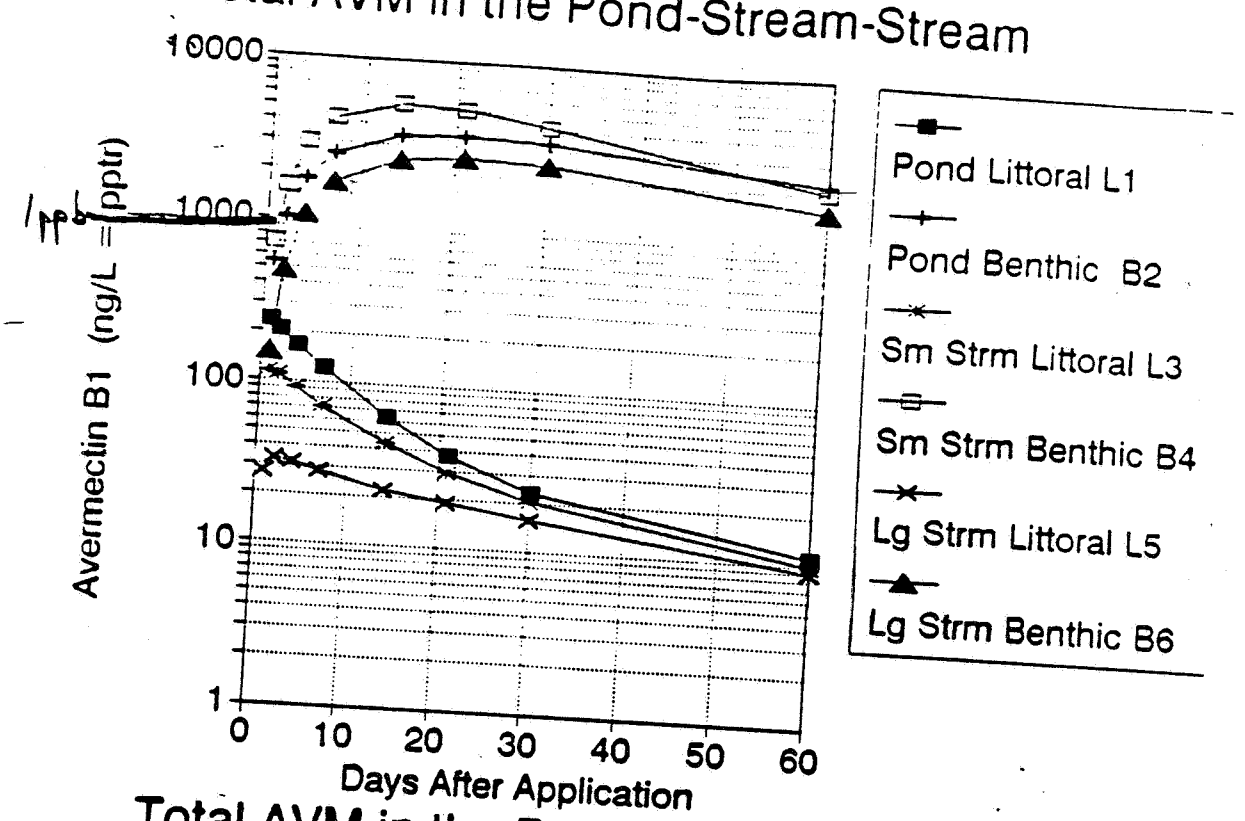
Table 6 (EXAMS II Table 20)

Table 8 summarizes the relative Exposure Concentrations in the entire Water Column and all the Benthic Sediments. The relative Fate of AVM in Water Column and the Benthic Sediments and the routes of dissipation are also summarized therein.

In summary, based on a limited set of data for aquatic dissipation of avermectin B_1, the relative distributions and fates of AVM in an aquatic environment have been simulated. The major assumptions which need further verification in either laboratory or field observations are:

1. The dissipation half-life of AVM in the aquatic environment
2. Identification of fate associated with microbial activitities
3. Possible pathways of degradation which may be better coupled to the process algorithms inherent in the EXAMS II model
4. The potential for AVM to accumulate in the environment if aerobic conditions do not exist.

Avermectin B1 Load to Pond L1



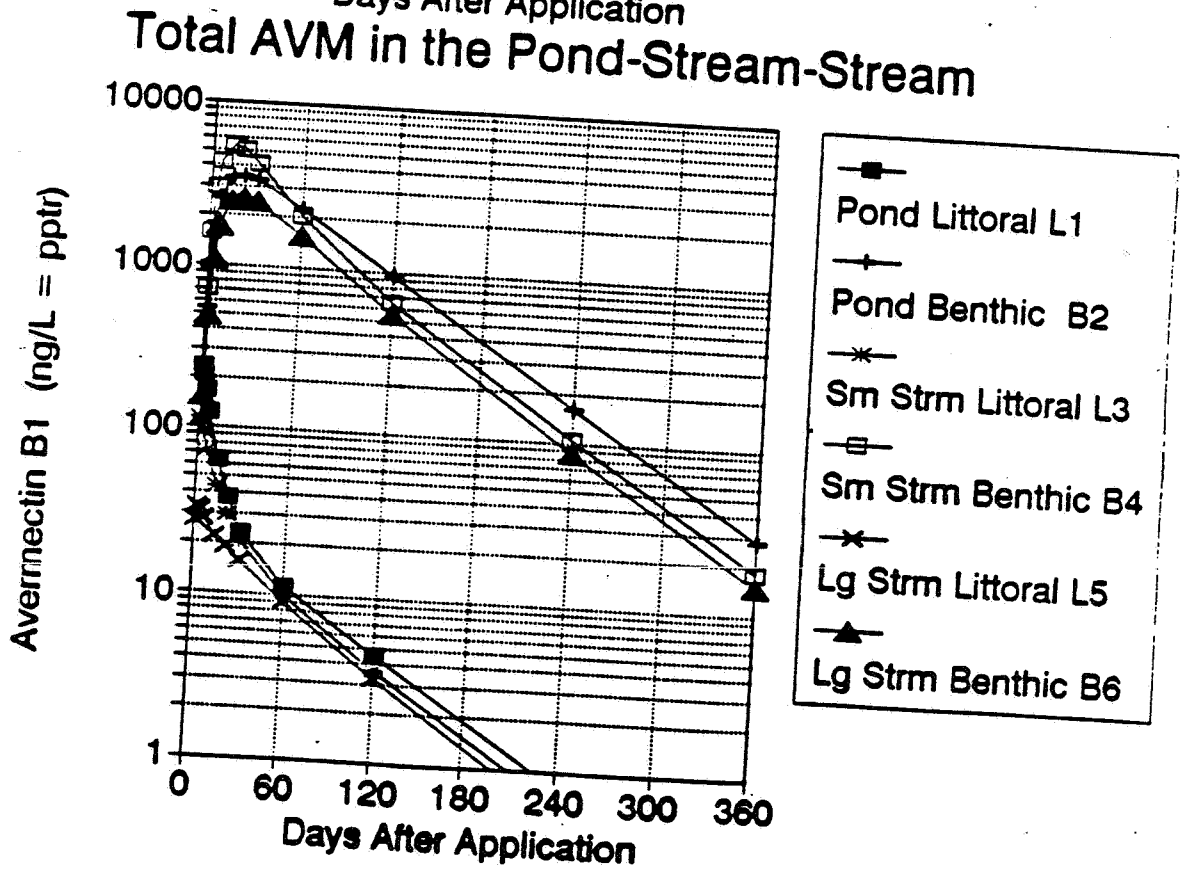
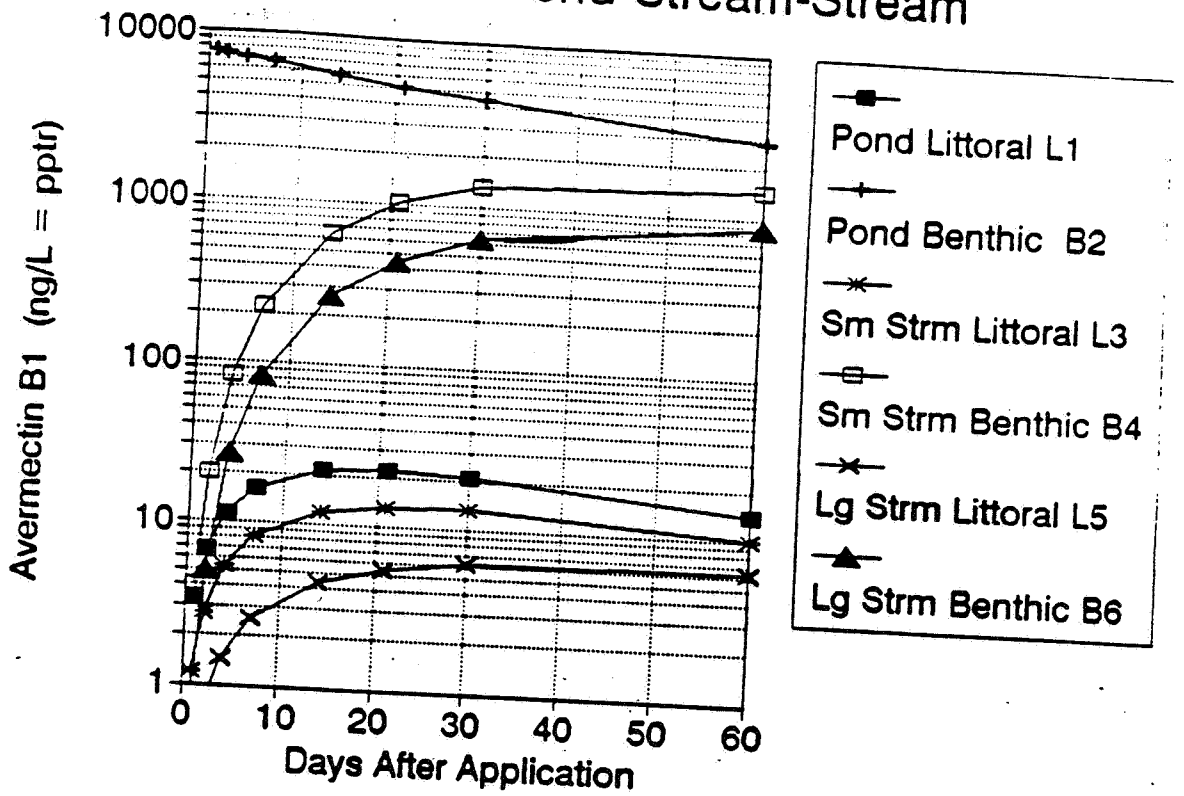


Figure 1. 5.19 g Avermectin B_1 Loading to Pond Littoral L1
A = 0 - 60 Days B = 0 - 360 Days

Avermectin B1 Load to Pond B2

Total AVM in the Pond-Stream-Stream



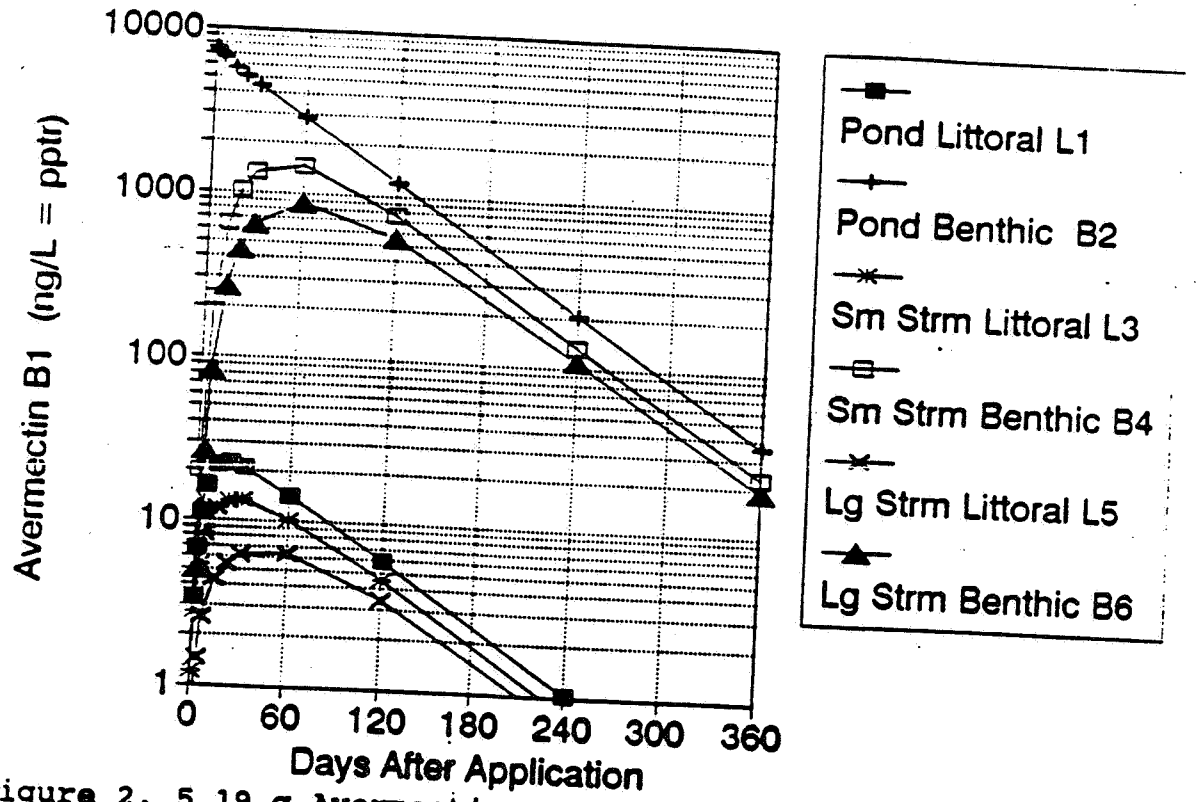
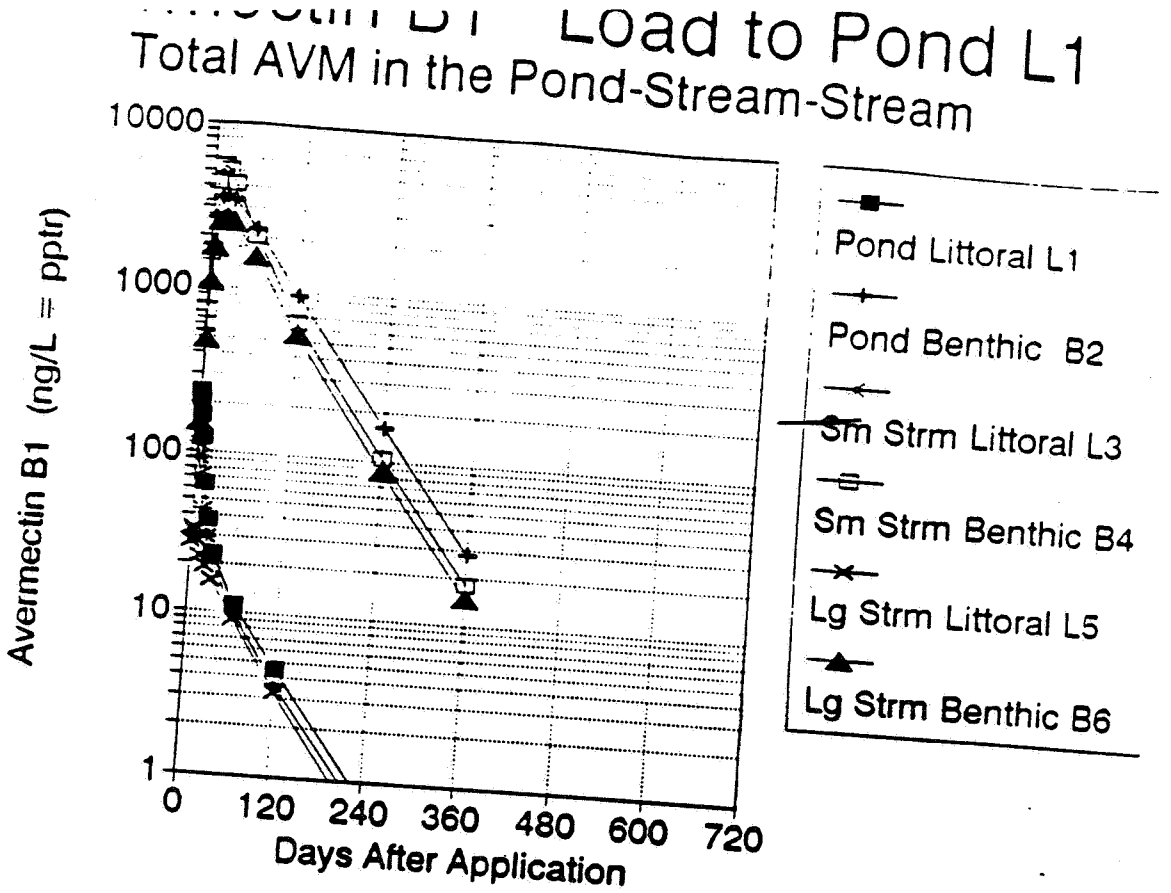


Figure 2. 5.19 g Avermectin B_1 Loading to Pond Benthic B2
A = 0 - 60 Days B = 0 - 360 Days



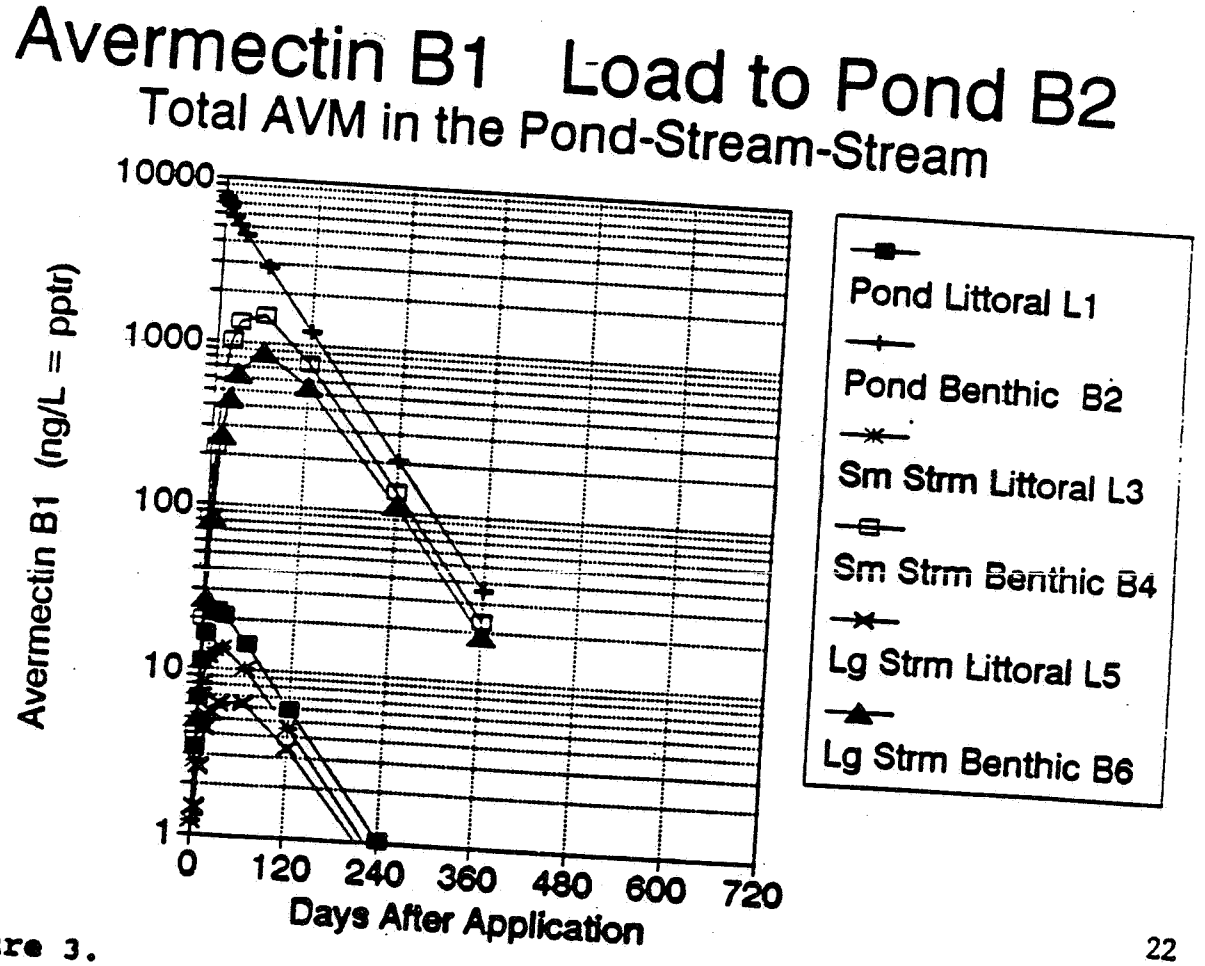


Figure 3.

A. 5.19 g Avermectin B_1 Loading to Pond Littoral L1 0-720 d
B. 5.19 g Avermectin B_1 Loading to Pond Benthic B2 0-720 d

70

Table 5. Relative Distributions of Avermectin B_1 for 5.19 g Loading to Pond Littoral L1
[Data Obtained from Table 15 of EXAMS II]

A. Total Chemical Concentrations (ng/L)

Day	Littoral	1	2	4	7	14	21	30	60	120	240	360
Table 15	5.19 g AVM Load to Pond Littoral - L1 All Values are Total Chemical Concentrations											
ng/L	L 1	232	208	168	123	63	3	23	11	5	1	0
ppt	L 3	115	109	91	71	43	30	21	10	4	1	0
	L 5	27	33	31	28	22	19	16	9	3	1	0
ng/L	B 2	544	1017	1784	2582	3424	3555	3340	2238	932	161	28
ppt	B 4	708	1575	2940	4271	5310	5059	4227	2027	641	104	18
	B 6	153	477	1068	1703	2416	2566	2130	1550	555	87	15

Table 5. Relative Distributions of Avermectin B_1 for 5.19 g Loading to Pond Littoral L1
[Data Obtained from Table 15 of EXAMS II)

B. Dissolved Chemical Concentrations (ng/L)

Day	Littoral	1	2	4	7	14	21	30	60	120	240	360
Table 15	5.19 g AVM Load to Pond Littoral - L1 All Values are Dissolved Chemical Concentrations (ng/L)											
ng/L	L 1	231	207	167	122	63	37	23	11	5	1	0
ppt	L 3	114	108	91	71	43	29	20	10	4	1	0
	L 5	27	33	31	27	22	19	15	9	3	1	0
	B 2	3	6	11	16	21	22	21	14	6	1	0
	B 4	4	10	18	27	33	32	26	13	4	1	0
	B 6	1	3	7	11	15	16	15	10	3	1	0

Table 6. Relative Distributions of Avermectin B_1 for 5.19 g Loading to Pond Benthic B2
[Data Obtained from Table 15 of EXAMS II]

A. Total Chemical Concentrations (ng/L)

Day	Benthic	1	2	4	7	14	21	30	60	120	240	360
Table 15	5.19 g AVM Load to Pond Benthic - B2 All Values are Total Chemical Concentrations (mg/L)											
ng/L	L 1	3	7	11	16	21	22	21	14	6	1	0
ppm	L 3	1	3	5	8	12	13	13	10	4	1	0
	L 5	0	1	1	3	4	5	6	6	3	1	0
	B 2	7496	7318	6992	6565	5767	5138	4472	2871	1193	206	36
	B 4	4	20	82	225	637	1004	1321	1452	746	133	23
	B 6	1	5	26	82	261	445	637	864	551	109	19

Table 6. Relative Distributions of Avermectin B_1 for 5.19 g Loading to Pond Benthic B2
[Data Obtained from Table 15 of EXAMS II)

B. Dissolved Chemical Concentrations (ng/L)

Day	Benthic	1	2	4	7	14	21	30	60	120	240	360
Table 15	5.19 g AVM Load to Pond Benthic - B2 All Values are Dissolved Chemical Concentrations (ng/L)											
ng/L	L 1	3	6	11	16	21	22	21	14	6	1	0
ppm	L 3	1	3	5	8	12	13	13	10	4	1	0
	L 5	0	1	1	3	4	5	6	6	3	1	0
	B 2	47	46	44	41	36	32	28	18	7	1	0
	B 4	0	0	1	1	4	6	8	9	5	1	0
	B 6	0	0	0	1	2	3	4	5	3	1	0

Figure 1. 5.19 g Avermectin B_1 Loading to Pond Benthic B2
A = 0 - 60 Days B = 0 - 360 Days

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11. COMPLETION OF ONE-LINER:

This study reports simulations on the residual concentrations of AVM one year after introduction into a small pond assuming (1) AVM is tightly sorbed to soil which washes into the pond and (2) field dissipation times ($T_{1/2,dissipation}$) of 60 and 120 days.

12. CBI APPENDIX:

No CBI are submitted with this report.

Appendices

1. Aquatic EEC Simulation Summary - Runoff Determination

2. Figure from Soil Residue (Field Dissipation) Study (EFGWB #90-0710/-0711)

3. Supporting Tables

Table 4. EXAMS II Output Tables

1. Chemical Inputs: Fate Data
2. Chemical Inputs: Product Data
3. Pulse Chemical Loadings
4. Environmental Input: Biological Parameters
5. Environmental Input: Hydrological Parameters
6. Environmental Input: Sediment Properties
7. Environmental Input: Physical Geometery
8. Miscellanenous Environmental Input Data
9. Input Specifications: Advective Transport
10. Input Specifications: Dispersive Transport
11. Environmental Input: Global Site Parameters
12. Kinetic Profile of Synthetic Chemical
13. Chemical Reactivity Profile of Ecosystem
14. Allochthanous Chemical Loads and Pulses
15. Distribution of Chemical in the Environment
16. Chemical Speciation of Dissolved Chemical
17. Chemical Concentration Means, Maxima, Minima
18. Sensitivity Analysis of Environmental Fate
19. Summary Time-Trace of Chemical Concentrations
20. Exposure Analysis Summary

Table 5. EXAMS II Table 15 for Days
1,2,4,7,14,21,30,60,120,240,360
Results of Load to Pond Littoral L1 on Left
Results of Load to Pond Benthic B2 or Right

Table 6. EXAMS II Table 20 for Days
1,2,4,7,14,21,30,60,120,240,360
Results of Load to Pond Littoral L1 on Left
Results of Load to Pond Benthic B2 or Right

APPENDIX 1

AQUATIC EEC SIMULATION SUMMARY:

I. Runoff Determination

PRZM (Pesticide Root Zone Model) a computer model, was used to simulate runoff of Avermectin EC off a cotton field in Texas. In simulation, the pesticide was applied 0.024 kg/ha at three intervals during the year. From these results, the following runoff events have been selected to represent runoff in the wettest year (the maximum runoff/pesticide conc.), the average wet year (the average runoff/pest.conc.) and the dry year (the minimum runoff/pest.conc.).

Unit Runoff/Pesticide Conc. (kg/ha)

Max Value J.Day 235	Avg Value J.Day 235	Min Value J.Day 234
0.00051 kg/ha	0.000011 kg/ha	--0--

These values were used to calculate the pesticide concentration at edge of field (1a & 2a) and the concentration within a 2 x 10 liter pond from a 10 ha field loading (1b & 2b). The calculations can be found within the attached report.

1. Edge-of-field & Pond concentrations for maximum year loading:

a. Max. Pesticide Conc. from field: = 4.36×10^{-4} mg/l (ppm)

b. Max. Pesticide Conc. in 2×10^{7} l pond = 1.60 x 10-4 mg/l (ppm)

2. Edge-of-field & Pond concentrations for average year loading:

a. Avg. Pesticide Conc. from field: = 8.5×10^{-4} ppm

b. Avg. Pesticide Conc. in 2×10^{7} l pond = 5.46×10^{-6} ppm

Questions regarding the following information should be addressed to Catherine Eiden 557-7356.

Avermectin: Runoff simulation with PRZM for development of an Aquatic Estimated Environmental Concentration (EEC).

I. Background of Assignment

The Ecological Effects Branch (EEB) has requested an aquatic EEC for the insecticide avermectin B emulsifiable concentrate (EC formulation). EEB has specified a simulation with application on cotton in Texas. The surface water section of EFGWB is using the Pesticide Root Zone Model (PRZM) to develop a worst-case scenario for the determination of the runoff loadings of avermectin from a 10 ha cotton field into a 1 ha pond.

PRZM is a compartmental model designed to simulate chemical movement for edge-of-field runoff and leaching purposes. The model is set up with hydrologic, soil, pesticide parameters, cropping information, and meteorological data specific to the area of simulation. Precipitation within the model is distributed between plant canopy, runoff, and leaching below the root zone. Surface runoff takes into account both overland flow and interflow. Pesticide residue transported from the field is calculated as pesticide in runoff (kg/ha) and pesticide associated with eroded sediment as (kg/ha), also. The sum of these two outputs from PRZM is used as the total pesticide load leaving the field and available for transport to ponds and streams.

II. Environmental Fate of Avermectin

Avermectin is a miticide/insecticide commonly used on citrus and cotton crops for control of various mites. on cotton plants, it is primarily used for control of spider mites.

Avermectin is not expected to hydrolyze in the environment. It has been found to rapidly undergo photodegradation in both soil and water with half-lives of less than one day. Soil metabolism studies indicate that degradation occurs with half-lives of two weeks to two months under aerobic conditions. Anaerobic degradation is slower. Avermectin has also been found to rapidly decay from foliage with half-lives of less than one day (Bull et al, 1984). Adsorption values are high (clay kd=134, silt loam Kd=30.9) suggesting immobility, thus low leaching potential. The environmental fate of the chemical suggests it will degrade rapidly in the natural environment with low concentrations expected in runoff. However, little is known about the degradation products persistence and mobility.

III. Runoff Modelling Scenario

Summary of scenario developed for Avermectin on cotton field in Texas: Estimated Environmental Concentration.

Request from EEB: Scenario Criteria
- -Cotton grown in Texas
- -Max use application rates

-Min between treatment intervals
-Assume treatment up to edge of water body

Background: Site selection- THe surface water team of EFGWB was presented with a request for determination of an aquatic EEC for avermectin. The requirements for site selection are listed above.

In review of the chemicals use and cotton production with Texas, Dan Reider(EEB) and myself agreed upon a site within Williamson Co. Texas. Primary soils within the area for cotton production are Branyon and Houston Black clays. These are both hydrologic group D soils(minimum infiltration of 0.03-0.13 cm/hr). Slopes for the area range around 2%. The Soil Conservation Service Agent Bill Owen was contacted regarding the area, he felt that considering the crop and runoff/erosion concerns that Williamson Co. was the best choice for simulation.

Dan Reider of EEB, checked on cotton production levels within the sounty and found that approximately 42,000 acres are producing cotton within the county.

Due to the specificity of PRZM input parameters, I have narrowed the scenario down to one of the two soil types mentioned previously. Both soil types are high clay %, hydro group D however the Branyon soil has a higher acreage then the Houston Black. The scenario description following has been based on a Branyon clay. Textural properties and other soil factors are provided in Tables 1a &b and were obtained through DBAPE (Data Base Analyzer and Parameter Estimator) a data base set up from the SCS Soil Surveys.

The simulation was run with 10 years of meteorologic data generated through a sub-routine in PRZM called WEATHER. The generated data is based on information specific to the Austin, Texas meteorologic station. The weather file generated was compared to actual meteorologic data for Austin, Texas and average annual precipitation values range around 80 cm for both the generated and actual data. The weather files for this simulation seem to be closely representative of actual precipitation records.

EEB has indicated that an extreme-case, catastrophic event is represented by a one-in-ten year storm. This event was not represented within the generated weather file. In order to simulate this event, rainfall was manually added on August 22nd of the highest rainfall year out of the 10 years of generated weather. August 22nd is the day after the third and final application of avermectin for a given year of precipitation. The amount of rainfall added is specific to the geographic area. In the case of Williamson County, Texas, a one-in-ten year rainfall is 16.87 cm in a 24 hour period.

EEB has supplied a protocol for maximum, average, and minimum values of pesticide in runoff. Avermectin application for the simulation is based on the current label. According to the label, 48 fl. oz./acre/year (2% a.i.) is the maximum label rate. This is

broken down into three applications at 16 fl.oz./acre (0.024 kg ha) at each application interval.

IV. Conclusions

The highest edge-of-field concentration was 0.000519 kg/ha of avermaectin. This given as the daily load on August 22nd (Julian day 234). The average edge of field load was 0.000011 kg/ha on August 11th (Julian day 235). The calculations for pesticide concentration at the edge-of-the-field and in a 1 ha pond from a 10 ha field are given in Tables 2 & 3.

SOIL SERIES (NAME) BRANYON SOIL NUMBER (NUMERIC CODE) PL 1110

DEPTH(CM)	CLASS	% SAND L	% SAND H	% CLAY L	% CLAY H	BULK DENS. L	BULK DENS. H	ORG. MAT. L	ORG. MAT. H	AVAIL H2O L	AVAIL H2O H	HGRP
SUR 10.2	1	0	25	40	60	1.15	1.45	2.0	4.0	0.15	0.18	D
SUB 152.4	1	0	25	40	60	1.20	1.45	0.6	2.0	0.15	0.18	
STR 203.2	1	0	40	30	60	1.40	1.55	0.4	1.2	0.11	0.18	

POTENTIAL CROPS

2 COTTON 6 SORGHUM 3 GRASS/PAS/HAY 9 WHEAT

TOTAL ACRES: 69250.

FROM:
TX:491

INSTRUCT

'Next' command to go to next screen

Help:F1 Next:F2 Prev:F4 Status:F7 Intrpt:F6 Xpad:F9 Cmnd

Display (EPD)

Soil > BRANYON (1 of 1) Zone > SUR Depth 10.2

	Organic Matter (percent)	Wilting Point wlpt&aw	Field Capacity -.10 bar	Field Capacity -.33 bar
Midpoint Estimate	3.	0.33983	0.50483	0.57507	0.54308
Estimated Range	2.	0.26707	0.41707	0.46093	0.4312
	4.	0.4126	0.5926	0.6892	0.65495

NOTE: use Intrpt command to quit display and return to Przm screen.

INSTRUCT

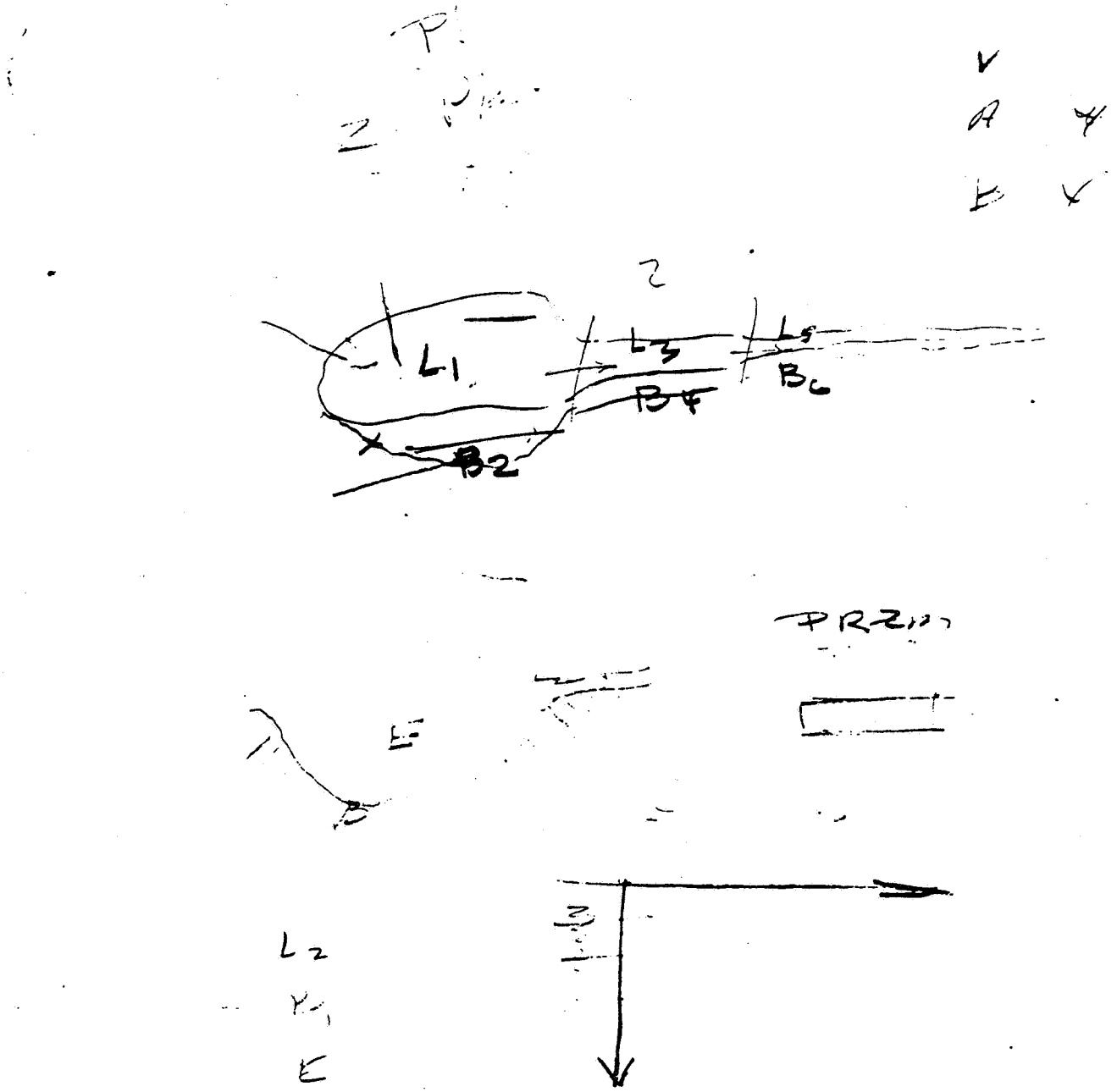
View data in highlighted field.
Use 'Help' command to see field definition(s).

Help:F1 Next:F2 Prev:F4 Limits:F5 Status:F7 Intrpt:F6 Xpad:F9 Cmnd

Display (EPD)

Soil > BRANYON (1 of 1) Zone > SUB Depth 152.4

	Organic Matter (percent)	Wilting Point wlpt&aw	Field Capacity -.10 bar	Field Capacity -.33 bar
Midpoint Estimate	1.3	0.30362	0.46862	0.50492	0.47441
Estimated Range	0.6	0.23762	0.38763	0.40494	0.37617
	2.	0.36962	0.54962	0.60491	0.57265



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INSTRUCT

View data in highlighted field.
Use 'Help' command to see field definition(s).

Help:F1 Next:F2 Prev:F4 Limits:F5 Status:F7 Intrpt:F6 Xpad:F9 Cmnd

Display (EPD)

Soil > BRANYON (1 of 1) Zone > STR Depth 203.2

	Organic Matter (percent)	Wilting Point	Field Capacity wlpt&aw	-.10 bar	-.33 bar
Midpoint Estimate	0.8	0.26538	0.41038	0.43879	0.41069
Estimated Range	0.4	0.1816	0.2916	0.32185	0.29493
	1.2	0.34915	0.52915	0.55573	0.52644

NOTE: use Intrpt command to quit display and return to Przm screen.

INSTRUCT

View data in highlighted field.
Use 'Help' command to see field definition(s).

Help:F1 Next:F2 Prev:F4 Limits:F5 Status:F7 Intrpt:F6 Xpad:F9 Cmnd

Table 2: Calculations for EEC determination.

Maximum Value: Year 1, August 23rd (Julian Day 235)

Annual Load = 0.00081 kg/ha

8/23/1 Load = 0.00052 kg/ha

1) Percent Chemical lost through runoff Annual

(0.00081 kg/ha /0.024 kg/ha x 3 applic.) x 100% = 1.12%

Percent Chemical lost through runoff Daily (8/22/9)

(0.00052 kg/ha /0.00081 kg/ha) x 100% = 63.8% of 1.12% = 0.71%

2) Runoff in cm for August 23rd year 1 = 11.89 cm

3) $11.89\ cm \times 10^8\ cm^2/ha = 1.189 \times 10^9\ cm^3/ha$

$1.189 \times 10^9\ cm^3/ha = 1.189 \times 10^9\ ml/ha$

$1.189 \times 10^9\ ml/ha \times 10^{-3}\ l/ml = 1.189 \times 10^6\ l/ha$

4) $0.00051\ kg/ha\ /\ 1.189 \times 10^6\ l/ha = 4.36 \times 10^{-10}\ kg/l$

5) $4.36 \times 10^{-10}\ kg/l \times 10^6\ mg/kg = 4.36 \times 10^{-4}\ mg/l$ (ppm)
Pesticide concentration coming off of the field.

6) From a 1 ha load:
$0.00051\ kg/ha \times 10^6\ mg/kg\ /1.189 \times 10^6\ l + 2 \times 10^7\ l$ pond

$= 2.45 \times 10^{-5}\ mg/l$ (ppm)

$= 2.45 \times 10^{-2}$ ppb = 24.5 ppt

Concentration of pesticide within a 2 x 107 l pond.

7) From a 10 ha load:

$0.00051\ kg/ha \times 10^6\ mg/kg \times 10\ ha\ /\ (1.189 \times 10^6\ l/ha \times 10\ ha) + 2 \times 10^7 = 1.599 \times 10^{-4}\ mg/l =$

160 ppt

Table 3: Calculations for EEC determination.

Average Year: Year 3, August 23rd (Julian Day 235)

Annual Load = 0.00024 kg/ha

8/23/3 Load = 0.000011 kg/ha

1) Percent Chemical lost through runoff Annual

(0.00024 kg/ha /0.024 kg/ha x 3 applic.) x 100% = 0.333%

Percent Chemical lost through runoff Daily (8/23/3)

(0.000011 kg/ha /0.00024 kg/ha) x 100% = 4.7% of 0.333% = 0.015%

2) Runoff in cm from the field on August 23 year 3 = 0.132

3) $0.132 \text{ cm} \times 10^8 \text{ cm}^2/\text{ha} = 0.132 \times 10^8 \text{ cm}^3/\text{ha} =$

$0.132 \times 10^8 \text{ ml/ha} \times 10^{-3} \text{ l/ml} = 0.132 \times 10^5 \text{ l/ha}$

4) $0.000011 \text{ kg/ha} / 0.132 \times 10^5 \text{ l/ha} = 8.5 \times 10^{-10} \text{ kg/l}$

$8.5 \times 10^{-10} \text{ kg/l} \times 10^6 \text{ mg/kg} = 8.5 \times 10^{-4} \text{ mg/l}$

8.5×10^{-4} mg/l (ppm)

Pesticide concentration coming off of the field.

5) From a 1 ha load:

$0.000011 \text{ kg/ha} \times 10^6 \text{ mg/kg} / 0.132 \times 10^5 \text{ l} + 2 \times 10^7 \text{ l pond.}$

$= 5.61 \times 10^{-7}$ mg/l (ppm) $= 5.61 \times 10^{-4}$ ppb

= 0.561 ppt

Pesticide concentration in a 2×10^7 liter pond.

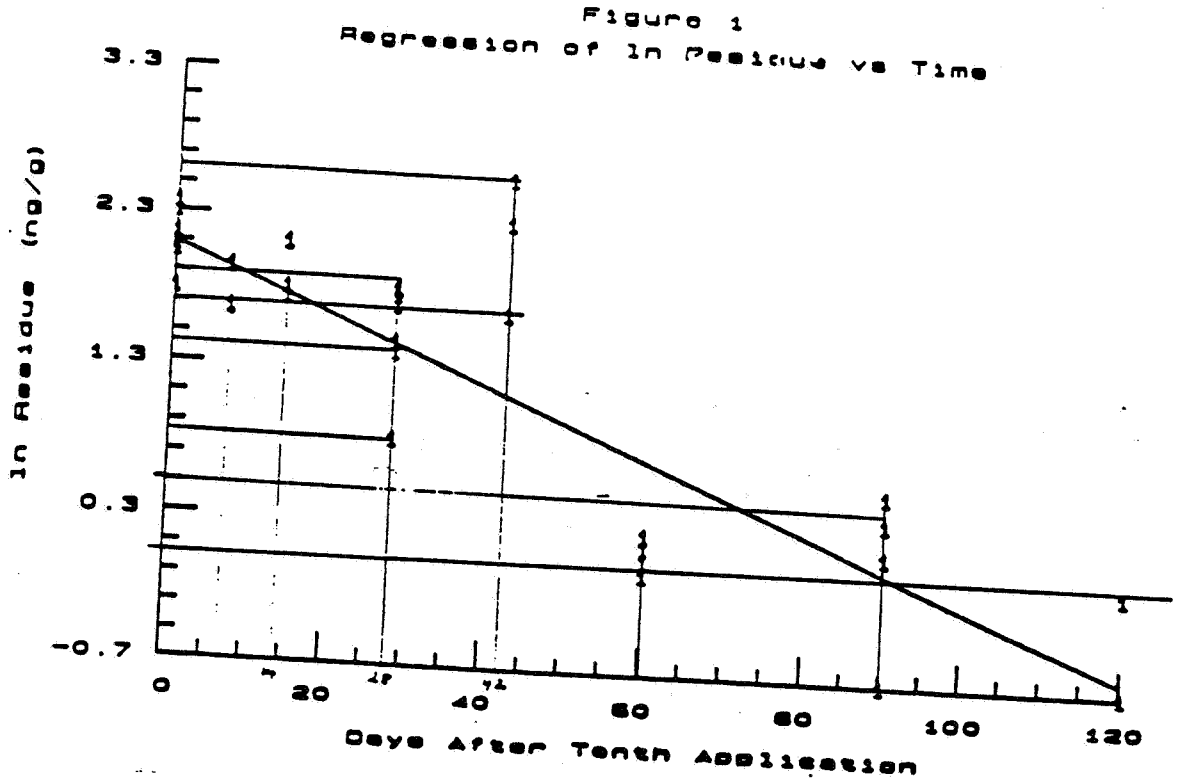
6) From a 10 ha load:

$0.000011 \text{ kg/ha} \times 10^6 \text{ mg/kg} \times 10 \text{ ha} / (0.132 \times 10^5 \text{ l/ha} \times 10 \text{ ha}) + 2 \times 10^7 \text{ l} = 5.46 \times 10^{-6} \text{ mg/l} =$

5.46 ppt

Appendix 2

Figure 1 is reproduced from the soil residue (field dissipation) submitted by Wehner (1989) [EFGWB #90-0710/-0711] in support of registration of abermectin B_1 on cotton and citrus.



Ten weekly applications of abermectin B_1 0.15 EC were applied by ground sprayers at an average rate of 0.021 lb ai/acre to a crop of celery. The field contained a sandy loam soil with an organic content less than 1.5% (Tulare County CA). ...

Soil cores were taken 0-12 inches before treatment, and after each treatment, as well as after the 10th treatment on days 1,3,7,14,28,42, 60,90 and 120. ...

Reported Results

The half-life (time for 50% of the initial avermectin B_1 residue to dissipate) of avermectin B_1 was 31 ± 6 days. The residue decline 2is shown in Figure 1.

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Alternative Interpretation

From days 0 to 42 after the 10th application of avermectin B_1, the values range between 1.8 to 2.1 ng/g for day 0; for day 28 from 0.8 to 1.6 ng/g; for day 42 from 1.6 to 2.6 ng/g. These values show, in general, a stable or upward trend, especially in view of the drop at day 28 and the increase at day 42. For day 60, the values cluster closely around 0.2; for day 90 loosely around 0.3; and for day 120 around 0 or less.

Unless these values fall within the analytical and processing experiemtnal errors, these data can be interpreted as a stable or upward trend for days 0 to 44 which are followed by another stable or upward trend for days 60 to 120. Alternatively, these values may be consistent with the production of an analytically reactive degradate (with a half-life of the same order of magnitude of avermectin B_1) after the cessation of avermectin B_1 application. Are values for day 42 unusually high? Are values for days 60, 90 and 120 essentially the same (approximating zero)?

T. Wehner. 1989.
Additional Soil Residue Data in Support of Applications for Registration ofAbamectin Soil Leaching andDissipation Study.
Analytical Development Corporation and Merck, Sharp & Dohme Research Laboratories
Merck No. 001-87-6045. MRID No. 411915-01.

Appendix 3. EXAMS II Output Tables

1 Chemical inputs: FATE Data
2 Chemical inputs: PRODUCT Chemistry
3 PULSE Chemical Loadings
4 Environmental Input Data: BIOLOGICAL Parameters
5 Environmental Input Data: HYDROLOGIC Parameters
6 Environmental Input Data: SEDIMENT Properties
7 Environmental Input Data: PHYSICAL GEOMETRY
8 MISCellaneous Environmental Input Data: Wind, D.O., etc.
9 Input specifications: ADVECTIVE transport field
10 Input specifications: DISPERSIVE transport field
11 Environmental Input Data: GLOBAL site parameters
12 KINETIC PROFILE of Synthetic Chemical
13 Chemical REACTIVITY PROFILE of Ecosystem
14 Allochthonous Chemical LOADS and Pulses
15 DISTRIBUTION of Chemical in Environment
16 Chemical SPECIATION of Dissolved Concentrations
17 Chemical Concentration MEANS, Maxima, and Minima
18 Sensitivity Analysis of Chemical FATE
19 Summary TIME-TRACE of Chemical Concentrations
20 Exposure Analysis SUMMARY

Chemical: 1) Avermectin B1

Table 1.01.1 Chemical input data for neutral molecule (Sp.#1).
*** Chemical-specific data: SET via "entry(1)"
MWT: 8.30E+02 VAPR: 1.50E-09 HENRY: KOW: 9.77E+03
KVO: EVPR: EHEN: KOC:
*** Ion-specific data: "entry(1, 1)"
SOL: 5.00 KPB: KPS: 1.34E+02
ESOL: KPDOC:
*** Reactivity of dissolved species: SET via "entry(1, 1, 1)"
KAH: EAH: KNH: 4.81E-04 ENH:
KBH: EBH: KRED: ERED:
KBACW: QTBAW: KBACS: QTBAS:
*** Reactivity of solids-sorbed species: "entry(2, 1, 1)"
KAH: EAH: KNH: 4.81E-04 ENH:
KBH: EBH: KRED: ERED:
KBACW: QTBAW: KBACS: QTBAS:
*** Reactivity of "DOC"-complexed species: "entry(3, 1, 1)"
KAH: EAH: KNH: ENH:
KBH: EBH: KRED: ERED:
KBACW: QTBAW: KBACS: QTBAS:
*** Reactivity of biosorbed species: "entry(4, 1, 1)"
KBACW: QTBAW: KBACS: QTBAS:

Photochemical process data; Ion-specific data: "entry(1, 1)"
KDP(1, 1): 5.54E-02 RFLAT(1, 1): 40.6 LAMAX(1, 1): 0.0
*** Reactivity of dissolved species: SET via "entry(1, 1, 1)"
K1O2: EK1O2: KOX: EOX:
*** Reactivity of solids-sorbed species: "entry(2, 1, 1)"
K1O2: EK1O2: KOX: EOX:
*** Reactivity of "DOC"-complexed species: "entry(3, 1, 1)"
K1O2: EK1O2: KOX: EOX:
QUA(1,1, 1) QUA(2,1, 1) QUA(3,1, 1)
Light ABSORption (n,1, 1): (1) (2)
(3) (4) (5) (6)
(7) (8) (9) (10)
(11) (12) (13) (14)
(15) (16) (17) (18)
(19) (20) (21) (22)
(23) (24) (25) (26)
(27) (28) (29) (30)
(31) (32) (33) (34)
(35) (36) (37) (38)
(39) (40) (41) (42)
(43) (44) (45) (46)
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Chemical: 1) Avermectin B1

Table 2. Chemical input data: product chemistry.

No product chemistry specified.

Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: 1) Avermectin B1

Table 3. Chemical input data: pulse loadings.*

[illegible]
[illegible]
[illegible]

* N.B.: These values represent the input request stream only; they may be revised during simulation.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 4.13. Mean environmental input data: biologicals.**

Sp #	T* y	BACPL cfu/ml	BNBAC cfu/100g	PLMAS mg/L	BNMAS dry g/m2
1	L	1.00E+05		4.00E-01	
2	B		2.00E+08		6.00E-03
3	L	1.00E+05		4.00E-01	
4	B		2.00E+08		6.00E-03
5	L	1.00E+05		4.00E-01	
6	B		2.00E+08		6.00E-03

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
** Average of 12 monthly mean values.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Seg #	T* y	STFLO m3/hr	STSED kg/hr	NPSFL m3/hr	NPSED kg/hr	SEEPS m3/hr	EVAP mm/mon
1	L			1.00E+01	1.00E+01		9.00E+01
2	B						
3	L			3.00	3.00		9.00E+01
4	B						
5	L			3.00	3.00		9.00E+01
6	B						

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
** Average of 12 monthly mean values.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 6.13. Mean environmental inputs: sediment properties.**

Seg #	T* y	SNSED mg/L	BULKD g/cm3	PCTWA %	FROC	CEC meq/100g	AEC (dry)
1	L	3.00E+01			4.00E-02	2.50E+01	2.50E+01
2	B		1.85	1.37E+02	4.00E-02	2.50E+01	2.50E+01
3	L	3.00E+01			4.00E-02	2.50E+01	2.50E+01
4	B		1.85	1.37E+02	4.00E-02	2.50E+01	2.50E+01
5	L	3.00E+01			4.00E-02	2.50E+01	2.50E+01
6	B		1.85	1.37E+02	4.00E-02	2.50E+01	2.50E+01

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
** Average of 12 monthly mean values.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 7. Environmental input data: physical geometry.

Seg #	T* y	VOLume m3	AREA m2	DEPTH m	XSA m2	LENGth m	WIDTH m
1	L	2.00E+04	1.00E+04	2.00		1.00E+02	1.00E+02
2	B	5.00E+02	1.00E+04	5.00E-02		1.00E+02	1.00E-02
3	L	1.50E+02	3.00E+02	5.00E-01		1.00E+02	3.00
4	B	1.50E+01	3.00E+02	5.00E-02		1.00E+02	3.00
5	L	4.50E+02	9.00E+02	5.00E-01		3.00E+02	3.00
6	B	4.50E+01	9.00E+02	5.00E-02		3.00E+02	3.00

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 8.13. Mean miscellaneous environmental input data.**

Seg #	T* y	DFAC m/m	DISO2 mg/L	KO2 cm/hr@20	WIND m/s@10cm	DOC mg/L	CHL pgmt mg/L
1	L	1.10	5.00	8.00	1.00	5.00	5.00E-03
2	B					5.00	
3	L	1.10	5.00	8.00	1.00	5.00	5.00E-03
4	B					5.00	
5	L	1.10	5.00	8.00	1.00	5.00	5.00E-03
6	B					5.00	

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
** Average of 12 monthly mean values.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 9. Input specifications -- advective transport field.

J FR AD	1	3	5
J TO AD	3	5	0
ADV PR	1.00	1.00	1.00

Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 10.13. Mean dispersive transport field.

J TURB	1	3	5
I TURB	2	4	6
XS TUR m2	1.000E+04	300.	1.200E+03
CHARL m	1.02	0.275	0.275
DSP m2/hr*	3.000E-05	3.000E-05	3.000E-05

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OXRAD (M) 1.00E-09 RAIN(mm/mo) 100.0 CLOUD 4.00 LAT 30.3
OZONE(cm) 0.315 ATURB(km) 2.00 RHUM(%) 50.0 LONG 97.7
ELEV (m): 200.0 Air mass type: R
WLAM, P/cm2/s/N nm: 5.507E-07 6.357E-03 10.6 1.108E+04
2.680E+06 1.630E+08 3.545E+09 3.429E+10 2.014E+11 7.523E+11
2.027E+12 4.508E+12 7.721E+12 1.267E+13 1.781E+13 2.237E+13
2.735E+13 4.332E+13 2.004E+14 2.193E+14 2.554E+14 2.838E+14
3.415E+14 3.573E+14 3.636E+14 5.402E+14 6.513E+14 6.978E+14
6.751E+14 8.042E+14 9.222E+14 9.738E+14 9.791E+14 1.030E+15
9.994E+14 1.060E+15 1.086E+15 1.147E+15 1.177E+15 1.188E+15
1.222E+15 1.230E+15 1.235E+15 1.240E+15 1.214E+15 1.165E+15

Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: Avermectin B1

Table 12.01.13. Mean kinetic profile of synthetic chemical, computed from chemical and environmental reactivity data.

Seg #	T* y	Local pseudo-first-order process half-lives (hours) Biolysis	Photol	Oxidat	Hydrol	Reduct	Volatil
1	L		1.40E+03		1.44E+03		5.92E+07
2	B				1.44E+03		
3	L		3.49E+02		1.44E+03		1.48E+07
4	B				1.44E+03		
5	L		3.49E+02		1.44E+03		1.49E+07
6	B				1.44E+03		

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 13.13. Mean chemical reactivity profile of ecosystem.

T* y p	S e g	pH	pOH	Temp Deg. C.	Piston Veloc. m/hr	Mean Light %	Bact. Popn. cfu/**	Oxidant Conc. Molar	Singlet Oxygen Molar	Reduct. (REDAC) Molar
L	1	8.0	6.0	15.0	7.1E-02	1	1.0E+05	1.8E-11	1.3E-15	
B	2	6.0	8.0	15.0			2.0E+08			
L	3	8.0	6.0	15.0	7.1E-02	7	1.0E+05	7.1E-11	5.1E-15	
B	4	6.0	8.0	15.0			2.0E+08			
L	5	8.0	6.0	15.0	7.1E-02	7	1.0E+05	7.1E-11	5.1E-15	
B	6	6.0	8.0	15.0			2.0E+08			

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic
** Active bacterial populations as cfu/mL in water column, and as cfu/100 g (dry weight) of sediments in benthic segments.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: 1) Avermectin B1

Table 14.01. Allochthonous loads (kg/hr) and pulses (kg).

Seg	Streams	Rainfall	Seeps	NPS Loads	Drift	Pulse IC
1						
2						5.190E-03
3						
4			—	—		
5						
6						

Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: Avermectin B1

Table 19. Summary time-trace of chemical concentrations during the period from 0 through 1 Days.

Time Days	Average Chemical Concentrations Water Column Free-mg/L	Sorb-mg/kg	Benthic Sediments Pore-mg/L	Sed-mg/kg	Total Chemical M... Water Col Total kg	Bent... Total kg
0	8.60E-05	1.38E-02	0.00E-01	0.00E-01	5.19E-03	0.00E-01
0	1.09E-04	1.75E-02	4.84E-07	7.75E-05	5.06E-03	9.87E-05
0	1.19E-04	1.91E-02	1.20E-06	1.93E-04	4.93E-03	1.97E-04
0	1.23E-04	1.98E-02	2.04E-06	3.26E-04	4.80E-03	2.95E-04
1	1.24E-04	1.99E-02	2.92E-06	4.67E-04	4.68E-03	3.91E-04

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Seg #	Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
			Chemical Concentrations			
In the Water Column:						
1	4.65E-03	99.37	2.323E-04	2.310E-04	3.701E-02	0.419
3	1.72E-05	0.37	1.145E-04	1.139E-04	1.825E-02	0.206
5	1.23E-05	0.26	2.725E-05	2.710E-05	4.342E-03	4.912E-02
	4.68E-03	92.28				
and in the Benthic Sediments:						
2	3.67E-04	93.96	5.440E-04	3.387E-06	5.427E-04	6.140E-03
4	1.43E-05	3.67	7.080E-04	4.408E-06	7.063E-04	7.991E-03
6	9.28E-06	2.37	1.527E-04	9.509E-07	1.524E-04	1.724E-03
	3.91E-04	7.72				

Total Mass (kilograms) = 5.0659E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: Avermectin B1

Table 16.01.1. Distribution among aqueous chemical species at the end of 1. days. All concentrations in ug/L (ppb).

Seg #	T*	Total Aqueous	DOC Complexed	- Chemical Species (by valency) - (0)
1	L	0.231		0.23
2	B	3.387E-03		3.39E-03
3	L	0.114		0.11
4	B	4.408E-03		4.41E-03
5	L	2.710E-02		2.71E-02
6	B	9.509E-04		9.51E-04

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: Avermectin B1

Table 17.01. Chemical concentration spatial means, maxima, and minima at the end of 1. days. Number in parens (Seg) indicates segment where value was found.

	Total Seg mg/*	Dissolved Seg mg/L **	Sediments Seg mg/kg	Biota Seg ug/gram
Water Column:				
Mean	1.247E-04	1.240E-04	1.987E-02	0.225
Max	(1) 2.323E-04	(1) 2.310E-04	(1) 3.701E-02	(1) 0.419
Min	(5) 2.725E-05	(5) 2.710E-05	(5) 4.342E-03	(5) 4.912E-02
Benthic Sediments:				
Mean	4.682E-04	2.915E-06	4.671E-04	5.285E-03
Max	(4) 7.080E-04	(4) 4.408E-06	(4) 7.063E-04	(4) 7.991E-03
Min	(6) 1.527E-04	(6) 9.509E-07	(6) 1.524E-04	(6) 1.724E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: Avermectin B1

Table 18.01. Sensitivity analysis: after 1 days.

Current Value by Process	Mass Flux Kg/ day	% of Total Flux	Half-life* days
Hydrolysis	5.8485E-05	46.51	60.04
Reduction			
Radical oxidation			
Direct photolysis	5.6708E-05	45.09	61.92
Singlet oxygen oxidation			
All Chemical Processes	1.1519E-04	91.60	30.48
Bacterioplankton			
Benthic Bacteria			
Total Biolysis			
Surface Water-borne Export	1.0564E-05	8.40	332.4
Seepage export			
Volatilization	1.3192E-09	0.00	2.622E-04

Total mass flux: 1.2576E-04

---

* Pseudo-first-order estimates based on flux/resident mass.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 1 days.

Exposure Concentrations:
==========

Water Column: --	
Total (mg/L)	2.323E-04
Dissolved (mg/L)	2.310E-04
Plankton (ug/g dry)	0.419
Benthic Sediments:	
Total (mg/kg dry)	7.080E-04
Dissolved (mg/L pore)	4.408E-06
Benthos (ug/g dry)	7.991E-03

Fate:	Current Resident Mass -- kg	5.066E-03
====	Water Column	92.28 %
	Benthic Sediments	7.72 %
	Total Flux of Chemical -- kg / day	1.258E-04
	Chemical Transformations:	91.60 %
	Biological Transformations:	0.00 %
	Volatilization:	0.00 %
	Water-borne Export:	8.40 %

Table 5. EXAMS II Output Table 15 for Days 1,2,4,7,14,21,30,60,120,240,360

Results of Load to Pond Littoral L1 on Left
Results of Load to Pond Benthic B2 on Right

Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 1. days.

Seg #	Resident Mass Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	4.64E-03	99.37	2.322E-04	2.309E-04	3.700E-02	0.419
3	1.72E-05	0.37	1.145E-04	1.138E-04	1.824E-02	0.206
5	1.23E-05	0.26	2.723E-05	2.708E-05	4.339E-03	4.909E-02
	4.67E-03	92.23				
and in the Benthic Sediments:						
2	3.57E-04	93.96	5.439E-04	3.387E-06	5.427E-04	6.139E-03
4	1.43E-05	3.67	7.077E-04	4.407E-06	7.061E-04	7.988E-03
6	9.29E-06	2.37	1.526E-04	9.504E-07	1.523E-04	1.723E-03
	3.91E-04	7.72				

Total Mass (kilograms) = 5.0645E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 2. days.

Seg #	Resident Mass Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	4.16E-03	99.26	2.080E-04	2.069E-04	3.315E-02	0.375
3	1.63E-05	0.39	1.087E-04	1.081E-04	1.732E-02	0.196
5	1.49E-05	0.35	3.301E-05	3.283E-05	5.261E-03	5.952E-02
	4.19E-03	84.86				
and in the Benthic Sediments:						
2	6.87E-04	91.86	1.017E-03	6.334E-06	1.015E-03	1.148E-02
4	3.19E-05	4.27	1.575E-03	9.810E-06	1.572E-03	1.778E-02
6	2.90E-05	3.87	4.765E-04	2.967E-06	4.754E-04	5.379E-03
	7.48E-04	15.14				

Total Mass (kilograms) = 4.9395E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 4. days.

Seg #	Resident Mass Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	3.35E-03	99.18	1.676E-04	1.667E-04	2.671E-02	0.302
3	1.37E-05	0.41	9.129E-05	9.079E-05	1.455E-02	0.165
5	1.40E-05	0.41	3.103E-05	3.086E-05	4.945E-03	5.594E-02
	3.38E-03	71.78				
and in the Benthic Sediments:						
2	1.20E-03	90.62	1.784E-03	1.111E-05	1.780E-03	2.013E-02
4	5.97E-05	4.49	2.949E-03	1.836E-05	2.942E-03	3.329E-02
6	6.49E-05	4.88	1.068E-03	6.650E-06	1.065E-03	1.205E-02
	1.33E-03	28.22				

Total Mass (kilograms) = 4.7091E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 1. days.

Seg #	Resident Mass Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	6.81E-05	99.61	3.406E-06	3.387E-06	5.427E-04	6.139E-
3	1.81E-07	0.26	1.207E-06	1.201E-06	1.924E-04	2.176E-
5	8.81E-08	0.13	1.957E-07	1.947E-07	3.119E-05	3.529E-
	6.84E-05	1.33				
and in the Benthic Sediments:						
2	5.06E-03	100.00	7.496E-03	4.663E-05	7.479E-03	8.461E-
4	8.22E-08	0.00	4.057E-06	2.526E-08	4.048E-06	4.579E-
6	4.16E-08	0.00	6.848E-07	4.264E-09	6.832E-07	7.729E-
	5.06E-03	98.67				

Total Mass (kilograms) = 5.1299E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 2. days.

Seg #	Resident Mass Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	1.27E-04	99.46	6.369E-06	6.334E-06	1.015E-03	1.148E-0
3	4.11E-07	0.32	2.738E-06	2.723E-06	4.363E-04	4.936E-
5	2.81E-07	0.22	6.254E-07	6.219E-07	9.965E-05	1.127E-0
	1.28E-04	2.53				
and in the Benthic Sediments:						
2	4.94E-03	99.99	7.318E-03	4.557E-05	7.301E-03	8.260E-0
4	4.04E-07	0.01	1.994E-05	1.242E-07	1.989E-05	2.251E-0
6	3.04E-07	0.01	5.002E-06	3.115E-08	4.991E-06	5.646E-0
	4.94E-03	97.47				

Total Mass (kilograms) = 5.0696E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 4. days.

Seg #	Resident Mass Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	2.23E-04	99.35	1.117E-05	1.111E-05	1.780E-03	2.013E-02
3	8.00E-07	0.36	5.330E-06	5.391E-06	8.494E-04	9.609E-03
5	6.65E-07	0.30	1.477E-06	1.469E-06	2.354E-04	2.663E-03
	2.25E-04	4.54				
and in the Benthic Sediments:						
2	4.72E-03	99.93	6.992E-03	4.353E-05	6.975E-03	7.891E-02
4	1.66E-06	0.04	8.214E-05	5.114E-07	8.195E-05	9.271E-04
6	1.60E-06	0.03	2.631E-05	1.638E-07	2.624E-05	2.969E-04
	4.72E-03	95.46				

Total Mass (kilograms) = 4.9486E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 7. days.

Seg #	Resident Mass Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	2.45E-03	99.07	1.226E-04	1.219E-04	1.954E-02	0.221
3	1.07E-05	0.43	7.129E-05	7.090E-05	1.136E-02	0.129
5	1.24E-05	0.50	2.761E-05	2.746E-05	4.399E-03	4.977E-02
	2.48E-03	56.15				
and in the Benthic Sediments:						
2	1.74E-03	90.17	2.582E-03	1.607E-05	2.576E-03	2.914E-02
4	8.65E-05	4.48	4.271E-03	2.659E-05	4.261E-03	4.820E-02
6	1.03E-04	5.35	1.703E-03	1.060E-05	1.699E-03	1.922E-02
	1.93E-03	43.85				

Total Mass (kilograms) = 4.4084E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 14. days.

Seg #	Resident Mass Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	1.27E-03	98.72	6.336E-05	6.302E-05	1.010E-02	0.114
3	6.52E-06	0.51	4.345E-05	4.321E-05	6.923E-03	7.832E-02
5	9.98E-06	0.78	2.217E-05	2.205E-05	3.533E-03	3.997E-02
	1.28E-03	33.34				
and in the Benthic Sediments:						
2	2.31E-03	90.09	1.424E-03	2.132E-05	3.417E-03	3.865E-02
4	1.08E-04	4.19	5.310E-03	3.307E-05	5.298E-03	5.994E-02
6	1.47E-04	5.72	2.416E-03	1.504E-05	2.410E-03	2.727E-02
	2.57E-03	66.66				

Total Mass (kilograms) = 3.8503E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 21. days.

Seg #	Resident Mass Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	7.43E-04	98.30	3.714E-05	3.694E-05	5.918E-03	6.695E-02
3	4.44E-06	0.59	2.959E-05	2.943E-05	4.715E-03	5.335E-02
5	8.41E-06	1.11	1.868E-05	1.858E-05	2.977E-03	3.368E-02
	7.56E-04	22.13				
and in the Benthic Sediments:						
2	2.40E-03	90.28	3.555E-03	2.214E-05	3.547E-03	4.012E-02
4	1.02E-04	3.85	5.059E-03	3.150E-05	5.047E-03	5.710E-02
6	1.56E-04	5.87	2.566E-03	1.598E-05	2.560E-03	2.896E-02
	2.66E-03	77.87				

Total Mass (kilograms) = 3.4143E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 7. days.

Seg #	Resident Mass Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	3.22E-04	99.27	1.616E-05	1.607E-05	2.576E-03	2.914E-0
3	1.23E-06	0.38	8.207E-06	8.162E-06	1.308E-03	1.479E-[illegible]
5	1.15E-06	0.35	2.553E-06	2.539E-06	4.069E-04	4.603E-0
	3.26E-04	6.83				
and in the Benthic Sediments:						
2	4.43E-03	99.79	6.565E-03	4.088E-05	6.550E-03	7.410E-0
4	4.57E-06	0.10	2.254E-04	1.404E-06	2.249E-04	2.544E-[illegible]
6	4.96E-06	0.11	8.164E-05	5.083E-07	8.145E-05	9.214E-0
	4.44E-03	93.17				

Total Mass (kilograms) = 4.7675E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 14. days.

Seg #	Resident Mass Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	4.29E-04	99.14	2.144E-05	2.132E-05	3.417E-03	3.865E-0
3	1.78E-06	0.41	1.184E-05	1.177E-05	1.886E-03	2.134E-0
5	1.96E-06	0.45	4.347E-06	4.324E-06	6.927E-04	7.837E-0
	4.33E-04	9.93				
and in the Benthic Sediments:						
2	3.89E-03	99.27	5.767E-03	3.591E-05	5.754E-03	6.509E-0
4	1.29E-05	0.33	6.366E-04	3.964E-06	6.351E-04	7.185E-0
6	1.58E-05	0.40	2.607E-04	1.624E-06	2.601E-04	2.943E-0
	3.92E-03	90.07				

Total Mass (kilograms) = 4.3551E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 21. days.

Seg #	Resident Mass Kilos	%	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	4.45E-04	99.02	2.226E-05	2.214E-05	3.547E-03	4.012E-02
3	1.96E-06	0.44	1.310E-05	1.302E-05	2.087E-03	2.361E-0
5	2.46E-06	0.55	5.459E-06	5.429E-06	8.699E-04	9.841E-0
	4.50E-04	11.33				
and in the Benthic Sediments:						
2	3.47E-03	98.65	5.138E-03	3.200E-05	5.127E-03	5.800E-0
4	2.03E-05	0.58	1.004E-03	6.250E-06	1.001E-03	1.133E-0
6	2.70E-05	0.77	4.451E-04	2.771E-06	4.440E-04	5.024E-0
	3.52E-03	88.67				

Total Mass (kilograms) = 3.9664E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Table 15.01. Distribution of chemical after [illegible] days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	4.58E-04	97.85	2.288E-05	2.276E-05	3.646E-03	4.125E-02
3	3.09E-06	0.66	2.057E-05	2.045E-05	3.277E-03	3.708E-02
5	6.98E-06	1.49	1.550E-05	1.542E-05	2.470E-03	2.794E-02
	4.68E-04	15.32				
and in the Benthic Sediments:						
2	2.26E-03	90.52	3.347E-03	2.080E-05	3.332E-03	3.770E-02
4	8.56E-05	3.44	4.227E-03	2.632E-05	4.219E-03	4.771E-02
6	1.48E-04	5.93	2.430E-03	1.513E-05	2.425E-03	2.743E-02
	2.49E-03	84.18				

Total Mass (kilograms) = 2.9562E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 60. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	2.22E-04	97.58	1.110E-05	1.104E-05	1.769E-03	2.002E-02
3	1.49E-06	0.65	9.883E-06	9.829E-06	1.575E-03	1.782E-02
5	4.02E-06	1.77	8.937E-06	8.888E-06	1.424E-03	1.611E-02
	2.28E-04	12.15				
and in the Benthic Sediments:						
2	1.51E-03	91.78	2.238E-03	1.393E-05	2.233E-03	2.526E-02
4	4.11E-05	2.49	2.027E-03	1.262E-05	2.023E-03	2.288E-02
6	9.42E-05	5.72	1.550E-03	9.649E-06	1.546E-03	1.749E-02
	1.65E-03	87.85				

Total Mass (kilograms) = 1.8737E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 120. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	9.11E-05	97.85	4.554E-06	4.529E-06	7.256E-04	8.209E-03
3	5.46E-07	0.59	3.637E-06	3.617E-06	5.795E-04	6.556E-03
5	1.45E-06	1.56	3.228E-06	3.210E-06	5.144E-04	5.819E-03
	9.31E-05	12.11				
and in the Benthic Sediments:						
2	6.29E-04	93.08	9.315E-04	5.800E-06	9.294E-04	1.051E-02
4	1.30E-05	1.92	6.409E-04	3.991E-06	6.394E-04	7.234E-03
6	3.37E-05	4.99	5.553E-04	3.458E-06	5.540E-04	6.268E-03
	6.76E-04	87.89				

Total Mass (kilograms) = 7.6874E-04

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Chemical: Avermectin B1 [illegible]

Table 15.01. Distribution of chemical after 30. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	[illegible]
In the Water Column:						
1	4.18E-04	98.87	2.091E-05	2.080E-05	3.332E-03	[illegible]
3	1.97E-06	0.47	1.316E-05	1.308E-05	2.096E-03	[illegible]
5	2.81E-06	0.66	6.249E-06	6.215E-06	9.958E-04	[illegible]
	4.23E-04	12.06				
and in the Benthic Sediments:						
2	3.02E-03	97.88	4.472E-03	2.785E-05	4.462E-03	[illegible]
4	2.68E-05	0.87	1.321E-03	8.228E-06	1.318E-03	[illegible]
6	3.87E-05	1.26	6.373E-04	3.968E-06	6.359E-04	[illegible]
	3.08E-03	87.94				

Total Mass (kilograms) = 3.5080E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 60. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	2.80E-04	98.48	1.401E-05	1.393E-05	2.233E-03	2.526E-[illegible]
3	1.51E-06	0.53	1.006E-05	1.000E-05	1.602E-03	1.813E-[illegible]
5	2.82E-06	0.99	6.272E-06	6.237E-06	9.994E-04	1.131E-[illegible]
	2.85E-04	12.35				
and in the Benthic Sediments:						
2	1.94E-03	95.95	2.871E-03	1.788E-05	2.864E-03	3.240E-[illegible]
4	2.94E-05	1.46	1.452E-03	9.039E-06	1.448E-03	1.638E-[illegible]
6	5.25E-05	2.60	8.636E-04	5.378E-06	8.616E-04	9.748E-[illegible]
	2.02E-03	87.65				

Total Mass (kilograms) = 2.3048E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 120. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	1.17E-04	98.12	5.832E-06	5.800E-06	9.294E-04	1.051E-02
3	6.74E-07	0.57	4.496E-06	4.471E-06	7.164E-04	8.104E-03
5	1.56E-06	1.31	3.456E-06	3.437E-06	5.508E-04	6.231E-03
	1.19E-04	12.22				
and in the Benthic Sediments:						
2	8.06E-04	94.31	1.193E-03	7.429E-06	1.190E-03	1.347E-02
4	1.51E-05	1.77	7.463E-04	4.647E-06	7.446E-04	8.423E-03
6	3.35E-05	3.92	5.512E-04	3.432E-06	5.499E-04	6.221E-03
	8.54E-04	87.78				

Total Mass (kilograms) = 9.7302E-04

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 240. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	1.57E-05	97.98	7.867E-07	7.824E-07	1.254E-04	1.418E-03
3	9.22E-08	0.57	6.145E-07	6.111E-07	9.791E-05	1.108E-03
5	2.33E-07	1.45	5.174E-07	5.145E-07	8.244E-05	9.327E-04
	1.61E-05	12.16				
and in the Benthic Sediments:						
2	1.09E-04	93.64	1.009E-04	1.002E-06	1.606E-04	1.816E-03
4	2.11E-06	1.82	1.044E-04	6.499E-07	1.041E-04	1.178E-03
6	5.27E-06	4.54	8.673E-05	5.400E-07	8.653E-05	9.789E-04
	1.16E-04	87.84				

Total Mass (kilograms) = 1.3210E-04

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 360. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	2.72E-06	97.99	1.359E-07	1.352E-07	2.166E-05	2.450E-04
3	1.59E-08	0.57	1.061E-07	1.055E-07	1.691E-05	1.913E-04
5	4.00E-08	1.44	8.880E-08	8.832E-08	1.415E-05	1.601E-04
	2.77E-06	12.16				
and in the Benthic Sediments:						
2	1.88E-05	93.68	2.780E-05	1.731E-07	2.774E-05	3.138E-04
4	3.65E-07	1.82	1.800E-05	1.121E-07	1.796E-05	2.032E-04
6	9.02E-07	4.50	1.484E-05	9.241E-08	1.481E-05	1.675E-04
	2.00E-05	87.84				

Total Mass (kilograms) = 2.2811E-05

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 240. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	2.02E-05	98.00	1.008E-06	1.002E-06	1.606E-04	1.816E-
3	1.18E-07	0.57	7.863E-07	7.820E-07	1.253E-04	1.4[illegible]E-
5	2.94E-07	1.43	6.536E-07	6.500E-07	1.041E-04	1.178E-
	2.06E-05	12.16				
and in the Benthic Sediments:						
2	1.39E-04	93.73	2.061E-04	1.283E-06	2.056E-04	2.326E-
4	2.70E-06	1.82	1.334E-04	8.304E-07	1.331E-04	1.505E-
6	6.61E-06	4.45	1.088E-04	6.777E-07	1.086E-04	1.228E-
	1.48E-04	87.84				

Total Mass (kilograms) = 1.6904E-04

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 360. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	3.48E-06	97.99	1.741E-07	1.731E-07	2.774E-05	3.138E-0
3	2.04E-08	0.57	1.359E-07	1.351E-07	2.165E-05	2.450E-0
5	5.11E-08	1.44	1.136E-07	1.130E-07	1.811E-05	2.048E-0
	3.55E-06	12.16				
and in the Benthic Sediments:						
2	2.40E-05	93.69	3.561E-05	2.217E-07	3.552E-05	4.019E-0
4	4.67E-07	1.82	2.306E-05	1.436E-07	2.300E-05	2.603E-0
6	1.15E-06	4.49	1.898E-05	1.182E-07	1.894E-05	2.142E-0
	2.57E-05	87.84				

Total Mass (kilograms) = 2.9214E-05

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Table 6. EXAMS II Output Table 20 for Days 1,2,4,7,14,21,30,60,120,240,360

Results of Load to Pond Littoral on Left
Results of Load to Pond Benthic on Right

Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 1 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	2.322E-04
Dissolved (mg/L)	2.309E-04
Plankton (ug/g dry)	0.419
Benthic Sediments:	
Total (mg/kg dry)	7.877E-04
Dissolved (mg/L pore)	4.407E-06
Benthos (ug/g dry)	7.988E-03

Fate: Current Resident Mass -- kg	5.065E-03
Water Column	92.28 %
Benthic Sediments	7.72 %
Total Flux of Chemical -- kg / day	1.271E-04
Chemical Transformations:	90.62 %
Biological Transformations:	0.00 %
Volatilization:	1.08 %
Water-borne Export:	8.31 %

Ecosystem: TX P-S-S foc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 2 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	2.098E-04
Dissolved (mg/L)	2.069E-04
Plankton (ug/g dry)	0.375
Benthic Sediments:	
Total (mg/kg dry)	1.575E-03
Dissolved (mg/L pore)	9.810E-06
Benthos (ug/g dry)	1.778E-02

Fate: Current Resident Mass -- kg	4.940E-03
Water Column	84.86 %
Benthic Sediments	15.14 %
Total Flux of Chemical -- kg / day	1.221E-04
Chemical Transformations:	88.51 %
Biological Transformations:	0.00 %
Volatilization:	1.01 %
Water-borne Export:	10.48 %

Ecosystem: TX P-S-S foc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 4 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.676E-04
Dissolved (mg/L)	1.667E-04
Plankton (ug/g dry)	0.302
Benthic Sediments:	
Total (mg/kg dry)	2.949E-03
Dissolved (mg/L pore)	1.836E-05
Benthos (ug/g dry)	3.329E-02

Fate: Current Resident Mass -- kg	4.709E-03
Water Column	71.78 %
Benthic Sediments	28.22 %
Total Flux of Chemical -- kg / day	1.036E-04
Chemical Transformations:	88.01 %
Biological Transformations:	0.00 %
Volatilization:	0.92 %
Water-borne Export:	11.08 %

Ecosystem: TX P-S-S foc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 1 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	3.406E-06
Dissolved (mg/L)	3.387E-06
Plankton (ug/g dry)	6.139E-03
Benthic Sediments:	
Total (mg/kg dry)	7.496E-03
Dissolved (mg/L pore)	4.668E-05
Benthos (ug/g dry)	8.461E-02

Fate: Current Resident Mass -- kg	5.130E-03
Water Column	1.33 %
Benthic Sediments	98.67 %
Total Flux of Chemical -- kg / day	6.018E-05
Chemical Transformations:	99.84 %
Biological Transformations:	0.00 %
Volatilization:	0.03 %
Water-borne Export:	0.13 %

Ecosystem: TX P-S-S foc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 2 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	6.363E-06
Dissolved (mg/L)	6.334E-06
Plankton (ug/g dry)	1.148E-02
Benthic Sediments:	
Total (mg/kg dry)	7.318E-03
Dissolved (mg/L pore)	4.557E-05
Benthos (ug/g dry)	8.260E-02

Fate: Current Resident Mass -- kg	5.070E-03
Water Column	2.53 %
Benthic Sediments	97.47 %
Total Flux of Chemical -- kg / day	6.033E-05
Chemical Transformations:	99.54 %
Biological Transformations:	0.00 %
Volatilization:	0.06 %
Water-borne Export:	0.40 %

Ecosystem: TX P-S-S foc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 4 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.117E-05
Dissolved (mg/L)	1.111E-05
Plankton (ug/g dry)	2.013E-02
Benthic Sediments:	
Total (mg/kg dry)	6.992E-03
Dissolved (mg/L pore)	4.353E-05
Benthos (ug/g dry)	7.891E-02

Fate: Current Resident Mass -- kg	4.949E-03
Water Column	4.54 %
Benthic Sediments	95.46 %
Total Flux of Chemical -- kg / day	6.053E-05
Chemical Transformations:	98.95 %
Biological Transformations:	0.00 %
Volatilization:	0.11 %
Water-borne Export:	0.95 %

100

Table 20.01. Exposure analysis at the elapse of 7 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.226E-04
Dissolved (mg/L)	1.219E-04
Plankton (ug/g dry)	0.221
Benthic Sediments:	
Total (mg/kg dry)	4.271E-03
Dissolved (mg/L pore)	2.659E-05
Benthos (ug/g dry)	4.820E-02

Fate: Current Resident Mass -- kg 4.408E-03

Water Column	56.15 %
Benthic Sediments	43.85 %
Total Flux of Chemical -- kg / day	9.264E-05
Chemical Transformations:	87.66 %
Biological Transformations:	0.00 %
Volatilization:	0.79 %
Water-borne Export:	11.55 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 14 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	6.336E-05
Dissolved (mg/L)	6.302E-05
Plankton (ug/g dry)	0.114
Benthic Sediments:	
Total (mg/kg dry)	5.310E-03
Dissolved (mg/L pore)	3.307E-05
Benthos (ug/g dry)	5.994E-02

Fate: Current Resident Mass -- kg 3.850E-03

Water Column	33.34 %
Benthic Sediments	66.66 %
Total Flux of Chemical -- kg / day	6.932E-05
Chemical Transformations:	87.05 %
Biological Transformations:	0.00 %
Volatilization:	0.55 %
Water-borne Export:	12.40 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 21 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	3.714E-05
Dissolved (mg/L)	3.694E-05
Plankton (ug/g dry)	6.595E-02
Benthic Sediments:	
Total (mg/kg dry)	5.059E-03
Dissolved (mg/L pore)	3.150E-05
Benthos (ug/g dry)	5.710E-02

Fate: Current Resident Mass -- kg 3.414E-03

Water Column	22.13 %
Benthic Sediments	77.87 %
Total Flux of Chemical -- kg / day	5.636E-05
Chemical Transformations:	86.75 %
Biological Transformations:	0.00 %
Volatilization:	0.41 %
Water-borne Export:	12.85 %

Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 7

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.616E-05
Dissolved (mg/L)	1.607E-05
Plankton (ug/g dry)	2.914E-02
Benthic Sediments:	
Total (mg/kg dry)	6.565E-03
Dissolved (mg/L pore)	4.288E-05
Benthos (ug/g dry)	7.410E-02

Fate: Current Resident Mass -- kg 4.768E-03

Water Column	6.83 %
Benthic Sediments	93.17 %
Total Flux of Chemical -- kg / day	6.012E-05
Chemical Transformations:	98.19 %
Biological Transformations:	0.00 %
Volatilization:	0.16 %
Water-borne Export:	1.65 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 14 days

Exposure Concentrations:

Water Column:	
Total (mg/L)	2.144E-05
Dissolved (mg/L)	2.132E-05
Plankton (ug/g dry)	3.865E-02
Benthic Sediments:	
Total (mg/kg dry)	5.767E-03
Dissolved (mg/L pore)	3.591E-05
Benthos (ug/g dry)	6.509E-02

Fate: Current Resident Mass -- kg 4.355E-03

Water Column	9.93 %
Benthic Sediments	90.07 %
Total Flux of Chemical -- kg / day	5.740E-05
Chemical Transformations:	96.84 %
Biological Transformations:	0.00 %
Volatilization:	0.22 %
Water-borne Export:	2.94 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 21 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	2.226E-05
Dissolved (mg/L)	2.214E-05
Plankton (ug/g dry)	4.012E-02
Benthic Sediments:	
Total (mg/kg dry)	5.138E-03
Dissolved (mg/L pore)	3.200E-05
Benthos (ug/g dry)	5.800E-02

Fate: Current Resident Mass -- kg 3.966E-03

Water Column	11.33 %
Benthic Sediments	88.67 %
Total Flux of Chemical -- kg day	5.358E-05
Chemical Transformations:	95.80 %
Biological Transformations:	0.00 %
Volatilization:	0.25 %
Water-borne Export:	3.95 %

Table 20.01. Exposure analysis at the elapse of 30 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	2.288E-05
Dissolved (mg/L)	2.276E-05
Plankton (ug/g dry)	4.125E-02
Benthic Sediments:	
Total (mg/kg dry)	4.227E-03
Dissolved (mg/L pore)	2.632E-05
Benthos (ug/g dry)	4.771E-02

Fate:	Current Resident Mass -- kg	2.956E-03
	Water Column	15.82 %
	Benthic Sediments	84.18 %
	Total Flux of Chemical -- kg / day	4.623E-05
	Chemical Transformations:	86.69 %
	Biological Transformations:	0.00 %
	Volatilization:	0.31 %
	Water-borne Export:	13.00 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 60 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.110E-05
Dissolved (mg/L)	1.104E-05
Plankton (ug/g dry)	2.002E-02
Benthic Sediments:	
Total (mg/kg dry)	2.238E-03
Dissolved (mg/L pore)	1.393E-05
Benthos (ug/g dry)	2.526E-02

Fate:	Current Resident Mass -- kg	1.874E-03
	Water Column	12.15 %
	Benthic Sediments	87.85 %
	Total Flux of Chemical -- kg / day	2.808E-05
	Chemical Transformations:	87.41 %
	Biological Transformations:	0.00 %
	Volatilization:	0.25 %
	Water-borne Export:	12.34 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 120 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	4.554E-06
Dissolved (mg/L)	4.529E-06
Plankton (ug/g dry)	8.209E-03
Benthic Sediments:	
Total (mg/kg dry)	9.315E-04
Dissolved (mg/L pore)	5.800E-06
Benthos (ug/g dry)	1.051E-02

Fate:	Current Resident Mass -- kg	7.687E-04
	Water Column	12.11 %
	Benthic Sediments	87.89 %
	Total Flux of Chemical -- kg / day	1.134E-05
	Chemical Transformations:	88.71 %
	Biological Transformations:	0.00 %
	Volatilization:	0.25 %
	Water-borne Export:	11.04 %

Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 30 days

Exposure Concentrations:

Water Column:	
Total (mg/L)	2.091E-05
Dissolved (mg/L)	2.080E-05
Plankton (ug/g dry)	3.770E-02
Benthic Sediments:	
Total (mg/kg dry)	4.472E-03
Dissolved (mg/L pore)	2.785E-05
Benthos (ug/g dry)	5.048E-02

Fate:	Current Resident Mass -- kg	3.508E-03
	Water Column	12.06 %
	Benthic Sediments	87.94 %
	Total Flux of Chemical -- kg / day	4.828E-05
	Chemical Transformations:	94.72 %
	Biological Transformations:	0.00 %
	Volatilization:	0.26 %
	Water-borne Export:	5.02 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 60 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.401E-05
Dissolved (mg/L)	1.393E-05
Plankton (ug/g dry)	2.526E-02
Benthic Sediments:	
Total (mg/kg dry)	2.871E-03
Dissolved (mg/L pore)	1.788E-05
Benthos (ug/g dry)	3.240E-02

Fate:	Current Resident Mass -- kg	2.305E-03
	Water Column	12.35 %
	Benthic Sediments	87.65 %
	Total Flux of Chemical -- kg / day	3.268E-05
	Chemical Transformations:	92.30 %
	Biological Transformations:	0.00 %
	Volatilization:	0.26 %
	Water-borne Export:	7.44 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 120 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	5.832E-06
Dissolved (mg/L)	5.800E-06
Plankton (ug/g dry)	1.051E-02
Benthic Sediments:	
Total (mg/kg dry)	1.193E-03
Dissolved (mg/L pore)	7.429E-06
Benthos (ug/g dry)	1.347E-02

Fate:	Current Resident Mass -- kg	9.730E-04
	Water Column	12.22 %
	Benthic Sediments	87.78 %
	Total Flux of Chemical -- kg / day	1.411E-05
	Chemical Transformations:	90.25 %
	Biological Transformations:	0.00 %
	Volatilization:	0.26 %
	Water-borne Export:	9.50 %

Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 240 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	7.867E-07
Dissolved (mg/L)	7.824E-07
Plankton (ug/g dry)	1.418E-03
Benthic Sediments:	
Total (mg/kg dry)	1.609E-04
Dissolved (mg/L pore)	1.002E-06
Benthos (ug/g dry)	1.816E-03

Fate: Current Resident Mass -- kg	1.321E-04
Water Column	12.16 %
Benthic Sediments	87.84 %
Total Flux of Chemical -- kg / day	1.924E-06
Chemical Transformations:	89.38 %
Biological Transformations:	0.00 %
Volatilization:	0.25 %
Water-borne Export:	10.37 %

Ecosystem: TX P-S-S foc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 364 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.282E-07
Dissolved (mg/L)	1.275E-07
Plankton (ug/g dry)	2.311E-04
Benthic Sediments:	
Total (mg/kg dry)	2.622E-05
Dissolved (mg/L pore)	1.633E-07
Benthos (ug/g dry)	2.959E-04

Fate: Current Resident Mass -- kg	2.151E-05
Water Column	12.16 %
Benthic Sediments	87.84 %
Total Flux of Chemical -- kg / day	3.148E-07
Chemical Transformations:	89.43 %
Biological Transformations:	0.00 %
Volatilization:	0.25 %
Water-borne Export:	10.31 %

Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 240 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.003E-06
Dissolved (mg/L)	1.002E-06
Plankton (ug/g dry)	1.816E-03
Benthic Sediments:	
Total (mg/kg dry)	2.061E-04
Dissolved (mg/L pore)	1.283E-06
Benthos (ug/g dry)	2.326E-03

Fate: Current Resident Mass -- kg	1.690E-04
Water Column	12.16 %
Benthic Sediments	87.84 %
Total Flux of Chemical -- kg / day	2.472E-06
Chemical Transformations:	89.50 %
Biological Transformations:	0.00 %
Volatilization:	0.25 %
Water-borne Export:	10.25 %

Ecosystem: TX P-S-S foc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 360 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.741E-07
Dissolved (mg/L)	1.731E-07
Plankton (ug/g dry)	3.138E-04
Benthic Sediments:	
Total (mg/kg dry)	3.561E-05
Dissolved (mg/L pore)	2.217E-07
Benthos (ug/g dry)	4.019E-04

Fate: Current Resident Mass -- kg	2.921E-05
Water Column	12.16 %
Benthic Sediments	87.84 %
Total Flux of Chemical -- kg / day	4.275E-07
Chemical Transformations:	89.44 %
Biological Transformations:	0.00 %
Volatilization:	0.25 %
Water-borne Export:	10.31 %

Appendix 3. EXAMS II Output Tables

1 Chemical inputs: FATE Data
2 Chemical inputs: PRODUCT Chemistry
3 PULSE Chemical Loadings
4 Environmental Input Data: BIOLOGICAL Parameters
5 Environmental Input Data: HYDROLOGIC Parameters
6 Environmental Input Data: SEDIMENT Properties
7 Environmental Input Data: PHYSICAL GEOMETRY
8 MISCellaneous Environmental Input Data: Wind, D.O., etc.
9 Input specifications: ADVECTIVE transport field
10 Input specifications: DISPERSIVE transport field
11 Environmental Input Data: GLOBAL site parameters
12 KINETIC PROFILE of Synthetic Chemical
13 Chemical REACTIVITY PROFILE of Ecosystem
14 Allochthonous Chemical LOADS and Pulses
15 DISTRIBUTION of Chemical in Environment
16 Chemical SPECIATION of Dissolved Concentrations
17 Chemical Concentration MEANS, Maxima, and Minima
18 Sensitivity Analysis of Chemical FATE
19 Summary TIME-TRACE of Chemical Concentrations
20 Exposure Analysis SUMMARY

Chemical: 1) Avermectin B1

Table 1.01.1 Chemical input data for neutral molecule (Sp.#1).
*** Chemical-specific data: SET via "entry(1)"
MWT: 8.30E+02 VAPR: 1.50E-09 HENRY: KOW: 9.77E+03
KVO: EVPR: EHEN: KOC:
*** Ion-specific data: "entry(1, 1)"
SOL: 5.00 KPB: KPS: 1.34E+02
ESOL: KPDOC:
*** Reactivity of dissolved species: SET via "entry(1, 1, 1)"
KAH: EAH: KNH: 4.81E-04 ENH:
KBH: EBH: KRED: ERED:
KBACW: QTBAW: KBACS: QTBAS:
*** Reactivity of solids-sorbed species: "entry(2, 1, 1)"
KAH: EAH: KNH: 4.81E-04 ENH:
KBH: EBH: KRED: ERED:
KBACW: QTBAW: KBACS: QTBAS:
*** Reactivity of "DOC"-complexed species: "entry(3, 1, 1)"
KAH: EAH: KNH: ENH:
KBH: EBH: KRED: ERED:
KBACW: QTBAW: KBACS: QTBAS:
*** Reactivity of biosorbed species: "entry(4, 1, 1)"
KBACW: QTBAW: KBACS: QTBAS:

Photochemical process data; Ion-specific data: "entry(1, 1)"
KDP(1, 1): 5.54E-02 RFLAT(1, 1): 40.6 LAMAX(1, 1): 0.0
*** Reactivity of dissolved species: SET via "entry(1, 1, 1)"
K1O2: EK1O2: KOX: EOX:
*** Reactivity of solids-sorbed species: "entry(2, 1, 1)"
K1O2: EK1O2: KOX: EOX:
*** Reactivity of "DOC"-complexed species: "entry(3, 1, 1)"
K1O2: EK1O2: KOX: EOX:
QUA(1,1, 1) QUA(2,1, 1) QUA(3,1, 1)
Light ABSORption (n,1, 1): (1) (2)
(3) (4) (5) (6)
(7) (8) (9) (10)
(11) (12) (13) (14)
(15) (16) (17) (18)
(19) (20) (21) (22)
(23) (24) (25) (26)
(27) (28) (29) (30)
(31) (32) (33) (34)
(35) (36) (37) (38)
(39) (40) (41) (42)
(43) (44) (45) (46)
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Chemical: 1) Avermectin B1

Table 2. Chemical input data: product chemistry.

No product chemistry specified.

Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: 1) Avermectin B1

Table 3. Chemical input data: pulse loadings.*

CHEM-ADB# 1
Segment 1
LMASS (kg) 5.190E-03

* N.B.: These values represent the input request stream only; they may be revised during simulation.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 4.13. Mean environmental input data: biologicals.**

S #	T* y	BACPL cfu/ml	BNBAC cfu/100g	PLMAS mg/L	BNMAS dry g/m2
1	L	1.00E+05		4.00E-01	
2	B		2.00E+08		6.00E-03
3	L	1.00E+05		4.00E-01	
4	B		2.00E+08		6.00E-03
5	L	1.00E+05		4.00E-01	
6	B		2.00E+08		6.00E-03

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
** Average of 12 monthly mean values.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Seg #	T* y	STFLO m3/hr	STSED kg/hr	NPSFL m3/hr	NPSED kg/hr	SEEPS m3/hr	EVAP mm/mon
1	L			1.00E+01	1.00E+01		9.00E+01
2	B						
3	L			3.00	3.00		9.00E+01
4	B						
5	L			3.00	3.00		9.00E+01
6	B						

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
** Average of 12 monthly mean values.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 6.13. Mean environmental inputs: sediment properties.**

Seg #	T* y	SUSED mg/L	BULKD g/cm3	POTWA %	FROC	CEC meq/100g (dry)	AEC (dry)
1	L	3.00E+01			4.00E-02	2.50E+01	2.50E+01
2	B		1.85	1.37E+02	4.00E-02	2.50E+01	2.50E+01
3	L	3.00E+01			4.00E-02	2.50E+01	2.50E+01
4	B		1.85	1.37E+02	4.00E-02	2.50E+01	2.50E+01
5	L	3.00E+01			4.00E-02	2.50E+01	2.50E+01
6	B		1.85	1.37E+02	4.00E-02	2.50E+01	2.50E+01

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
** Average of 12 monthly mean values.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 7. Environmental input data: physical geometry.

Seg #	T* y	VOLume m3	AREA m2	DEPTH m	XSA m2	LENGth m	WIDTH m
1	L	2.00E+04	1.00E+04	2.00		1.00E+02	1.00E+02
2	B	5.00E+02	1.00E+04	5.00E-02		1.00E+02	1.00E+02
3	L	1.50E+02	3.00E+02	5.00E-01		1.00E+02	3.00
4	B	1.50E+01	3.00E+02	5.00E-02		1.00E+02	3.00
5	L	4.50E+02	9.00E+02	5.00E-01		3.00E+02	3.00
6	B	4.50E+01	9.00E+02	5.00E-02		3.00E+02	3.00

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 8.13. Mean miscellaneous environmental input data.**

Seg #	T* y	DFAC m/m	DISO2 mg/L	KO2 cm/hr@20	WIND m/s@10cm	DOC mg/L	CHL cont mg/L
1	L	1.19	5.00	8.00	1.00	5.00	5.00E-03
2	B					5.00	
3	L	1.19	5.00	8.00	1.00	5.00	5.00E-03
4	B					5.00	
5	L	1.19	5.00	8.00	1.00	5.00	5.00E-03
6	B					5.00	

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
** Average of 12 monthly mean values.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 9. Input specifications -- advective transport field.

FR AD	1	3	5
TO AD	3	5	0
ADV PR	1.00	1.00	1.00

Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 10.13. Mean dispersive transport field.

TURB	1	3	5
TURB	2	4	6
XS TUR m2	1.000E+04	300.	1.200E+03
CHARL m	1.02	0.275	0.275
DSP m2/hr*	3.000E-05	3.000E-05	3.000E-05

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OXRAD (M) 1.00E-09 RAIN(mm/mo) 100.0 CLOUD 4.00 LAT 30.3
OZONE(cm) 0.315 ATURB(km) 2.00 RHUM(%) 50.0 LONG 97.7
ELEV (m): 200.0 Air mass type: R

WLAM, P/cm2/s/N nm:	5.507E-07	6.357E-03	10.6	1.108E+04	
2.680E+06	1.630E+08	3.545E+09	3.429E+10	2.014E+11	7.523E+11
2.027E+12	4.508E+12	7.721E+12	1.267E+13	1.781E+13	2.237E+13
2.735E+13	4.332E+13	2.004E+14	2.193E+14	2.554E+14	2.838E+14
3.415E+14	3.573E+14	3.636E+14	5.402E+14	6.513E+14	6.978E+14
6.751E+14	8.042E+14	9.222E+14	9.738E+14	9.791E+14	1.030E+15
9.994E+14	1.060E+15	1.086E+15	1.147E+15	1.177E+15	1.188E+15
1.222E+15	1.230E+15	1.235E+15	1.240E+15	1.214E+15	1.165E+15

Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: Avermectin B1

Table 12.01.13. Mean kinetic profile of synthetic chemical, computed from chemical and environmental reactivity data.

Seg #	T* y	Local pseudo-first-order process half-lives (hours) Biolysis	Photol	Oxidat	Hydrol	Reduct	Volatil
1	L		1.40E+03		1.44E+03		5.92E+07
2	B				1.44E+03		
3	L		3.49E+02		1.44E+03		1.49E+07
4	B				1.44E+03		
5	L		3.49E+02		1.44E+03		1.49E+07
6	B				1.44E+03		

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90

Table 13.13. Mean chemical reactivity profile of ecosystem.

T* y p	S e g	pH	pOH	Temp Deg. C.	Piston Veloc. m/hr	Mean Light %	Bact. Popn. cfu/**	Oxidant Conc. Molar	Singlet Oxygen Molar	Reduct. (REDAG) Molar
L	1	8.0	6.0	15.0	7.1E-02	1	1.0E+05	1.8E-11	1.3E-15	
B	2	6.0	8.0	15.0			2.0E+08			
L	3	8.0	6.0	15.0	7.1E-02	7	1.0E+05	7.1E-11	5.1E-15	
B	4	6.0	8.0	15.0			2.0E+08			
L	5	8.0	6.0	15.0	7.1E-02	7	1.0E+05	7.1E-11	5.1E-15	
B	6	6.0	8.0	15.0			2.0E+08			

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic
** Active bacterial populations as cfu/mL in water column, and as cfu/100 g (dry weight) of sediments in benthic segments.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: 1) Avermectin B1

Table 14.01. Allochthonous loads (kg/hr) and pulses (kg).

Seg	Streams	Rainfall	Seeps	NPS Loads	Drift	Pulse IC
1						5.190E-03
2						
3						
4						
5						
6						

Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: Avermectin B1

Table 19. Summary time-trace of chemical concentrations during the period from 0 through 1 Days.

Time Days	Average Chemical Concentrations Water Column Free-mg/L	Water Column Sorb-mg/kg	Benthic Sediments Pore-mg/L	Benthic Sediments Sed-mg/kg	Total Chemical M. Water Col Total kg	Benth Total kg
0	8.60E-05	1.38E-02	0.00E-01	0.00E-01	5.19E-03	0.00E-01
0	1.09E-04	1.75E-02	4.84E-07	7.75E-05	5.06E-03	9.87E-05
0	1.19E-04	1.91E-02	1.20E-06	1.93E-04	4.93E-03	1.97E-04
0	1.23E-04	1.98E-02	2.04E-06	3.26E-04	4.80E-03	2.95E-04
1	1.24E-04	1.99E-02	2.92E-06	4.67E-04	4.68E-03	3.91E-04

[illegible] Distribution of Chemical after [illegible] days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	4.65E-03	99.37	2.323E-04	2.310E-04	3.701E-02	0.419
3	1.72E-05	0.37	1.145E-04	1.139E-04	1.825E-02	0.206
5	1.23E-05	0.26	2.725E-05	2.710E-05	4.342E-03	4.912E-02
	4.68E-03	92.28				
and in the Benthic Sediments:						
2	3.67E-04	93.96	5.440E-04	3.387E-06	5.427E-04	6.140E-03
4	1.43E-05	3.67	7.080E-04	4.408E-06	7.063E-04	7.991E-03
6	9.28E-06	2.37	1.527E-04	9.509E-07	1.524E-04	1.724E-03
	3.91E-04	7.72				

Total Mass (kilograms) = 5.0659E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: Avermectin B1

Table 16.01.1. Distribution among aqueous chemical species at the end of 1. days. All concentrations in ug/L (ppb).

Seg #	T* y	Total Aqueous	DOC Complexed	- Chemical Species (by valency) - (0)
1	L	0.231		0.23
2	B	3.387E-03		3.39E-03
3	L	0.114		0.11
4	B	4.408E-03		4.41E-03
5	L	2.710E-02		2.71E-02
6	B	9.509E-04		9.51E-04

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: Avermectin B1

Table 17.01. Chemical concentration spatial means, maxima, and minima at the end of 1. days. Number in parens (Seg) indicates segment where value was found.

	Total Seg mg/*	Dissolved Seg mg/L **	Sediments Seg mg/kg	Biota Seg ug/gram
Water Column:				
Mean	1.247E-04	1.240E-04	1.987E-02	0.225
Max	(1) 2.323E-04	(1) 2.310E-04	(1) 3.701E-02	(1) 0.419
Min	(5) 2.725E-05	(5) 2.710E-05	(5) 4.342E-03	(5) 4.912E-02
Benthic Sediments:				
Mean	4.682E-04	2.915E-06	4.671E-04	5.285E-03
Max	(4) 7.080E-04	(4) 4.408E-06	(4) 7.063E-04	(4) 7.991E-03
Min	(6) 1.527E-04	(6) 9.509E-07	(6) 1.524E-04	(6) 1.724E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: Avermectin B1

Table 18.01. Sensitivity analysis: after 1 days.

Current Value by Process	Mass Flux Kg/ day	% of Total Flux	Half-Life* days
Hydrolysis	5.8485E-05	46.51	60.04
Reduction			
Radical oxidation			
Direct photolysis	5.6708E-05	45.09	61.92
Singlet oxygen oxidation			
All Chemical Processes	1.1519E-04	91.60	30.48
Bacterioplankton			
Benthic Bacteria			
Total Biolysis			
Surface Water-borne Export	1.0564E-05	8.40	332.4
Seepage export			
Volatilization	1.3393E-09	0.00	2.622E-[illegible]

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Total mass flux: 1.2576E-04

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* Pseudo-first-order estimates based on flux/resident mass.
Exposure Analysis Modeling System -- EXAMS Version 2.93, Mode 2
Ecosystem: Texas Pond - Stream 6/6/90
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 1 days.

Exposure Concentrations:
==========

Water Column:	
Total (mg/L)	2.323E-04
Dissolved (mg/L)	2.310E-04
Plankton (ug/g dry)	0.419
Benthic Sediments:	
Total (mg/kg dry)	7.080E-04
Dissolved (mg/L pore)	4.408E-06
Benthos (ug/g dry)	7.991E-03

Fate:	Current Resident Mass -- kg	5.066E-03
====	Water Column	92.28 %
	Benthic Sediments	7.72 %
	Total Flux of Chemical -- kg / day	1.258E-04
	Chemical Transformations:	91.60 %
	Biological Transformations:	0.00 %
	Volatilization:	0.00 %
	Water-borne Export:	8.40 %

Table 5. EXAMS II Output Table 15 for Days 1,2,4,7,14,21,30,60,120,240,360

Results of Load to Pond Littoral L1 on Left
Results of Load to Pond Benthic B2 on Right

Table 15.01. Distribution of chemical after 1. days.

Seg #	Resident Mass Kilos	Resident Mass %	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	4.64E-03	99.37	2.322E-04	2.309E-04	3.700E-02	0.419
3	1.72E-05	0.37	1.145E-04	1.138E-04	1.824E-02	0.206
5	1.22E-05	0.26	2.723E-05	2.708E-05	4.339E-03	4.909E-02
	4.67E-03	92.28				
and in the Benthic Sediments:						
2	3.67E-04	93.36	5.439E-04	3.387E-06	5.427E-04	6.139E-03
4	1.43E-05	3.67	7.077E-04	4.407E-06	7.061E-04	7.988E-03
6	9.28E-06	2.37	1.526E-04	9.504E-07	1.523E-04	1.723E-03
	3.91E-04	7.72				

Total Mass (kilograms) = 5.0645E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 2. days.

Seg #	Resident Mass Kilos	Resident Mass %	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	4.16E-03	99.26	2.080E-04	2.069E-04	3.315E-02	0.375
3	1.63E-05	0.39	1.087E-04	1.081E-04	1.732E-02	0.196
5	1.49E-05	0.35	3.301E-05	3.283E-05	5.261E-03	5.952E-02
	4.19E-03	84.86				
and in the Benthic Sediments:						
2	6.87E-04	91.86	1.122E-03	6.334E-06	1.015E-03	1.148E-02
4	3.19E-05	4.27	1.575E-03	9.810E-06	1.572E-03	1.778E-02
6	2.90E-05	3.87	4.765E-04	2.967E-06	4.754E-04	5.379E-03
	7.48E-04	15.14				

Total Mass (kilograms) = 4.9395E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 4. days.

Seg #	Resident Mass Kilos	Resident Mass %	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	3.35E-03	99.18	1.676E-04	1.667E-04	2.671E-02	0.302
3	1.37E-05	0.41	9.129E-05	9.079E-05	1.455E-02	0.165
5	1.40E-05	0.41	3.103E-05	3.086E-05	4.945E-03	5.594E-02
	3.38E-03	71.78				
and in the Benthic Sediments:						
2	1.20E-03	90.62	1.784E-03	1.111E-05	1.780E-03	2.013E-02
4	5.97E-05	4.49	2.949E-03	1.836E-05	2.942E-03	3.329E-02
6	6.49E-05	4.88	1.068E-03	6.650E-06	1.065E-03	1.205E-02
	1.33E-03	28.22				

Total Mass (kilograms) = 4.7091E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 1. days.

Seg #	Resident Mass Kilos	Resident Mass %	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota
In the Water Column:						
1	6.81E-05	99.61	3.406E-06	3.387E-06	5.427E-04	6.[illegible]
3	1.81E-07	0.26	1.207E-06	1.201E-06	1.924E-04	2.[illegible]
5	8.81E-08	0.13	1.957E-07	1.947E-07	3.119E-05	3.5[illegible]
	6.84E-05	1.33				
and in the Benthic Sediments:						
2	5.06E-03	100.00	7.496E-03	4.668E-05	7.479E-03	8.46[illegible]
4	8.22E-08	0.00	4.057E-06	2.526E-08	4.043E-06	4.5[illegible]
6	4.16E-08	0.00	6.848E-07	4.264E-09	6.832E-07	7.7[illegible]
	5.06E-03	98.67				

Total Mass (kilograms) = 5.1239E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 2. days.

Seg #	Resident Mass Kilos	Resident Mass %	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	1.27E-04	99.46	6.369E-06	6.334E-06	1.015E-03	1.148E-[illegible]
3	4.11E-07	0.32	2.738E-06	2.723E-06	4.363E-04	4.936E-[illegible]
5	2.81E-07	0.22	6.254E-07	6.219E-07	9.965E-05	1.127E-[illegible]
	1.28E-04	2.53				
and in the Benthic Sediments:						
2	4.94E-03	99.99	7.318E-03	4.557E-05	7.301E-03	8.263E-[illegible]
4	4.04E-07	0.01	1.994E-05	1.242E-07	1.989E-05	2.251E-[illegible]
6	3.04E-07	0.01	5.002E-06	3.115E-08	4.991E-06	5.646E-[illegible]
	4.94E-03	97.47				

Total Mass (kilograms) = 5.0696E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 4. days.

Seg #	Resident Mass Kilos	Resident Mass %	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	2.23E-04	99.35	1.117E-05	1.111E-05	1.780E-03	2.013E-02
3	8.00E-07	0.36	5.330E-06	5.391E-06	8.494E-04	9.609E-03
5	6.65E-07	0.30	1.477E-06	1.469E-06	2.354E-04	2.563E-03
	2.25E-04	4.54				
and in the Benthic Sediments:						
2	4.72E-03	99.93	6.992E-03	4.353E-05	6.975E-03	7.891E-02
4	1.66E-06	0.04	8.214E-05	5.114E-07	8.195E-05	9.271E-04
6	1.60E-06	0.03	2.631E-05	1.638E-07	2.624E-05	2.969E-04
	4.72E-03	95.46				

Total Mass (kilograms) = 4.9486E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Table 15.01. Distribution of chemical after 7. days.

Seg #	Resident Mass Kilos	Resident Mass %	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	2.45E-03	99.07	1.226E-04	1.219E-04	1.954E-02	0.221
3	1.07E-05	0.43	7.129E-05	7.090E-05	1.136E-02	0.129
5	1.24E-05	0.50	2.761E-05	2.746E-05	4.399E-03	4.977E-02
	2.48E-03	56.15				
and in the Benthic Sediments:						
2	1.74E-03	90.17	2.582E-03	1.607E-05	2.576E-03	2.914E-02
4	8.65E-05	4.48	4.271E-03	2.659E-05	4.261E-03	4.820E-02
6	1.03E-04	5.35	1.703E-03	1.060E-05	1.699E-03	1.922E-02
	1.93E-03	43.85				

Total Mass (kilograms) = 4.4084E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 14. days.

Seg #	Resident Mass Kilos	Resident Mass %	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	1.27E-03	98.72	6.336E-05	6.302E-05	1.010E-02	0.114
3	6.52E-06	0.51	4.345E-05	4.321E-05	6.923E-03	7.832E-02
5	9.98E-06	0.78	2.217E-05	2.205E-05	3.533E-03	3.997E-02
	1.28E-03	33.34				
and in the Benthic Sediments:						
2	2.31E-03	90.09	3.424E-03	2.132E-05	3.417E-03	3.865E-02
4	1.08E-04	4.19	5.310E-03	3.307E-05	5.298E-03	5.994E-02
6	1.47E-04	5.72	2.416E-03	1.504E-05	2.410E-03	2.727E-02
	2.57E-03	66.66				

Total Mass (kilograms) = 3.8503E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 21. days.

Seg #	Resident Mass Kilos	Resident Mass %	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	7.43E-04	98.30	3.714E-05	3.694E-05	5.918E-03	6.695E-02
3	4.44E-06	0.59	2.959E-05	2.943E-05	4.715E-03	5.335E-02
5	8.41E-06	1.11	1.868E-05	1.858E-05	2.977E-03	3.368E-02
	7.56E-04	22.13				
and in the Benthic Sediments:						
2	2.40E-03	90.28	3.555E-03	2.214E-05	3.547E-03	4.012E-02
4	1.02E-04	3.85	5.059E-03	3.150E-05	5.047E-03	5.710E-02
6	1.56E-04	5.87	2.566E-03	1.598E-05	2.560E-03	2.896E-02
	2.66E-03	77.87				

Total Mass (kilograms) = 3.4143E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 7. days.

Seg #	Resident Mass Kilos	Resident Mass %	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota
In the Water Column:						
1	3.22E-04	99.27	1.616E-05	1.607E-05	2.576E-03	[illegible]
3	1.23E-06	0.38	8.207E-06	8.162E-06	1.308E-03	[illegible]
5	1.15E-06	0.35	2.553E-06	2.539E-06	4.069E-04	[illegible]
	3.26E-04	6.83				
and in the Benthic Sediments:						
2	4.43E-03	99.79	6.565E-03	4.088E-05	6.550E-03	[illegible]
4	4.57E-06	0.10	2.254E-04	1.404E-06	2.249E-04	[illegible]
6	4.96E-06	0.11	8.164E-05	5.083E-07	8.145E-05	[illegible]
	4.44E-03	93.17				

Total Mass (kilograms) = 4.7675E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 14. days.

Seg #	Resident Mass Kilos	Resident Mass %	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	4.29E-04	99.14	2.144E-05	2.132E-05	3.417E-03	3.865E-
3	1.78E-06	0.41	1.184E-05	1.177E-05	1.886E-03	2.134E-
5	1.96E-06	0.45	4.347E-06	4.324E-06	6.927E-04	7.837E-
	4.33E-04	9.93				
and in the Benthic Sediments:						
2	3.89E-03	99.27	5.767E-03	3.591E-05	5.754E-03	6.509E-
4	1.29E-05	0.33	6.366E-04	3.964E-06	6.351E-04	7.185E-
6	1.58E-05	0.40	2.607E-04	1.624E-06	2.601E-04	2.943E-
	3.92E-03	90.07				

Total Mass (kilograms) = 4.3551E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 21. days.

Seg #	Resident Mass Kilos	Resident Mass %	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	4.45E-04	99.02	2.226E-05	2.214E-05	3.547E-03	4.012E-02
3	1.96E-06	0.44	1.310E-05	1.302E-05	2.087E-03	2.361E-02
5	2.46E-06	0.55	5.459E-06	5.429E-06	8.699E-04	9.841E-03
	4.50E-04	11.33				
and in the Benthic Sediments:						
2	3.47E-03	98.65	5.138E-03	3.200E-05	5.127E-03	5.800E-02
4	2.03E-05	0.58	1.004E-03	6.250E-06	1.001E-03	1.133E-02
6	2.70E-05	0.77	4.451E-04	2.771E-06	4.440E-04	5.024E-03
	3.52E-03	88.67				

Total Mass (kilograms) = 3.9664E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Table 15.01. Distribution of chemical after [illegible] days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	4.58E-04	97.85	2.288E-05	2.276E-05	3.646E-03	4.125E-02
3	2.09E-06	0.66	2.057E-05	2.045E-05	3.277E-03	3.708E-02
5	6.98E-06	1.49	1.550E-05	1.542E-05	2.470E-03	2.794E-02
	4.68E-04	15.32				
and in the Benthic Sediments:						
2	2.26E-03	90.62	3.349E-03	2.080E-05	3.332E-03	3.770E-02
4	8.56E-05	3.44	4.227E-03	2.632E-05	4.219E-03	4.771E-02
6	1.48E-04	5.93	2.430E-03	1.513E-05	2.425E-03	2.743E-02
	2.49E-03	84.18				

Total Mass (kilograms) = 2.9562E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 60. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	2.22E-04	97.58	1.110E-05	1.104E-05	1.769E-03	2.002E-02
3	1.48E-06	0.65	9.883E-06	9.829E-06	1.575E-03	1.782E-02
5	4.02E-06	1.77	8.937E-06	8.888E-06	1.424E-03	1.611E-02
	2.28E-04	12.15				
and in the Benthic Sediments:						
2	1.51E-03	91.78	2.238E-03	1.393E-05	2.233E-03	2.526E-02
4	4.11E-05	2.49	2.027E-03	1.262E-05	2.022E-03	2.288E-02
6	9.42E-05	5.72	1.550E-03	9.640E-06	1.546E-03	1.749E-02
	1.65E-03	87.85				

Total Mass (kilograms) = 1.8737E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 120. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	9.11E-05	97.85	4.554E-06	4.529E-06	7.256E-04	8.209E-03
3	5.46E-07	0.59	3.637E-06	3.617E-06	5.795E-04	6.556E-03
5	1.45E-06	1.56	3.228E-06	3.210E-06	5.144E-04	5.819E-03
	9.31E-05	12.11				
and in the Benthic Sediments:						
2	6.29E-04	93.08	9.315E-04	5.800E-06	9.294E-04	1.051E-02
4	1.30E-05	1.92	6.409E-04	3.991E-06	6.394E-04	7.234E-03
6	3.37E-05	4.99	5.553E-04	3.458E-06	5.540E-04	6.268E-03
	6.76E-04	87.89				

Total Mass (kilograms) = 7.6874E-04

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Avermectin B1

Table 15.01. Distribution of chemical after 30. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota
In the Water Column:						
1	4.18E-04	98.87	2.091E-05	2.080E-05	3.332E-03	3.7[illegible]
3	1.97E-06	0.47	1.316E-05	1.308E-05	2.096E-03	2.[illegible]
5	2.81E-06	0.66	6.249E-06	6.215E-06	9.958E-04	1.1[illegible]
	4.23E-04	12.06				
and in the Benthic Sediments:						
2	3.02E-03	97.88	4.472E-03	2.785E-05	4.462E-03	5.048E[illegible]
4	2.68E-05	0.87	1.321E-03	8.228E-06	1.318E-03	1.49[illegible]
6	3.87E-05	1.26	6.373E-04	3.968E-06	6.359E-04	7.174E[illegible]
	3.08E-03	87.94				

Total Mass (kilograms) = 3.5080E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 60. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	2.80E-04	98.48	1.401E-05	1.393E-05	2.233E-03	2.526E-0[illegible]
3	1.51E-06	0.53	1.006E-05	1.000E-05	1.602E-03	1.813E-[illegible]
5	2.82E-06	0.99	6.272E-06	6.237E-06	9.994E-04	1.131E-0[illegible]
	2.85E-04	12.35				
and in the Benthic Sediments:						
2	1.94E-03	95.95	2.871E-03	1.788E-05	2.864E-03	3.240E-0[illegible]
4	2.94E-05	1.46	1.452E-03	9.033E-06	1.448E-03	1.638E-0[illegible]
6	5.25E-05	2.60	8.636E-04	5.375E-06	8.616E-04	9.748E-0[illegible]
	2.02E-03	87.65				

Total Mass (kilograms) = 2.3048E-03

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 120. days.

Seg #	Resident Mass Kilos	%	Chemical Concentrations Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	1.17E-04	98.12	5.832E-06	5.800E-06	9.294E-04	1.051E-02
3	6.74E-07	0.57	4.496E-06	4.471E-06	7.164E-04	8.104E-03
5	1.56E-06	1.31	3.456E-06	3.437E-06	5.508E-04	6.231E-03
	1.19E-04	12.22				
and in the Benthic Sediments:						
2	8.06E-04	94.31	1.193E-03	7.429E-06	1.190E-03	1.347E-02
4	1.51E-05	1.77	7.463E-04	4.647E-06	7.446E-04	8.423E-03
6	3.35E-05	3.92	5.512E-04	3.432E-06	5.499E-04	6.221E-03
	8.54E-04	87.78				

Total Mass (kilograms) = 9.7382E-04

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 240. days.

Seg #	Resident Mass Kilos	Resident Mass %	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	1.57E-05	97.98	7.867E-07	7.824E-07	1.254E-04	1.418E-03
3	9.22E-08	0.57	6.145E-07	6.111E-07	9.791E-05	1.108E-03
5	2.33E-07	1.45	5.174E-07	5.145E-07	8.244E-05	9.327E-04
	1.61E-05	12.16				
and in the Benthic Sediments:						
2	1.09E-04	93.64	1.609E-04	1.002E-06	1.606E-04	1.816E-03
4	2.11E-06	1.82	1.044E-04	6.499E-07	1.041E-04	1.178E-03
6	5.27E-06	4.54	8.673E-05	5.400E-07	8.653E-05	9.789E-04
	1.16E-04	87.84				

Total Mass (kilograms) = 1.3210E-04

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 240. days.

Seg #	Resident Mass Kilos	Resident Mass %	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/
In the Water Column:						
1	2.02E-05	98.00	1.008E-06	1.002E-06	1.606E-04	1.816E-
3	1.18E-07	0.57	7.863E-07	7.820E-07	1.253E-04	1.417E
5	2.94E-07	1.43	6.536E-07	6.500E-07	1.041E-04	1.178E-
	2.06E-05	12.16				
and in the Benthic Sediments:						
2	1.39E-04	93.73	2.061E-04	1.283E-06	2.056E-04	2.326E-
4	2.70E-06	1.82	1.334E-04	8.304E-07	1.331E-04	1.505E-
6	6.61E-06	4.45	1.088E-04	6.777E-07	1.086E-04	1.228E-
	1.48E-04	87.84				

Total Mass (kilograms) = 1.6904E-04

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 .60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 360. days.

Seg #	Resident Mass Kilos	Resident Mass %	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	2.72E-06	97.99	1.359E-07	1.352E-07	2.166E-05	2.450E-04
3	1.59E-08	0.57	1.061E-07	1.055E-07	1.691E-05	1.913E-04
5	4.00E-08	1.44	8.880E-08	8.832E-08	1.415E-05	1.601E-04
	2.77E-06	12.16				
and in the Benthic Sediments:						
2	1.88E-05	93.68	2.780E-05	1.731E-07	2.774E-05	3.138E-04
4	3.65E-07	1.82	1.800E-05	1.121E-07	1.796E-05	2.032E-04
6	9.02E-07	4.50	1.484E-05	9.241E-08	1.481E-05	1.675E-04
	2.00E-05	87.84				

Total Mass (kilograms) = 2.2811E-05

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 15.01. Distribution of chemical after 360. days.

Seg #	Resident Mass Kilos	Resident Mass %	Total mg/*	Dissolved mg/L **	Sediments mg/kg	Biota ug/g
In the Water Column:						
1	3.48E-06	97.99	1.741E-07	1.731E-07	2.774E-05	3.138E-
3	2.04E-08	0.57	1.359E-07	1.351E-07	2.165E-05	2.450E-
5	5.11E-08	1.44	1.136E-07	1.130E-07	1.811E-05	2.048E-
	3.55E-06	12.16				
and in the Benthic Sediments:						
2	2.40E-05	93.69	3.561E-05	2.217E-07	3.552E-05	4.019E-
4	4.67E-07	1.82	2.306E-05	1.436E-07	2.300E-05	2.603E-
6	1.15E-06	4.49	1.898E-05	1.182E-07	1.894E-05	2.142E-
	2.57E-05	87.84				

Total Mass (kilograms) = 2.9214E-05

* Units: mg/L in Water Column; mg/kg in Benthos.
** Includes complexes with "dissolved" organics.

Table 6. EXAMS II Output Table 20 for Days 1,2,4,7,14,21,30,60,120,240,360

Results of Load to Pond Littoral on Left
Results of Load to Pond Benthic on Right

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Table 20.01. Exposure analysis at the elapse of 1 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	2.322E-04
Dissolved (mg/L)	2.309E-04
Plankton (ug/g dry)	0.419
Benthic Sediments:	
Total (mg/kg dry)	7.077E-04
Dissolved (mg/L pore)	4.407E-06
Benthos (ug/g dry)	7.988E-03

Fate: Current Resident Mass -- kg 5.065E-03

Water Column	92.28 %
Benthic Sediments	7.72 %
Total Flux of Chemical -- kg / day	1.271E-04
Chemical Transformations:	90.62 %
Biological Transformations:	0.00 %
Volatilization:	1.08 %
Water-borne Export:	8.31 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 2 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	2.090E-04
Dissolved (mg/L)	2.069E-04
Plankton (ug/g dry)	0.375
Benthic Sediments:	
Total (mg/kg dry)	1.575E-03
Dissolved (mg/L pore)	9.810E-06
Benthos (ug/g dry)	1.778E-02

Fate: Current Resident Mass -- kg 4.940E-03

Water Column	84.86 %
Benthic Sediments	15.14 %
Total Flux of Chemical -- kg / day	1.221E-04
Chemical Transformations:	88.51 %
Biological Transformations:	0.00 %
Volatilization:	1.01 %
Water-borne Export:	10.48 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 4 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.676E-04
Dissolved (mg/L)	1.667E-04
Plankton (ug/g dry)	0.302
Benthic Sediments:	
Total (mg/kg dry)	2.949E-03
Dissolved (mg/L pore)	1.836E-05
Benthos (ug/g dry)	3.329E-02

Fate: Current Resident Mass -- kg 4.709E-03

Water Column	71.78 %
Benthic Sediments	28.22 %
Total Flux of Chemical -- kg / day	1.036E-04
Chemical Transformations:	88.01 %
Biological Transformations:	0.00 %
Volatilization:	0.92 %
Water-borne Export:	11.08 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 1 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	3.406E-06
Dissolved (mg/L)	3.387E-06
Plankton (ug/g dry)	6.139E-03
Benthic Sediments:	
Total (mg/kg dry)	7.496E-03
Dissolved (mg/L pore)	4.668E-05
Benthos (ug/g dry)	8.461E-02

Fate: Current Resident Mass -- kg 5.130E-03

Water Column	1.33 %
Benthic Sediments	98.67 %
Total Flux of Chemical -- kg / day	6.018E-05
Chemical Transformations:	99.84 %
Biological Transformations:	0.00 %
Volatilization:	0.03 %
Water-borne Export:	0.13 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 2 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	6.369E-06
Dissolved (mg/L)	6.334E-06
Plankton (ug/g dry)	1.148E-02
Benthic Sediments:	
Total (mg/kg dry)	7.318E-03
Dissolved (mg/L pore)	4.557E-05
Benthos (ug/g dry)	8.260E-02

Fate: Current Resident Mass -- kg 5.070E-03

Water Column	2.53 %
Benthic Sediments	97.47 %
Total Flux of Chemical -- kg / day	6.039E-05
Chemical Transformations:	99.54 %
Biological Transformations:	0.00 %
Volatilization:	0.06 %
Water-borne Export:	0.40 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 4 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.117E-05
Dissolved (mg/L)	1.111E-05
Plankton (ug/g dry)	2.013E-02
Benthic Sediments:	
Total (mg/kg dry)	6.992E-03
Dissolved (mg/L pore)	4.353E-05
Benthos (ug/g dry)	7.891E-02

Fate: Current Resident Mass -- kg 4.949E-03

Water Column	4.54 %
Benthic Sediments	95.46 %
Total Flux of Chemical -- kg / day	6.053E-05
Chemical Transformations:	98.95 %
Biological Transformations:	0.00 %
Volatilization:	0.11 %
Water-borne Export:	0.95 %

Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 7 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.226E-04
Dissolved (mg/L)	1.219E-04
Plankton (ug/g dry)	0.221
Benthic Sediments:	
Total (mg/kg dry)	4.271E-03
Dissolved (mg/L pore)	2.659E-05
Benthos (ug/g dry)	4.820E-02

Fate: Current Resident Mass -- kg	4.408E-03
Water Column	56.15 %
Benthic Sediments	43.85 %
Total Flux of Chemical -- kg / day	9.264E-05
Chemical Transformations:	87.66 %
Biological Transformations:	0.00 %
Volatilization:	0.79 %
Water-borne Export:	11.55 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 14 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	6.336E-05
Dissolved (mg/L)	6.302E-05
Plankton (ug/g dry)	0.114
Benthic Sediments:	
Total (mg/kg dry)	5.310E-03
Dissolved (mg/L pore)	3.307E-05
Benthos (ug/g dry)	5.994E-02

Fate: Current Resident Mass -- kg	3.859E-03
Water Column	33.34 %
Benthic Sediments	66.66 %
Total Flux of Chemical -- kg / day	6.932E-05
Chemical Transformations:	87.05 %
Biological Transformations:	0.00 %
Volatilization:	0.55 %
Water-borne Export:	12.40 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 21 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	3.714E-05
Dissolved (mg/L)	3.694E-05
Plankton (ug/g dry)	6.595E-02
Benthic Sediments:	
Total (mg/kg dry)	5.059E-03
Dissolved (mg/L pore)	3.150E-05
Benthos (ug/g dry)	5.710E-02

Fate: Current Resident Mass -- kg	3.414E-03
Water Column	22.13 %
Benthic Sediments	77.87 %
Total Flux of Chemical -- kg / day	5.636E-05
Chemical Transformations:	86.75 %
Biological Transformations:	0.00 %
Volatilization:	0.41 %
Water-borne Export:	12.85 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 7 days

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.616E-05
Dissolved (mg/L)	1.607E-05
Plankton (ug/g dry)	2.914E-02
Benthic Sediments:	
Total (mg/kg dry)	6.565E-03
Dissolved (mg/L pore)	4.088E-05
Benthos (ug/g dry)	7.410E-02

Fate: Current Resident Mass -- kg	4.768E-03
Water Column	6.83 %
Benthic Sediments	93.17 %
Total Flux of Chemical -- kg / day	6.012E-05
Chemical Transformations:	98.19 %
Biological Transformations:	0.00 %
Volatilization:	0.16 %
Water-borne Export:	1.65 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 14 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	2.144E-05
Dissolved (mg/L)	2.132E-05
Plankton (ug/g dry)	3.865E-02
Benthic Sediments:	
Total (mg/kg dry)	5.767E-03
Dissolved (mg/L pore)	3.591E-05
Benthos (ug/g dry)	6.509E-02

Fate: Current Resident Mass -- kg	4.355E-03
Water Column	9.93 %
Benthic Sediments	90.07 %
Total Flux of Chemical -- kg / day	5.740E-05
Chemical Transformations:	96.84 %
Biological Transformations:	0.00 %
Volatilization:	0.22 %
Water-borne Export:	2.94 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 21 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	2.226E-05
Dissolved (mg/L)	2.214E-05
Plankton (ug/g dry)	4.012E-02
Benthic Sediments:	
Total (mg/kg dry)	5.138E-03
Dissolved (mg/L pore)	3.200E-05
Benthos (ug/g dry)	5.800E-02

Fate: Current Resident Mass -- kg	3.966E-03
Water Column	11.33 %
Benthic Sediments	88.67 %
Total Flux of Chemical -- kg day	5.358E-05
Chemical Transformations:	95.80 %
Biological Transformations:	0.00 %
Volatilization:	0.25 %
Water-borne Export:	3.95 %

Table 20.01. Exposure analysis at the elapse of 30 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	2.288E-05
Dissolved (mg/L)	2.276E-05
Plankton (ug/g dry)	4.125E-02
Benthic Sediments:	
Total (mg/kg dry)	4.227E-03
Dissolved (mg/L pore)	2.632E-05
Benthos (ug/g dry)	4.771E-02

Fate:	Current Resident Mass -- kg	2.956E-03
	Water Column	15.82 %
	Benthic Sediments	84.18 %
	Total Flux of Chemical -- kg / day	4.623E-05
	Chemical Transformations:	86.69 %
	Biological Transformations:	0.00 %
	Volatilization:	0.31 %
	Water-borne Export:	13.00 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 60 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.110E-05
Dissolved (mg/L)	1.104E-05
Plankton (ug/g dry)	2.002E-02
Benthic Sediments:	
Total (mg/kg dry)	2.238E-03
Dissolved (mg/L pore)	1.393E-05
Benthos (ug/g dry)	2.526E-02

Fate:	Current Resident Mass -- kg	1.874E-03
	Water Column	12.15 %
	Benthic Sediments	87.85 %
	Total Flux of Chemical -- kg / day	2.808E-05
	Chemical Transformations:	87.41 %
	Biological Transformations:	0.00 %
	Volatilization:	0.25 %
	Water-borne Export:	12.34 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 120 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	4.554E-06
Dissolved (mg/L)	4.529E-06
Plankton (ug/g dry)	8.209E-03
Benthic Sediments:	
Total (mg/kg dry)	9.315E-04
Dissolved (mg/L pore)	5.800E-06
Benthos (ug/g dry)	1.051E-02

Fate:	Current Resident Mass -- kg	7.687E-04
	Water Column	12.11 %
	Benthic Sediments	87.89 %
	Total Flux of Chemical -- kg / day	1.134E-05
	Chemical Transformations:	88.71 %
	Biological Transformations:	0.00 %
	Volatilization:	0.25 %
	Water-borne Export:	11.04 %

Ecosystem: TX [illegible]
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 30 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	2.091E-05
Dissolved (mg/L)	2.080E-05
Plankton (ug/g dry)	3.770E-02
Benthic Sediments:	
Total (mg/kg dry)	4.472E-03
Dissolved (mg/L pore)	2.785E-05
Benthos (ug/g dry)	5.048E-02

Fate:	Current Resident Mass -- kg	3.508E-03
	Water Column	12.06 %
	Benthic Sediments	87.94 %
	Total Flux of Chemical -- kg / day	4.828E-05
	Chemical Transformations:	94.72 %
	Biological Transformations:	0.00 %
	Volatilization:	0.26 %
	Water-borne Export:	5.02 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 60 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.401E-05
Dissolved (mg/L)	1.393E-05
Plankton (ug/g dry)	2.526E-02
Benthic Sediments:	
Total (mg/kg dry)	2.871E-03
Dissolved (mg/L pore)	1.788E-05
Benthos (ug/g dry)	3.240E-02

Fate:	Current Resident Mass -- kg	2.305E-03
	Water Column	12.35 %
	Benthic Sediments	87.65 %
	Total Flux of Chemical -- kg / day	3.268E-05
	Chemical Transformations:	92.30 %
	Biological Transformations:	0.00 %
	Volatilization:	0.26 %
	Water-borne Export:	7.44 %

Ecosystem: TX P-S-S froc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 120 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	5.832E-06
Dissolved (mg/L)	5.800E-06
Plankton (ug/g dry)	1.051E-02
Benthic Sediments:	
Total (mg/kg dry)	1.193E-03
Dissolved (mg/L pore)	7.429E-06
Benthos (ug/g dry)	1.347E-02

Fate:	Current Resident Mass -- kg	9.730E-04
	Water Column	12.22 %
	Benthic Sediments	87.78 %
	Total Flux of Chemical -- kg / day	1.411E-05
	Chemical Transformations:	90.25 %
	Biological Transformations:	0.00 %
	Volatilization:	0.26 %
	Water-borne Export:	9.50 %

Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 240 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	7.867E-07
Dissolved (mg/L)	7.824E-07
Plankton (ug/g dry)	1.418E-03
Benthic Sediments:	
Total (mg/kg dry)	1.609E-04
Dissolved (mg/L pore)	1.002E-06
Benthos (ug/g dry)	1.816E-03

Fate: Current Resident Mass -- kg	1.321E-04
Water Column	12.16 %
Benthic Sediments	87.84 %
Total Flux of Chemical -- kg / day	1.924E-06
Chemical Transformations:	89.38 %
Biological Transformations:	0.00 %
Volatilization:	0.25 %
Water-borne Export:	10.37 %

Ecosystem: TX P-S-S foc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 364 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.282E-07
Dissolved (mg/L)	1.275E-07
Plankton (ug/g dry)	2.311E-04
Benthic Sediments:	
Total (mg/kg dry)	2.622E-05
Dissolved (mg/L pore)	1.633E-07
Benthos (ug/g dry)	2.959E-04

Fate: Current Resident Mass -- kg	2.151E-05
Water Column	12.16 %
Benthic Sediments	87.84 %
Total Flux of Chemical -- kg / day	3.148E-07
Chemical Transformations:	89.43 %
Biological Transformations:	0.00 %
Volatilization:	0.25 %
Water-borne Export:	10.31 %

Ecosystem: TX P-S-S foc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 240 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.003E-06
Dissolved (mg/L)	1.002E-06
Plankton (ug/g dry)	1.816E-03
Benthic Sediments:	
Total (mg/kg dry)	2.061E-04
Dissolved (mg/L pore)	1.283E-06
Benthos (ug/g dry)	2.325E-03

Fate: Current Resident Mass -- kg	1.690E-04
Water Column	12.16 %
Benthic Sediments	87.84 %
Total Flux of Chemical -- kg / day	2.472E-06
Chemical Transformations:	89.50 %
Biological Transformations:	0.00 %
Volatilization:	0.25 %
Water-borne Export:	10.25 %

Ecosystem: TX P-S-S foc = 2% bulkd = 1.30 60 d
Chemical: Avermectin B1

Table 20.01. Exposure analysis at the elapse of 360 days.

Exposure Concentrations:

Water Column:	
Total (mg/L)	1.741E-07
Dissolved (mg/L)	1.731E-07
Plankton (ug/g dry)	3.138E-04
Benthic Sediments:	
Total (mg/kg dry)	3.561E-05
Dissolved (mg/L pore)	2.217E-07
Benthos (ug/g dry)	4.019E-04

Fate: Current Resident Mass -- kg	2.921E-05
Water Column	12.16 %
Benthic Sediments	87.84 %
Total Flux of Chemical -- kg / day	4.275E-07
Chemical Transformations:	89.44 %
Biological Transformations:	0.00 %
Volatilization:	0.25 %
Water-borne Export:	10.31 %