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9/25/96

Profenofos

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

OFFICE OF
PESTICIDES AND
TOXIC
SUBSTANCES

MEMORANDUM

DATE: September 25, 1996

TO: Les Touart, Ph.D., Section Chief
Ecological Effects Branch
Environmental Fate and Effects Division

FROM: Ronald Parker, Ph.D., Environmental Engineer
Surface Water Section
Environmental Fate and Ground Water Branch

THROUGH: Henry Nelson, Ph.D., Head
Surface Water Section
Environmental Fate and Ground Water Branch

Henry Jacoby, Chief
Environmental Fate And Ground Water Branch
Environmental Fate and Effects Division

Attached, please find the EFGWB refined surface water computer modelling report for Profenofos applied to cotton.

Product Name: Curacron

Common Name: Profenofos

Type of Product: Acaracide, insecticide

Company Name: Ciba-Geigy

Chemical #: 111401

DP Barcode: D222822, D222825

Purpose: To provide aquatic exposure assessment for Profenofos through PRZM-EXAMS computer modelling.

2034623

EEC Modelling Summary

CHEMICAL COMMON NAME: PROFENOFOS **FORMULATION NAME:** CURACRON
RUNOFF MODEL: PRZM2.3 **RECEIVING WATER MODEL:** EXAMS 2.95
REGISTRANT(S): CIBA-GEIGY **MODELLER:** RON PARKER **DATE:** 9/23/96

CHEMICAL PARAMETERS:
HYDROLYSIS t½:pH5 108 DA pH7 62 D pH9 0.25 D AQU PHOTOL t½ STAB
KOC 45000 KD ____ AEROBIC SOIL t½ 5.7 D ANEROBIC SOIL t½ 8.7 D
AEROBIC AQUATIC t½ STAB ANAEROBIC AQUATIC t½ STAB SOL 0.20
VAPOR PRESSURE 6.7e-09 HENRYS LAW CONSTANT 1.83e-8

CROP SITE 1

LOCATION:
CROP **COTTON** COUNTY JACKSON STATE MS MLRA R134
SOIL SERIES LORING TEXTURE SILT LOAM
JUSTIFICATION This is a typical upland cotton site near Jackson, MS and is representative of a high runoff cotton field.

MANAGEMENT:
TILLAGE TYPE CONV-NOTILL TILLAGE TIME SPRING RESIDUES REMAINING
APPLICATION METHOD AERIAL SPRAY INCORPORATION DEPTH 0.0
CROP DATES: PLANTING 25/4 EMERGENCE 1/5 MATURITY 7/9
HARVEST 22/9 SPRAY DRIFT 5.0 %

PESTICIDE APPLICATION:
RATE(LBS/AC) 1.00 DATES:1 1/8 2 7/8 3 13/8 4 19/8 5 25/8 6 31/8
7 ____ 8 ____ 9 ____ 10 ____ JUSTIFICATION This is the maximum annual total application of 1.0lbs and assumes 75% application efficiency.

RESULTS:
MAXIMUM DISSOLVED CONCENTRATION[1] - TEN YEAR RETURN PERIOD (PPB)
POST LOAD[1] 5.93 96HOUR[2] 2.59 21DAY[3] 1.15 60DAY 0.75
90DAY 0.50 ____ DAY ____ ____ DAY ____ AVE RAIN (INCH/YEAR) 50.0
AVE RUNOFF (IN/YEAR) 14.7 AVE EROSION (TONS/ACRE/YEAR) ____
LOADING BREAKDOWN[4]:RUNOFF 14.6 % EROSION 1.3 % SP DRIFT 84.1 %

COMMENTS: This is a high exposure site for cotton.

[1] MAX PEAK - MAXIMUM OF ALL POND CONCENTRATIONS DURING THE YEAR CALCULATED IMMEDIATELY AFTER A RUNOFF OR SPRAY DRIFT LOADING AND COMPLETE MIXING IN THE POND BUT BEFORE ANY DEGREDATION OF THE LAST LOADING HAS TAKEN PLACE

[2] 96 HOUR - MAXIMUM OF THE RUNNING AVERAGE CONCENTRATIONS OF ANY CONSECUTIVE FOUR DAY PERIOD DURING THE YEAR

[3] 21 DAY - MAXIMUM OF THE RUNNING AVERAGE CONCENTRATIONS OF ANY CONSECUTIVE TWENTY-ONE DAY PERIOD DURING THE YEAR

[4] VALUES REFER TO THE % OF EACH FORM OF ANNUAL LOADING IN THE YEAR REPRESENTING THE ONE IN TEN YEAR EXCEEDENCE PROBABILITY

MODELLING SUMMARY (Cotton)

This report describes the Tier II estimated environmental concentration (EEC) computer modelling for Profenofos (Curacron) use on cotton. The purpose of this analysis is to generate aquatic exposure estimates for use in a refined ecological risk assessment for this chemical. This Tier II EEC calculation uses a single cotton site which represents a high exposure scenario for the use of Curacron on this crop. The site is located in the Mississippi hills north of Jackson and would be expected to produce high runoff and soil erosion. Aerial spray application is simulated. This is an area in the heart of the south-central cotton growing region and provides a site which contains a highly erodible soil and an very erosive rainfall. It is therefore ideal for modeling pesticides which are strongly adsorbed to the soil. All cotton cultural practices represented are those legal under the conservation compliance section of the Food Security Act. The weather and agricultural practices are modelled at the site over 36 years so that the ten year exceedence probability EEC at that site can be estimated.

The EEC's generated in this analysis were calculated using PRZM2 for simulating runoff from the agricultural field and EXAMS II 2.94 for estimating environmental fate and transport in surface water. A summary of input values for both programs for this site is attached to this report in Tables 1 and 2. The scenarios chosen were cotton fields in Yazoo County, Mississippi. The Loring silt loam soil is a C hydrologic group soil and is expected to produce high runoff and erosion. Copies of the PRZM2 input files are also attached.

The EXAMS II receiving water program was used to simulate the fate and transport of Curacron in the standard static pond. The one hectare by two meter pond which receives runoff from the ten hectare field has the characteristics of the Georgia pond which is provided with the EXAMS program, except that it is a mode 3 environment rather than a mode 2 environmental. The latitude and climatic regimes are similar and it is therefore believed that it is not an unreasonable representation of a Mississippi pond. The simulation is carried out at a pH value of 7.0.

Calculations were made for one aerial spray applications on cotton during May each year. Five percent (5%) of the application rate as spray drift directly to the pond is assumed in the modelling. The Tier 2 upper tenth percentile EEC's are graphed and listed below. The EEC's have been calculated so that in any given year, there is a 10% probability that the maximum of the average concentrations for each duration in that year will equal or exceed the EEC at the site.

Scenarios

The Mississippi hills scenario chosen was used to represent a typical runoff site for Profenofos applied on cotton. The site represents a 10 hectare cotton field draining into a one hectare static pond, 2 meters deep with no outlet. Cropping and soils information was confirmed by the local extension office. It is assumed that losses out of the pond from evaporation and inflow into the pond from rainfall and runoff are in balance. Basic data on soils, methods of cotton culture and regimes of pesticide application have been provided by the Agricultural Research Service (ARS) and Natural Resources Conservation Service (NRCS) of USDA in Mississippi and by the Yazoo county extension office. Data for the Loring silt loam was taken from the PIC database and the 1987 National Resources Inventory (NRI).

This a is hydrologic group C soil and NRCS curve numbers were generated based on this grouping. When the PRZM2 model is run with curve numbers chosen from standard tables for row crops under this scenario, the runoff volume is very small compared to the actual runoff volume expected from USDA runoff studies conducted on this soil. The models were therefore calibrated by raising the curve numbers to give a long-term average runoff of 30 percent of rainfall. This is reflective of USDA field experimental values.

USLE soil loss ratios are based on plant cover and were developed with the Revised Universal Soil Loss Equation (RUSLE) computer model. The scenario assumes moderate crop residues remain on the field after harvest and that weeds which normally grow in the cotton fields in winter are not removed and therefore provide protection against erosion during that period. Weeds are typically killed with herbicide (Lindane or Roundup) just prior to planting. MLRA 134 weather data was taken from the NOAA weather station in Brownsville, Mississippi over the period between January 1948 and December 1983. Average rainfall is 50.0 inches per year. A total of 29.4 percent of this becomes runoff in this simulation.

This simulation attempts to model cotton culture in the hill area of the county. Approximately forty percent of Yazoo county agricultural area is in the Delta region and the other sixty percent is in the hill region. Roughly 100,000 acres in the hill area is planted in cotton. Slopes in the hill area range from two to six percent. Slope lengths as used in the Universal Soil Loss Equation (USLE) vary from 75-150 feet.

The best cotton soil in the hill region of Yazoo county, Morganfield silt loam, is very restricted in area. The most common soil in the hill area of the county is the Loring silt loam and is used in this simulation. It is a very highly erodible soil with a USLE K value of 0.49 and has a fragipan at a depth of about two feet. Soil characteristics are estimated by the PIC input file facility for PRZM for the Loring silt loam.

Cotton culture is restricted by the provisions of the conservation compliance portion of the Food Security Act. Loring silt loam has a tolerance (T) of three tons of soil loss per acre per year. The Act limits soil loss for cotton to 4T (four times the tolerance value). Cotton farmers on Loring soil therefore are held to a long term average soil loss of 12 tons per acre per year based on USLE calculations. Farmers achieve this limit of soil loss either through conventional practices with terracing (75%) or through a no-till scheme (6% and growing rapidly). One common scheme is a rotation including two years of no-till followed by one year of conventional cotton during which time the beds are rebuilt. The latter scheme is the one modelled in this simulation because it provides the worst legal case for soil erosion occurring one out of every three years.

The conservation compliance farm plan which is likely to provide the least protection for aquatic resources is the rotation of one year of conventional tillage with two years of no-till. Heavier runoff and soil erosion are likely during the years in which the conventional tillage is practiced. USDA runoff experiments on Loring soils in Mississippi show a water yield of 27 percent from no-till soybeans and 35 percent from conventional soybeans. A rotation of one year of conventional cotton followed by two years of no-till is modeled in this exercise.

Environmental Fate Inputs

Environmental fate inputs to the PRZM2 and EXAMS II programs are listed along with their sources in Tables 1 and 2 attached. Hard copies of the input files are also attached.

Results

Modelling results are shown on the attached graphs and spreadsheet tables and are include in the EEC Modelling Summary sheets which follow.

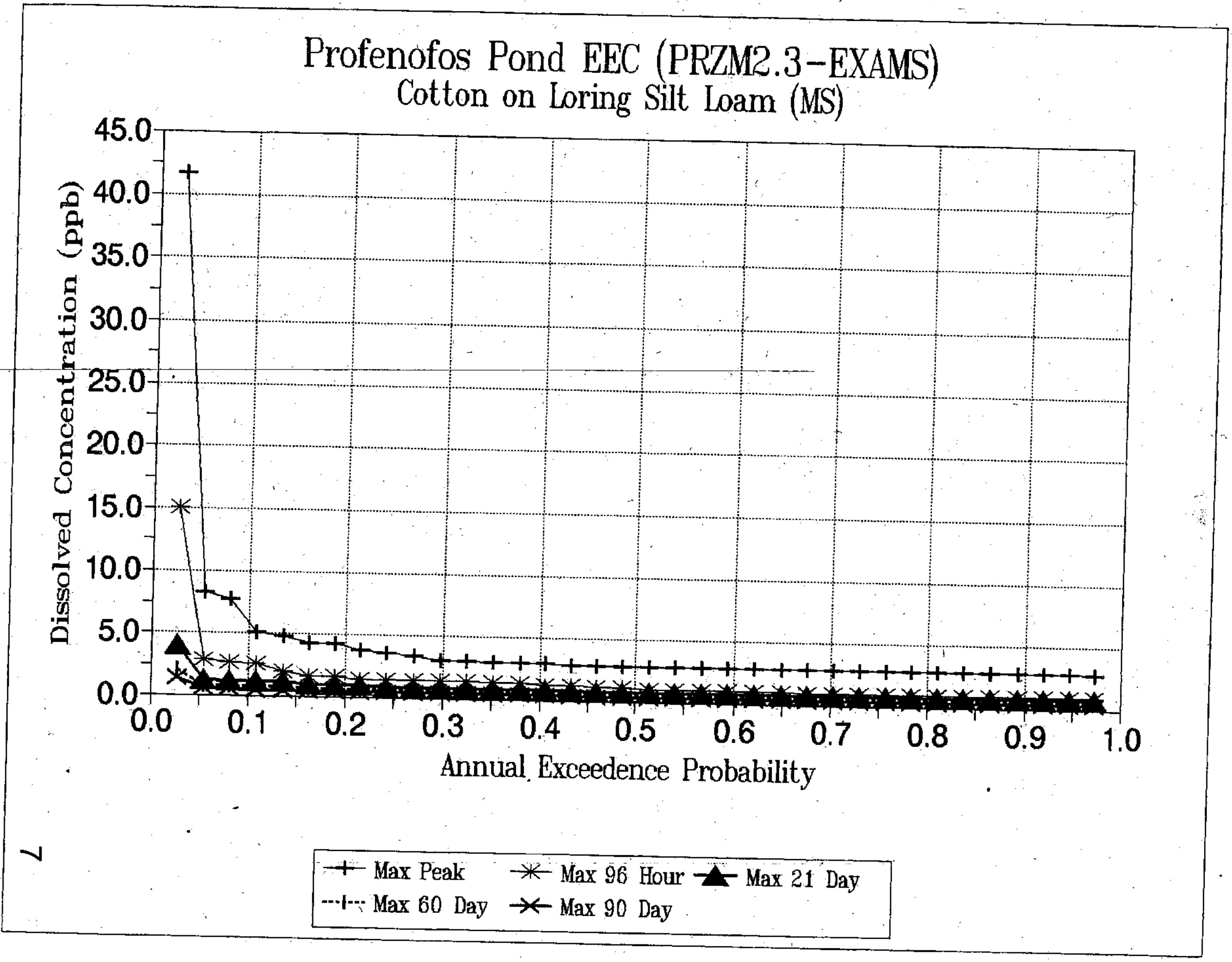
Limitations of this Analysis

There are several factors which may limit the accuracy and precision of this analysis including the selection of the typical exposure scenarios, the quality of the input data, the ability of the models to represent the real world, and the number of years that were modeled.

Scenarios that are selected for use in Tier II EEC calculations are ones likely to produce large concentrations in the aquatic environment. Each scenario should represent a real site to which the pesticide in question is likely to be applied. Sites should be extreme enough to provide conservative estimates of the EEC, but not so extreme that the model cannot properly simulate the fate and transport processes at the site. Currently, sites are chosen by best professional judgement to represent sites which generally produce EEC's larger than 90% of all sites use for that crop. The EEC's in this analysis are accurate only to the extent that the site represents this hypothetical high exposure site. The most limiting part of the site selection is the use of the standard pond with no outlet.

Limitations in the models themselves may also represent a limitation on the quality of the analysis. While the models are some of the best environmental fate estimation tools available, they have significant limitations in their ability to represent some processes. The most substantial limitation in this analysis is the handling of spray drift, which is estimated as a straight 5% of the application rate reaching the pond for each application. A second major limitation of the models is the lack of validation at the field level for pesticide runoff. While several of the algorithms (volume of runoff water, eroded sediment mass, are well validated and well understood, no adequate validation has yet been made of PRZM2 for the amount of pesticide transported in runoff events for all combinations of sites and pesticide fate characteristics. Other limitations of the models include: inability to handle within site variation (spatial variability), lack of crop growth algorithms, and overly simple soil water transport algorithms (ie. the "tipping bucket" method).

A final limitation is that only thirty-six years of weather data was available for the site. Consequently there is approximately 1 chance in 20 that the true 10% exceedence EEC's are larger than the maximum EEC in the calculated in the analysis.


Profenofos Pond EEC (PRZM2.3-EXAMS)
Cotton on Loring Silt Loam (MS)
Dissolved Concentration (ppb)
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Annual Exceedence Probability
Max Peak
Max 96 Hour
Max 21 Day
Max 60 Day
Max 90 Day

PEAK	96 HOUR	21 DAY	60 DAY	90 DAY	RANK	EX PROB
41.739	15.07	4.036	2.1181	1.4123	1	0.027
8.262	2.842	1.2219	0.79336	0.52891	2	0.054
7.732	2.663	1.1499	0.76866	0.51268	3	0.081
5.163	2.555	1.145	0.7485	0.49982	4	0.108
4.8159	2	1.118	0.72132	0.4809	5	0.135
4.358	1.6579	0.9763	0.70175	0.46804	6	0.162
4.3029	1.656	0.9744	0.66666	0.44454	7	0.189
3.8499	1.5079	0.929	0.65928	0.43954	8	0.216
3.597	1.493	0.8984	0.63436	0.42298	9	0.243
3.414	1.4799	0.8935	0.63338	0.4225	10	0.270
3.0639	1.4419	0.88469	0.62589	0.41731	11	0.297
3.0489	1.441	0.87759	0.62016	0.41354	12	0.324
3.0309	1.331	0.8635	0.61687	0.41125	13	0.351
3.0099	1.3299	0.86009	0.61651	0.41102	14	0.378
3.006	1.268	0.84469	0.61059	0.40727	15	0.405
2.919	1.2369	0.84109	0.60066	0.40045	16	0.432
2.912	1.1679	0.8063	0.59293	0.39537	17	0.459
2.881	1.1509	0.8058	0.5899	0.39327	18	0.486
2.8549	1.093	0.79849	0.58798	0.392	19	0.514
2.8529	1.065	0.79439	0.57914	0.38613	20	0.541
2.8519	1.057	0.7911	0.57884	0.38591	21	0.568
2.8489	1.047	0.7896	0.57814	0.38546	22	0.595
2.8489	1.0439	0.78179	0.5745	0.38301	23	0.622
2.848	1.021	0.77599	0.57217	0.38148	24	0.649
2.847	1.004	0.77369	0.56925	0.3795	25	0.676
2.846	0.99709	0.7667	0.56296	0.37532	26	0.703
2.846	0.9911	0.7644	0.56159	0.37439	27	0.730
2.846	0.9907	0.764	0.5595	0.373	28	0.757
2.846	0.9839	0.7617	0.55882	0.37265	29	0.784
2.846	0.9821	0.7613	0.55771	0.37181	30	0.811
2.846	0.98099	0.76069	0.55442	0.36978	31	0.838
2.846	0.98049	0.76019	0.55228	0.36837	32	0.865
2.846	0.9798	0.7601	0.5516	0.36789	33	0.892
2.845	0.9786	0.75969	0.55109	0.36778	34	0.919
2.845	0.9786	0.75969	0.55018	0.36726	35	0.946
2.807	0.9786	0.75969	0.54996	0.36686	36	0.973

1 in 10 Y EEC's

5.9337	2.5874	1.1465	0.75455	0.50368

Loading Breakdown	Percent
Spray Drift	84.1
Dissolved in runoff	14.6
Adsorbed to soil	1.3

IA. PRZM INPUTS - PROFENOFOS ON COTTON

VARIABLE NAME	VARIABLE DESCRIPTION	VALUE	UNITS	SOURCE
PFAC	Pan factor	0.75	dimensionless	PIC
SFAC	Snow factor	0.15	cm melt/C°	PIC
ANETD	Depth evap extracted	17	centimeters	PIC
ISCOND	Postharvest cond	3	residue	PIC
DT	Monthly ave daylight	N/A	hours	
USLEK	Erodibility factor	0.49	dimensionless	NRI
USLELS	Lengthslope factor	0.40	dimensionless	NRI
USLEP	Practice factor	0.75	dimensionless	NRI
AFIELD	Field area	10.0	hectares	STANDARD
TR	Runoff duration	5.8	hours	PIC
CINTCP	Crop interception	0.20	centimeters	PIC
AMXDR	Active root depth	125	centimeters	PIC
COVMAX	Areal crop cover	98	percent	PIC
ICNAH	Postharvest surface	3	flag	PIC
CN1	Curve no fallow	99;94	dimensionless	PIC-See attached input file
CN2	Curve no crop	93;84	dimensionless	PIC-See attached input file
CN3	Curve no harvest	92;83	dimensionless	PIC-See attached input file

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IB. PRZM INPUTS - PROFENOFOS ON COTTON (CONTINUED)

USLEC1	USLE C value fallow	.63;.16	dimensionless	WISCHMEIER AND SMITH See attached input file
USLEC2	USLE C value crop	.16;.12	dimensionless	
USLEC3	USLE C value residue	.18;.09	dimensionless	
WFMAX	Crop dry weight	0.0	kilo gram/m^2	PIC
HTMAX	Crop max height	0.0	centimeters	PIC
EMD, EMM IYREM	Emergence date (day/month/year)	1/5/ea	day	PIC
MAD, MAM IYRMAT	Maturity date (day/month/year)	7/9/ea	day	PIC
HAD, HAM IYRHAR	Harvest date (day/month/year)	22/9/ea	day	PIC
APD, APM IAPYR	Pesticide application date (day/month/year)	08/01/ea 08/07/ea 08/13/ea 08/19/ea 08/25/ea 08/31/ea		
TAPP	Application rate	0.842	kilogram/ha	Assuming 75% efficiency
FAM	Foliar appl. flag	2	N/A	PIC
FEXTRA	Foliar extraction	0.1	% / cm rain	PIC
PLDKRT	Foliar decay rate	0.0	day^{-1}	Willis and McDowell
CORED	Depth of soil core	125	centimeters	PIC

0

IC. PRZM INPUTS - PROFENOFOS ON COTTON (CONTINUED)

UPTKF	Plant uptake factor	0.0	fract of evap	PIC/no actual data
HSWZT	Drainage flag	0	N/A	standard
NHORIZ	Number of horizons	3	N/A	PIC
THKNS1	Thickness horizon 1	10.0	centimeters	PIC
BD1	Bulk den. horizon 1	1.60	$tonnes/m^3$	PIC
THETO1	Soil water horiz. 1	0.294	cm^3/cm^3	PIC
AD1	Drainage para hor 1	0.0	liter/day	PIC
DISP1	Solute dispersion 1	0.0	cm^2/day	PIC
THKNS2	Thickness horizon 2	10.0	centimeters	PIC
BD2	Bulk den. horizon 2	1.60	$tonnes/m^3$	PIC
THETO2	Soil water horiz. 2	0.294	cm^3/cm^3	PIC
AD2	Drainage para hor 2	0.0	liter/day	PIC
DISP2	Solute dispersion 2	0.0	cm^2/day	PIC
THKNS3	Thickness horizon 3	105.0	centimeters	PIC
BD3	Bulk den. horizon 3	1.8	$tonnes/m^3$	PIC
THETO3	Soil water horiz. 3	0.294	cm^3/cm^3	PIC
AD3	Drainage para hor 3	N/A	liter/day	PIC
DISP3	Solute dispersion 3	N/A	cm^2/day	PIC
DWRATE1	Dissolv hydrol rate1	0.1220	day^{-1}	Registrant
DSRATE1	Adsorb hydrol rate 1	0.1220	day^{-1}	Registrant
DGRATE1	Vapor decay rate 1	0.0	day^{-1}	

ID. PRZM INPUTS - PROFENOFOS ON COTTON (CONTINUED)

DWRATE2	Dissolv hydrol rate2	0.0797	day^{-1}	Registrant
DSRATE2	Adsorb hydrol rate 2	0.0797	day^{-1}	Registrant
DGRATE2	Vapor decay rate 2	0.0	day^{-1}	
DWRATE3	Dissolv hydrol rate3	0.0797	day^{-1}	Registrant
DSRATE3	Adsorb hydrol rate 3	0.0797	day^{-1}	Registrant
DGRATE3	Vapor decay rate 3	N/A	day^{-1}	PIC
DPN1	Compart. thickness 1	0.1	centimeters	PIC
THETFC1	Field capacity 1	0.294	cm^3/cm^3	PIC
THETWP1	Wilting point 1	0.094	cm^3/cm^3	PIC
OC1	Organic carbon 1	1.16	Percent	PIC
KD1	Partition coef 1	9.74	$cm^3/gram$	Registrant
DPN2	Compart. thickness 2	2.0	centimeters	PIC
THETFC2	Field capacity 2	0.294	cm^3/cm^3	PIC
THETWP2	Wilting point 2	0.094	cm^3/cm^3	PIC
OC2	Organic carbon 2	9.74	percent	PIC
KD2	Partition coef 2	78.8	$cm^3/gram$	Registrant
DPN3	Compart. thickness 3	5.0	centimeters	PIC
THETFC3	Field capacity 3	0.147	cm^3/cm^3	PIC
THETWP3	Wilting point 3	0.087	cm^3/cm^3	PIC
OC3	Organic carbon 3	0.174	percent	PIC
KD3	Partition coef 3	1.46	$cm^3/gram$	Registrant

Table 2A. EXAMS INPUTS - PROFENOFOS

VARIABLE NAME	VARIABLE DESCRIPTION	VALUE	UNITS	SOURCE
	CHEMICAL VARIABLES			
HENRY	Henry's law rate	3.34E-7	atm-m^3/mole	Registrant
VAPR	Vapor Pressure	9.0E-10	torr	Registrant
KBACW	Water col bact rate	0.0	$(cfu/mL)^{-1}hr^{-1}$	Registrant
KBACS	Benthic bact rate	0.0	$(cfu/mL)^{-1}hr^{-1}$	Registrant
KAH	Acid hydrol rate	3.45E+1	$hour^{-1}$/mole	Registrant
KBH	Base hydrol const	2.30e+5	$hour^{-1}$/mole	Registrant
KNH	Neutral hydrol rate	6.08E-3	$hour^{-1}$	Registrant
KDP	Direct photol rate	0.0	$hour^{-1}$	Registrant
KOC	Partition coef.	840	liter/kg	Registrant
KOW	Octanol water part.	N/A	liter/kg	Registrant
KPS	Sediment part. coef.	N/A	liter/kg	Registrant
MWT	Molecular weight	374	grams/mole	Registrant
QTBAS	Sediment bacteria temperature coef.	2	dimensionless	STANDARD
QTBAW	Water bacteria temp coef	2	dimensionless	STANDARD
SOL	Solubility	28	mg/liter	Registrant
PCTWA	PercentWater Benthic	137	Percent	Georgia Pond

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2B. EXAMS INPUTS - PROFENOFOS (Continued)

	Geometry Variables			
AREA	Segment area	10,000	$meter^2$	Standard
CHARL	Mixing length	1.025	meter	Georgia Pond
DEPTH	Segment thickness	2	meter	Standard
KOUNT	Number of segments	2	N/A	Standard
WIDTH	Segment width	63.2	meter	Standard
LENG	Segment length	157.2	meter	Standard
VOL	Segment volume	20,000	$meter^3$	Standard
	Flow and loading variables			
ADVPR	Part flow advected	0.0	proportion	
DRFLD	Drift loadings	0.0	kg/hour	
EVAP	Evaporation	0.0	mm/month	
IMASS	Pulse load		kilogram	Spray Drift
NPSED	Nonpoint sed load	0.0	kg/hour	
NPSFL	Nonpoint flow	0.0	$meter^3$/hour	
NPSLD	Nonpoint chem load		kg/hour	
PCPLD	Precipitation load	0.0	kg/hour	
SEEPS	Seepage flow	0.0	$meter^3$/hour	
STFLO	Stream flow	0.0	$meter^3$/hour	
STRLD	Chem load in flow	0.0	kg/hour	
STSED	Stream-borne sed.	0.0	kg/hour	

2C. EXAMS INPUTS - PROFENOFOS (Continued)

	Environmental Variables			
AEC	Anion exchange cap	1.0e-2	meq/100 gr	GEORGIA POND
ATURB	Atmospheric turb	2.0	kilometer	GEORGIA POND
BACPL	Plankton Population	1.0	cfu/mL	GEORGIA POND
BNBAC	Benthic bacteria	37	cfu/100 gr	GEORGIA POND
BNMAS	Benthic biomass	6.0e-3	gr/m^2	GEORGIA POND
BULKD	Bulk density	1.85	gr/cm^3	GEORGIA POND
CEC	Cation exchange cap	1.0e-2	meq/100 gr	GEORGIA POND
CLOUD	Mean monthly clouds		tenths of sky	GEORGIA POND
DFAC	Distribution factor	1.19	dimensionless	GEORGIA POND
DISO2	Disolved oxygen	5.0	mg/liter	GEORGIA POND
DOC	Dissolved org carb	5.0	mg/liter	GEORGIA POND
DSP	Dispersion coef.	3.0e-5	m^2/hour	GEORGIA POND
FROC	Frac. organic carbon	0.04	dimensionless	GEORGIA POND
OZONE	Mean monthly ozone	0.3	cm NTP	GEORGIA POND
PH	Log hydrogen ion con	7.0	pH units	GEORGIA POND
POH	Log hydroxid ion con	7.0	pOH units	GEORGIA POND
RAIN	Ave monthly rainfall	N/A	mm/month	GEORGIA POND
RHUM	Relative Humidity	N/A	% saturation	GEORGIA POND
SUSED	Suspended sediment	30	mg/liter	GEORGIA POND
TCEL	Temperature celsius	variable	C° Max=30 C°	Monthly average at site

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*** PRZM2 Version 2.3 Input Data File ***
*** MSCOTTON.INP February 27, 1996 ***
*** Assume 3 Year rotation w/one year conventional tillage & 2 years no-till
Profenofos
Loring silt loam; MLRA P-134, Jackson County, Mississippi, Cotton
   0.750   0.150        0   17.00        1       3
      1
    0.49    0.40     0.75   10.00     5.80
      3
      1     0.20   125.00   98.00        3  99  93  92 .63 .16 .18     0.00
      2     0.20   125.00   98.00        3  94  84  83 .16 .13 .13     0.00
      3     0.20   125.00   98.00        3  94  84  83 .16 .12 .09     0.00
     36
  010548  070948  220948        1
  010549  070949  220949        2
  010550  070950  220950        3
  010551  070951  220951        1
  010552  070952  220952        2
  010553  070953  220953        3
  010554  070954  220954        1
  010555  070955  220955        2
  010556  070956  220956        3
  010557  070957  220957        1
  010558  070958  220958        2
  010559  070959  220959        3
  010560  070960  220960        1
  010561  070961  220961        2
  010562  070962  220962        3
  010563  070963  220963        1
  010564  070964  220964        2
  010565  070965  220965        3
  010566  070966  220966        1
  010567  070967  220967        2
  010568  070968  220968        3
  010569  070969  220969        1
  010570  070970  220970        2
  010571  070971  220971        3
  010572  070972  220972        1
  010573  070973  220973        2
  010574  070974  220974        3
  010575  070975  220975        1
  010576  070976  220976        2
  010577  070977  220977        3
  010578  070978  220978        1
  010579  070979  220979        2
  010580  070980  220980        3
  010581  070981  220981        1
  010582  070982  220982        2
  010583  070983  220983        3
Application Schedule: 6 aerial apps of 1.00 lb a.i/a, @ 75% eff. w/5% drift
    216       1       0
Profenofos Koc:840 AeSM: T1/2=3x1.9 days; AnSM: T1/2=3x2.9 days
  010848        0       0.0    0.842
  070848        0       0.0    0.842
  130848        0       0.0    0.842
  190848        0       0.0    0.842
  260848        0       0.0    0.842
  310848        0       0.0    0.842
  010849        0       0.0    0.842
```

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  \\\\\\      \      \\\    \\\\\

  250882       0      0.0    0.842
  310882       0      0.0    0.842
  010883       0      0.0    0.842
  070883       0      0.0    0.842
  130883       0      0.0    0.842
  190883       0      0.0    0.842
  250883       0      0.0    0.842
  310883       0      0.0    0.842
       2       1      0.0
    0.00   0.693      0.1
Loring silt loam; Hydrologic Group C;
  125.00     0.0    0    0    0    0    0    0    0    0    0
     0.0    0.00    0.00
       3
       1   10.00   1.600    0.294    0.000    0.000
          0.1220  0.1220    0.000
            0.10   0.294    0.094    1.160     9.74
       2   10.00   1.600    0.294    0.000    0.000
          0.0797  0.0797    0.000
            2.00   0.294    0.094    1.160     9.74
       3  105.00   1.800    0.147    0.000    0.000
          0.0797  0.0797    0.000
             5.0   0.147    0.087    0.174     1.46
       0       0
            YEAR       5             YEAR        5             YEAR      5   1
       5    YEAR
    RFLX    TSER          1.0E+05
    EFLX    TSER          1.0E+05
    ESLS    TSER          1.0E+00
    RUNF    TSER          1.0E+00
    PRCP    TSER          1.0E+00
```

```
-------------------------------------------------------------
Table 1.01.1  Chemical input data for neutral molecule (Sp.#1).
*** Chemical-specific data: SET via "entry( 1)"
MWT:     3.74E+02 VAPR:    1.90E-05 HENRY: 3.34E-07 KOW:
KVO:              EVPR:             EHEN:           KOC:     8.40E+02
*** Ion-specific data: "entry(1, 1)"
SOL:     2.80E+01 KPB:              KPS:
ESOL:             KPDOC:
*** Reactivity of dissolved species: SET via "entry(1, 1, 1)"
KAH:     3.45E+01 EAH:              KNH:    6.08E-03 ENH:
KBH:     2.30E+05 EBH:              KRED:            ERED:
KBACW:            QTBAW:            KBACS:           QTBAS:
*** Reactivity of solids-sorbed species:     "entry(2, 1, 1)"
KAH:     3.45E+01 EAH:              KNH:    6.08E-03 ENH:
KBH:     2.30E+05 EBH:              KRED:            ERED:
KBACW:            QTBAW:            KBACS:           QTBAS:
*** Reactivity of "DOC"-complexed species:   "entry(3, 1, 1)"
KAH:     3.45E+01 EAH:              KNH:    6.08E-03 ENH:
KBH:     2.30E+05 EBH:              KRED:            ERED:
KBACW:            QTBAW:            KBACS:           QTBAS:
*** Reactivity of biosorbed species:         "entry(4, 1, 1)"
KBACW:            QTBAW:            KBACS:           QTBAS:

Do you want to inspect the photolytic process data?
Please enter Yes, No, or Quit->
```

LOADING SUMMARY FOR Profenofos

YEAR	RFLX	EFLX	ESLS	RUNF	PRCP	DRIFT
	PESTICIDE DISSOLVED IN RUNOFF WATER (KG/YR)	PESTICIDE ADSORBED TO ERODED SOIL (KG/YR)	ERODED SOIL (TONS/YR)	RUNOFF DEPTH (CM/YR)	RAINFALL DEPTH (CM/YR)	SPRAY DRIFT TO POND (KG/YR)
1948	.2912E-01	.3995E-02	.1282E+03	.4215E+02	.1205E+03	.337
1949	.1178E+00	.9275E-02	.1435E+03	.4906E+02	.1530E+03	.337
1950	.4532E-01	.2540E-02	.9164E+02	.4002E+02	.1578E+03	.337
1951	.7551E-02	.9077E-03	.1061E+03	.3771E+02	.1155E+03	.337
1952	.1117E-01	.1302E-02	.8197E+02	.2911E+02	.1092E+03	.337
1953	.6689E-02	.8729E-03	.3951E+02	.1712E+02	.1094E+03	.337
1954	.5544E-03	.4718E-04	.6644E+02	.2643E+02	.9304E+02	.337
1955	.1013E-02	.6862E-04	.8651E+02	.3038E+02	.1076E+03	.337
1956	.1431E-01	.1523E-02	.6705E+02	.2958E+02	.1289E+03	.337
1957	.1266E+00	.1536E-01	.1875E+03	.6682E+02	.1744E+03	.337
1958	.1728E-01	.1281E-02	.1186E+03	.4233E+02	.1359E+03	.337
1959	.4972E-01	.4155E-02	.6006E+02	.2892E+02	.1359E+03	.337
1960	.3504E-01	.4596E-02	.1120E+03	.3834E+02	.1088E+03	.337
1961	.4468E-02	.5860E-03	.7413E+02	.2695E+02	.1130E+03	.337
1962	.1655E-01	.1507E-02	.5042E+02	.2181E+02	.1173E+03	.337
1963	.5438E-02	.8177E-03	.4220E+02	.1489E+02	.6896E+02	.337
1964	.1295E-01	.1388E-02	.1147E+03	.3872E+02	.1165E+03	.337
1965	.2276E-01	.1111E-02	.4730E+02	.2111E+02	.9804E+02	.337
1966	.9223E+00	.7786E-01	.1358E+03	.4630E+02	.1169E+03	.337
1967	.1711E-01	.1233E-02	.8948E+02	.3218E+02	.1264E+03	.337
1968	.5415E-02	.2218E-03	.8861E+02	.3996E+02	.1489E+03	.337
1969	.6695E-01	.9338E-02	.1153E+03	.4329E+02	.1243E+03	.337
1970	.1403E-02	.3739E-03	.7864E+02	.2658E+02	.1084E+03	.337
1971	.1020E+00	.6095E-02	.5455E+02	.2579E+02	.1232E+03	.337
1972	.8788E-01	.1076E-01	.1292E+03	.4187E+02	.1114E+03	.337
1973	.4243E-01	.1405E-02	.1925E+03	.6644E+02	.1876E+03	.337
1974	.3975E-01	.2550E-02	.8696E+02	.3688E+02	.1460E+03	.337
1975	.3803E-01	.5525E-02	.6311E+02	.2586E+02	.1117E+03	.337
1976	.2539E-01	.2062E-02	.6267E+02	.2317E+02	.1081E+03	.337
1977	.2800E-02	.1902E-03	.4117E+02	.2020E+02	.1156E+03	.337
1978	.1445E+00	.9449E-02	.2380E+03	.7505E+02	.1550E+03	.337
1979	.6488E-01	.4279E-02	.1427E+03	.5045E+02	.1566E+03	.337
1980	.1110E-02	.9203E-04	.3318E+02	.1652E+02	.9598E+02	.337
1981	.4782E-01	.7034E-02	.1135E+03	.3957E+02	.1163E+03	.337
1982	.2342E-01	.2133E-02	.1387E+03	.4635E+02	.1531E+03	.337

YEAR	RFLX (KG/YR)	EFLX (KG/YR)	ESLS (TONS/YR)	RUNF (CM/YR)	PRCP (CM/YR)	DRIFT (KG/YR)
TOTAL	.2157E+01	.1919E+00	.3422E+04	.1258E+04	.4369E+04	.337
AVERAGE	.5993E-01	.5332E-02	.9505E+02	.3494E+02	.1214E+03	.337

MEAN LOADING DISSOLVED IN RUNOFF = 14.90 PERCENT

MEAN LOADING ADSORBED TO SEDIMENT = 1.33 PERCENT

MEAN LOADING FROM SPRAY DRIFT = 83.77 PERCENT