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OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

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MEMORANDUM

SUBJECT: Tier II Drinking Water Assessment for the Section 18 Registration of Flusilazole

TO: Carmen Rodia, Chemical Review Manager
Emergency Response and Minor Use Section
Registration Division (7505C)

George Kramer, Ph.D. Chemist
RAB1/HED (7509C)

FROM: Cheryl Sutton, Ph.D., Environmental Scientist
Environmental Risk Branch IV
Environmental Fate and Effects Division (7507C)

Cheryl Sutton
12/1/05

REVIEWED BY: Kevin Costello, Geologist
Environmental Risk Branch IV
Environmental Fate and Effects Division (7507C)

Kevin Costello *11/30/05*

APPROVED BY: Elizabeth Behl, Branch Chief
Environmental Risk Branch IV
Environmental Fate and Effects Division (7507C)

Elizabeth Behl *11/30/05*

Conclusions

A Tier II drinking water assessment was conducted for the proposed use of flusilazole on soybeans. The assessment was based on the maximum proposed application rate of 0.103 lbs ai/acre/application, applied in two applications at 14- and 21-day intervals. Using the 21-day interval between the two applications produced the highest estimated drinking water concentrations (EDWC). This could be attributed to a rain event in the meteorology file occurring immediately after the application date. These results may vary with scenarios using different meteorology files. Both aerial and ground applications were modeled.

For aerial applications, the estimated 1-in-10-year annual acute concentration of flusilazole in surface water sources of drinking water is 1.81 µg/L. The estimated 1-in-10-year annual average (chronic) concentration of flusilazole in drinking water is 0.92 µg/L. The estimated 30-year annual average concentration is 0.72 µg/L.



For ground applications, the estimated 1-in-10-year annual acute concentration of flusilazole in surface water sources of drinking water is **1.73 µg/L**. The estimated 1-in-10-year annual average (chronic) concentration is **0.87 µg/L**. The estimated 30-year annual average concentration is **0.66 µg/L**.

For groundwater sources of drinking water, the estimated concentration of flusilazole in shallow groundwater is **0.05 µg/L**.

Environmental Fate Summary

Based on the submitted environmental fate data, its physical-chemical properties, and the proposed use patterns, flusilazole is a non-volatile compound that is, in general, expected to be persistent and to have low mobility in soil. Flusilazole is stable to hydrolysis and to aqueous photolysis, but undergoes relatively slow degradation via microbially mediated metabolism, with much of the apparent loss of the compound attributed to the formation of non-extractable residues. Microbially mediated cleavage of the parent at the methylene bridge yields the minor degradates [bis(4-fluorophenyl)methyl]silanol (silanol) and 1H-1,2,4-triazole (triazole); there are no major degradates. In anaerobic flooded sediments, flusilazole undergoes very slow transformation, with relatively rapid dissipation from the water column to the sediment phase, where it remains as parent and bound residues. In aerobic flooded sediments, flusilazole is essentially stable to degradation, but partitions predominantly to the sediment phase. While the silanol degradate has low to moderate mobility in soil, the triazole has very high mobility. However, both of the degradates appear to degrade more rapidly than they are formed, and do not reach major degradate levels (i.e., $\geq 10\%$) in the laboratory studies.

Surface Water Modeling

There are no monitoring data for flusilazole in the U.S., as the pesticide is not yet registered for use in the U.S. Estimated drinking water concentrations (EDWCs) were estimated using EFED's Tier II aquatic models: PRZM (Pesticide Root Zone Model; Vers. 3.12 beta) and EXAMS (EXposure Analysis Modeling System; Vers. 2.98.04). Calculations were carried out with the linkage program shell - PE4VO1.pl - which incorporates the standard scenarios developed by EFED.

PRZM simulates pesticide fate and transport as a result of leaching, direct spray drift, runoff and erosion from an agricultural field, and EXAMS estimates environmental fate and transport of pesticides in a surface water body for a 30-year period. The combined model is designed to estimate pesticide concentrations found in water at the edge of the treated field. As such, it provides high-end values of the pesticide concentrations that might be found in ecologically sensitive environments following pesticide application. The location of the field is specific to the crop being simulated using site-specific information on the soils, weather, cropping, and management factors associated with the scenario. The crop/location scenario is intended to represent a high-end exposure site on which the crop is normally grown. Based on historical rainfall patterns, the receiving water body receives multiple runoff events during the years simulated. Weather and agricultural practices are simulated for 30 years so that the 10-year exceedance probability at the site can be estimated. The simulation was generated using 30 years of meteorological data, encompassing the years from 1961 to 1990. Additional information on these models can be found at: <http://www.epa.gov/oppefed1/models/water/index.htm>. For drinking water exposure assessments, the Index Reservoir (IR) scenario is used in lieu of the standard pond scenario. It is used in a manner similar to that which the standard pond is used in

ecological exposure assessments, except that flow rates have been modified to reflect local weather conditions. The index reservoir (IR) is approximately 82-m wide and 640-m long, with an area of 5.3 ha. (USEPA, 2000). The area of the entire watershed is 172.8 ha. Guidance for using the IR is located at: <http://www.epa.gov/pesticides/trac/science/>.

The EDWCs for flusilazole use on soybeans were determined using the Mississippi soybeans standard scenario, with a maximum yearly application rate of 0.103 lbs ai/A/application, applied in two applications at 14- and 21-day intervals (for a total application rate of 0.206 lb ai/A. Foliar applications via both aerial and ground spray methods were simulated. The application date was modeled as June 1. Other input parameter values used in this assessment were selected from the environmental fate data submitted by the registrant and in accordance with US EPA-OPP EFED water model parameter selection guidelines, *Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides*, Version II, February 28, 2002. Physical/chemical properties and environmental fate source data (from submitted studies) are presented in **Appendix A**. Input values used for modeling are presented in **Table 1**.

A percentage crop area adjustment factor (PCA) of 0.41 was applied to the modeling results since flusilazole is not registered for or proposed for use on any crops other than this emergency exemption for use on soybean. The PCA is a generic watershed-based adjustment factor that is applied to pesticide concentrations estimated for the surface water component of the drinking water exposure assessment using PRZM/EXAMS with the index reservoir scenario. The output generated by the PRZM/EXAMS model is multiplied by the maximum PCA in any watershed (expressed as a decimal) generated for the crop or crops of interest. Guidance for using PCAs and a thorough discussion of this method and comparisons of monitoring and modeling results for selected pesticide/crop/site combinations is located at: <http://www.epa.gov/pesticides/trac/science/>. No PCA adjustment is applied to groundwater concentrations estimated with SCI-GROW2.

Results for both of the application interval scenarios (14 and 21 days) are presented in **Table 2**, with the full modeling output attached as **Appendix B**. There is a slight increase in the estimated concentration as the application interval increases from 14 to 21 days for both aerial and ground spray applications. This may be due to the timing of rain events occurring after the application date. Thus, there is some uncertainty in the results associated with the application date and rain events in the model.

Although this risk assessment addresses the specific emergency exemption request for the states of Minnesota and South Dakota, the Registration Division may use this assessment to address requests from other states for emergency exemption to control soybean rust. However, higher rates, more frequent applications, or different intervals for Section 18 uses to control soybean rust from other states may change the conclusions concerning the contribution to human health risks from drinking water.

There is much uncertainty regarding the environmental fate of the triazole degradate. While not detected in two laboratory aerobic soil metabolism studies, 1,2,4-triazole was detected at approximately 8% of the parent flusilazole in a field soil metabolism study. This suggests that under normal use conditions, that triazole formation occurs. Currently HED and EFED are working on "*1,2,4-Triazole, Triazole Alanine, Triazole Acetic Acid: Aggregate Risk Assessment in Support of Reregistration and Registration Actions for Triazole-derivative Fungicide Compounds*," which, when available, will evaluate the environmental fate of triazole. However,

further data may still be required to address the uncertainties surrounding triazole degradates and their parent compounds.

Table 1. Input values used for modeling flusilazole use on soybeans with PRZM/EXAMS.

Model Input Parameter	Input Value and Unit	Source/Comments
Maximum Application Rate	0.103 lb a.i./A/applic.	Proposed label
Maximum Number of Applications	2	Proposed label
Method of Application	aerial and ground spray	Proposed label
Application Efficiency	0.95 (aerial) 0.99 (ground spray)	Input parameter guidance
Spray Drift Fraction	0.16 (aerial) 0.064 (ground)	Input parameter guidance
Type of Application	foliar (CAM 2; IPSCND 3)	PRZM/EXAMS manual
Date of Application	June 1	Based on USDA Crop Profiles and PRZM MS soybean standard scenario information
Minimum Interval between Applications	14 and 21 days	Proposed label
Organic-Carbon Normalized Partition Coefficient K_{oc}	1642 mg/L (mean of 4 values)	Input parameter guidance
Henry's Law Constant	--	--
Hydrolysis	0 days (stable)	Accession # 252481
Aerobic Soil Metabolism Half-life (days)	769	Accession # 144214; Registrant data review, 2005; Represents 90 th -percentile value per input parameter guidance
Aerobic Aquatic Metabolism Half-life (days)	1537	Default value is twice input value for aerobic soil metabolism per input parameter guidance
Anaerobic Aquatic Metabolism Half-life (days)	2025	MRIDs 40042146, 41088301; Represents 90 th -percentile value per input parameter guidance
Aqueous Photolysis Half-life (days)	0 days (stable)	MRIDs 40042143, 41088304
Vapor pressure	2.9×10^{-7} torr	MRIDs 40804705, 41088306
Solubility in water (pH 7, 20°C)	41.9 mg/L	EU Monograph; Oct. 2000 Addendum
Molecular Wt.	315.1	Registrant data

Table 2. PRZM/EXAMS Estimated drinking water concentrations of flusilazole use on soybeans (corrected with the PCA adjustment of 0.41 for soybeans).

Scenario	1-in-10-year annual acute conc. (ppb)	1-in-10-year avg. annual (chronic) concentration (ppb)	30-year avg. annual concentration (ppb)
Mississippi Soybeans			
Two aerial applications w/14-day interval	1.75	0.90	0.71
Two aerial applications w/21-day interval	1.81	0.92	0.72
Two ground applications w/14-day interval	1.68	0.85	0.66
Two ground applications w/21-day interval	1.73	0.87	0.66

Groundwater Modeling

The regression model SCI-GROW2 (v. 2.2) was used to estimate the concentration of flusilazole in ground water. SCI-GROW estimated the concentration of flusilazole in shallow ground water sources to be **0.05 ppb**. Input parameters for SCI-GROW are presented in Table 3.

SCI-GROW2 is a regression-based, Tier 1 screening model that provides a groundwater exposure value to be used in determining the potential risk to human health from drinking water contaminated with the pesticide. SCI-GROW2 estimates likely groundwater concentrations if the pesticide is used at the maximum allowable rate in areas where groundwater is vulnerable to contamination. Characteristics of such vulnerable areas include high rainfall, rapidly permeable soil, and a shallow aquifer. In most cases, a large majority of the use area will have groundwater that is less vulnerable to contamination than the areas used to derive the SCI-GROW2 estimate.

Table 3. Input values used for modeling groundwater concentrations of flusilazole using SCI-GROW2

Model Input Parameter	Input Value and Unit	Source/Comments
Aerobic Soil Metabolism Half-life (days)	437.5 days	Average of two values.
Organic-Carbon Normalized Partition Coefficient K_{oc}	985 mL/g	Lowest of four values.
Application Rate	0.103 lb ai/A	Proposed label
Maximum No. of Applications/Year	2	Proposed label

APPENDIX A
PHYSICAL AND CHEMICAL PROPERTIES SOURCE DATA

Table A1. Physical/chemical properties and environmental fate source data for flusilazole.

Property	Value	Source and/or Comments
Chemical Name	(1-[Bis(4-fluorophenyl)methyl)silyl] methyl-1H,1,1,4-triazole	--
Molecular Weight	315.1	Registrant
Solubility in Water (20C)	41.9 mg/L	EU Monograph; Oct. 2000 Addendum
Vapor Pressure (25C)	2.9×10^{-7} mm Hg	MRIDs 40804705, 41088306
Hydrolysis Half-life (pH 5, 7, 9; 25C)	stable	Accession # 252481
Aqueous Photolysis Half-life (pH 7)	stable	MRIDs 40042143, 41088304
Soil Photolysis Half-life (days)	>30, 97	MRIDs 40042144, 40042145
Aerobic Soil Metabolism Half-life (days)	330, 545	Accession # 144214; Registrant data reviews, 2005 ^{1,2}
Anaerobic Soil Metabolism Half-life (days)	--	--
Aerobic Aquatic Metabolism Half-life	--	--
Anaerobic Aquatic Metabolism Half-life (days)	345, 1169	MRIDs 40042146, 41088301
Organic Carbon-Normalized Soil Partition Coefficient (Koc)	985, 1701, 1844, 2038 (mean 1642)	Registrant data reviews, 2005 ^{1,2}
Soil Adsorption Coefficient (Kd)	12, 13, 46, 74 (mean 36)	Registrant data reviews, 2005 ^{1,2}
Log Kow (pH 7)	3.87	Registrant (EU Reviewed Study)
Henry's Law Constant	--	--
Bioconcentration Factor in Fish (BCF)	160-250X	EFGWB Review

¹Singles, Suzanne K. Environmental fate data available for Section 18 and Section 3 registration submissions for flusilazole. (Position Paper) June 29, 2005. DuPont Project Identification DuPont-17756. E.I. du Pont de Nemours and Company, Newark, DE.

²Russell, Mark H. and Amy Ritter. Calculation of the laboratory and field degradation kinetics and sorption behavior of flusilazole and its degradation products. (Position Paper) June 24, 2005. DuPont Project Identification DuPont-17756. E.I. du Pont de Nemours and Company, Newark, DE.

**APPENDIX B
TIER II SURFACE WATER MODELING OUTPUT FILES**

1. Aerial Application with a 14-day Interval

stored as flul4aer dwa.out

Chemical: flusilazole

PRZM environment: MSsoybeanC.txt modified Satday, 12 October 2002 at 17:07:44

EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 15:34:12

Metfile: w13893.dvf modified Wedday, 3 July 2002 at 09:06:20

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.742	2.629	2.309	1.733	1.27	0.5192
1962	2.42	2.334	2.176	1.859	1.804	1.488
1963	2.881	2.781	2.463	2.018	1.82	1.255
1964	2.542	2.456	2.203	1.879	1.814	1.437
1965	3.246	3.13	2.783	2.237	2.088	1.691
1966	2.255	2.185	1.964	1.714	1.694	1.464
1967	2.783	2.683	2.399	2.116	2.025	1.514
1968	3.757	3.608	3.215	2.559	2.32	1.822
1969	3.64	3.503	3.15	2.467	2.164	1.797
1970	3.038	2.939	2.699	2.429	2.26	1.86
1971	2.662	2.583	2.29	1.841	1.763	1.399
1972	4.348	4.169	3.678	2.905	2.531	1.842
1973	3.325	3.213	2.825	2.51	2.413	2.002
1974	3.191	3.084	2.802	2.675	2.554	1.995
1975	2.202	2.136	1.917	1.685	1.605	1.477
1976	3.149	3.032	2.625	2.181	2.056	1.555
1977	2.454	2.369	2.098	1.876	1.789	1.499
1978	4.167	4.024	3.642	2.962	2.728	2.074
1979	3.243	3.144	2.91	2.576	2.38	2.2
1980	5.901	5.67	4.884	4.447	3.976	2.523
1981	3.207	3.102	2.848	2.356	2.249	1.963
1982	3.353	3.24	2.914	2.644	2.448	2.043
1983	3.804	3.664	3.332	2.586	2.168	1.893
1984	2.824	2.747	2.476	2.182	2.07	1.892
1985	2.501	2.417	2.244	2.06	1.965	1.528
1986	3.943	3.837	3.355	2.784	2.266	1.467
1987	4.087	3.962	3.06	2.69	2.252	1.817
1988	4.086	3.938	3.58	2.845	2.554	2.177
1989	4.281	4.13	3.669	3.111	2.845	2.343
1990	2.679	2.595	2.238	2.058	1.92	1.781

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	5.901	5.67	4.884	4.447	3.976	2.523
0.0645161290322581	4.348	4.169	3.678	3.111	2.845	2.343
0.0967741935483871	4.281	4.13	3.669	2.962	2.728	2.2
0.129032258064516	4.167	4.024	3.642	2.905	2.554	2.177
0.161290322580645	4.087	3.962	3.58	2.845	2.554	2.074
0.193548387096774	4.086	3.938	3.355	2.784	2.531	2.043
0.225806451612903	3.943	3.837	3.332	2.69	2.448	2.002

0.258064516129032	3.804	3.664	3.215	2.675	2.413	1.995
0.290322580645161	3.757	3.608	3.15	2.644	2.38	1.963
0.32258064516129	3.64	3.503	3.06	2.586	2.32	1.893
0.354838709677419	3.353	3.24	2.914	2.576	2.266	1.892
0.387096774193548	3.325	3.213	2.91	2.559	2.26	1.86
0.419354838709677	3.246	3.144	2.848	2.51	2.252	1.842
0.451612903225806	3.243	3.13	2.825	2.467	2.249	1.822
0.483870967741936	3.207	3.102	2.802	2.429	2.168	1.817
0.516129032258065	3.191	3.084	2.783	2.356	2.164	1.797
0.548387096774194	3.149	3.032	2.699	2.237	2.088	1.781
0.580645161290323	3.038	2.939	2.625	2.182	2.07	1.691
0.612903225806452	2.881	2.781	2.476	2.181	2.056	1.555
0.645161290322581	2.824	2.747	2.463	2.116	2.025	1.528
0.67741935483871	2.783	2.683	2.399	2.06	1.965	1.514
0.709677419354839	2.742	2.629	2.309	2.058	1.92	1.499
0.741935483870968	2.679	2.595	2.29	2.018	1.82	1.488
0.774193548387097	2.662	2.583	2.244	1.879	1.814	1.477
0.806451612903226	2.542	2.456	2.238	1.876	1.804	1.467
0.838709677419355	2.501	2.417	2.203	1.859	1.789	1.464
0.870967741935484	2.454	2.369	2.176	1.841	1.763	1.437
0.903225806451613	2.42	2.334	2.098	1.733	1.694	1.399
0.935483870967742	2.255	2.185	1.964	1.714	1.605	1.255
0.967741935483871	2.202	2.136	1.917	1.685	1.27	0.5192

0.1 4.2696 4.1194 3.6663 2.9563 2.7106
2.1977

Average of yearly averages:

1.74390666666667

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: flul4aer.dwa

Metfile: wl3893.dvf

PRZM scenario: MSsoybeanC.txt

EXAMS environment file: ir298.exv

Chemical Name: flusilazole

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	315.1	g/mol	
Henry's Law Const.	henry		atm-m ³ /mol	
Vapor Pressure	vapr	2.9E-7	torr	
Solubility	sol	41.9	mg/L	
Kd	Kd		mg/L	
Koc	Koc	1642	mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	1537	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	2025	days	Halfife
Aerobic Soil Metabolism	asm	769	days	Halfife
Hydrolysis: pH 5	0	days	Half-life	
Hydrolysis: pH 7	0	days	Half-life	
Hydrolysis: pH 9	0	days	Half-life	
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0	cm	
Application Rate:	TAPP	0.115	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.16	fraction of application rate applied to pond	
Application Date	Date	01-06	dd/mm or dd/mm or dd-mm or dd-mmm	

Interval 1 interval 14 days Set to 0 or delete line for single app.
 Record 17: FILTRA
 IPSCND 3
 UPTKF
 Record 18: PLVKRT
 PLDKRT
 FEXTRC 0.5
 Flag for Index Res. Run IR IR
 Flag for runoff calc. RUNOFF total none, monthly or
 total(average of entire run)

2. Aerial Application with a 21-day Interval

stored as flu21aer dwa.out
 Chemical: flusilazole
 PRZM environment: MSsoybeanC.txt modified Satday, 12 October 2002 at 17:07:44
 EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 15:34:12
 Metfile: wl3893.dvf modified Wedday, 3 July 2002 at 09:06:20
 Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.77	2.656	2.333	1.751	1.285	0.5208
1962	2.327	2.254	2.107	1.865	1.755	1.47
1963	2.421	2.333	2.034	1.751	1.623	1.198
1964	2.667	2.575	2.264	1.956	1.873	1.48
1965	3.292	3.175	2.823	2.27	2.125	1.72
1966	2.274	2.206	1.987	1.7	1.694	1.478
1967	2.873	2.768	2.473	2.166	2.057	1.524
1968	3.885	3.729	3.312	2.618	2.371	1.835
1969	3.679	3.541	3.183	2.492	2.186	1.81
1970	3.154	3.048	2.786	2.43	2.256	1.868
1971	2.781	2.697	2.386	1.91	1.799	1.42
1972	4.486	4.299	3.797	2.994	2.59	1.878
1973	3.372	3.259	2.864	2.552	2.449	2.022
1974	3.14	3.043	2.866	2.639	2.546	2.01
1975	2.126	2.065	1.873	1.704	1.647	1.508
1976	3.246	3.124	2.701	2.239	2.111	1.577
1977	2.322	2.277	2.098	1.779	1.818	1.499
1978	4.3	4.152	3.757	3.064	2.824	2.125
1979	3.181	3.099	2.881	2.598	2.456	2.248
1980	6.113	5.873	5.054	4.613	4.118	2.578
1981	3.262	3.156	2.898	2.398	2.294	2.005
1982	3.379	3.311	2.962	2.493	2.323	2.031
1983	3.844	3.703	3.369	2.617	2.197	1.927
1984	2.855	2.777	2.504	2.207	2.083	1.908
1985	2.508	2.427	2.253	1.993	1.89	1.516
1986	3.993	3.886	3.397	2.818	2.294	1.48
1987	4.204	4.075	3.141	2.76	2.307	1.842
1988	4.131	3.982	3.621	2.923	2.624	2.217
1989	4.416	4.258	3.777	3.152	2.864	2.371
1990	2.627	2.547	2.26	2.052	1.914	1.791

Sorted results

Prob. Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	6.113	5.873	5.054	4.613	4.118 2.578
0.0645161290322581		4.486	4.299	3.797	3.152 2.864 2.371
0.0967741935483871		4.416	4.258	3.777	3.064 2.824 2.248
0.129032258064516	4.3	4.152	3.757	2.994	2.624 2.217
0.161290322580645	4.204	4.075	3.621	2.923	2.59 2.125
0.193548387096774	4.131	3.982	3.397	2.818	2.546 2.031
0.225806451612903	3.993	3.886	3.369	2.76	2.456 2.022
0.258064516129032	3.885	3.729	3.312	2.639	2.449 2.01
0.290322580645161	3.844	3.703	3.183	2.618	2.371 2.005
0.32258064516129	3.679	3.541	3.141	2.617	2.323 1.927
0.354838709677419	3.379	3.311	2.962	2.598	2.307 1.908
0.387096774193548	3.372	3.259	2.898	2.552	2.294 1.878
0.419354838709677	3.292	3.175	2.881	2.493	2.294 1.868
0.451612903225806	3.262	3.156	2.866	2.492	2.256 1.842
0.483870967741936	3.246	3.124	2.864	2.43	2.197 1.835
0.516129032258065	3.181	3.099	2.823	2.398	2.186 1.81
0.548387096774194	3.154	3.048	2.786	2.27	2.125 1.791
0.580645161290323	3.14	3.043	2.701	2.239	2.111 1.72
0.612903225806452	2.873	2.777	2.504	2.207	2.083 1.577
0.645161290322581	2.855	2.768	2.473	2.166	2.057 1.524
0.67741935483871	2.781	2.697	2.386	2.052	1.914 1.516
0.709677419354839	2.77	2.656	2.333	1.993	1.89 1.508
0.741935483870968	2.667	2.575	2.264	1.956	1.873 1.499
0.774193548387097	2.627	2.547	2.26	1.91	1.818 1.48
0.806451612903226	2.508	2.427	2.253	1.865	1.799 1.48
0.838709677419355	2.421	2.333	2.107	1.779	1.755 1.478
0.870967741935484	2.327	2.277	2.098	1.751	1.694 1.47
0.903225806451613	2.322	2.254	2.034	1.751	1.647 1.42
0.935483870967742	2.274	2.206	1.987	1.704	1.623 1.198
0.967741935483871	2.126	2.065	1.873	1.7	1.285 0.5208

0.1 4.4044 4.2474 3.775 3.057 2.804 2.2449
Average of yearly averages:
1.76189333333333

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: flu21aer.dwa

Metfile: w13893.dvf

PRZM scenario: MSsoybeanC.txt

EXAMS environment file: ir298.exv

Chemical Name: flusilazole

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	315.1	g/mol	
Henry's Law Const.	henry		atm-m ³ /mol	
Vapor Pressure	vapr	2.9E-7	torr	
Solubility	sol	41.9	mg/L	
Kd	Kd		mg/L	
Koc	Koc	1642	mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	1537	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	2025	days	Halfife
Aerobic Soil Metabolism	asm	769	days	Halfife
Hydrolysis: pH 5	0	days		Half-life

Hydrolysis: pH 7 0 days Half-life
 Hydrolysis: pH 9 0 days Half-life
 Method: CAM 2 integer See PRZM manual
 Incorporation Depth: DEPI 0 cm
 Application Rate: TAPP 0.115 kg/ha
 Application Efficiency: APPEFF 0.95 fraction
 Spray Drift DRFT 0.16 fraction of application rate applied to pond
 Application Date Date 01-06 dd/mm or dd/mm or dd-mm or dd-mm
 Interval 1 interval 21 days Set to 0 or delete line for single app.

Record 17: FILTRA
 IPSCND 3
 UPTKF

Record 18: PLVKRT
 PLDKRT
 FEXTRC 0.5

Flag for Index Res. Run IR IR
 Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)

3. Ground Application with a 14-day Interval

stored as flul4grd dwa.out

Chemical: flusilazole

PRZM environment: MSsoybeanC.txt modified Satday, 12 October 2002 at 17:07:44

EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 15:34:12

Metfile: w13893.dvf modified Wedday, 3 July 2002 at 09:06:20

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.748	2.631	2.299	1.691	1.201	0.4059
1962	2.18	2.11	1.957	1.734	1.577	1.355
1963	2.267	2.195	1.935	1.628	1.495	1.095
1964	2.379	2.329	2.141	1.634	1.545	1.279
1965	3.148	3.03	2.678	2.13	1.948	1.542
1966	2.216	2.146	1.922	1.633	1.506	1.306
1967	2.367	2.282	2.03	1.837	1.751	1.357
1968	3.263	3.135	2.817	2.248	2.106	1.678
1969	3.515	3.378	3.021	2.34	2.039	1.653
1970	2.584	2.509	2.269	2.049	1.915	1.718
1971	2.448	2.373	2.094	1.666	1.478	1.237
1972	3.978	3.811	3.329	2.629	2.422	1.699
1973	3.163	3.053	2.67	2.359	2.246	1.866
1974	2.868	2.785	2.514	2.298	2.237	1.858
1975	1.906	1.847	1.668	1.574	1.545	1.318
1976	3.034	2.915	2.505	2.064	1.947	1.4
1977	2.164	2.119	1.946	1.64	1.686	1.342
1978	4.186	4.037	3.641	2.832	2.562	1.942
1979	3.069	2.987	2.77	2.493	2.354	2.073
1980	5.753	5.525	4.745	4.223	3.789	2.41
1981	3.15	3.043	2.785	2.284	2.146	1.827
1982	3.248	3.182	2.842	2.303	2.149	1.91
1983	3.804	3.66	3.313	2.533	2.087	1.753
1984	2.797	2.718	2.439	2.141	2.019	1.753

1985	2.226	2.153	2.009	1.686	1.641	1.373
1986	3.933	3.824	3.326	2.74	2.189	1.31
1987	4.111	3.982	3.024	2.642	2.175	1.674
1988	4.094	3.94	3.568	2.832	2.535	2.049
1989	3.908	3.771	3.345	2.777	2.558	2.222
1990	2.645	2.558	2.085	1.946	1.814	1.636

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	5.753	5.525	4.745	4.223	3.789	2.41
0.0645161290322581	4.186	4.037	3.641	2.832	2.562	2.222
0.0967741935483871	4.111	3.982	3.568	2.832	2.558	2.073
0.129032258064516	4.094	3.94	3.345	2.777	2.535	2.049
0.161290322580645	3.978	3.824	3.329	2.74	2.422	1.942
0.193548387096774	3.933	3.811	3.326	2.642	2.354	1.91
0.225806451612903	3.908	3.771	3.313	2.629	2.246	1.866
0.258064516129032	3.804	3.66	3.024	2.533	2.237	1.858
0.290322580645161	3.515	3.378	3.021	2.493	2.189	1.827
0.32258064516129	3.263	3.182	2.842	2.359	2.175	1.753
0.354838709677419	3.248	3.135	2.817	2.34	2.149	1.753
0.387096774193548	3.163	3.053	2.785	2.303	2.146	1.718
0.419354838709677	3.15	3.043	2.77	2.298	2.106	1.699
0.451612903225806	3.148	3.03	2.678	2.284	2.087	1.678
0.483870967741936	3.069	2.987	2.67	2.248	2.039	1.674
0.516129032258065	3.034	2.915	2.514	2.141	2.019	1.653
0.548387096774194	2.868	2.785	2.505	2.13	1.948	1.636
0.580645161290323	2.797	2.718	2.439	2.064	1.947	1.542
0.612903225806452	2.748	2.631	2.299	2.049	1.915	1.4
0.645161290322581	2.645	2.558	2.269	1.946	1.814	1.373
0.67741935483871	2.584	2.509	2.141	1.837	1.751	1.357
0.709677419354839	2.448	2.373	2.094	1.734	1.686	1.355
0.741935483870968	2.379	2.329	2.085	1.691	1.641	1.342
0.774193548387097	2.367	2.282	2.03	1.686	1.577	1.318
0.806451612903226	2.267	2.195	2.009	1.666	1.545	1.31
0.838709677419355	2.226	2.153	1.957	1.64	1.545	1.306
0.870967741935484	2.216	2.146	1.946	1.634	1.506	1.279
0.903225806451613	2.18	2.119	1.935	1.633	1.495	1.237
0.935483870967742	2.164	2.11	1.922	1.628	1.478	1.095
0.967741935483871	1.906	1.847	1.668	1.574	1.201	0.4059

0.1	4.1093	3.9778	3.5457	2.8265	2.5557
	2.0706				

Average of yearly averages:

1.60136333333333

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: flul4grd dwa

Metfile: w13893.dvf

PRZM scenario: MSsoybeanC.txt

EXAMS environment file: ir298.exv

Chemical Name: flusilazole

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	315.1	g/mol	
Henry's Law Const.	henry		atm-m ³ /mol	
Vapor Pressure	vapr	2.9E-7	torr	

Solubility sol 41.9 mg/L
 Kd Kd mg/L
 Koc Koc 1642 mg/L
 Photolysis half-life kdp 0 days Half-life
 Aerobic Aquatic Metabolism kbacw 1537 days Halfife
 Anaerobic Aquatic Metabolism kbacs 2025 days Halfife
 Aerobic Soil Metabolism asm 769 days Halfife
 Hydrolysis: pH 5 0 days Half-life
 Hydrolysis: pH 7 0 days Half-life
 Hydrolysis: pH 9 0 days Half-life
 Method: CAM 2 integer See PRZM manual
 Incorporation Depth: DEPI 0 cm
 Application Rate: TAPP 0.115 kg/ha
 Application Efficiency: APPEFF 0.99 fraction
 Spray Drift DRFT 0.064 fraction of application rate applied to pond
 Application Date Date 01-06 dd/mm or dd/mm/mm or dd-mm or dd-mm/mm
 Interval 1 interval 14 days Set to 0 or delete line for single app.
 Record 17: FILTRA
 IPSCND 3
 UPTKF
 Record 18: PLVKRT
 PLDKRT
 FEXTRC 0.5
 Flag for Index Res. Run IR IR
 Flag for runoff calc. RUNOFF total none, monthly or
 total (average of entire run)

4. Ground Application with a 21-day Interval

stored as flu21grd dwa.out
 Chemical: flusilazole
 PRZM environment: MSsoybeanC.txt modified Satday, 12 October 2002 at
 17:07:44
 EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at
 15:34:12
 Metfile: w13893.dvf modified Wedday, 3 July 2002 at 09:06:20
 Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.777	2.659	2.323	1.709	1.215	0.4087
1962	2.208	2.135	1.971	1.743	1.583	1.338
1963	1.762	1.704	1.532	1.366	1.292	1.035
1964	2.442	2.39	2.198	1.695	1.601	1.324
1965	3.189	3.07	2.714	2.16	1.979	1.573
1966	2.24	2.171	1.944	1.652	1.524	1.319
1967	2.413	2.326	2.068	1.865	1.776	1.367
1968	3.331	3.199	2.87	2.285	2.127	1.692
1969	3.545	3.406	3.047	2.359	2.057	1.665
1970	2.599	2.524	2.309	2.072	1.918	1.726
1971	2.553	2.475	2.18	1.729	1.53	1.259
1972	4.07	3.899	3.408	2.682	2.46	1.737
1973	3.197	3.086	2.7	2.384	2.273	1.886
1974	2.887	2.804	2.552	2.33	2.235	1.874
1975	1.948	1.888	1.726	1.61	1.587	1.351
1976	3.127	3.004	2.578	2.12	2	1.423

1977	2.205	2.159	1.978	1.662	1.714	1.342
1978	4.322	4.168	3.759	2.928	2.65	1.995
1979	3.168	3.083	2.86	2.573	2.431	2.122
1980	5.945	5.708	4.902	4.365	3.914	2.468
1981	3.204	3.096	2.834	2.326	2.188	1.871
1982	3.371	3.301	2.934	2.352	2.182	1.897
1983	3.843	3.697	3.348	2.563	2.115	1.788
1984	2.827	2.747	2.466	2.166	2.042	1.769
1985	2.213	2.139	2	1.676	1.574	1.36
1986	3.982	3.871	3.367	2.773	2.216	1.323
1987	4.231	4.097	3.106	2.711	2.229	1.7
1988	4.137	3.983	3.607	2.912	2.605	2.091
1989	3.997	3.856	3.418	2.834	2.608	2.25
1990	2.589	2.505	2.123	1.935	1.803	1.646

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	5.945	5.708	4.902	4.365	3.914	2.468
0.0645161290322581		4.322	4.168	3.759	2.928	2.65 2.25
0.0967741935483871		4.231	4.097	3.607	2.912	2.608 2.122
0.129032258064516	4.137	3.983	3.418	2.834	2.605	2.091
0.161290322580645	4.07	3.899	3.408	2.773	2.46	1.995
0.193548387096774	3.997	3.871	3.367	2.711	2.431	1.897
0.225806451612903	3.982	3.856	3.348	2.682	2.273	1.886
0.258064516129032	3.843	3.697	3.106	2.573	2.235	1.874
0.290322580645161	3.545	3.406	3.047	2.563	2.229	1.871
0.32258064516129	3.371	3.301	2.934	2.384	2.216	1.788
0.354838709677419	3.331	3.199	2.87	2.359	2.188	1.769
0.387096774193548	3.204	3.096	2.86	2.352	2.182	1.737
0.419354838709677	3.197	3.086	2.834	2.33	2.127	1.726
0.451612903225806	3.189	3.083	2.714	2.326	2.115	1.7
0.483870967741936	3.168	3.07	2.7	2.285	2.057	1.692
0.516129032258065	3.127	3.004	2.578	2.166	2.042	1.665
0.548387096774194	2.887	2.804	2.552	2.16	2	1.646
0.580645161290323	2.827	2.747	2.466	2.12	1.979	1.573
0.612903225806452	2.777	2.659	2.323	2.072	1.918	1.423
0.645161290322581	2.599	2.524	2.309	1.935	1.803	1.367
0.67741935483871	2.589	2.505	2.198	1.865	1.776	1.36
0.709677419354839	2.553	2.475	2.18	1.743	1.714	1.351
0.741935483870968	2.442	2.39	2.123	1.729	1.601	1.342
0.774193548387097	2.413	2.326	2.068	1.709	1.587	1.338
0.806451612903226	2.24	2.171	2	1.695	1.583	1.324
0.838709677419355	2.213	2.159	1.978	1.676	1.574	1.323
0.870967741935484	2.208	2.139	1.971	1.662	1.53	1.319
0.903225806451613	2.205	2.135	1.944	1.652	1.524	1.259
0.935483870967742	1.948	1.888	1.726	1.61	1.292	1.035
0.967741935483871	1.762	1.704	1.532	1.366	1.215	0.4087

0.1	4.2216	4.0856	3.5881	2.9042	2.6077
	2.1189				

Average of yearly averages: 1.61999

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:
 Output File: flu21grd.dwa
 Metfile: w13893.dvf

```

PRZM scenario:      MSsoybeanC.txt
EXAMS environment file: ir298.exv
Chemical Name:     flusilazole
Description Variable Name      Value Units Comments
Molecular weight  mwt      315.1 g/mol
Henry's Law Const.      henry      atm-m^3/mol
Vapor Pressure      vapr      2.9E-7      torr
Solubility          sol      41.9 mg/L
Kd      Kd      mg/L
Koc      Koc      1642 mg/L
Photolysis half-life  kdp      0      days Half-life
Aerobic Aquatic Metabolism  kbacw 1537 days Halfife
Anaerobic Aquatic Metabolism  kbacs 2025 days Halfife
Aerobic Soil Metabolism  asm      769 days Halfife
Hydrolysis: pH 5      0      days Half-life
Hydrolysis: pH 7      0      days Half-life
Hydrolysis: pH 9      0      days Half-life
Method:             CAM      2      integer      See PRZM manual
Incorporation Depth:  DEPI      0      cm
Application Rate:    TAPP      0.115 kg/ha
Application Efficiency: APPEFF      0.99 fraction
Spray Drift          DRFT      0.064 fraction of application rate applied to pond
Application Date     Date      01-06 dd/mm or dd/mm or dd-mm or dd-mm
Interval 1          interval      21      days Set to 0 or delete line for single
app.
Record 17:  FILTRA
             IPSCND      3
             UPTKF
Record 18:  PLVKRT
             PLDKRT
             FEXTRC      0.5
Flag for Index Res. Run IR      IR
Flag for runoff calc.  RUNOFF      total none, monthly or
total(average of entire run)

```

APPENDIX C
TIER I GROUND WATER MODELING OUTPUT FILE

SCIGROW
VERSION 2.3
ENVIRONMENTAL FATE AND EFFECTS DIVISION
OFFICE OF PESTICIDE PROGRAMS
U.S. ENVIRONMENTAL PROTECTION AGENCY
SCREENING MODEL
FOR AQUATIC PESTICIDE EXPOSURE

SciGrow version 2.3
chemical:flusilazole
time is 11/ 2/2005 15: 0:30

```
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```

Application rate (lb/acre) (days)	Number of applications	Total Use (lb/acre/yr)	Koc (ml/g)	Soil Aerobic metabolism
0.103	2.0	0.206	9.85E+02	437.5

```
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```

```
--  
groundwater screening cond (ppb) = 4.87E-02
```
