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

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<u>MEMORANDUM</u>

SUBJECT: Tier 2 Drinking Water Assessment for Fluazifop-P-butyl and its Major Degradate
             Fluazifop-acid

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        At the request of Diana Locke of the Health Effects Division, we have performed a Tier 2
drinking water assessment (DWA) for fluazifop-P-butyl. The Tier 1 DWA was completed on
October 29, 2003.

        In the Tier 1 DWA, the highest chronic drinking water expected concentration (DWEC)
was 12 ppb for the tree fruit use. The asparagus uses had chronic DWECs of 11 and 10 ppb (the
latter being for a 24(c) label.) According to HED's calculations. the lowest Drinking Water
Level of Comparison (DWLOC) is 9 ppb for chronic exposure to infants, not including
residential lawn uses (D. Locke e-mail of 6/22/2004). Thus, at the present level of analysis, the
chronic DWEC slightly exceeds the chronic DWLOC.

        The Tier 1 DWA noted that the DWECs for tree fruits and asparagus were higher than
those for the major uses (soybeans and cotton) because we used the default percent cropped area
(PCA) factor of 87%, i.e., we assumed that 87% of the acreage of the watershed of the Index
Reservoir was planted in orchards or asparagus. We also used the highest labeled use rates,
maximum number of applications, and minimum application intervals. Thus, the Tier 1 DWECs

are expected to be high-end estimates of expected concentrations in raw drinking water.

For the Tier 2 analysis, we have chosen to model two tree fruit scenarios, California fruit (plums) and Georgia peaches. These scenarios were chosen because tree fruit has the highest labeled use rates (1.125 lb active ingredient per acre per year), and gave the highest DWECs in the Tier 1 analysis. Fluazifop-P-butyl is used to kill grasses in orchards, and is used as a ground spray directed at the grass. We currently have no PRZM scenarios for asparagus.

Input Parameters. The following values were used as inputs for the Tier 2 model PRZM-EXAMS with the Index Reservoir scenario. The values were chosen in accordance with the Input Parameter Guidance (Feb. 28, 2002), and are intended to represent the combined residue of parent fluazifop-P-butyl and the degradate fluazifop-acid.

Table 1. PRZM-EXAMS Input Parameters

Input Parameter	Value	Reference/Comment
Molecular Weight	383.4 g/mol	Nat'l Library of Medicine Hazardous Substances Databank (NLM-HSDB)
Henry's Law Constant	2.1 E-7 atm-m^3/mol	VP/solubility for parent
Vapor Pressure	4.1 E-7 mmHg = 5.4 E-10 atm	0.055 mPa @ 20°C (NLM-HSDB)
Solubility	400 mg/L (acid) 1 mg/L (parent)	10 times estimated value for fluazifop acid (EPISuite) (NLM-HSDB)
Organic Carbon Partitioning Coefficient	8.3 mL/g	MRID 41900604
Chemical Application Method (CAM)	4	Indicates soil applied, uniform depth, user defined incorporation depth
Incorporation depth	1 cm	assumed
Application Rate	0.42 kg/hectare	0.375 lb/acre x 1.12 (Label)
Number of Applications	3 at 21-day intervals	(Label)
Application Efficiency	0.99	Indicates ground application
Spray Drift Fraction	0.064	Indicates ground application
Application Date	GA peach: Mar.15 CA fruit: Jan. 28	1 week after crop emergence date in PRZM scenario

Aqueous photolysis half-life	acid is stable	MRID 41598002
Water Half-life	78 days	pH 7 hydrolysis half-life
Benthic half-life	assumed stable	no data
Soil half-life	22 days	90th percentile upper bound on mean value
FILTRA, UPTKF, PLVKRT, PLDKRT	0	default values
FEXTRC	0.5	Default value

Results. The following results were obtained for the Georgia peach and California fruit scenarios. A default PCA factor of 0.87 has been applied. The values represent 1-in-10 year return frequencies for the acute and chronic (annual) values; the cancer chronic DWEC is the average of the 30 chronic DWEC values.

Table 2. Drinking Water Expected Concentrations (raw surface water) for the Combined Residues of Fluazifop-P-butyl and Fluazifop-acid

Scenario	Acute DWEC (ppb)	Chronic DWEC (ppb)	Cancer Chronic DWEC (ppb)
GA peaches	8.7	3.1	1.4
CA Fruit	5.6	2.2	1.5

APPENDIX A: PRZM-EXAMS Input and Output files

stored as GApeach.out
Chemical: fluazifop
PRZM environment: GAPeachesC.txt   modified Satday, 12 October 2002 at 17:59:56
EXAMS environment: ir298.exv   modified Thuday, 29 August 2002 at 16:34:12
Metfile: w03813.dvf modified Wedday, 3 July 2002 at 10:04:32
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.762	2.718	2.567	2.237	2.049	0.9065
1962	2.698	2.666	2.436	2.085	1.961	0.9264
1963	3.925	3.849	3.553	3.004	2.659	1.256
1964	6.54	6.297	5.569	4.973	4.352	1.871
1965	3.399	3.358	3.143	2.798	2.509	1.056
1966	2.635	2.604	2.463	2.153	2.005	0.937
1967	3.741	3.685	3.459	3.007	2.691	1.341
1968	3.058	3.022	2.793	2.443	2.236	1.148
1969	3.359	3.319	3.133	2.8	2.595	1.262
1970	3.883	3.832	3.6	3.275	3.07	1.366
1971	2.686	2.655	2.469	2.11	1.932	0.8631
1972	2.74	2.707	2.558	2.224	2.069	0.9684
1973	26.03	25.35	22.82	18.48	16.21	6.84
1974	10.37	10.21	9.678	8.599	7.663	3.743
1975	5.186	5.067	4.712	4.577	4.34	2.069
1976	3.199	3.123	2.889	2.481	2.259	1.119
1977	5.322	5.255	4.929	4.642	4.385	1.961
1978	2.992	2.934	2.738	2.407	2.223	1.087
1979	5.616	5.516	5.154	4.808	4.552	2.017
1980	2.828	2.795	2.63	2.286	2.124	1.019
1981	2.543	2.483	2.307	2.013	1.767	0.7454
1982	12.86	12.64	11.73	10.61	9.528	3.946
1983	3.17	3.137	2.953	2.6	2.344	1.188
1984	2.781	2.748	2.454	2.054	1.806	0.776
1985	2.734	2.701	2.539	2.196	2.039	0.9312
1986	3.95	3.901	3.661	3.327	3.082	1.331
1987	2.778	2.747	2.579	2.228	2.059	0.9566
1988	2.826	2.788	2.628	2.298	2.147	1.017
1989	4.221	4.15	3.871	3.317	2.96	1.396
1990	3.583	3.543	3.337	2.995	2.756	1.273

| 0.1 | 9.987 | 9.8187 | 9.2671 | 8.2364 | 7.3519 | 3.5756 |

Average of yearly averages: 1.57722

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

Data used for this run:
Output File: GApeach
Metfile: w03813.dvf
PRZM scenario: GAPeachesC.txt
EXAMS environment file: ir298.exv
Chemical Name: fluazifop

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	383.37	g/mol	
Henry's Law Const.	henry	2.1E-7	atm-m^3/mol	
Vapor Pressure	vapr	4.1e-7	torr	
Solubility	sol	400	mg/L	
Kd	Kd		mg/L	
Koc	Koc	8.3	mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	78	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	0	days	Halfife
Aerobic Soil Metabolism	asm	22	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	4	integer	See PRZM manual
Incorporation Depth:	DEPI	1	cm	
Application Rate:	TAPP	0.42	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	
Application Date	Date	15-03	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	21	days	Set to 0 or delete line for single app.
Interval 2	interval	21	days	Set to 0 or delete line for single app.
Record 17:	FILTRA	0		
	IPSCND	1		
	UPTKF	0		
Record 18:	PLVKRT	0		
	PLDKRT	0		
	FEXTRC	0.5		
Flag for Index Res. Run	IR	IR		
Flag for runoff calc.	RUNOFF	monthly	none, monthly or total(average of entire run)	

stored as CAfruit.out
Chemical: fluazifop
PRZM environment: CAfruitC.txt   modified Satday, 12 October 2002 at 17:35:16
EXAMS environment: ir298.exv   modified Thuday, 29 August 2002 at 16:34:12
Metfile: w93193.dvf   modified Wedday, 3 July 2002 at 10:04:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.723	2.701	2.612	2.384	2.213	1.118
1962	2.925	2.903	2.814	2.558	2.396	1.259
1963	3.708	3.669	3.546	3.218	3.082	1.643
1964	3.198	3.174	3.075	2.825	2.657	1.421
1965	4.598	4.519	4.203	3.726	3.42	1.766
1966	3.261	3.232	3.115	2.807	2.65	1.374
1967	6.531	6.464	6.203	5.588	5.121	2.439
1968	3.389	3.36	3.261	2.974	2.802	1.485
1969	6.074	6.027	5.83	5.524	5.183	2.493
1970	3.239	3.201	3.043	2.76	2.622	1.374
1971	3.057	3.041	2.94	2.659	2.494	1.303
1972	3.462	3.427	3.285	2.976	2.838	1.448
1973	2.995	2.969	2.859	2.602	2.437	1.251
1974	3.024	2.995	2.876	2.619	2.46	1.261
1975	3.059	3.037	2.945	2.731	2.553	1.364
1976	2.865	2.844	2.754	2.538	2.37	1.279
1977	3.062	3.038	2.94	2.658	2.495	1.276
1978	2.709	2.666	2.492	2.201	2.082	1.052
1979	3.775	3.741	3.601	3.269	3.108	1.512
1980	23.25	22.84	21.4	19.9	18.53	8.525
1981	7.717	7.649	7.373	7.052	6.85	3.473
1982	4.34	4.305	4.13	3.768	3.483	1.834
1983	3.743	3.7	3.53	3.1	2.856	1.434
1984	3.024	2.996	2.878	2.61	2.45	1.196
1985	2.98	2.956	2.86	2.576	2.408	1.182
1986	3.545	3.496	3.349	3.011	2.85	1.43
1987	2.973	2.947	2.839	2.548	2.385	1.194
1988	2.999	2.972	2.861	2.568	2.412	1.221
1989	2.979	2.941	2.784	2.467	2.333	1.17
1990	3.002	2.976	2.866	2.58	2.418	1.207

| 0.1 | 6.4853 | 6.4203 | 6.1657 | 5.5816 | 5.1768 | 2.4876 |

Average of yearly averages: 1.7328

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

Data used for this run:
Output File: CAfruit
Metfile: w93193.dvf
PRZM scenario: CAfruitC.txt
EXAMS environment file: ir298.exv
Chemical Name: fluazifop

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	383.37	g/mol	
Henry's Law Const.	henry	2.1E-7	atm-m^3/mol	
Vapor Pressure	vapr	4.1e-7	torr	
Solubility	sol	400	mg/L	
Kd	Kd		mg/L	
Koc	Koc	8.3	mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	78	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	0	days	Halfife
Aerobic Soil Metabolism	asm	22	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	4	integer	See PRZM manual
Incorporation Depth:	DEPI	1	cm	
Application Rate:	TAPP	0.42	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	
Application Date	Date	28-01	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	21	days	Set to 0 or delete line for single app.
Interval 2	interval	21	days	Set to 0 or delete line for single app.
Record 17:	FILTRA	0		
	IPSCND	1		
	UPTKF	0		
Record 18:	PLVKRT	0		
	PLDKRT	0		
	FEXTRC	0.5		
Flag for Index Res. Run	IR	IR		
Flag for runoff calc.	RUNOFF	monthly	none, monthly or total(average of entire run)	