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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

**OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES**

MEMORANDUM

DATE: 8/2/2004

SUBJECT: **Penoxsulam** Chronic Dietary Exposure Assessment for the Section 3 Registration Action.

PC Code: 119031 Decision Number: 305735
DP Number: D305545 PP Number: 3F6542

REVIEWER: William Cutchin, Chemist
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TO: William Cutchin, Chemist
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Executive Summary

A chronic dietary risk assessment was conducted using the Lifeline™ Model Version 2.0 which uses food consumption data from the United States Department of Agriculture's (USDA's) Continuing Surveys of Food Intakes by Individuals (CSFII) from 1994-1996 and 1998. The analysis was performed to support a Section 3 request.

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Acute Dietary Exposure Results and Characterization

No toxicological endpoint attributable to a single dose was identified by HED's HIARC, therefore an acute dietary exposure assessment was not conducted.

Chronic Dietary Exposure Results and Characterization

A chronic dietary analysis for penoxsulam was conducted using tolerance levels and 100 %CT for the requested use on rice. The results of the analysis indicate that chronic risk from the dietary exposure to penoxsulam from the requested use did not exceed HED's level of concern for the U.S. population or any population subgroup. All exposures were determined to be <1% cPAD for the U.S. population and all sub populations of interest.

Cancer Dietary Exposure Results and Characterization

HED's CARC classified penoxsulam as "Suggestive Evidence of Carcinogenicity, but Not Sufficient to Assess Human Carcinogenic Potential" and, therefore, quantification of human cancer risk is not required.

I. Introduction

Dietary risk assessment incorporates both exposure and toxicity of a given pesticide. For acute and chronic assessments, the risk is expressed as a percentage of a maximum acceptable dose (i.e., the dose which HED has concluded will result in no unreasonable adverse health effects). This dose is referred to as the population adjusted dose (PAD). The PAD is equivalent to the reference dose (RfD) divided by the special Food Quality Protection Act (FQPA) Safety Factor.

For acute and non-cancer chronic exposures, HED is concerned when estimated dietary risk exceeds 100% of the PAD. HED is generally concerned when estimated cancer risk exceeds one in one million (i.e., the risk exceeds 1×10^{-6}). References which discuss the acute and chronic risk assessments in more detail are available on the EPA/pesticides web site: "Available Information on Assessing Exposure from Pesticides, A User's Guide," 6/21/2000, web link: http://www.epa.gov/fedrgstr/EPA-PEST/2000/July/Day-12/6061.pdf; or see SOP 99.6 (8/20/99).

This action represents the first dietary exposure assessment for this active ingredient.

II. Residue Information

This is the first dietary exposure analysis for penoxsulam. Penoxsulam (company code XDE-638; PC Code 119031) is an herbicide intended for the control of *Echinochloa* grasses, broadleaf weeds, and sedge weeds in both water-injected (transplanted paddy) and postemergence (direct-seeded) rice.

Residue Data used for Chronic Assessments:

For this analysis the proposed tolerance levels and 100 %CT for rice commodities were used. Tolerances are not being recommended for animal commodities as a result of the proposed use.

Table 1. Tolerance Summary for Penoxsulam.

Commodity	Recommended Tolerance (ppm)
Rice grain	0.02
Rice straw	0.50

III Program and Consumption Information

Several reasonable peer-reviewed software packages have recently been emerging for modeling dietary exposure to pesticides. For a variety of technical, historical, and availability reasons, DEEM™ was the program generally used by EPA's Office of Pesticide Programs (OPP) for conducting its dietary risk assessments. With the advent and current availability of a number of other exposure software programs, OPP, registrants, and other interested parties have available to them the option of selecting other peer-reviewed exposure software in conducting risk assessments for pesticides. Lifeline™ is one such model and is the software being used in this HED review. Dietary exposure assessments may also be performed with other, similar programs, and if submitted, such results will be reviewed by EPA for acceptability and comparability to existing peer-reviewed software being used by OPP.

Lifeline™ Program and Consumption Information

Chronic dietary exposure estimates were conducted using the Lifeline™ Model (Version 2.0). Lifeline™ uses the recipe file to relate raw agricultural commodities (RACs) to foods "as-eaten." Lifeline™ converts the RAC residues into food residues by randomly selecting a RAC residue value from the "user defined" residue distribution (created from the residue, percent crop treated, and processing factors data), and calculating a net residue for that food based on the ingredients' mass contribution to that food item. For example, 'apple pie' will have a residue distribution based on the residues provided for apples (adjusted by the appropriate processing factors and percent crop treated), as well as the residues for each of the other ingredients in the apple pie recipe for which there may be tolerances. Lifeline™ calculates dietary exposure from 'apple pie' based on the amount eaten, and the residue drawn from the 'apple pie' residue distribution for that eating occasion. Lifeline™ models the individual's dietary exposures over a season by selecting a new CSFII diary each day from a set of similar individuals based on age and season attributes. Lifeline™ groups CSFII diaries based on the respondents' age and the season during which the food diary was recorded. Further information regarding the Lifeline™ Model can be found at the following web site: www.theLifelinegroup.org.

IV. Toxicological Information

On December 2, 2003, the Health Effects Division (HED) Hazard Identification Assessment Review Committee (HIARC) reviewed the recommendations of the toxicology reviewer for penoxsulam with regard to the acute and chronic Reference Doses (RfDs) and the toxicological endpoint selection for use as appropriate in occupational/residential exposure risk assessments. The potential for increased susceptibility of infants and children from exposure to penoxsulam was evaluated as required by the Food Quality Protection Act (FQPA) of 1996 in accordance with the 2002 OPP 10X Guidance Document. The committee's findings are listed in Table 2.

The Cancer Assessment Review Committee met on February 18, 2004 to evaluate the carcinogenic potential of penoxsulam. In accordance with the EPA Proposed Guidelines for Carcinogen Risk Assessment (July 1999), the Committee classified penoxsulam as "Suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential" and, therefore, quantification of human cancer risk is not required.

Table 2. Summary of Toxicological Doses and Endpoints for Penoxsulam for Use in Dietary Exposure Assessment

Exposure Scenario	Dose Used in Risk Assessment, UF	Hazard and Exposure Based Special FQPA Safety Factor	Study and Toxicological Effects
Acute Dietary (all populations)	None UF = N/A	Not applicable	No toxicological endpoint attributable to a single exposure was identified in the available toxicology studies on penoxsulam.
Chronic Dietary (all populations)	NOAEL= 14.7 mg/kg/day UF = 100 **Chronic RfD = 0.147 mg/kg/day**	FQPA SF = 1X **cPAD =** chronic RfD / FQPA SF **= 0.147 mg/kg/day**	1-Year Chronic Feeding Study in Dogs. LOAEL = 46.2 mg/kg/day based on multifocal hyperplasia of the pelvic epithelium of the kidney.
Cancer	NA	NA	Suggestive of cancer risk, cancer quantification not required

V. Results/Discussion

As stated above, for acute and chronic assessments, HED is concerned when dietary risk exceeds 100% of the PAD. The Lifeline™ analyses estimate the dietary exposure of the U.S. population and various population subgroups. The results reported in Table 3 are for the general U.S. Population, all infants (<1 year old), children 1-2, children 3-5, children 6-12, youth 13-19,

females 13-49, adults 20-49, and adults 50+ years.

Chronic dietary risks were estimated using the Lifeline™ model (version 2.0). The Lifeline™ chronic dietary exposure estimate is based on an average daily exposure from a profile of 1000 individuals over a one year period. The Lifeline™ chronic dietary exposure estimate for all population subgroups is <1% of the cPAD.

Table 3. Summary of Dietary Exposure and Risk for Penoxsulam

Population Subgroup	Chronic Dietary	
	Dietary Exposure (mg/kg/day)	% cPAD
General U.S. Population	0.000005	<1
All Infants (< 1 year old)	0.000014	<1
Children 1-2 years old	0.000010	<1
Children 3-5 years old	0.000008	<1
Children 6-12 years old	0.000006	<1
Youth 13-19 years old	0.000005	<1
Adults 20-49 years old	0.000004	<1
Adults 50+ years old	0.000004	<1
Females 13-49 years old	0.000005	<1

VI. Conclusions

Acute and cancer dietary exposure and risk determinations are not required for penoxsulam. A chronic dietary analysis for penoxsulam was conducted using tolerance levels and 100 %CT for the requested use on rice. The results of the analysis indicate that chronic risk from the dietary exposure to penoxsulam from the requested use did not exceed HED's level of concern for the U.S. population or any population subgroup. All exposures were determined to be <1% cPAD for the U.S. population and all population subgroups of interest. This analysis is very conservative and is, therefore, unlikely to underestimate dietary exposure. The use of anticipated residues (AR) and projected percent crop treated (%CT) data could be used to refine the exposure estimates.

VIII. List of Attachments

Attachment 1: Chronic Food Residue Input file.
Attachment 2: Chronic Results file.

Attachment 1 Lifeline Chronic Input File

Annual Commodity Factors Entered (A5134050) Code	Crop Group	Code	Commodity	Code	FoodForm	Residue	Dehydration	Washing	Heating	Refining	Storage	Other	Use Factor
15	CEREAL GRAINS	003230	Rice, white		All	0.02							
15	CEREAL GRAINS	003231	Rice, white-babyfood		All	0.02							
15	CEREAL GRAINS	003240	Rice, brown		All	0.02							
15	CEREAL GRAINS	003241	Rice, brown-babyfood		All	0.02							
15	CEREAL GRAINS	003250	Rice, flour		All	0.02							
15	CEREAL GRAINS	003251	Rice, flour-babyfood		All	0.02							
15	CEREAL GRAINS	003260	Rice, bran		All	0.02							
15	CEREAL GRAINS	003261	Rice, bran-babyfood		All	0.02							

Attachment 2 Lifeline Chronic Output File

age_group	person_years	P_95	cPAD_95	Chronic_moe_95	P_99	cPAD_99	Chronic_moe_99	P_99_9	cPAD_999	Chronic_moe_999	mean	cPAD_mean	Chronic_moe_mean	NOAEL	UFFQPA	cPAD
General U.S. Population	86000	8.44E-06	0.005741	1741706	1.25E-05	0.008484	1178711	1.89E-05	0.012875	776699	4.7E-06	0.003196	3128522	14.7	100	0.147
All Infants (<1 year old)	1000	1.99E-05	0.013539	738600.7	2.25E-05	0.015303	653478.6	2.86E-05	0.019456	513986	1.38E-05	0.009379	1066191	14.7	100	0.147
Children 1-2 years old	2000	1.3E-05	0.008857	1129032	1.48E-05	0.010073	992740.2	1.68E-05	0.011436	874414.5	1.01E-05	0.00685	1459926	14.7	100	0.147
Children 3-5 years old	3000	1.02E-05	0.006937	1441530	1.17E-05	0.007935	1260315	1.29E-05	0.008807	1135464	7.56E-06	0.005143	1944319	14.7	100	0.147
Children 6-12 years old	7000	8.57E-06	0.005828	1715786	9.93E-06	0.006753	1480922	1.2E-05	0.008148	1227301	5.59E-06	0.003803	2629490	14.7	100	0.147
Youth 13-19 years old	7000	7.43E-06	0.005056	1977800	9.19E-06	0.00625	1600000	1.23E-05	0.00838	1193303	4.68E-06	0.003185	3140130	14.7	100	0.147
Adults 20-49 years old	30000	6.79E-06	0.004616	2166544	8.34E-06	0.005676	1761798	1.08E-05	0.007369	1357027	4.27E-06	0.002902	3445608	14.7	100	0.147
Adults 50+ years old	36000	6.4E-06	0.004351	2298222	7.89E-06	0.00537	1862233	1.01E-05	0.006895	1450240	4.1E-06	0.002789	3585603	14.7	100	0.147
Females 13-49 years old	18352	7.52E-06	0.005114	1955437	9.18E-06	0.006247	1600871	1.25E-05	0.008476	1179775	4.89E-06	0.003329	3003730			

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Chemical:	**Benzenesulfonamide, 2-(2,2-difluoroethox**
PC Code:	**119031**
HED File Code	**11000 Chemistry Reviews**
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File ID:	**DPD305545**
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HED Records Reference Center
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