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OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

DATE: March 13, 2007

SUBJECT: Addendum to the Environmental Fate and Effects Division (EFED) Drinking Water Exposure Assessment for the Addition of Propazine Use on Texas Sorghum to the Triazine Cumulative Dietary Risk Assessment (DP 336742 & DP 329876)

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The Environmental Fate and Effects Division (EFED) have completed an addendum to the drinking water exposure assessment conducted previously for the triazine cumulative dietary risk assessment. This addendum represents an additional drinking water exposure assessment for the principal sorghum growing areas of Texas. This addendum to the triazine cumulative risk assessment has been completed to augment the work already completed due to revised estimates of percent crop treated (PCT) for propazine and atrazine use in Texas only.

Previously EFED completed a drinking water exposure assessment for the triazine cumulative risk assessment that included an analysis of atrazine monitoring data from community water systems (CWS) in the Midwest, and modeling of atrazine in California and Florida. Given that the recently completed assessment for propazine use on sorghum is a new use this assessment has relied exclusively on modeling using the linked Pesticide

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Root Zone Model (PRZM) and Exposure Analysis Modeling System (EXAMS) to predict drinking water exposures in the principal sorghum growing areas. To the extent possible, this assessment follows the methods used in the previous assessment for modeling in California and Florida.

Additional information was provided by the Biological and Economic Analysis Division (BEAD) of the Office of Pesticide Programs (OPP) on the percentage of sorghum in total cropland and the percent crop treated (PCT) for Texas. The revised values were 15% for percentage of sorghum in total cropland for Texas, 18% for the PCT of propazine on sorghum, and 54% for PCT of atrazine on sorghum. These values reflect refinements to the estimates used in the original drinking water assessment (DP 334595) dated December 2006. These revised values were delivered to EFED on February 13, 2007 in an email from Jim Tompkins of the Registration Division of OPP.

For the Texas area, multiplying the 67% PCA with these factors yielded CAF's for propazine on sorghum of 0.01809 (1.8%), atrazine on sorghum of 0.05427 (5.4%), and atrazine on corn of 0.0506 (5.1%). All of the factors used in this assessment are summarized in **Table 1**.

Table 1. Factors used in Modeling to Derive the Cumulative Adjustment Factor (CAF) for the Texas Scenario

	Propazine on Sorghum	Atrazine on Sorghum	Atrazine on Corn
Number of Applications	1	1	2
Maximum Application Rate from Label	1.2 lbs/acre	2.0 lbs/acre	2.0 lbs/acre
Application Type	aerial	aerial	aerial
Maximum Percent Cropped Area for Sorghum Growing Region Assessed	67%	67%	46%
Degradate Adjustment	NA	0.24+1.418*ppb	0.24+1.418*ppb
Percentage of Crop in Growing Area	15%	15%	11%
Percent Cropped Treated	18%	54%	100%
Cumulative Adjustment Factor	0.01809	0.05427	0.0506

Model Inputs

Consistent with previous modeling both label maximum and typical application rates are available at the state level for atrazine (Kaul and Kiely, 2005, Phillips and Kiely, 2005). Propazine is a new use and as such no typical application rate information was available for use in this assessment. Both the typical and maximum application rates for atrazine use were modeled and provided separately. In addition, both the new propazine use and the existing atrazine uses allow for both ground and aerial applications. In this assessment, only the aerial application method has been modeled given that it is expected to yield higher EEC.

One outcome of the 2003 atrazine IRED process was a modification to all existing atrazine labels that requires setback distances around intermittent/perennial streams and lakes/reservoirs. The label changes specify setback distances of 66 feet and 200 feet for atrazine applications surrounding intermittent/perennial streams and lakes/reservoirs, respectively. The Agency incorporated these distances into this assessment and has modified the standard spray drift assumptions accordingly using AgDrift to estimate the impact of a setback distance of 66 feet on the fraction of drift reaching a surface water body. The revised spray drift percentages, which are incorporated into the PRZM/EXAMS modeling, are 0.6% for ground applications and 6.5% for aerial applications. The proposed propazine label contains similar language and the AgDrift derived spray drift values have been incorporated into this assessment as well.

Models to estimate the effect of setbacks on load reduction for runoff are not currently available. It is well documented that vegetated setbacks can result in a substantial reduction in pesticide load to surface water (USDA, NRCS, 2000). Specifically for atrazine, data reported in the USDA study indicate that well vegetated setbacks have been documented to reduce atrazine loading to surface water by as little as 11% and as much as 100% of total runoff without a setback. It is expected that the presence of a well-vegetated setback between the site of atrazine application and receiving water bodies could result in reduction in loading. Therefore, the aquatic EECs presented in this assessment are likely to over-estimate exposure in areas with well-vegetated setbacks. While the extent of load reduction cannot be accurately predicted through each relevant stream reach in the action area, data from USDA (USDA, 2000) suggest reductions could range from 11 to 100%.

The appropriate PRZM input parameters for both atrazine and propazine 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 2.3, February 28, 2002. The propazine input parameters are consistent with those used in the recent Section 3 new use risk assessment (D310326) and are summarized in **Table 2**. The atrazine input parameters are consistent with those used in both the 2003 IRED (U.S. EPA, 2003a) and the cumulative triazine risk assessment (U.S. EPA, 2006a) and are summarized in **Table 3**. More detail on the atrazine assessments may be found at:

http://www.epa.gov/oppsrrd1/REDs/atrazine_ired.pdf

http://www.epa.gov/pesticides/cumulative/common_mech_groups.htm#chloro

Table 2. Propazine Inputs Used in PRZM Modeling		
Parameter	**Value**	**Source**
Application Rate per Event	1.2 lb a.i./A	Propazine 4L label
Number of Applications per Crop Season	1 application per year	Propazine 4L label
Henry's constant	1.02 x10 -9	Product Chemistry
Molecular Weight	230 g/mole	Product Chemistry
Vapor Pressure	2.9E-8 torr	Product Chemistry
Water Solubility @ 20°C	2.9 mg/L	Product Chemistry
Aqueous Photolysis t ½	Stable	MRID 441848-05
Aerobic Soil Metabolism t ½	480 days [1]	MRID 441848-07
Hydrolysis t ½	Stable	MRID 436898-02
Aerobic Aquatic Degradation t ½	960 days [2]	EFED Guidance, 2002
Anaerobic Aquatic Degradation t ½	112 days [3]	EFED Guidance, 2002
Koc	125 mL/g [4]	MRIDs 001529-97, 436898-04
Application Efficiency	0.99 / 0.95	EFED Guidance, 2002
Spray Drift Fraction	0.006 / 0.065	AgDrift Modeling for label specified buffers

[1] Upper 90th Percentile based on mean half-lives of 289 and 105 days.
[2] 2x aerobic soil metabolism half-life (EFED Modeling Input Parameter Guidance, 2002).
[3] 2x anaerobic soil metabolism half-life (EFED Modeling Input Parameter Guidance, 2002).
[4] Average from all acceptable adsorption/desorption data including K_{oc} values of 65, 83, 123, 158, 79, 96, 128, and 268 (MRIDs 001529-97 and 436898-04).

Table 3. Atrazine Inputs Used in PRZM Modeling		
Fate Property	**Value**	**MRID (or source)**
Application Rate per Event	1.2 lb a.i./A	Atrazine Label
Number of Applications per Crop Season	1 application per year	Atrazine Label
Molecular Weight	215.7	MRID 41379803
Henry's constant	2.58 x10 -9	MRID 41379803
Vapor Pressure	3 x 10 -7	MRID 41379803
Solubility in Water	33 mg/l	MRID 41379803
Photolysis in Water	335 days	MRID 42089904
Aerobic Soil Metabolism Half-lives	152 days	MRID 40431301 MRID 40629303 MRID 42089906
Hydrolysis	stable	MRID 40431319
Aerobic Aquatic Metabolism (water column)	304 days	2x aerobic soil metabolism rate constant
Anaerobic Aquatic Metabolism (benthic)	608 days	MRID 40431323
Koc	88.78 ml/g	MRID 40431324 MRID 41257901 MRID 41257902 MRID 41257904 MRID 41257905 MRID 41257906
Application Efficiency	95 % for aerial 99 % for ground	default value[1]
Spray Drift Fraction	6.5 % for aerial 0.6 % for ground	AgDrift adjusted values based on label restrictions

[1] – Inputs determined in accordance with EFED "*Guidance for Chemistry and Management Practice Input Parameters for Use in Modeling the Environmental Fate and Transport of Pesticides*" dated February 28, 2002