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

OFFICE OF PREVENTION, PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

January 11, 2001

SUBJECT: Tier II Drinking Water Assessment for Tebuconazole
P.C. Code: 128997
DP Barcode: D269918

FROM: Amer Al-Mudallal, Chemist Amudallal 1/11/01
Environmental Risk Branch I
Environmental Fate and Effects Division (7507C)

THROUGH: Sid Abel, Branch Chief Sid Abel 1/11/01
Environmental Risk Branch 1
Environmental Fate and Effects Division (7507C)

TO: Mary Waller, PM
Registration devision (7505C)

As stated in our previous Tier II drinking water assessment for tebuconazole dated March 29, 2000 (attached), the use of tebuconazole on turf represents the highest annual use rate at 2.0 lbs ai/acre. However, not having a Tier II scenario for turf prevented us from performing the drinking water assessment for tebuconazole use on turf. The registered use of tebuconazole on cherries, peaches, and nectarines which represents the second highest annual use rate at 1.35 lbs ai/acre, was chosen for performing the drinking water assessment. Although a Tier I assessment for the use of tebuconazole on turf can be performed, EFED believes that a Tier II PRZM-EXAM (using the IR+PCA) drinking water assessment for the use of tebuconazole on cherries, provides a more appropriate assessment for use in HED's risk assessment..

The 1 in 10 year annual peak (acute) concentration of tebuconazole in drinking water is not expected to exceed **38.7** µg /L in a Wisconsin cherries index reservoir scenario adjusted for a default PCA factor of 0.87. The 1 in 10 year annual mean (chronic) concentration of tebuconazole in drinking water from this scenario is not expected to exceed **23.1** µg /L. The 36 year annual average concentration is not expected to exceed **19.1** µg /L.

However, since the cherry scenario does not reflect the highest proposed label use rate for tebuconazole, EFED cannot be certain that these concentrations represent the most conservative values. A Tier II assessment using a turf scenario may result in higher concentrations, especially given the higher use rate and potential use areas where soils may be more prone to runoff..

Table 1. PRZM/EXAMS INPUT PARAMETERS FOR Tebuconazole		
MODEL PARAMETER	VALUE	SOURCE
Application Rate	0.225 lb ai/acre	Label EPA Reg. # 3125-388
Number of Applications	6 applications	Label EPA Reg. # 3125-388
Interval Between Application	7 days	Label EPA Reg. # 3125-388
Aerobic Soil Metabolism $t_{1/2}$	796 days	MRID # 40700959
Anaerobic Soil Metabolism $t_{1/2}$	1063	MRID # 40700959
Organic Matter Partitioning Coefficient (K_d)	7.69	MRID # 40995922, 40700960
Molecular Weight	308	Product Chemistry
Solubility	32 ppm	Product Chemistry
Vapor Pressure	9.8E-9	Product Chemistry
Henry's Constant	1.24E-10	Calculated
Soil Photolysis	192.5 days	MRID # 40700958
Aqueous Photolysis $t_{1/2}$	590 days	MRID # 40700958

TABLE 2. IR/PCA TIER II CONCENTRATION OF TEBUCONAZOLE IN SURFACE WATER FROM SIX APPLICATIONS ON WISCONSIN CHERRIES					
PEAK	96 HOUR	21 DAYS	60 days	90 DAYS	YEARLY
38.7 µg /L	38.4 µg /L	37.4 µg /L	35.7 µg /L	34.0 µg /L	23.1 µg /L

Assumptions and Uncertainties

Index Reservoir

The index reservoir represents potential drinking water exposure from a specific area (Illinois) with specific cropping patterns, weather, soils, and other factors. Use of the index reservoir for areas with different climates, crops, pesticides used, sources of water (e.g. rivers instead of reservoirs, etc), and hydrogeology creates uncertainties. In general, because the index reservoir represents a fairly vulnerable watershed, the exposure estimated with the index reservoir will likely be higher than the actual exposure for most drinking water sources. However, the index reservoir is not a worst case scenario, communities that derive their drinking water from smaller bodies of water with minimal outflow, or with more runoff prone soils would likely get higher drinking water exposure than estimated using the index reservoir. Areas with a more humid climate that use a similar reservoir and cropping patterns may also get more pesticides in their drinking water than predicted using this scenario.

A single steady flow has been used to represent the flow through the reservoir. Discharge from the reservoir also removes chemical so this assumption will underestimate removal from the reservoir during wet periods and overestimates removal during dry periods. This assumption can both underestimate or overestimate the concentration in the pond depending upon the annual precipitation pattern at the site.

The index reservoir scenario uses the characteristics of a single soil to represent the soil in the basin. In fact, soils can vary substantially across even small areas, and this variation is not reflected in these simulations.

The index reservoir scenario does not consider tile drainage. Areas that are prone to substantial runoff are often tile drained. Tile drainage contributes additional water and in some cases, additional pesticide loading to the reservoir. This may cause either an increase or decrease in the pesticide concentration in the reservoir. Tile drainage also causes the surface soil to dry out faster. This will reduce runoff of the pesticide into the reservoir. The watershed used as the model for the index reservoir (Shipman City Lake) does not have tile drainage in the cropped areas.

EXAMS is unable to easily model spring and fall turnover. Turnover occurs when the temperature drops in the fall and the thermal stratification of the reservoir is removed. Turnover occurs again in the spring when the reservoir warms up. This results in complete mixing of the chemical through the water column at these times. Because of this inability, the Index Reservoir has been simulated without stratification. There is data to suggest that Shipman City Lake, upon which the Index Reservoir is based, does indeed stratify in the deepest parts of the lake at least in some years. This may result in both over and underestimation of the concentration in drinking water depending upon the time of the year and the depth the drinking water intake is drawing from.

Percent Crop Area Correction Factor

The PCA is a watershed-based modification. Implicit in its application is the assumption that currently-used field-scale models reflect basin-scale processes consistently for all pesticides and uses. In other words, we assume that the large field simulated by the coupled PRZM and EXAMS models is a reasonable approximation of pesticide fate and transport within a watershed that contains a drinking water reservoir. If the models fail to capture pertinent basin-scale fate and transport processes consistently for all pesticides and all uses, the application of a factor that reduces the estimated concentrations predicted by modeling could, in some instances, result in inadvertently passing a chemical through the screen that may actually pose a risk. Some preliminary assessments made in the development of the PCA suggest that PRZM/EXAMS may not be realistically capturing basin-scale processes for all pesticides or for all uses. A preliminary survey of water assessments which compared screening model estimates to readily available monitoring data suggest uneven model results. In some instances, the screening model estimates are more than an order of magnitude greater than the highest concentrations reported in available monitoring data; in other instances, the model estimates are less than monitoring concentrations. Because of these concerns, the SAP recommended using the PCA only for "major" crops in the Midwest. For other crops, development of PCA's will depend on the availability of relevant monitoring data that could be used to evaluate the result of the PCA adjustment.

The spatial data used for the PCA came from readily-available sources and have a number of inherent limitations:

- The size of the 8-digit HUC [mean = 366,989 ha; range = 6.7-2,282,081 ha; n = 2,111] may not provide reasonable estimates of actual PCA's for smaller watersheds. The watersheds that drain into drinking water reservoirs are generally smaller than the 8-digit HUC and may be better represented by watersheds defined for drinking water intakes.
- The conversion of the county level data to watershed-based percent crop areas assumes the distribution of the crops within a county is uniform and homogeneous throughout the county area. Distance between the treated fields and the water body is not addressed.
- The PCA's in Table 1 were generated using data from the 1992 Census of Agriculture. However, recent changes in the agriculture sector from farm bill legislation may significantly impact the distribution of crops throughout the country. The methods described in this report can rapidly be updated as more current agricultural crops data are obtained. The assumption that yearly changes in cropping patterns will cause minimal impact needs to be evaluated.

The PCA adjustment is only applicable to pesticides applied to agricultural crops. Contributions to surface waters from non-agricultural uses such as urban environments are not well-modeled. Currently, non-agricultural uses are not included in the screening model assessments for drinking water.

The PCA does not consider percent crop treated because detailed pesticide usage data are extremely limited at this time. Detailed pesticide usage data are currently available for only a few states.

References

Effland, W., N. Thurman, I. Kennedy, and S. Abel. 1999. " *Proposed Methods for Determining Watershed-derived Percent Crop Areas and Considerations for Applying Crop Area Adjustments to Surface Water Screening Models*, presented to the FIFRA Science Advisory Panel, March 1999. http://www.epa.gov/pesticides/SAP/1999/pca_sap.pdf

Jones, R.D., S.W. Abel, W. Effland, R. Matzner, and R. Parker. 1998. "An Index Reservoir for Use in Assessing Drinking Water Exposures. Chapter IV in *Proposed Methods for Basin-Scale Estimation of Pesticide Concentrations in Flowing Water and Reservoirs for Tolerance Reassessment.*, presented to the FIFRA Science Advisory Panel, July 1998. http://www.epa.gov/pesticides/SAP/1998/index.htm

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MEMORANDUM

March, 29, 2000

SUBJECT: Tier II Drinking Water Assessment for Tebuconazole
P.C. Code: 128997
DP Barcode: D259102, D259133

FROM: Amer Al-Mudallal, Chemist
Environmental Risk Branch I
Environmental Fate and Effects Division (7507C)

THROUGH: Arnet Jones, Branch Chief
Kevin Costello, Geologist, RAPL
Environmental Risk Branch 1
Environmental Fate and Effects Division (7507C)

TO: Linda Kutney
Registration devision (7505C)

Bill Wassell
Health Effects Division (7509C)

CONCLUSIONS

Although the proposed use of tebuconazole on turf represents the highest annual use rate at 2.0 lbs ai/acre, not having a Tier II scenario for turf prevented us from performing the drinking water assessment on turf. The registered use of tebuconazole on cherries, peaches, and nactarines which represents the second highest annual use rate at 1.35 lbs ai/acre was chosen for performing the drinking water assessment. A Tier II PRZM-EXAM modeling using the index reservoir (IR) scenario and the percent crop area (PCA) adjustment factor for the use of tebuconazole on cherries with an application rate of 0.225 lbs ai/acre, six applications at 7days interval was modeled.

The 1 in 10 year annual peak (acute) concentration of tebuconazole in drinking water is not expected to exceed **38.7** µg /L in a Wisconsin cherries index reservoir scenario adjusted for a default PCA factor of 0.87. The 1 in 10 year annual mean (chronic) concentration of tebuconazole in drinking water from this scenario is not expected to exceed **23.1** µg /L.

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DP BARCODE: D269918

CASE: 192687
SUBMISSION: S576214

DATA PACKAGE RECORD
BEAN SHEET

DATE: 10/25/00
Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REGISTRATION   ACTION: 116   RESB NC-NON-FOOD/FEED U
RANKING : 20 POINTS ()
CHEMICALS: 128997 Tebuconazole   0.0000%

ID#: 003125-GOO LYNX 25
COMPANY: 003125 BAYER CORP
PRODUCT MANAGER: 21 MARY WALLER   703-308-9354   ROOM: CM2 249
PM TEAM REVIEWER: MARY WALLER   703-308-9354   ROOM: CM2 249
RECEIVED DATE: 02/22/00   DUE OUT DATE: 08/30/00

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 269918   EXPEDITE: N   DATE SENT: 10/24/00   DATE RET.: / /
CHEMICAL: 128997 Tebuconazole
DP TYPE: 001 Submission Related Data Package
CSF: N   LABEL: Y

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	11/01/00	01/11/01
BRAN: ~~IO~~ ERBI	11/01/00	01/11/01
SECT: IO	11/01/00	01/11/01
REVR :	11/01/00	01/11/01
CONTR:	/ /	/ /

ADMIN DUE DATE: 02/21/01
NEGOT DATE: / /
PROJ DATE: / /

* * * DATA REVIEW INSTRUCTIONS * * *

Tebuconazole -

Please conduct a drinking water assessment to cover the use of tebuconazole on turf. Attached is a copy of the label and a set of labels for representative tebuconazole products. If you need any additional information, please contact Mary Waller. 308-9354.

* * * DATA PACKAGE EVALUATION * * *

No evaluation is written for this data package

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
264564	ERB1/IO	03/29/00	07/27/00	Y	N	N
269924	IO/IO	10/24/00	02/21/01	Y	N	Y