UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Refined Projected Percent Crop Treated (PPCT) Estimates for Use of Propazine and Atrazine on Sorghum in Texas, PC Code 080808, DP Barcode 335065

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I. SUMMARY

The Registration Division (RD) asked BEAD to review the market share estimate for propazine use on sorghum in Texas, which was submitted by the National Sorghum Growers (NSG). NSG estimated that propazine would capture a maximum of 20% market share as indicated under the propazine Section 18. BEAD determined that there were many uncertainties surrounding the reported percent crop treated (PCT) values in the Section 18 and proceeded to derive projected percent crop treated (PPCT) values for propazine and atrazine use on sorghum in Texas based on available historical usage data. BEAD found that for propazine, the best indication of future use was the last three years (1987-1989) of the propazine registration before cancellation; for

atrazine, the best indication of future use was during the years 1993-1995, the last time that atrazine and propazine were on the market simultaneously. The methodology used to produce the estimates for chronic risk assessment, 18 percent for propazine and 54 percent for atrazine, is outlined in Table 1. An analysis of additional biological information for propazine PPCT in Texas are also presented in this memo.

Table 1. Propazine and Atrazine PPCT Values to be used in Chronic Risk Assessment

Crop	Propazine PPCT	Atrazine PPCT
Sorghum	18%[a]	54%[b]

a. This is an average of the PCT for the last three years of propazine usage data when it had full registration, 1987-1989.

b. This is an average of PCT for three years, 1993-1995, of atrazine usage data when propazine was used under section 18.

II. BACKGROUND

RD asked the NSG to provide market share estimates for use on propazine on sorghum following EFED water calculations (based on PPCT estimates BEAD provided in 2005) that resulted in risks of concern for infants in Texas. The PPCT estimates that BEAD provided in 2005 consisted of two scenarios: one based on the market leader approach where the PPCT of the market leader, atrazine, was used as the upper bound estimate (70%) for propazine use on sorghum; and one based on the average US sorghum acreage treated with propazine in five states (CO, NM, OK, KS, and TX), which was 29%. In the second scenario, it was also assumed (conservatively) that all of the acreage in these states not treated with atrazine would be treated with propazine. Following receipt of the market share estimates from NSG (which BEAD believes is comparable to percent of crop treated), RD asked BEAD to verify them.

NSG estimated that propazine would capture a maximum of 20% market share as indicated under the propazine Section 18. They were comfortable with an assumption that propazine would replace atrazine on 15% of the acres treated with atrazine currently and 5% would be used on the 30% of the acreage that does not receive an atrazine treatment. (See BEAN DP Barcode #335065)

III. BEAD PPCT ESTIMATES

BEAD reviewed available data for propazine for the years 1983-2005. During that period, propazine was registered for use on sorghum for the years 1983-1989 and was allowed for use under a Section 18 for the years 1993-1995 after its use was cancelled in 1990. While the usages under the Section 18s for propazine clearly indicate the need for an alternative to atrazine, there are many uncertainties surrounding the reported PCT values. As a result, BEAD sought a more conservative approach. BEAD determined that the best indication of future propazine use was the last three years of the propazine registration (1987-1989), before cancellation, at a time when both atrazine and propazine were on the market. BEAD averaged the PCT for the last three years (1987-1989) to obtain a value of 18%, which was used as the PPCT value for propazine.

BEAD also reviewed available data for atrazine for the years 1983-2005. We did not consider

using atrazine usage data from 1987-1989 to derive the atrazine PPCT estimates because atrazine PCTs at that time were well below PCT values found since that time for atrazine in USDA NASS and proprietary data surveys. BEAD determined that the most conservative approach would be to look at the last time that atrazine and propazine were on the market simultaneously, during the years 1993-1995, the period in which there were Section 18s for propazine. BEAD averaged the PCT for the three years to obtain an average of 54%, which was used as the PPCT value for atrazine.

IV. ADDITIONAL FACTORS

Sorghum growers have expressed to EPA many of the benefits to registration of propazine (SMART meeting, 2004; Propazine Sorghum Use meeting, 2005). Two of the reasons that sorghum growers would like the registration of propazine are so that growers can rotate back into cotton or wheat, and because atrazine can injure sorghum. Both atrazine and propazine control a similar spectrum of weeds, including grasses and broadleaf weeds, as described in a previous BEAD memo (Phillips and Zinn, 2004): Propazine as a preemergence herbicide in grain sorghum production has had a use history, and then later it was the subject of Section 18 requests by Colorado, Oklahoma, Kansas, New Mexico, and Texas. In 1989, the manufacturer halted propazine production and supplies of propazine lasted end users until the mid 1990's; this is the time when states began submitting Section 18 requests to EPA.

The rationale for the Section 18s included the need to rotate cotton after sorghum. BEAD received information from the National Sorghum Growers on sorghum/cotton rotations in Texas (Lust, 2007). In the southern portion of the state, growers rotate cotton with sorghum or corn every other year. In the northern portion of the state, growers grow cotton continuously, and rotate into sorghum (or wheat) every 5 to 10 years (Lust, 2007). As mentioned previously by BEAD, according to the proposed propazine label the earliest cotton may be planted after treatment in Texas is 12 months (Phillips and Zinn, 2004). For atrazine, growers must wait until the following season to plant a crop other than corn or sorghum, unless additional restrictions apply (e.g. in the High Plains, after an atrazine application sorghum must be followed by sorghum or corn before another crop can be planted). Therefore, it is not clear if propazine will give growers a rotational benefit compared to atrazine, although in some areas, such as the High Plains, it may.

Preemergence applications of atrazine may cause phytotoxicity to sorghum (SMART meeting, 2004; Propazine Sorghum Use meeting 2005; Philips and Ross, ca. 1965). The atrazine label also identifies various conditions, such as post emergence applications to sand or loamy sand soils, when atrazine applications could cause sorghum injury.

In Texas, triazine resistant (specifically atrazine but cross resistance may occur) Palmer amaranth has been documented in corn and sorghum. In sorghum, resistance was identified in 1995 with an estimate of up to 1000 acres infested. It was also noted that the area with the resistant weed could be expanding (Heap, 2007). However, it is not clear how many acres are currently infested.

Given the rotational benefits in some areas and the phytotoxicity concerns with atrazine, even if more expensive, BEAD expects that some growers would choose to use propazine instead of atrazine. However, limitations to the adoption of propazine include the possibility of higher cost and the presence of resistant weeds.

V. CONCLUSIONS/RECOMMENDATIONS

BEAD recommends that the average PPCT values given in Table 1 be used by EFED for atrazine and propazine. BEAD has considered all available relevant information and believes it is unlikely that the above PPCT values will be exceeded during the next five years for sorghum.

VI. REFERENCES

Lust, T., CEO, National Sorghum Producers, Personal communication with D. Kenny, OPP, EPA, January 26, 2007.

Heap, I. The International Survey of Herbicide Resistant Weeds. Online. Internet. February 15, 2007. Web address: www.weedscience.com

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Phillips, W. and N. Zinn, 2004, Atrazine/Propazine Use on Sorghum, USEPA.

Phillips, W.M. and W.M. Ross., 1965, Effect of Propazine and Atrazine on Ten Hybrid Grain Sorghums, *Sorghum vulgare* Pers. Agron. J. 57:624-625

Propazine SMART meeting (EPA, National Grain Producers, USDA, DuPont), June 21, 2004.

EPA Proprietary Data (1983-2005), for use only within OPP.

USDA NASS Agricultural Chemical Usage, Field Crops Summary, different years.

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