UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

June 3, 1999

MEMORANDUM

Subject: Review of Request by South Dakota (99-SD-04) for the use of sulfentrazone (AI: 129081) on Sunflowers to control kochia. [Barcodes: D256028 & 256056]

From: James G. Saulmon
Herbicide and Insecticide Branch
Biological and Economic Analysis Division (7503C)

David Widawsky
Economic Analysis Branch
Biological and Economic Analysis Division (7503C)

To: Jackie Mosby-Gwaltney/Robert Forrest
Registration Support Branch
Registration Division (7505C)

We have reviewed the first request by South Dakota for an emergency exemption to use sulfentrazone (Spartan Herbicide) on 200,000 acres of sunflower to control kochia. Earlier this year, Virginia Dietrich reviewed similar requests from Colorado (99-CO-01), Kansas (99-KS-04, Nebraska (99-NE-04), and Wyoming (99-WY-04). Jim Saulmon also reviewed similar requests for North Dakota (99-ND-17) and Minnesota (99-MN-21).

An excerpt from the Kansas (99-KS-04) review can be applied to this review as follows: The situation as described meets agronomic criteria for an urgent and possibly non-routine condition in no-till and low till sunflowers because an adequate alternative is not available. The situation does not meet the economic criteria for significant economic loss because it appears to be directed toward revenue enhancement and/or expansion of viable sunflower acreage.

Biological Aspects:

This request is based on the following: 1. Sulfentrazone provides excellent control of kochia and other broadleaf weeds, and 2. Sulfentrazone is more effective than pendimethalin (Prowl), the registered alternative, for low-till and no-till sunflowers under low moisture conditions.

(1)

CONCURRENCES								
SYMBOL	7503C	7503C	BEAD	BEAD				
SURNAME	[illegible]	[illegible]	[illegible]	[illegible]				
DATE	6/3/99	6/3/99	6/3/99	6/3/99				

In regard to weed control in sunflowers, registered herbicides (e.g., ethalfluralin, trifluralin, and pendimethalin) do not provide adequate control of kochia. Non-chemical weed control methods (i.e., row cultivation is used 48% of the sunflower crop and rotary hoe is used on 3%) provide control alternatives in conventional tillage systems.

Leon Wrage and Anita Wells at South Dakota State University were contacted and kindly responded to questions about the SD request 99-SD-04 (please see Appendix 1) as follows: 1. The 200,000 acres estimate [of sunflowers to be treated] is based on approximately 20% of the total acreage; this would provide use on 40-50% of the acres where kochia is a significant problem. 2. An estimated 65-75% of the 200,000 acres currently [are] in no-till/minimum till systems. 3. An estimated 25-35% of the 200,000 acres are currently conventional till; would change to reduced till system if weed control is available. 4. Precipitation has been adequate for activation to this point in nearly all areas; however, pendimethalin preemergence is even less effective for Kochia as a preemergence treatment, even with optimum conditions. 5. ALS resistant biotypes are widespread in the state. Estimated 80-90% of the producers with Kochia problems are expected to be concerned about resistant biotypes. 6. County surveys have not been conducted. Field resistance was documented in 10 to 12 counties where ALS herbicides were used in winter wheat (about 10 years ago); resistance in fields was document the past 5 years in the spring wheat/soybean acres. These areas include the primary sunflower producing counties. Producers are now advised to consider that ALS resistance is now part at (sic) [of] significant Kochia problems. 7. There have been no new weed technologies for Kochia control during the past 5 years. Glyplasate (sic) [Glyphosate] labeling provides some burdown (sic) [burndown] control, but does not give residual control.

Leon J. Wrage provided eleven pages of copies of data as evidence of ALS resistant kochia biotypes. Included were studies in soybeans and in wheat. The performance of IMI and SU mode herbicides (when used alone) was noted. For example, a 1996 study of ALS Resistant kochia control in soybeans in Marshall County included preplant incorporated Treflan, Sonalan, and Prowl which provided 80%, 75%, and 66% control of ALS resistant kochia, respectively. Thus, there was less than adequate control of kochia.

In comparison, the sect 18 requests for ND (99-ND-17) and SD (99-SD-04) described similar problems with ALS resistant kochia and similar efforts to conserve soil and moisture losses no-till or minimum-till programs. It appears that the sunflower growers are in need of a preplant/preemergence herbicide, such as sulfentrazone, that works under the constraints of the no-till and minimum till programs.

Economic Aspects

The situation of kochia infested sunflower in South Dakota does not appear to result in economic

loss for a Section 18 exemption. This finding was based on several linked criteria:

1. **The kochia situation in South Dakota is largely routine.** Similar to the situations in North Dakota, Minnesota, Kansas, Nebraska, Colorado, and Wyoming (all of which have applied for Section 18 exemptions for sulfentrazone in sunflower), kochia appears to be endemic to the sunflower production system. The application introduces two tables to describe the importance of kochia in sunflower (pages 5 and 6), referring to the North Dakota State University (NDSU) Extension Report 46 from 1997. The application fails to mention that similar sunflower grower surveys were also published by NDSU in 1990, 1991, 1992, and 1994 and that all described kochia as an important weed in sunflower. Kochia has been a yield limiting problem for South Dakota sunflower growers for a considerable time and may not qualify as an emergency condition.

Economic losses result when current yields (*without sulfentrazone*) are expected to be less than historic yields (*without sulfentrazone*). But, there is limited evidence of changes in the weed problem, and the only apparent change is in the extent of herbicide resistant kochia. While Mr. Wrage (South Dakota State University extension weed specialist) notes that the majority of sunflower growers in the affected 200,000 acres are concerned about resistant kochia biotypes, there is no estimate of the relative contributions to yield loss from the non-resistant and resistant biotypes. Lacking evidence of the extent to which herbicide resistant kochia causes yield losses separate from those endemic to sunflower fields since at least the late 1980s, the situation must be considered routine with respect to significant economic loss under Section 18.

2. **Acreage expansion or change in cropping system do not support economic losses.** Economic losses, for Section 18 exemptions, would need to be based on production impacts on current sunflower production acres. Supporting conversion to no-till production is not a basis for claiming a Section 18 significant economic loss. Although the application argues convincingly that kochia can substantially reduce sunflower yields, sulfentrazone use in sunflowers appears to be intended (at least partly) to facilitate adoption of no-till production by replacing less effective herbicides. As such, these factors do not qualify as economic losses under routine, albeit yield limiting, conditions. As the application states:

"Lack of registered herbicides for broadleaf weed control in no-till and conventional till sunflower production systems limits expansion of sunflower acreage in the U.S."[page 6]

"Estimated 25-35% of the 200,000 acres are currently conventional till; would change to reduced till system if weed control is available."[Mr. Leon Wrage, note to EPA regarding 99SD04 application]

In spite of the concern about the feasibility of growing sunflower in South Dakota due to kochia infestation, the acreage planted in sunflower has steadily increased over the last four years. After peaking in 1994-5 at approximately 950 thousand acreas, sown acres declined to 700 thousand acres in 1996 and then grew steadily to 875 thousand acres in

1997 and 940 thousand acres in 1998. On March 31,1999 the South Dakota Agricultural Statistics Service announced that producers in South Dakota intended to plant 1.16 million acres of sunflowers, up 23 percent from 1998 (a 65 percent increase from 1996). If yield losses from kochia threaten the viability of sunflower production in South Dakota, it remains a question as to why growers are breaking new records for acreage planted to sunflower. Rapidly expanding acreage in the absence of sulfentrazone suggests favorable economic conditions and argues against a finding of significant economic loss.

3. **Explanation of Economic Loss is Incomplete.** The application presents tables estimating the economic loss associated with the emergency condition (page 9). These data are insufficient for determining economic loss, even if it were decided that the situation is urgent and non-routine. As noted above, economic loss is based on the expectation that yields and revenues under the emergency condition will decrease from the average expected yields, revenues, and profits. The application describes production costs in the aggregate, and includes the cost of Spartan as a production cost, which is inconsistent with making the determination of significant economic loss. Costs need to be disaggregated into specific fixed and variable costs in order to ascertain how costs will change in the emergency condition compared to the usual condition, irrespective of Spartan use. Similarly, yield losses should be disaggregated into those associated with endemic kochia infestations and those associated with an emergency condition. This is particularly important since the application and its supplementary information show that many of the 200,000 acres falling under the request are cultivated with conventional tillage, resistant kochia biotypes are not a problem everywhere, and rainfall has been adequate (even excessive), allowing activation of currently registered herbicides and reducing expected yield losses.

Conclusion. BEAD recommends that ~~RD~~ consider both agronomic and economic aspects in deciding whether to grant Kansas the emergency exemption for the use of sulfentrazone on sunflowers to control kochia in reduced tillage areas.

APPENDIX 1

5/19/99

To: Mr. Leon Wrage, Extension Weed Specialist, South Dakota State University, Brookings, SD
Phone: (605)-688-4591; Fax: (605)-688-4602; e-mail: wragel@ur.sdstate.edu

Many Thanks In Advance! Please send your responses to the questions by close of business, today (if possible), to Jim Saulmon at the following email address: saulmon.james@epa.gov
Jim can also be reached at phone: 703-308-8126; fax: 703-308-8090.

Questions regarding Sect_18 (99-SD-04) request to use sulfentrazone (Spartan Herbicide) (AI: 129081) in sunflowers to control kochia follow:

1. What percentage of the 200,000 acres of sunflowers which are proposed to be treated with sulfentrazone are currently in no-till?

2. What percentage of the 200,000 acres of sunflowers which are proposed to be treated with sulfentrazone are currently tilled?

3. What percentage of the 200,000 acres of sunflowers which are proposed to be treated with sulfentrazone has had sufficient moisture, so far during this growing season, to activate pendimethalin?

4. What percentage of the 200,000 acres of sunflowers, which are proposed to be treated with sulfentrazone, have had sufficient moisture for growth, so far during this growing season?

5. What percentage of the 200,000 acres of sunflowers which are proposed to be treated with sulfentrazone are infested with kochia species that are resistant to AlS (Imi & SU) mode of action herbicides?

6. Please provide data which substantiate claims of kochia species that are resistant to AlS (Imi & SU) mode of action herbicides?

7. Has there been any change in weed control of kochia in sunflowers during the last 5 years?

To: James Saulmon/DC/USEPA/US@EPA
Subject: FW: [Fwd: Urgent - Questions re Sect_18 (99-SD-04) for use of

The 200,000 acres estimate is based on approximately 20% of the total acreage; this would provide use on 40-50% of the acres where Kochia is a significant problem.

1. Estimated 65-75% of the 200,000 acres currently in no-till/minimum till systems.

2. Estimated 25-35% of the 200,000 acres are currently conventional till; would change to reduced till system if weed control is available.

3. Precipitation has been adequate for activation to this point in nearly all areas; however pendimethalin preemergence is even less effective for Kochia as a preemergence treatment, even with optimum conditions.

4. Rainfall has been abundant(excessive) in nearly all areas.

5. ALS biotypes are widespread in the state. Estimated 80-90% of the producers with Kochia problems are expected to be concerned about resistant biotypes.

6. County surveys have not been conducted. Field resistance was documented in 10 to 12 counties where ALS herbicides were used in winter wheat (about 10 years ago); resistance in fields was document the past 5 years in the spring wheat/soybean acres. These areas include the primary sunflower producing counties. Producers are now advised to consider that ALS resistance is now part at significant Kochia problems.

7. There have been no new weed technologies for Kochia control during the past 5 years. Glyplasate (sic) [Glyphosate] labeling provides some burdown (sic) [burndown] control, but does not give residual control.

Please let us know if there are additional questions.

-----Original Message-----
From: Wrage, Leon Plant Sci
Sent: Wednesday, May 19, 1999 3:57 PM
To: Wells, Anita Plant Sci
Subject: FW: [Fwd: Urgent - Questions re Sect_18 (99-SD-04) for use of
-----Original Message-----
From: Scott Wagner [mailto:wagners@ur.sdstate.edu]
Sent: Wednesday, May 19, 1999 1:54 PM
To: wragel
Subject: [Fwd: Urgent - Questions re Sect_18 (99-SD-04) for use of
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To: Mr. Leon Wrage, Extension Weed Specialist, South Dakota State University, Brookings, SD Phone: (605)-688-4591; Fax: (605)-688-6065; email:sdsuweed@brookings.net

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