DP Barcode : D191300
PC Code No : 122010
EEB Out : DEC 15 1993

To: Vickie Walters, PM Team Reviewer
Robert Taylor, Product Manager 41
Registration Division (7505C)

From: Anthony F. Maciorowski, Chief
Ecological Effects Branch/EFED (7507C)

Attached, please find the EEB review of...

Reg./File # : 352 - 435
Chemical Name : Metsulfuron methyl (Ally)
Type Product : Herbicide
Product Name : Ally Herbicide
Company Name : DuPont de Nemours and Co., Inc.
Purpose : Request to add grain sorghum to Ally label. Label and supporting refences enclosed.

Action Code : 330 Date Due : 12-30-93
Reviewer : William S. Rabert Date In EEB: 05-08-93

EEB Guideline/MRID Summary Table: The review in this package contains an evaluation of the following:

GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT
71-1(A)			72-2(A)			72-7(A)		
71-1(B)			72-2(B)			72-7(B)		
71-2(A)			72-3(A)			122-1(A)		
71-2(B)			72-3(B)			122-1(B)		
71-3			72-3(C)			122-2		
71-4(A)			72-3(D)			123-1(A)		
71-4(B)			72-3(E)			123-1(B)		
71-5(A)			72-3(F)			123-2		
71-5(B)			72-4(A)			124-1		
72-1(A)			72-4(B)			124-2		
72-1(B)			72-5			141-1		
72-1(C)			72-6			141-2		
72-1(D)						141-5		

Y=Acceptable (Study satisfied Guideline)/Concur
P=Partial (Study partially fulfilled Guideline but additional information is needed
S=Supplemental (Study provided useful information but Guideline was not satisfied)
N=Unacceptable (Study was rejected)/Nonconcur

EEB Review

Metsulfuron Methyl (Ally)

100 Submission Purpose and Label Information

DuPont has applied for a new use amendment to add the use of Ally Herbicide (metsulfuron methyl) for weed control in grain sorghum to the label. A tolerance request and supporting studies were submitted.

100.1 Pesticide Use

Metsulfuron methyl is a registered herbicide with registered uses on wheat, field corn, soybeans, cotton, etc. NOTE: Use on all crops are limited to soils with a pH level of 7.5-7.9 or less.

100.2 Formulation Information

No pesticide label was provided. Information on use and rates were provided on a supplemental label. Information on percent active ingredient was obtained for the EPA Reg. No. 352-435 from a former EEB review dated 9-21-92.

Active Ingredient: Metsulfuron methyl
Methyl 2-[[[(4-methoxy-6-methyl-1,3,5-triazin-2yl)-amino] carbonyl] -sulfonyl] benzoate . . . . . 60.0 %
Inert Ingredients . . . . . 40.0 %

100.3 Application Methods, Directions, Rates

Under the proposed new use, Ally herbicide would be applied at 1/20 oz/A in a tank mixture with 2,4-D Amine for use on irrigated or dryland grain sorghum in Colorado, Kansas, Nebraska, New Mexico, Oklahoma, and Texas. Do not use in the following counties of Colorado: Alamosa, Conejos, Costilla, Rio Grande and Saquache. Do not use on forage sorghum. Do not include a surfactant or crop oil in mixture.

Ally herbicide can be applied to grain sorghum by properly calibrated ground or aerial equipment. Select a spray volume and delivery system that will insure thorough coverage and a uniform spray pattern. Increase spray volume and pressure as weed density and size increases. (Flood nozzles may not provide adequate coverage for foliar contact.) Avoid overlapping, and shut off spray booms while starting, turning, slowing or stopping, or injury to the crop or following crops may result.

Note: Do not make applications during weather conditions which cause spray to drift onto nontarget sites.

Ground application: Apply uniformly by ground with a properly calibrated low pressure (20-40 PSI) boom sprayer equipped with flat fan nozzles. Use 10-30 GPA with ground equipment.

Aerial Application: Use orifice discs, cores and nozzle types and arrangements that will provide for maximum spray distribution and maximum coverage a 1 to 5 GPA. Do not apply during inversion conditions, when winds are gusty, or when other conditions will favor poor coverage and/or drift.

Ally can be used on either dryland or irrigated grain sorghum. Do not use this product through any type of irrigation system. If application is made to irrigated sorghum, delay first post-treatment irrigation for at least 3 days after treatment. The first post-treatment irrigation should not exceed 1".

Use cultivation prior to Ally + 2,4-D amine treatment to cover exposed brace roots of grain sorghum to minimize injury from 2,4-D Amine.

Do not exceed one (1) application per year.

100.4 Target Organism

Target organisms are unspecified weeds.

100.5 Precautionary Statements

A product label was not available. The following environmental precautions were extracted from the Supplemental Label. Some precautions listed below appear to be inconsistent with this petition for pesticide tolerances on grain sorghum, forage, fodder, and hay.

Temporary crop yellowing and/or stunting may occur soon after application, especially when crop is under stress.

Do not use on grain sorghum grown for seed production or syrup. Do not use on forage sorghum.

Do not include a surfactant or crop oil to the tank mix.

Do not apply this treatment under cold, wet weather conditions or to grain sorghum growing under stress caused by weather, insects or disease as crop injury may result.

Do not apply to irrigated land where tail water will be used to irrigate crops other than grain sorghum, wheat or barley.

Do not apply to fields confirmed to have weeds that are resistant to ALS/AHAS mode-of-action herbicides.

Do not apply to long season grain sorghum varieties or grain sorghum that is planted after July 1, as crop injury or delayed maturity may occur.

Do not exceed one (1) application per year.

The Supplement Label did not contain any human, fish or wildlife precautionary warnings.

101 Hazard Assessment

101.1 Discussion

Ally herbicide (metsulfuron methyl) is to be applied to grain sorghum at a rate of 1/20 oz. (ca. 0.003 lb) per acre in a tank mixture with 2,4-D Amine. Only one application per year is permitted. Treatments can be applied by ground or aerial applications. Grain sorghum to be treated is located in Colorado, Kansas, Nebraska, New Mexico, Oklahoma and Texas. According to Gusey and Maturgo (1973), grain sorghum fields in one or more of these states are heavily used for feeding by many species of wildlife. The wildlife species in these states include antelope, deer, aoudad (wild sheep), quail, pheasant, wild turkeys, greater and lesser prairie chickens, ducks, geese, sandhill cranes, mourning doves, and to a lesser degree of feeding by mule deer, squirrels, rabbits, and songbirds.

101.2 Likelihood of Adverse Effects on Nontarget Organisms

101.2 Environmental Fate

Summary of environmental fate data (from EFGW oneliner dated 10-20-89 and EFGW reports by Regelman (2-28-86 and 6-22-90)

Vapor Pressure = 5.8×10^{-5} Torr
Solubility in water at 25 °C: pH 4.6 = 270 mg/L
ph 5.4 = 1,750 mg/L
ph 6.7 = 9,500 mg/L
Ionization Constant (pK_a): 3.5
Log Octanol/Water Partition coefficient = 0.018
Hydrolysis: half-life at pH 5.0 = 3 weeks
pH 7.0 = stable
pH 9.0 = stable
Photolysis: half-life in water = stable (30 days)
half-life in soil = stable (30 days)
Aerobic soil metabolism (half-life) = somewhat persistent
Anaerobic soil metabolism (half-life) = 16-52 weeks
Field soil dissipation (half-life) = 2- 4 weeks
Simulated pond/sediment (half-life) = 4-11 weeks
Anaerobic aquatic system (half-life) = 5-20 weeks
Soil Koc: 61
Soil leaching = mobile (84-99%)
Bioconcentration: Bluegill uptake is low; highest levels in liver and viscera (2-4X)

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101.2.1 Terrestrial Exposures

The recommended application rate for metsulfuron methyl on grain sorghum is 1/20 oz (ca. 0.003 lb ai) per acre. Only one application is permitted per year. Treatments can be made with conventional ground equipment or aerial applications. Using EEB's nomograph (Urban, D. and N. Cook, Ecological Risk Assessment, EPA-540/9-85-001), the following maximum terrestrial residues are expected on the treatment site:

Substrate	Initial residues after application (ppm)
Short range grass	0.72
Leaves and leafy crops	0.33
Long grass	0.38
Forage (alfalfa and clover)	0.17
Pod containing seeds	0.04
Fruit	0.02
Soil (top 0.1 inch)	0.07

Exposures to off-site, non-target plants were calculated and summarized below for six scenarios resulting from either aerial or ground applications. For spray drift, the standard assumption is that for aerial applications the adjacent areas receive 5 percent of the application rate; while for ground applications, the policy is that the spray drift is considered minimal with minimal toxic effects. Two types of runoff are addressed (i.e., sheet and channelized runoff). Sheet runoff assumes sideways transport of the pesticide to an equal-sized, adjacent area. Channelized runoff assumes transport of the pesticide from a 10-acre treated area to a 1-acre wetland area. The percent of the applied pesticide present in the runoff is assumed to be a function of its solubility in water. Since metsulfuron methyl is highly soluble in water (> 100 ppm), 5 % runoff is assumed.

Aerial application (foliar and soil exposures):

A. Spray drift to off-site plants - foliar and soil exposures (standard value of 5 percent spray drift of application):

0.003 lb ai/A X 5 % spray drift = 0.00015 lbs ai/A

B. Sheet runoff and spray drift to equal-sized, off-site area - soil exposures (standard 60% of application rate reaches treatment area and 5% runoff based on high water solubility, > 100 ppm):

0.003 lb ai/A X 60 % X 5 % runoff + spray drift = 0.00009 lbs ai /A + 0.00015 lbs ai/A = 0.00024 lb ai/A

C. Channelized runoff to an off-site wetland - soil exposure (scenario: 10 acre treatment site to 1 acre wetland)

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0.003 lb ai/A X 60 % X 5 % runoff X 10 acres = 0.0009 lb ai/A

Ground application (foliar and soil exposures):

A. Spray drift on to an off-site area (standard policy assumes minimal risk to off-site plants)

B. Sheet runoff to an equal-sized, off-site area - soil level (standard 100 % of application rate reaches treatment site and there is minimal spray drift to adjacent areas):

0.003 lb ai/A X 100 % X 5 % runoff = 0.00015 lb ai/A

C. Channelized runoff to an off-site wetland - soil exposure (standard 10-acre treatment site to 1-acre wetland area)

0.003 lb ai/A X 100 % X 5 % runoff X 10 acres = 0.0015 lb ai/A

101.2.2 Aquatic Exposures

For ground applications, runoff could be a potential source for entry of metsulfuron methyl into aquatic areas. In addition to runoff, aerial application may result in direct application and spray drift to adjacent water bodies. Estimates of initial water concentrations of metsulfuron methyl in standing waters adjacent to fields are presented below.

Metsulfuron methyl is water soluble with a relatively low octanol/water partition and a low BCF value; and it is relatively stable to hydrolysis and photolysis. Metsulfuron methyl has been described as highly mobile in sandy soils with low organic content, hence runoff levels of about 5 percent might be expected from grain sorghum fields. Metsulfuron methyl is not likely to adsorb readily to sediments or organic matter or to bioaccumulate in aquatic organisms. The most rapid degradation found in studies is for hydrolysis at pH 5 (half-life is 3 weeks). Hence, aquatic concentrations are likely to remain relatively stable for 1 to 2 weeks and longer for aquatic systems with pH levels higher than 5.

Routes of exposure:	Initial water concentrations (ppb) Various Water depths (ft.)		
	0.5	3.0	6.0
Direct application	2.2	0.37	0.18
Spray drift (5 percent)	0.11	0.02	0.01
Runoff (5 percent)	0.54	0.18	0.09
Aquatic organisms (ppb)	< 2.2	< 0.37	< 0.18 (whole fish)

101.2.3 Terrestrial Toxicity

Acutely metsulfuron methyl is relatively nontoxic to bobwhite quail, mallard ducks, mammals and honey bees; and highly toxic to terrestrial plants, especially monocots (broad leaf species).

Test	Species	% a.i.	Test Results	MRID#	Status
Terrestrial Toxicity:					
71-1a	Mallard Duck	98 %	LD50 > 2510 mg/kg	071434	Core
71-2a	Bobwhite Quail	98 %	LC50 > 5620 ppm	071434	Core
71-2b	Mallard Duck	98 %	LC50 > 5620 ppm	071434	Core
71-4b	Mallard Duck	%	Repr. no study		
123-1(a)	Tier II. Pre-emergence (Seedling emergence)				
	Soybean	99 %	EC25 0.00041 lb/A	40639301	Suppl.
	Cocklebur	99 %	EC25 0.00048 lb/A	40639301	Suppl.
	Cotton	99 %	EC25 0.00036 lb/A	40639301	Suppl.
	Morningglory	99 %	EC25 0.000009 lb/A	40639301	Suppl.
	Wild Buckwheat	99 %	EC25 0.00035 lb/A	40639301	Suppl.
	Sugar Beet	99 %	EC25 0.000045 lb/A	40639301	Suppl.
	Corn	99 %	EC25 0.00091 lb/A	40639301	Suppl.
	Barnyardgrass	99 %	EC25 0.00187 lb/A	40639301	Suppl.
	Rice	99 %	EC25 0.00071 lb/A	40639301	Suppl.
	Nutsedge	99 %	EC25 0.00257 lb/A	40639301	Suppl.
123-1(a)	Tier II. Postemergence - growth inhibition (Vegetative vigor)				
	Soybean	99 %	EC25 0.000018 lb/A	40639301	Suppl.
	Cocklebur	99 %	EC25 0.00012 lb/A	40639301	Suppl.
	Cotton	99 %	EC25 0.00054 lb/A	40639301	Suppl.
	Morningglory	99 %	EC25 0.00032 lb/A	40639301	Suppl.
	Wild Buckwheat	99 %	EC25 > 0.001 lb/A (90 % effect at 0.001 lb ai/A)	40639301	Suppl.
	Sugar Beet	99 %	EC25 > 0.001 lb/A (100% effect at 0.001 lb ai/A)	40639301	Suppl.
	Corn	99 %	EC50 0.00303 lb/A (only one partial; no slope)	40639301	Suppl.
	Barnyardgrass	99 %	EC25 0.00034 lb/A	40639301	Suppl.
	Rice	99 %	EC50 0.015 lb/A (only one partial; no slope)	40639301	Suppl.
	Nutsedge	99 %	EC25 0.00025 lb/A	40639301	Suppl.
141-1	Honey Bee	95 %	Contact LD50 > 25 ug/bee	072765	Core
	Rat (male)	Tech.	LD50 > 5000 mg/kg	-	-
	Rat (female)	Tech.	LD50 > 5000 mg/kg	-	-
	Rat (male)	70 DF	LD50 > 5000 mg/kg	-	-
	Rat (female)	70 DF	LD50 > 5000 mg/kg	-	-
	Rabbit (dermal)	Tech.	LD50 > 2000 mg/kg	-	-
	Rat (inhal.)	Tech.	LC50 > 5.0 mg/l (4 hr)		-
	Rat (90 days)	Unkn.	NOEL 1000 ppm	-	-

Initial terrestrial residue levels are estimated to be as high as

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0.72 ppm on short grasses and 0.33 ppm on leaves. Acute effects are expected for birds or mammals that may feed on vegetation or insects in grain sorghum fields. No chronic toxicity data are available to assess possible reproductive effects on birds or mammals.

The risk assessment for off-site plants constitutes a comparison of spray drift exposure levels to the EC25 vegetative vigor toxicity values and the comparison of soil exposures produced from spray drift and runoff to the seedling emergence EC25 toxicity values. The available plant toxicity data were found insufficient for registration purposes, but can be used to estimate possible concerns for non-target crops and plants.

Aerial application at 0.003 lbs ai/A exceeds the EC25 toxicity values (**Risk Quotient**) for 2 out of 7 plant species from spray drift onto soybeans (**RQ=8**) and cocklebur (**RQ=1.25**), 2 out of 10 species from sheet and channelized runoff on morningglory (**RQ=27** and **RQ=100**, respectively, and on sugar beets **RQ=5** and **RQ=20**, respectively. Metsulfuron methyl had an even greater toxic effect on vegetative vigor for wild buckwheat and sugar beets. These two species might also be at risk from spray drift onto foliage, but the test data are insufficient to define their toxic-dose slopes and to calculate the EC25 toxicity values.

Ground application at 0.003 lbs ai per acre exceeds the EC25 risk values for 2 out of 10 species exposed to sheet runoff, i.e., morningglory, **RQ=17** and sugar beets, **RQ=3**. Channelized runoff to wetlands produces risk quotients greater than 1 for 8 out of 10 species, i.e., soybeans, **RQ=3.6**; cocklebur, **RQ=3**; cotton, **RQ=4**; morningglory, **RQ=167**; wild buckwheat, **RQ=4**; sugar beets, **RQ=33**; corn, **RQ=1.6**; and rice, **RQ=2**.

101.2.4 Aquatic Toxicity

Metsulfuron methyl is low acute toxicity to freshwater fish and aquatic invertebrates; and highly toxic to aquatic plants and algae.

Test	Species	% a.i.	Test Results				MRID#	Status
72.1a	Bluegill	92.9%	LC50	> 150	ppm		00125817	Core
72.1c	Rainbow Trout	92.9%	LC50	> 150	ppm		00125816	Core
72.2a	*Daphnia magna*	92.9%	LC50	> 150	ppm		00125818	Core
123-2	*Selenastrum capricornutum*	99 %	EC50	286	ppb		40639302 (5 days)	Core
123-2	Duckweed *Lemna gibba* G3	99.2%	EC50	0.36	ppb		41773902 (14 days)	Suppl.

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Adverse acute effects on fish and aquatic invertebrates are not expected from either spray drift or runoff from grain sorghum fields. Bioaccumulation in aquatic organisms is low and there is no concern for adverse effects for predatory birds or mammals.

Aquatic plants and algae are highly sensitive to metsulfuron methyl and may be adversely effected from direct application to water depth of 3 feet or less. Using the *Lemna gibba* EC50, the Risk Quotient for direct application is **RQ=6** in 6 inches of water and **RQ=1** in water 3 feet deep. Runoff into adjacent aquatic areas may also cause adverse effects to aquatic plants in water less than 3 feet in depth. Using the *Lemna gibba* EC50, the Risk Quotient for runoff is **RQ=1.5** in 6 inches of water which is a typical water depth for *Lemna gibba;* and **RQ=0.5** for water 3 feet deep.

101.3 Endangered Species Considerations

On the basis of toxicity data, EEB does not anticipate hazard to any endangered fish or wildlife species. However, metsulfuron methyl is highly toxic to plants, especially broadleaf species. Consequently, adverse affects may occur to endangered and threatened plants in areas adjacent to treated grain sorghum fields as a result of spray drift and runoff. Runoff of metsulfuron methyl may affect sensitive plants, if they are located downhill from treated sorghum fields, in adjacent wetlands, or nearby aquatic areas.

A cross check of grain sorghum-growing counties with EEB's Endangered Species files indicated that there are 57 sorghum-growing counties where endangered and/or threatened plant species occur (Attachment 1, dated 10/01/1992). A total of 26 species of endangered or threatened species were identified in 57 counties in Colorado, Kansas, Nebraska, New Mexico, Oklahoma, and Texas (Attachment 2). An cursory attempt was made to determine whether these plant species were adjacent to or near grain sorghum fields. A number of plants of potential concern are indicated (see the footnote for Attachment 2).

The habitat of some endangered and threatened plant species are prime agricultural areas. Considering the high risk levels for some non-target terrestrial plants above from spray drift and runoff, concern for adverse effects on endangered plants is a clear possibility for those plant species which occur near treated sorghum fields. While a few endangered plant species occur in remote areas and are not likely to be affected by metsulfuron methyl applications, there are a large number of species that may be located near grain sorghum fields. For example, the eastern and western prairie fringed orchids and Mead's milkweed were found in the tall grass prairie ecosystems that have been largely cleared for agricultural use in Kansas, Nebraska and Oklahoma. The location and potential for adverse effects for all listed plant species need to clarified with the U.S. Fish and Wildlife Service, Office of Endangered Species.

101.4 Adequacy of Toxicity Data

The existing data base is missing an upland avian and a waterfowl reproduction studies with bobwhite quail and mallard ducks to assess potential chronic effects on various bird species. The plant toxicity tests were classified as supplemental, because insufficient information were included in the submission to determined if Guideline requirements for Tiers I and II have been satisfied. Greater certainty about the potential for risks to terrestrial plants can be achieved if acceptable terrestrial plant toxicity tests are submitted.

The persistence of metsulfuron methyl is sufficient that chronic toxicity tests on daphnids and fish should be required to assess possible chronic and reproductive effects on aquatic species. Toxicity tests are available only two out of the 5 recommended aquatic plant species; data are still needed for *Anabaena flos-aquae*, *Skeletonoma costatum*, and a freshwater diatom.

Since grain sorghum is grown in the coastal counties of Kleberg, Nueces, and Refugio in Texas, acute aquatic toxicity tests are needed for the following estuarine species: mysid shrimp, oyster, and fish species to assess possible adverse effects in estuarine ecosystems. If chronic effects are found in the freshwater fish early life stage test or significant acute effects occur in the estuarine acute tests compared to freshwater species, a chronic estuarine tests would appear to be appropriate for mysid shrimp and an estuarine fish species to assess possible chronic effects for estuarine species.

101.5 Adequacy of Labeling

Since a product label was not submitted with the review package, it is not possible to assess the adequacy of precautionary statements for keeping metsulfuron methyl out of water. The label probably should be amended to reflect the new Pesticide Regulation notice: "Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark."

The supplemental labeling attached to the review package indicates that "The minimization of pesticide drift is the responsibility of the applicator." While provides some useful suggestions, the guidance lacks any particulars. Appropriate buffer zones from non-target crops and aquatic environments would be useful to reduce spray drift and runoff. According to a memorandum from James Akerman, dated Nov. 13, 1990, a buffer zone of 20 yards around aquatic environments is acceptable for ground spray applications for the pesticide avermectin. This would also seem appropriate for this herbicide, except may for endangered species. EEB recommends that ground applications, not aerial applications, should be used near sensitive crops, aquatic areas, and endangered plants.

102.0 Classification

Metsulfuron methyl is a highly toxic sulfonylurea herbicide and is

one of the most toxic registered herbicides to plants. But, since there is no numeric Restricted Use criteria for plants, restricted use is not triggered. However, restricted use may reduce risks to other sensitive crops, non-crop plants and endangered plant species by providing greater certainty that it is applied correctly.

102.1 Endangered Species Restrictions

It is possible that adverse effects may occur to some endangered or threatened plants from applications to grain sorghum. A number of listed plants have been identified which occur adjacent to agricultural areas. Exactly where grain sorghum is grown near endangered species has not yet been determined. In order to protect endangered plant species growing near or downstream from grain sorghum, it is important that additional clarification of their proximity to sorghum be determined.

103 Conclusions

EEB has reviewed the proposed registration for metsulfuron methyl use on grain sorghum only (i.e., not sorghum hay or silage) in Colorado, Kansas, New Mexico, Nebraska, Oklahoma, and Texas. EEB concludes that while the proposed registered use is not likely to result in hazard to fish, aquatic invertebrates or wildlife. Potential risks to non-target terrestrial plants are indicated for both aerial and ground applications at 0.003 lbs ai/A. In one scenario, the exposure estimates exceed the plant EC25 toxicity values for 8 out of 10 plants. Aquatic plants are also potentially at risk from direct application.

The highest risk quotient (167) results from runoff to wetlands from ground application. The next highest risk quotient is 100 which results from runoff to wetlands from aerial application. These risk quotients suggest concerns for adverse effects to sensitive crops, non-target terrestrial plants, aquatic plants, and endangered plants located adjacent to or downstream from grain sorghum. Buffer areas may be useful to reduce adverse effects to sensitive plants from spray drift and runoff.

A total of 26 endangered and threatened plants have been identified that occur in grain sorghum growing counties where metsulfuron methyl is proposed for use. A list of endangered and threatened plants which occur in grain sorghum-growing counties in Colorado, Kansas, Nebraska, New Mexico, Oklahoma and Texas is attached (Attachment 2). Concerns about these species need to be addressed. In the meantime, EEB recommends that pesticide applications be limited to ground equipment in those sensitive areas where endangered and/or threatened species may occur, in order to reduce any possible adverse effects.

It is recommended that as a condition of registration, the registrant be asked to preform a telephone survey, and possibly a literature search to determine more precisely which of the 26 endangered plant species indentified in Attachment 2 actually occur in areas

potentially exposed to metsulfuron methyl when used on grain sorghum. This survey would not include on site field studies, and should be conducted within one year.

The information provided by the registrant would be used to determine if formal consultation with the USFWS was required or not. EEB recommendeds that the registrant consult with EPA about their proposed survey to insure that their final report will adequately address the requirements by the USFWS.

William Rabert 12/14/93

William Rabert
Ecological Effects Branch
Environmental Fate and Effects Division (7507C)

Dan Rieder 12-15-93

Dan Rieder, Section Head III
Ecological Effects Branch
Environmental Fate and Effects Division (7507C)

A. F. Maciorowski 12.15.93

Anthony F. Maciorowski, Chief
Ecological Effects Branch
Environmental Fate and Effects Division (7507C)

ATTACHMENT 1

10/04/93

A LISTING OF ENDANGERED PLANTS WHERE SORGHUM IS GROWN
FOR COLORADO, KANSAS, NEBRASKA, NEW MEXICO,
OKLAHOMA AND TEXAS
EITHER OF THE CROPS SELECTED MUST GREATER THAN ZERO

STATE and COUNTY	GRAIN SORGHUM ONLY	SORGHUM HAY	SORGHUM SILAGE	COUNT
** STATE : COLORADO				
CO ,MESA	179	0	33	1
CO ,MESA	179	0	33	1
CO ,MONTROSE	0	0	34	1
CO ,MONTROSE	0	0	34	1
CO ,MONTROSE	0	0	34	1
CO ,MORGAN	3104	126	1731	1
CO ,WELD	1971	674	1232	1
** Subtotal **				7
** STATE : KANSAS				
KS ,ALLEN	19291	0	132	1
KS ,ANDERSON	22705	0	381	1
KS ,ANDERSON	22705	0	381	1
KS ,ATCHISON	32153	0	464	1
KS ,BOURBON	12311	34	477	1
KS ,COFFEY	24807	0	952	1
KS ,COFFEY	24807	0	952	1
KS ,CRAWFORD	26330	100	64	1
KS ,CRAWFORD	26330	100	64	1
KS ,DOUGLAS	18903	0	541	1
KS ,DOUGLAS	18903	0	541	1
KS ,FRANKLIN	21469	0	1108	1
KS ,FRANKLIN	21469	0	1108	1
KS ,JACKSON	23760	0	640	1
KS ,JEFFERSON	17596	0	407	1
KS ,JEFFERSON	17596	0	407	1
KS ,JOHNSON	4799	0	0	1
KS ,JOHNSON	4799	0	0	1
KS ,LEAVENWORTH	14487	0	284	1
KS ,LEAVENWORTH	14487	0	284	1
KS ,LINN	16867	0	163	1
KS ,LYON	35421	0	2853	1
KS ,MIAMI	17421	0	201	1
KS ,NEOSHO	28847	0	183	1
KS ,OSAGE	39997	0	644	1
KS ,POTTAWATOMIE	27721	0	1529	1
KS ,RILEY	25050	0	2372	1
KS ,SHAWNEE	20453	0	270	1
** Subtotal **				28

A LISTING OF ENDANGERED PLANTS WHERE SORGHUM IS GROWN
FOR COLORADO, KANSAS, NEBRASKA, NEW MEXICO,
OKLAHOMA AND TEXAS
EITHER OF THE CROPS SELECTED MUST GREATER THAN ZERO

STATE and COUNTY	SORGHUM	SORGHUM HAY	SORGHUM SILAGE	COUNT
** STATE : NEBRASKA				
NE ,BOX BUTTE	0	0	62	1
NE ,CHERRY	532	0	155	1
NE ,CHERRY	532	0	155	1
NE ,GARDEN	684	92	70	1
NE ,HALL	3243	0	145	1
NE ,LANCASTER	126384	0	928	1
NE ,SEWARD	67710	14	545	1
NE ,SHERIDAN	601	0	24	1
** Subtotal **				8
** STATE : NEW MEXICO				
NM ,CHAVES	2188	0	90	1
NM ,DONA ANA	358	0	0	1
** Subtotal **				2
** STATE : OKLAHOMA				
OK ,CHOCTAW	1034	0	30	1
OK ,CRAIG	12560	0	80	1
OK ,ROGERS	1842	0	164	1
** Subtotal **				3
** STATE : TEXAS				
TX ,BANDERA	166	0	64	1
TX ,BRAZOS	3737	0	0	1
TX ,BURLESON	5100	292	91	1
TX ,COKE	713	0	268	1
TX ,EL PASO	545	0	253	1
TX ,FORT BEND	24908	0	0	1
TX ,FREESTONE	21	0	0	1
TX ,FREESTONE	21	0	0	1
TX ,GRIMES	0	0	120	1
TX ,HAYS	2718	0	0	1
TX ,HIDALGO	88903	220	567	1
TX ,HUDSPETH	413	0	0	1
TX ,HUDSPETH	413	0	0	1
TX ,JIM WELLS	55167	0	248	1
TX ,KERR	198	181	140	1
TX ,KIMBLE	540	0	0	1
TX ,KIMBLE	540	0	0	1
TX ,KLEBERG	29639	0	0	1

A LISTING OF ENDANGERED PLANTS WHERE SORGHUM IS GROWN
FOR COLORADO, KANSAS, NEBRASKA, NEW MEXICO,
OKLAHOMA AND TEXAS
EITHER OF THE CROPS SELECTED MUST GREATER THAN ZERO

STATE and COUNTY	SORGHUM	SORGHUM HAY	SORGHUM SILAGE	COUNT
TX ,KLEBERG	29639	0	0	1
TX ,MITCHELL	1669	36	142	1
TX ,NUECES	120321	92	240	1
TX ,PECOS	1045	0	0	1
TX ,REFUGIO	43298	0	0	1
TX ,ROBERTSON	3978	36	0	1
TX ,ROBERTSON	3978	36	0	1
TX ,RUNNELS	42076	166	1210	1
TX ,STARR	76281	30	46	1
TX ,STARR	76281	30	46	1
TX ,STARR	76281	30	46	1
TX ,STARR	76281	30	46	1
TX ,UVALDE	6625	399	0	1
TX ,UVALDE	6625	399	0	1
TX ,UVALDE	6625	399	0	1
TX ,WASHINGTON	821	29	202	1
TX ,WEBB	449	0	0	1
** Subtotal **				35
*** Total ***				83

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Attachment 2. Grain sorghum-growing counties and the endangered or threatened plant species identified in those counties.

State	County	Plant Species
Colorado	Mesa	* Spineless hedgehog cactus
		** Unita Basin hookless cactus
	Morgan	* Ute ladies'-tresses
	Weld	* Ute ladies'-tresses
Kansas	Allen	** Mead's milkweed
	Anderson	** Mead's milkweed
		** Western prairie fringed orchid
	Atchison	** Western prairie fringed orchid
	Bourbon	** Mead's milkweed
	Coffey	** Mead's milkweed
		** Western prairie fringed orchid
	Crawford	** Mead's milkweed
		** Western prairie fringed orchid
	Douglas	** Mead's milkweed
		** Western prairie fringed orchid
	Franklin	** Mead's milkweed
		** Western prairie fringed orchid
	Jackson	** Western prairie fringed orchid
	Jefferson	** Mead's milkweed
		** Western prairie fringed orchid
	Johnson	** Mead's milkweed
		** Western prairie fringed orchid
	Leavenworth	** Mead's milkweed
		** Western prairie fringed orchid
	Linn	** Mead's milkweed
	Lyon	** Western prairie fringed orchid
	Miami	** Mead's milkweed
	Neosho	** Mead's milkweed
	Osage	** Western prairie fringed orchid
	Pottawatomie	** Western prairie fringed orchid
	Riley	** Western prairie fringed orchid
	Shawnee	** Western prairie fringed orchid
Nebraska	Cherry	** Western prairie fringed orchid
		* Blowout penstemon
	Garden	* Blowout penstemon
	Hall	** Western prairie fringed orchid
	Lancaster	** Western prairie fringed orchid
	Seward	** Western prairie fringed orchid
	Sheridan	* Blowout penstemon
New Mexico	Chaves	* Kuenzler hedgehog cactus
	Dona Ana	* Sneed pincushion cactus

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Oklahoma	Choctaw	**	Eastern prairie fringed orchid
	Craig	**	Western prairie fringed orchid
	Rogers	**	Western prairie fringed orchid
Texas	Bandera	*	Tobusch fishhook cactus
	Brazos	*	Navasota ladies'-tresses
	Burleson	*	Navasota ladies'-tresses
	Coke	*	Texas poppy-mallow
	El Paso	*	Sneed pincushion cactus
	Fort Bend	**	Texas prairie dawn
	Freestone	*	Navasota ladies'-tresses
		*	Large-fruited sand-verbena
	Harris	***	Texas prairie dawn
	Hays	****	Texas wild-rice
	Hidalgo	**	Walker's manioc
	Hudspeth	*	Lloyd's hedgehog cactus
		*	Sneed pincushion cactus
	Jim Wells	**	Black lace cactus
	Kerr	**	Tobusch fishhook cactus
	Kimble	**	Tobusch fishhook cactus
		*	Texas snowbells
	Kleberg	**	Black lace cactus
		**	Slender Rush-pea
	Mitchell	*	Texas poppy-mallow
	Nueces	**	Slender Rush-pea
	Pecos	*	Lloyd's hedgehog cactus
	Refugio	**	Black lace cactus
	Robertson	*	Navasota ladies'-tresses
		*	Large-fruited sand-verbena
	Runnels	*	Texas poppy-mallow
	Starr	??	Star cactus
		*	Ashy dogweed
		*	Johnston's frankenia
		**	Walker's manioc
	Uvalde	**	Black lace cactus
		***	Tobusch fishhook cactus
		*	Texas snowbells
	Washington	*	Navasota ladies'-tresses
	Webb	*	Ashy dogweed

* Listed species that does not grow near grain sorghum fields.
** Listed species that could grow near grain sorghum fields, but it has not yet been determined.
*** Listed species which are reported to grow near grain sorghum.
**** Listed species which may occur downriver from grain sorghum.
?? A preliminary determination can not be made because too little information has been given on the location of this newly proposed species.