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241556  
RECORD NO.

108501  
SHAUGHNESSEY NO.

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52  
REVIEW NO.

EEB REVIEW

DATE: IN 03-06-89 OUT MAR 23 1989

FILE OR REG. NO. \_\_\_\_\_

PETITION OR EXP. NO. 89-OR-09

DATE OF SUBMISSION 02-27-89

DATE RECEIVED BY EFED 03-16-89

RD REQUESTED COMPLETION DATE 03-30-89

EEB ESTIMATED COMPLETION DATE 03-30-89

RD ACTION CODE/TYPE OF REVIEW 510

TYPE PRODUCT(S) Herbicide

DATA ACCESSION NOS. \_\_\_\_\_

PRODUCT MANAGER NO. D. Stubbs (41)

PRODUCT NAME(S) Prowl 4E (Pendimethalin)

COMPANY NAME State of Oregon

SUBMISSION PURPOSE Proposed Sec. 18 for use

on onions

SHAUGHNESSEY NO.	CHEMICAL AND FORMULATION	% AI
<u>108501</u>	<u>Pendimethalin</u>	<u>45.6%</u>
_____	_____	_____
_____	_____	_____

## EEB REVIEW

Chemical: Prowl (Pendimethalin)

100 Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

The State of Oregon is requesting an emergency exemption (Section 18) for the use of Prowl to control a variety of weed species in onions. No new data were submitted with this request.

100.2 Formulation Information

Active Ingredient:

Pendimethalin, N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine . . . . .	45.6%
Inert Ingredients . . . . .	54.4%

This product (Prowl) contains 4 lb ai per gallon.

100.3 Application Methods, Directions, Rates

(See Attachment C for labelling information)

100.4 Target Organisms

Pigweed	Purlane	Lamb's Quarters
Barnyardgrass	Yellow Fox Tail	Annual Ryegrass
Annual Bluegrass	Shepherd's Purse	Chickweed
Groundsel	Prostrate Spotted Spurge	
Yellow Nutsedge	Carpetweed Smartweed	

100.5 Precautionary Labeling

Precautionary labeling was not provided.

101 Hazard Assessment

101.1 Discussion

The State of Oregon is requesting an emergency exemption for the use of pendimethalin on onions. Pendimethalin is currently registered for use on a number of crops such as soybeans, cotton, rice, peanuts, and sorghum. Registered rates of application range from 0.5 to 2.0 lb ai per acre. Oregon is requesting one application at 1.0 lb ai per acre. Sites to be treated are in the counties of Washington, Clackamas, Multnomah, Marion and Yamhill. The total acreage covered under this exemption is 3,600 acres.

## 101.2 Likelihood of Adverse Effects on Nontarget Organisms

### Terrestrial Organisms

Pendimethalin is only slightly toxic to birds (dietary LC50 > 4000 ppm for bobwhite quail and mallard duck). At the maximum proposed rate of application, 1.0 lb ai per acre, residues on terrestrial food items are expected to range from 7 to 240 ppm. Highest expected residue levels are well below avian hazard triggers based on laboratory-determined LC50 levels for birds. Thus, the proposed use is not likely to cause adverse effects in birds. No data were available on toxicity to mammals.

### Aquatic Organisms

Pendimethalin is highly toxic to aquatic organisms, with LC50 values in the range of 140 to 420 ppb for Daphnia, bluegill sunfish, and rainbow trout. Chronic studies with fathead minnow showed reduction in egg production at 9.8 ppb and reduced hatchability of eggs at 22 ppb. Chronic studies with Daphnia showed reproductive impairment at 17.2 ppb.

To assess potential hazard to aquatic organisms, EEB used a quick aquatic EEC calculation (Attachment A) to estimate aquatic residues from application at the maximum proposed rate. The resulting aquatic EEC of 6.72 ppb is very near the chronic effect levels for the indicator species, the fathead minnow and Daphnia, and would be expected to exceed the chronic no effect level for more sensitive species. As shown above with the LC<sub>50</sub> data differences in sensitivity are significant. In addition the variation between laboratories and EEC value would in all likelihood provide parameters that would coincide. Also pendimethalin is somewhat persistent (1/2-life > 90 days) and may bioaccumulate (BCF = 2200X). The results of the EEB fate program shows that with the 90 day half-life, the EEC would be expected to decline only to 5.7 ppm in 22 days (See Attachment B). The Daphnia chronic study exposure period is 21 days. Based on this, the proposed use of pendimethalin may result in hazard to aquatic organisms in bodies of water near treatment sites.

## 101.3 Endangered Species Considerations

On the basis of information in its Endangered Species files, EEB has determined that application to onions in Oregon counties of Washington, Clackmas, Multnomah, Marion, and Yamhill will not result in exposure of endangered species of aquatic organisms or plants.

## 101.4 Adequacy of Toxicity Data

The existing database is adequate to assess hazards to nontargets under the proposed exemption.

103      Conclusions

EEB has reviewed the proposed emergency exemption for the use of Prowl (pendimethalin) in onions in the Oregon counties of Washington, Clackmas, Multnomah, Marion, and Yamhill EEB concludes that the proposed use will not result in hazard to terrestrial nontarget organisms. However, aquatic organisms in freshwater habitats near treatment areas may be at risk from the proposed use.

*Dennis J. McLane*

Dennis J. McLane, Wildlife Biologist  
Ecological Effects Branch  
Environmental Fate and Effects Division (H7505C)

Date: 3-20-89

Raymond W. Matheny, Supervisory Biologist  
Ecological Effects Branch  
Environmental Fate and Effects Division (H7505C)

*Raymond W. Matheny*  
3/21/89

*James W. Akerman* 3/21/89  
James W. Akerman, Chief  
Ecological Effects Branch  
Environmental Fate and Effects Division (H7505C)

EEC CALCULATION SHEETI. For un-incorporated ground application

## A. Runoff

$$\underline{1} \text{ lb(s)} \times \frac{0.01}{(1\% \text{ runoff})} \times 10 \text{ (A)} = \underline{0.1} \text{ lb(s)} \text{ (tot. runoff)} \\ \text{drainage basin)}$$

EEC of 1 lb a.i. direct application to 1 A. pond 6-foot deep = 61 ppb

$$\text{Therefore, EEC} = 61 \text{ ppb} \times \underline{0.1} \text{ (lb)} = \underline{6.1} \text{ ppb}$$

II. For incorporated ground application

## A. Runoff

$$\underline{1} \text{ lb(s)} \div \frac{\text{_____ (cm)}}{(\text{depth of incorporation})} \times \frac{0.01}{(\% \text{ runoff})} \times 10 \text{ (A)} = \underline{\hspace{1cm}} \text{ lb(s)} \text{ (tot. runoff)} \\ \text{d.basin)}$$

$$\text{Therefore, EEC} = 61 \text{ ppb} \times \underline{\hspace{1cm}} \text{ (lbs)} = \underline{\hspace{1cm}} \text{ ppb}$$

III. For aerial application (or mist blower)

## A. Runoff

$$\underline{1} \text{ lb(s)} \times \frac{0.6}{(\text{appl. efficiency})} \times \frac{0.01}{(\% \text{ runoff})} \times 10 \text{ (A)} = \underline{0.06} \text{ lb(s)} \text{ (tot. runoff)} \\ \text{d.basin)}$$

## B. Drift

$$\underline{1} \text{ lb(s)} \times \frac{0.05}{(5\% \text{ drift})} = \underline{0.05} \text{ lb(s)} \text{ (tot. drift)}$$

$$\text{Tot. loading} = \underline{0.06} \text{ lb(s)} \text{ (tot. runoff)} + \underline{0.05} \text{ lb(s)} \text{ (tot. drift)} = \underline{0.11} \text{ lb(s)}$$

$$\text{Therefore, EEC} = 61 \text{ ppb} \times \underline{0.11} \text{ (lbs)} = \underline{6.71} \text{ ppb}$$

# DAILY PESTICIDE RESIDUE--SINGLE APPLICATION

Attachment B

Chemical name -----	pendimethalin
Initial concentration (ppm) -----	6.72
Half-life -----	90
Length of simulation (day) -----	22

DAY	RESIDUE (PPM)
---	-----

0	6.72
1	6.668444
2	6.617283
3	6.566515
4	6.516136
5	6.466144
6	6.416536
7	6.367308
8	6.318457
9	6.269982
10	6.221878
11	6.174144
12	6.126775
13	6.07977
14	6.033126
15	5.98684
16	5.940908
17	5.895329
18	5.850099
19	5.805218
20	5.76068
21	5.716483
22	5.672626

Maximum residue -----	6.72
average residue -----	6.182204



## Oregon Department of Agriculture

635 CAPITOL STREET NE, SALEM, OREGON 97310-0110

89-OR-09

Attachment C

February 27, 1989

Mr. Donald R. Stubbs, Section Head  
Emergency Response Group (TS-767C)  
Environmental Protection Agency  
1921 Jefferson Davis Highway  
Arlington, VA 22202

Dear Mr. Stubbs:

The Oregon Department of Agriculture requests approval of this application for a specific exemption under Section 18, FIFRA, as amended, in Part 166, Title 40, CFR 166, for use of pendimethalin (Prowl) herbicide for weed control in onions produced for bulbs in western Oregon.

- (1) Onions are produced in two distinct locations in Oregon. In western Oregon, they are produced on old lakebeds where organic matter levels are generally high. For many years, onion growers used Radox as a preemergence herbicide to control grassy and broadleaf weeds. Radox is no longer available. Handweeding is not practical because of excessive cost and an insufficient number of field laborers. Ramrod (propachlor) had been shown to be effective for weed control and also nonphytotoxic to the onions grown on high organic soils. This herbicide was used under emergency exemption in 1983 and 1984, but we have been informed that possibly no specific exemptions for propachlor are to be granted in 1989. Because Dacthal does not perform on soils with high organic matter (mostly 6-60%), Prowl herbicide will provide some weed control in onions in western Oregon. Thus, we request a specific exemption be considered for Prowl for general preemergence weed control in western Oregon.
- (2) The following products are, or were, registered for weed control in onions; some are no longer available, and others are not effective under Oregon conditions. As stated above, Radox is no longer available. Dacthal is not effective on peat soils, the type of soil in which onions are produced in western Oregon. Roundup is registered as a preemergence herbicide, but has no residual activity. Additionally, Roundup can not be used at planting time because weeds are not present and post-plant application would damage onion plants. Furloe (Chloro IPC) causes injury on onions grown in rich (high organic) soils in western Oregon due to the irregularity of soil types in lake bottoms, and it does not control all weed species which are a problem in this area. Treflan is not effective on high organic soils and is difficult to apply and incorporate between 3 to 14 inch rows, which is the system of planting in western Oregon. Treflan also will cause phytotoxicity to emerging onions when incorporated to reduce volatility. Goal is registered for use at the 2-true leaf stage and works satisfactorily on some broadleaf weeds, but injury will occur if this herbicide is applied preemergence to the crop; additionally, Goal will not provide late season weed control,

especially with grasses. Gramoxone (paraquat) can only be applied pre-plant or pre-emergent to the crop, and it has no long-term weed control capabilities. Fluazifop (Fusilade) is effective under some conditions, but it only controls some grasses. Fusilade is not soil residual. Mono urea sulfuric acid (Enquik) is ineffective on most grasses. Bensulide (Prefar) is ineffective on organic soils.

(3) The time period for use of Prowl in onions in Oregon is April 1, 1989 through June 30, 1989.

(4) The following weeds are serious problems in onions in Oregon:

Pigweed (*Amaranthus retroflexus*)  
Purslane (*Portulaca oleracea*)  
Lamb's Quarters (*Chenopodium album*)  
Barnyardgrass (*Echinochloa crusgalli*)  
Yellow Fox Tail (*Setaria lutescens*)  
Annual Ryegrass (*Colium sp.*)  
Annual Bluegrass (*Poa annua*)  
Shepherd's Purse (*Capsella bursa-pastoris*)  
Chickweed (*Stellaria media*)  
Groundsel (*Senecio vulgaris*)  
Prostrate Spotted Spurge (*Euphorbia supina*)  
Yellow Nutsedge (*Cyperus esculentus*)  
Carpetweed (*Mollugo verticillata*)  
Smartweed (*Polygonum persicaria*)

(5) This specific exemption is requested for the following Oregon counties: Washington, Clackamas, Multnomah, Marion and Yamhill. It is anticipated that 3,000 acres of bulb onions will require treatment. The total onion acreage in the above counties is approximately 3,600 acres. Soils in the onion growing areas range from 0.125-60% organic matter.

(6) Economic Information:

(a) Economic benefits and losses (emergency areas only) expected with and without use of requested chemical:  
Weeding costs without herbicides range from \$72 to \$250 per acre. Use of herbicides reduces weeding costs by approximately 75%.

Average weeding costs  
without Prowl herbicide = \$200/acre X 3,000 = \$600,000

Average weeding costs  
with Prowl herbicide = \$50.00/acre X 3,000 = \$150,000

Difference in weeding costs = \$450,000  
=====



If weeds are not removed, yields and quality of onion bulbs will be reduced significantly and harvest costs will be increased. Depending on weed densities, bulb yields could be reduced by 30-50 percent.

Research and extensive grower use of registered herbicides, either singly or in combination, indicate these products will not control crabgrass, annual bluegrass, shepherd's purse, prostrate spurge, purslane and carpetweed, six of the most serious weed problems in western Oregon onion fields.

(b) Crop production costs per acre for the last five years:

Western Oregon:

1988	\$1,545/acre
1987	1,545/acre
1986	1,530/acre
1985	1,525/acre
1984	1,423/acre

(c) Crop yields over four years:

Western Oregon:

1988	391 CWT/acre
1987	404 CWT/acre
1986	443 CWT/acre
1985	396 CWT/acre
1984	395 CWT/acre

(d) Estimation of percent control of the pests with registered pesticides over the last five years: 25-35% control of broadleaf and grassy weeds. Research has shown that weed control with Prowl alone will improve weed control, giving a range depending on weed species, of 60-75%.

(e) Estimation of percent of control of the pests for the upcoming year with:

(1) Registered pesticides:	25-35%
(2) Proposed pesticide:	65-85%

(f) Economic value of onions to Western Oregon for five years:

1988	\$10,556,000
1987	\$10,334,000
1986	\$11,725,000
1985	\$ 4,517,000
1984	\$16,671,000

(g) Price received for the crop for five years:

Western Oregon

1988	\$3,383/acre @ \$8.90/CWT
1987	\$3,422/acre @ \$8.45/CWT
1986	\$4,424/acre @ \$9.98/CWT
1985	\$1,585/acre @ \$3.99/CWT
1984	\$2,567/acre @ \$6.50/CWT

(7) Name and formulation of product to be used:

Prowl 4E (pendimethalin)  
EPA Registration No. 241-243  
Manufactured by American Cyanamid Company  
Agricultural Division  
Wayne, N.J. 07470

(8) Rates of application to be used for the aforementioned product in western Oregon:

(a) Pounds of active ingredients/acre and total pounds a.i. required:

0.75-1.0 lbs. a.i./acre broadcast. Estimated number of acres to be treated in western Oregon is 3,000. Total material needed for one application on 3,000 acres is 3,000 lbs. active ingredient.

(b) Pounds of formulated product per acre and total pounds of formulation required:

Broadcast - 4E formulation  
(1.5 to 2.0 pts./acre on 3,000 acres x 1 application) = 750 gallons

(c) Pre-harvest interval and restrictions:

Planting of onions is expected to begin March 15, 1989; the last planting date will be about May 1, 1989. The earliest harvest date is expected to be September 1, 1989. A preharvest interval of 60 days is requested.

(d) Proposed label directions/information for Prowl 4E herbicide for western Oregon; we request the following be included in the directions for use:

Prowl can be applied at the 1 to 5 true leaf stage of crop development. Uniformly apply Prowl treatments at 1.5 to 2.0 pts. of product in 10 or more gallons of water per acre by ground equipment. Use the high rate on high organic soils and the low rate on low organic soils. Do not use on mineral soils or soils with less than 2.5% organic matter.

Do not make more than one application per season. Prowl treatments will not control emerged weeds. Destroy existing weeds before applying Prowl. Prowl treatments are most effective in controlling weeds when adequate rainfall or overhead irrigation is received within 7 days after application. Do not apply Prowl through any type of irrigation system.

Unusually cold, excessively wet, or hot and dry conditions that delay germination or extend germination over a long period of time may reduce weed control

Prowl will not cause crop injury when applied according to the label under normal growing conditions. Over-application may result in injury to crops, poor stands, or soil residues; conversely, uneven application may reduce weed control

Diseases, cold weather, excessive moisture, deep planting, low or high pH, salinity, or drought may weaken seedlings and plants and make them more susceptible to herbicidal damage.

NOTE: If loss of onion crop occurs due to adverse weather conditions, any crop registered for Prowl pre-plant incorporated or pre-emergence use can be replanted the same year into treated soil without adverse effects. If replanting is necessary, DO NOT rework the soil deeper than the treated zone or two inches deep if surface applied.

Do not graze treated fields or feed treated onions to livestock.

Do not apply within 60 days of harvest.

When applied as directed under the conditions described, this product controls those weed species listed on the product label. See the product label for general mixing and spraying instructions.

- (9) No residues of pendimethalin in onions are anticipated. An experimental use permit for Prowl 4E was granted on May 1, 1984 to May 1, 1985. The EPA permit number is 241-EUP-104. Residue data were submitted to EPA in 1985 as part of PP No. 3G2957, Accession No. 071484.

Mr. Donald R. Stubbs

February 27, 1989

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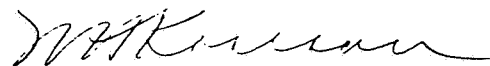
(10) Knowledgeable Experts:

Dr. Ray D. William  
Extension Hort. Weed Spec.  
Cordley Hall  
Oregon State University  
Corvallis, OR 97331  
(503) 754-3464

Mr. Ron Collins  
Consultant to the  
Oregon Onion Commission  
Route 2, Box 344  
Hillsboro, OR 97123  
(503) 628-2108

Mr. Dan McGrath  
Marion County Extension Service  
3180 Center St. N.E., Rm. 160  
Salem, OR 97310  
(503) 588-5301

Sincerely,



W. H. Kosesan  
Deputy Director  
(503) 378-4666

SEC18/90-95#4

cc: Ray William  
Ron Collins  
Dan McGrath  
W. Steller, Jr.  
Jon Heller  
Files