ECOLOGICAL EFFECTS BRANCH
REVIEW

DATE: IN 8/24/79 OUT 5/13/80

FILE OR REG.NO. 241-243

PETITION, EXP. PERMIT, S. 18, 24c, NO. 9F2246

DATE OF SUBMISSION ____________________________

DATE DIV. RECEIVED ____________________________

TYPE PRODUCT(S): I, D, (H,) F, N, R, S Herbicide

DATA ACCESSION NO(S). NONE

PRODUCT MGR. NO. 25 - Taylor

PRODUCT NAME(S) Prowl

COMPANY NAME American Cyanamid Company

SUBMISSION PURPOSE Proposed Use on grain sorghum - Incremental

Risk Assessment Request

CHEMICAL & FORMULATION N-(1-ethylpropyl)-3,4-dimethyl-2,6-
dinitrobenzeneamine - 42.3% E.C.
Pesticide Name

Prowl

100 Pesticide Label Information

100.1 Pesticide Use

Prowl is currently registered for use on field corn, cotton and soybeans as a post-emergence herbicide. The proposed registration would add the use of Prowl to grain Sorghum in Colorado, Kansas, Nebraska, New Mexico, Oklahoma and Texas.

100.2 Formulation Information

Pendimethalin -- 42.3% EC formulation, 4 lbs. of Pendimethalin/gallon

100.3 Application Methods, Directions, Rates

See Appendix.

100.5 Precautionary Labeling

This product is toxic to fish. Keep out of lakes, streams or ponds. DO NOT apply when weather conditions favor drift from target area. DO NOT contaminate water by cleaning equipment or disposal of wastes.

101 Physical and Chemical Properties

101.1 Chemical Name

N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine
[N-(1-ethylpropyl)-2,6-dinitro-3,4-xyldine]

101.2 Structural Formula

\[ \text{Chemical Structure Image} \]
101.3 Common Names
Penoxyn, Penoxalin, Pendimethalin, AC92, 553, CL92, 553

101.4 Trade Name
Prowl

101.5 Molecular Weight
\[ C_{13}H_{19}N_3O_4 \quad - 281.3 \]

101.6 Physical State
Color and State .........................Orange-yellow crystals
Odor ...........................................Faint, nutty odor
Boiling Point ..................................330°C
Melting Point ..................................56-57°C
Specific Gravity .............................1.9 at 25°C
Vapor Pressure ...................... \( 3.0 \times 10^{-5} \) mm Hg at 25°C
Stability .........................Stable to Alkaline and Acidic Conditions
Corrosiveness ..........................Non-corrosive

101.7 Solubility

<table>
<thead>
<tr>
<th>Solvent</th>
<th>Temp. °C</th>
<th>Solubility (g/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>23</td>
<td>0.5</td>
</tr>
<tr>
<td>Acetone</td>
<td>26</td>
<td>699</td>
</tr>
<tr>
<td>Xylene</td>
<td>26</td>
<td>628</td>
</tr>
<tr>
<td>Isopropanol</td>
<td>26</td>
<td>77</td>
</tr>
<tr>
<td>Corn Oil</td>
<td>26</td>
<td>148</td>
</tr>
</tbody>
</table>

102 Behavior in the Environment
See the EEB review by W. Rabert (10/23/79).

103 Toxicological Properties
See the EEB review by W. Rabert (10/23/79).

104 Hazard Assessment
104.1 Discussion

Grain Sorghum is a major crop in the Great Plains and the Southwest. It is grown both as a dryland and as an irrigated crop. Texas, Kansas and Nebraska account for over 80 percent of the U.S. production. Colorado, New Mexico and Oklahoma account for a large measure of the remaining production. Together, these six states have approximately 16 million acres of cropland devoted to Sorghum. In Texas, over 900,000 acres are in its coastal counties.

Prowl is applied as a postemergence, incorporated herbicide. Application is made when grain Sorghum is 4 to 6 inches tall or at layby when grain Sorghum is approximately 20 to 24 inches tall. Maximum application rate is 1.5 lbs a.i./acre alone or in combination with Atrazine.

104.2 Likelihood of Adverse Effects to Non-Target Organisms

Applications of Prowl to Sorghum should result in immediate soil residues of 33 ppm in the top 0.1 inch and with incorporation to 1 inch the residue should be 3.3 ppm. The active ingredient in Prowl, Pendiuthalin, is slightly toxic to terrestrial vertebrates and is not expected to approach toxic levels in these animals' feedstuff when label directions are followed and applications are fully incorporated.

Pendiuthalin is highly toxic to aquatic organisms. A chronic freshwater fish study indicates that reproductive effects may occur down to 10 ppb. Also, Pendiuthalin is concentrated to 2200x in fathead minnows suggesting a bioaccumulation problem. Considering the solubility and soil adsorption characteristics of Pendiuthalin (500/mg/l in water and slightly leachable) together with information on its persistence (1/2-life > 90 days) a serious aquatic hazard may be expected. Additional information is necessary to fully evaluate this potential hazard. A chronic aquatic invertebrate study is necessary as are studies to determine the toxicity of Pendiuthalin to Estuarine organisms.

104.3 Endangered Species Considerations

The use of Prowl sorghum may adversely affect endangered amphibious and aquatic organisms in the proposed use area. Additional studies are needed to fully evaluate this potential hazard.
Conclusions

The Ecological Effects Branch does not concur with the proposed conditional registration of Prowl for use on Sorghum. Additional studies are necessary to complete a hazard evaluation.

Data Requests

The following studies are required by the Ecological Effects Branch before an Environmental Hazard Assessment can be completed.

1. **An Aquatic invertebrate life-cycle toxicity study** preferably with *Daphnia magna*.
   [See 7/10/78 EPA Guidelines, Sec. 163.72-4(a)(1)(iii) and (iv)]

2. **An estuarine fish embryo-larvae toxicity study** preferably with sheepshead minnow or spot, also the 96-hr LC₅₀ should be reported.
   [Sec. 163.72-3(a) and Sec. 163.72-4(a)(1)(iii) and (iv)]

3. **An estuarine invertebrate life-cycle toxicity study** preferably with mysid shrimp, also the 96-hr LC₅₀ should be reported.
   [Sec. 163.72-3(a) and Sec. 163.72-4(a)(1)(iii) and (iv)]

Additionally, field monitoring data on a sorghum or similar field may be needed to determine the residues of Pendimethalin in runoff, groundwater and receiving aquifers under actual use conditions.

Any questions concerning the above requests or acceptable protocols should be directed to the Ecological Effects Branch.

Leslie Touart, Fisheries Biologist, Section 1

Ray Matheny, Head, Section 1

Clayton Bushong, Chief, Ecological Effects Branch
Pendimethalin ecological effects review

Page _____ is not included in this copy.
Pages 6 through 10 are not included in this copy.

The material not included contains the following type of information:

__ Identity of product inert ingredients
__ Identity of product impurities
__ Description of the product manufacturing process
__ Description of product quality control procedures
__ Identity of the source of product ingredients
__ Sales or other commercial/financial information
__ A draft product label
__ The product confidential statement of formula
__ Information about a pending registration action
__ FIFRA registration data
__ The document is a duplicate of page(s) _________
__ The document is not responsive to the request

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.
December 19, 1979

Mr. Robert J. Taylor
Acting Branch Chief
Fungicide-Herbicide Branch
Registration Division (WH-567)
U.S. Environmental Protection Agency
Waterside Mall, East Tower
Washington D.C. 20460

Dear Mr. Taylor:

Re: PROWL® herbicide

Mr. William Rabert of the Fish and Wildlife Division contacted me about some questions that arose during his review of our pending application for use of PROWL on grain sorghum. Would you please make the following information available to him for his files:

A. The accession numbers for the study titled: Chronic Toxicity of CL 92,553 to the Fathead Minnow, are 95521, 96342 and 232264.

B. The time of application of PROWL herbicide on grain sorghum would be 6 to 8 weeks after planting for a lay-by application and no less than 2 to 3 weeks after planting when applied on sorghum up to 4 to 6 inches tall.

C. In the study titled: Acute Toxicity of AC 92,553 to Bluegill, Rainbow Trout and Channel Catfish, done by Bionomics, Inc. (9/72), 10 fish of each species were used at each dose level. A copy of the letter from Bionomics confirming the number of fish is attached.

D. The percent by weight of active ingredients of the test compounds in the study titled: Acute Toxicity of PROWL 3E, PROWL 4E and AVENGÉ® 2A-S wild oat herbicide to Bluegill and Rainbow Trout, done by Bionomics, Inc. (5/74) was at the time the tests were performed:
PROWL 3E  35.4%  pendimethalin
PROWL 4E  44.3%  pendimethalin
AVENG 2A-S  22%  difenzoquat cation

Very truly yours,

J. Gretchen Dyer

J. Gretchen Dyer, Ph.D.
Registrations Coordinator
Plant Industry Registrations

JGD:vec
Attachment
November 14, 1979

Mr. Jim Behm
American Cyanamid Company
Agricultural Division
P.O. Box 400
Princeton, NJ 08540

RE: Acute toxicity of AC 92553 to bluegill, rainbow trout and channel catfish

Dear Mr. Behm:

This is to confirm Dr. Nacek's assurance to you in a telephone conversation on November 13, 1979 that during the acute toxicity testing performed in September of 1972 with AC 92553, we exposed ten fish in each concentration for tests with all three species, i.e. bluegill, rainbow trout and channel catfish. The omission of that information from the report was an oversight and I apologize for any inconvenience this may have caused you.

If you should need further information on this subject, or if I might help you in any other way, please contact me. Again, I am sorry for the oversight.

Sincerely,

EG&G, BIONOMICS

Bevier H. Sleight, III
Manager, Aquatic Toxicology Laboratories

BHS:jeb