US EPA ARCHIVE DOCUMENT

Reviews

EEE BRANCH REVIEW

DATE: IN 4/1/77 OUT 9/22/77 IN _____ OUT _____ IN _____ OUT _____

FISH & WILDLIFE ENVIRONMENTAL CHEMISTRY EFFICACY

FILE OR REG. NO. 241-243

PETITION OR EXP. PERMIT NO. _____

DATE DIV. RECEIVED 1/27/77

DATE OF SUBMISSION 1/27/77

DATE SUBMISSION ACCEPTED _____

TYPE PRODUCTS(S): I, D, (H,) F, N, R, S _____

DATA ACCESSION NO(S). _____

PRODUCT MGR. NO. (25) Taylor

PRODUCT NAME(S) PROWL herbicide

COMPANY NAME American Cyanamid Co.

SUBMISSION PURPOSE Use with Sencor/Lexone

CHEMICAL & FORMULATION PROWL: (N - [1 - ethylpropyl] - 3, 4 - dimethyl -2, 6 - dinitrobenzenamine) ---------- 49.2%

[redacted]

Inert ingredients ----------

SENCOR: (4 - amino - 6 - [1, 1 - dimethylethyl] - 3 - [methythio] - 1, 2, 4 - Triazin - 5 [4H] - one ---------- 56.5%

Inert ingredients ---------- 43.5%

INERT INGREDIENT INFORMATION IS NOT INCLUDED

100.0 Pesticidal Use

Control of most annual grasses and certain broadleaf weeds in soybeans. This application for amended registration is for use of PROWL alone applied as a preplant incorporated treatment followed by a preemergence application of SENCOR/LEXONE; or PROWL plus SENCOR/LEXONE (tank-mix) applied as either preplant incorporated or preemergence treatments in soybeans.

100.1 Application Methods/Rates/Directions

GENERAL INFORMATION

PROWL herbicide controls most annual grasses and certain broadleaf weeds in soybeans. PROWL controls weeds as they germinate but will not control established weeds. Destroy existing weeds before applying PROWL.

PROWL alone may be applied only as a preplant incorporated treatment in soybeans. Mechanical incorporation is not required if a rain of one-quarter inch or more occurs within 7 days after application.

PROWL plus SENCOR[1]/LEXONE[2] tank mixtures may be applied as either preplant incorporated or preemergence treatments in soybeans. PROWL applied preplant incorporated may be followed by a preemergence application of SENCOR/LEXONE.

PROWL will not reduce soybean yields if applied according to label directions and under normal growing conditions. Over-application can result in crop stand loss, crop injury, or soil residues. Uneven application or improper soil incorporation can decrease weed control or cause crop injury. Soil incorporation deeper than recommended can reduce weed control.

Seedling diseases, cold weather, excessive moisture, deep planting, high soil pH, high soil salt concentration, or drought can weaken soybean seedlings and plants, and increase the possibility of crop damage from PROWL. Under these conditions, crop yields can be reduced.

Mixing Instructions

Mix PROWL alone or PROWL plus SENCOR/LEXONE tank-mix combinations as follows:

1. Fill tank one-half to three-quarters full with clean water.

2. When using PROWL alone, add PROWL to partially filled tank while agitating and then fill the remainder of the tank with water.

3. (a) When using PROWL with SENCOR/LEXONE make a slurry of the SENCOR/LEXONE wettable powder in water (1 part WP + 2 parts water). Add the slurry slowly into the partially-filled tank while agitating.

   (b) When the slurry is properly mixed, add PROWL to the tank. Fill the remainder of the tank with water while agitating.

Maintain good agitation at all times until spraying is completed.

Spraying Instructions

GROUND APPLICATIONS

DO NOT apply PROWL during period of gusty winds or when wind velocity is greater than 10 mph.

Broadcast Treatment - Apply in water as specified in this label.

Band Treatment - Apply the broadcast equivalent rate and volume per acre. To determine these:

$$\frac{\text{Band width in inches}}{\text{Row width in inches}} \times \text{Broadcast RATE per acre} = \text{Band RATE per acre}$$

$$\frac{\text{Band width in inches}}{\text{Row width in inches}} \times \text{Broadcast VOLUME per acre} = \text{Band VOLUME per acre}$$

AERIAL APPLICATIONS

Apply in 5 or more gallons of water per acre. To minimize drift, DO NOT apply during period of gusty winds or winds in excess of 5 mph.

PREEMERGENCE APPLICATIONS

The weed bed should be firm and free of clods and trash. Uniformly apply the recommended PROWL plus SENCOR/LEXONE tank-mix combination treatment in 10 or more gallons of water per acre by aircraft. DO NOT apply Prior to Planting Crop or Postemergence To Crop.

PROWL plus SENCOR/LEXONE tank-mix combination preemergence treatments are most effective in controlling weeds when adequate rainfall or overhead irrigation is received within 7 days after application. If cultivation is necessary because of soil crusting, soil compaction, or weed germination before rain or irrigation, use shallow tillage (such as rotary hoe, light harrow) and make certain crop seeds are below the tilled area. Unusually cold, excessively wet, or hot dry conditions that delay germination or extend germination over a long period of time can reduce weed control. Under these abnormal conditions, there can be a temporary yellowing of soybean seedlings, but recovery will be rapid when good growth conditions return.

PREPLANT INCORPORATED APPLICATIONS

Thoroughly mix the previous crop residues into the soil to a depth of 4 to 6 inches by plowing or disking prior to application. Uniformly apply PROWL alone or PROWL plus SENCOR/LEXONE tank-mix combination treatments in 10 or more gallons of water per acre by ground equipment. Apply in 5 or more gallons of water per acre by aircraft.

PROWL alone may be applied immediately before planting or up to 60 days prior to planting. DO NOT APPLY PROWL AS A POSTEMERGENCE SPRAY.

PROWL is to be incorporated into the soil within 7 days after application prior to planting. For best results, mechanical incorporation should be into the top 1 or 2 inches of soil. Mechanical incorporation is not required if a rain of one-quarter inch or more occurs within 7 days after application.

SENCOR/LEXONE can be applied as a preemergence treatment following a PROWL preplant incoporated treatment.

PROWL plus SENCOR/LEXONE preplant application treatments must be incorporated into the soil within 7 days after application and the soybeans must be planted no later than 7 days after application. For best results, mechanical incorporation should be into the top 1 or 2 inches of soil.

After application, rotary-hoeing, shallow cultivation, or hand-hoeing can be practiced without reducing weed control. When mechanically incorporated, PROWL is not dependent upon rainfall for effective weed control.

WEED SPECIES CONTROLLED

The following weed species are susceptible to treatments of PROWL in soybeans at the rates recommended for each soil texture listed below.

Barnyardgrass (Echinochloa crus-galli)
Crabgrass (Digitaria spp.)
Goosegrass (Eleusine indica)
Signalgrass (Brachiaria platyphylla)
Johnsongrass (from seed) (Sorghum halepense)
Panicums (Panicum spp.)
Giant foxtail (Setaria faberii)
Green foxtail (Setaria viridis)
Yellow foxtail (Setaria lutescens)
Pigweed (Amaranthus spp.)
Lambquarters (Chenopodium album)
Purslane (Portulaca oleracea)
Carpetweed (Mollugo verticillata)
Spurge, annuals (Euphorbia spp.)

PROWL will aid in the control of and reduce competition from:

Velvetleaf (Abutilon theophrasti)
Smartweed (Polygonum pensylvanicum)

PROWL does not control ragweeds, jimsonweed, mustards, prickly sida, cocklebur, sicklepod, hemp sesbania, morningglory or nutsedges.

When applied as directed, tank mixtures of PROWL plus SENCOR/-LEXONE or PROWL preplant incorporated plus SENCOR/LEXONE preemergence will control these broadleaf weeds in addition to those controlled with PROWL alone.

Velvetleaf (Abutilon theophrasti)
Smartweed (Polygonum spp.)
Common Ragweed (Ambrosia spp.)
Jimsonweed (Datura stramonium)
Mustards (Brassica spp.)
Venice Mallow (Hibiscus trionum)
Prickly Sida (Sida spinosa)

Tank mixtures of PROWL plus SENCOR/LEXONE will reduce competition from cockebur (Xanthium pensylvanicum). Use either a preplant incorporated application of PROWL followed by a preemergence application of SENCOR/LEXONE or a preemergence tank mix combination treatment of PROWL plus SENCOR/LEXONE where severe cocklebur infestations are anticipated.

PREPLANT INCORPORATED APPLICATIONS OF PROWL ALONE

The following recommended treatments for preplant incorporated applications of PROWL alone are to be used when no combinations with LEXONE/SENCOR are planned. If decision has been made to use SENCOR/LEXONE as a sequential preemergence treatment to PROWL then refer to recommendations under Preplant and Preemergence Tank-Mixture or Preplant Plus Preemergence Sequential Applications of PROWL plus SENCOR/LEXONE for the recommended PROWL application to use as well as any crop restrictions.

SOUTHERN STATES AND EASTERN COASTAL PLAINS

For use only in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Missouri "Bootheel Region", and Coastal Plains of Delaware, Maryland, New Jersey, and Virginia.

Preplant Incorporated Broadcast Rate Per Acre
of PROWL in Soybeans

Soil Texture	PROWL
COARSE sands, loamy sands, sandy loams	1.0 to 1.5 pints (0.5 to 0.75 lbs a.i.)
MEDIUM sandy clay loams, sandy clays, loams, silts, silt loams	1.5 to 2.0 pints (0.75 to 1.00 lbs a.i.)
FINE clay loams, silty clay loams, clays	1.5 to 3.0 pints (0.75 to 1.50 lbs a.i.)

The high rate for each soil texture above should be used if heavy weed populations are anticipated. Use the 3 pint rate for heavy clay soils.

DO NOT USE on peat or muck soils.

NORTHEASTERN AND NORTH CENTRAL STATES

For use only in Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Nebraska, New York, North Dakota, Ohio, Pennsylvania, South Dakota, Wisconsin, Missouri (except the "Bootheel Region"), and in all areas of Delaware, Maryland, New Jersey, and Virginia (except the Coastal Plains of these states).

Preplant Incorporated Broadcast Rate Per Acre
of PROWL in Soybeans

Soil Texture	Up to 3% Organic Matter	More than 3% Organic Matter
COARSE loamy sands, sandy loams	1.0 to 2.0 pints	2.0 pints (1.0 lbs a.i.)
MEDIUM sandy clay loams sandy clays, loams, silts, silt loams	1.5 to 2.5 pints	2.5 to 3.0 pints (1.25 to 1.50 lbs a.i.)
FINE clay loams, silty clay loams, clay	2.0 to 3.0 pints	3.0 pints (1.5 lbs a.i.)

The high rate for each soil texture above, where listed, should be used if heavy weed populations are anticipated.

DO NOT USE on peat or muck soils.

PREPLANT AND PREEMERGENCE TANK-MIXTURES OR PREPLANT PLUS PREEMERGENCE SEQUENTIAL APPLICATIONS OF PROWL PLUS SENCOR/LEXONE

SOUTHERN STATES AND EASTERN COASTAL PLAINS

For use only in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Southeastern Missouri "Bootheel Region", and Coastal Plains of Delaware, Maryland, New Jersey, and Virginia.

Rates Per Acre of Preplant Incorporated or Preemergence Broadcast PROWL plus SENCOR/LEXONE Tank Mixtures or PROWL Preplant Incorporated plus SENCOR/LEXONE Preemergence

Soil Texture	PROWL + SENCOR 50W/LEXONE 50W
COARSE Loamy sands, sandy loams	1.5 pints (0.75 lbs a.i.) + 0.5 lb. (0.3 lbs a.i.)
MEDIUM sandy clay loams, sandy clays, loams, silts, silt loams	1.5 pints (0.75 lbs a.i.) + 0.75 lb. (0.4 lbs a.i.)
FINE clay loams, silty clay loams, clays	1.5 to 2.0 pints (0.75 - 1.00 lbs a.i.) + 1.0 (0.5 lbs a.i.) lb.

DO NOT USE on sands. DO NOT USE on loamy sands, or on sandy loams that contain less than 1% organic matter. DO NOT USE on peat or muck soils.

NOTE: The high rate of PROWL for fine soil textures, as stated above, should be used if heavy weed populations are anticipated.

NORTHEASTERN AND NORTHCENTRAL STATES

For use only in Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Nebraska, New York, North Dakota, Ohio, Pennsylvania, South Dakota, Wisconsin, Missouri (except the "Bootheel Region"), and all areas of Delaware, Maryland, New Jersey, and Virginia (except the Eastern Coastal Plains).

Rates Per Acre of Preplant Incorporated or Preemergence
Broadcast PROWL plus SENCOR/LEXONE Tank Mixtures or
PROWL Preplant Incorporated Plus SENCOR/LEXONE Preemergence

	PROWL + SENCOR 50W/ LEXONE 50W	PROWL + SENCOR 50W/ LEXONE 50W
Soil Texture	Organic Matter Content	
COARSE loamy sands, sandy loams	2 to 3% O.M. - 1.0 pt + 0.75 lb. (0.5 lbs a.i. + 0.4 lbs a.i.)	More than 3% O.M. 1.5 pts + 0.75 lb. (0.75 lbs a.i. + 0.4 lbs a.i.)
MEDIUM sandy clay loams, sandy clays, loams, silts, silt loams	Up to 3% O.M. 1.5 to 2.0 pints + 0.75 lb. (0.75 - 1.00 lbs a.i. + 0.4 lbs a.i.)	More than 3% O.M. 1.5 to 2.0 pints + 0.75 to 1.0 lb. (0.75 - 1.0 lbs a.i. + 0.4 - 0.5 lb. a.i.)
FINE clay loams, silty clay loams, clays	Up to 3% O.M. 1.5 to 2.0 pints + 0.75 to 1.0 lb (0.75 - 1.0 lbs a.i. + 0.4 - 0.5 lbs a.i.)	More than 3% O.M. 2.0 to 2.5 pints + 1.0 lb (1.0 - 1.25 lbs a.i. + 0.5 lb a.i.)

DO NOT USE on sands. DO NOT USE on loamy sands or on sandy loams that contain less than 2% organic matter. DO NOT USE on peat or muck soils.

NOTE: The high rates of PROWL and SENCOR/LEXONE for each soil texture, if stated above, should be used if heavy weed populations are anticipated.

Special Precautions for PROWL + SENCOR/LEXONE Combinations

PROWL + SENCOR/LEXONE will not reduce soybean yields if applied according to label directions and under normal growing conditions. Over-Applications can result in crop

stand loss, crop injury, or soil residues. Uneven application or improper soil incorporation can decrease weed control or cause crop injury. Soybean seed should be planted at least 1 1/2 inches below soil surface. Application should not be made to soils having a calcareous surface or a pH of 7.5 or higher. Soil incorporation deeper than recommended will reduce weed control and can result in crop injury.

Seedling diseases, cold weather, excessive moisture, deep planting, high soil pH, high soil salt concentration, or drought can weaken soybean seedlings and plants and increase the possibility of crop damage from PROWL and the PROWL plus SENCOR/LEXONE combination treatments. Under these conditions, crop yields can be reduced.

The PROWL + SENCOR/LEXONE treatment can be applied only once per cropping season. DO NOT use on sensitive soybean varieties -- Tracy, Semmes, Altona, Vansoy or Coker 102.

DO NOT USE on peat or muck soils.

Flood, furrow or sub-irrigated soils with 10% or less organic matter that have been treated with SENCOR/LEXONE should be plowed to a depth of 6 to 8 inches before <u>any</u> rotation crops are planted.

<u>LEAFY VEGETABLES (INCLUDING LETTUCE, MUSTARD, TURNIP GREENS, BEET GREENS, COLE CROPS, CELERY, SPINACH)</u> Do not plant for 12 months after application of SENCOR/LEXONE in Alabama, Arizona, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, New Jersey, Oklahoma, South Carolina, Tennessee, Texas and on soils with 10% or less organic matter in all other states.

101.0 <u>Chemical and Physical Properties:</u>

(1) PROWL: [N - (1 - ethylpropyl) - 3, 4 - dimethyl - 2, 6 - dinitrobenzenamine]

(2) SENCOR: 4 - amino - 6 - (1, 1 dimethylethyl) - 3 - (methythio) - 1, 2, 4 - triazin - 5 (4 <u>H</u>) - one

101.2 (1) PROWL, Penoxalin
(2) SENCOR, Metribuzin

101.4
thru
101.6 See previous reviews

102.0 Behavior in Environment:

(1) PROWL: See review by N. J. Cook (28 March 77).
(2) SENCOR: See below:

102.1 Soil

Half life of SENCOR was approximately 30 days in most soil types. Dissipation in soil was related to the amount of rainfall. The proportion of SENCOR bound in soil 10 weeks after application ranged from 14-56%.

SENCOR appeared to have temporarily depressed populations of bacteria and fungi. One week after treatment, populations of bacteria, fungi and actinomycetes were equivalent to untreated controls.

102.2 Water

Decomposition studies of SENCOR in pond water (pH 7 and water temperature of 10-23°C) exposed to sunlight and wind showed a half-life of 2 1/2 days for the technical grade and 6 1/2 days for the 70% WP formulation.

Approximately 2-5% and 3-6% of a SENCOR application was removed in runoff water on loam and clay loam soils, respectively, in 14 days following 4 inches of simulated rainfall.

102.3 Plant

Crop residue studies indicated that SENCOR residues were 0.02 ppm in soybean foilage following application of 1.0 lb a.i. and 0.01 ppm after application of 0.5 lb a.i.

102.4 Animal

The bioaccumulation factor of SENCOR in bluegill sunfish was less than 10X at exposure of 1 ppm, i.e. residues in fish were only slightly higher than toxicant level in water.

Dog feeding study indicated some accumulation of SENCOR and its metabolites in tissue. However, at 120 hours, 52-60% of SENCOR had been excreted in urine and 30% was excreted in feces.

Rat feeding study indicated excretion rates similar to dog. Also, an initial accumulation of SENCOR was noted in body tissue (including testes and ovaries), but these residues later declined.

103.0 Toxicological Properties:

103.1.1 Mammal:

See previous reviews in Environmental Safety files.

103.1.2. Bird

DATA REVIEW NUMBER: (ES) C-1
TEST: Avian acute oral LD_{50}
CHEMICAL TESTED: PROWL Technical (AC-1984-793)
TEST SPECIES: Mallard
RESULT:
(1) LD_{50} = 1,421 (938-2152) mg/kg
(2) No effect level was 215 mg/kg
(3) 90% mortality at highest treatment dosage (4,640 ppm)
(4) Food consumption and weight gain of birds tested with PROWL Technical were comparable to untreated control birds.
(5) Symptoms of toxicity preceding death were depression, reduced reaction to external stimuli and loss of coordination.
EVALUATION CATEGORY: Core
CATEGORY REPAIRABILITY: N.A.
REGISTRANT: American Cyanamid Co. (Tested by Truslow-Farms, Inc.)
DATE DATA SUBMITTED: May 14, 1976
ADDITIONAL TEST DATA: Statistical analysis followed method of Litchfield and Wilcoxon.
EVALUATION CATEGORY RATIONALE: The methodology of this test included two major diversions from recommended EPA guidelines: (1) test birds were 14 days of age instead of adult birds; and (2) test birds were observed for only 8 days (instead of 14 days) after administration of oral doses of PROWL. The Environmental Safety Section presently requires strict adherence to the specification

that young adult birds be used for the avian acute oral test. But our policy is that tests which were conducted with younger birds prior to July 1976 will not be rejected. Although the test birds were observed for only 8 days after dosing, the total mortality recorded for each treatment (at 8 days) had occurred by the fifth day after treatment. Hence, we assumed that no additional mortality would have occurred if the test birds had been observed for an additional 6 days.

Each of the discrepancies in test protocol described above represent serious departures from EPA guidelines. However, because test protocol was otherwise scientifically sound and the reported LC_{50} indicated that PROWL herbicide is of relatively low toxicity to bobwhite quail, the Environmental Safety Section will not require the registrant to rerun the avian acute oral test.

DATA REVIEW NUMBER: (ES) D-1
TEST: Avian 8-day dietary LC_{50}
CHEMICAL TESTED: PROWL (Technical, AC 92553)
TEST SPECIES: Bobwhite quail
RESULT:
(1) LC_{50} = 4,187 (3,149 - 5,567) ppm
(2) No mortality at 215, 464, 1,000 and 2,150 ppm.
(3) 60% mortality at 4,640 ppm.
(4) Test birds on PROWL treatment diet (all treatment levels) consumed about 15% less food and recorded about 35% less weight gain in comparison to birds fed control diet.

EVALUATION CATEGORY: Core
CATEGORY REPAIRABILITY: N.A.
REGISTRANT: American Cyanamid Co. (Tested by Hazelton Labs)
DATE DATA SUBMITTED: May 4, 1973
ADDITIONAL TEST DATA: Statistical analysis by Litchfield and Wilcoxon.
EVALUATION CATEGORY RATIONALE: Test protocol reported for this study was acceptable. However, the LC_{50} value reported for this test was calculated from an insufficient number of mortality levels. Nevertheless, the study indicated that the LC_{50} was between 2,150 ppm and 4,640 ppm. Therefore, the test was classified as a core study because LC_{50} > 2,150 ppm can be used for the Environmental Safety Section hazard evaluation of dietary toxicity for upland gamebirds.

DATA REVIEW NUMBER: (ES) E-1
TEST: Avian 8-day dietary LC_{50}
CHEMICAL TESTED: PROWL (Technical, AC 92553)
TEST SPECIES: Mallard
RESULT:
(1) LC_{50} = 10,388 (1,177 - 91, 712) ppm
(2) No mortality at 215, 464, 1,000 and 2,150 ppm.
(3) 20% mortality at 4,640 ppm.
(4) Food consumption and weight gain of test birds on PROWL treatment were comparable to birds on control diet.

EVALUATION CATEGORY: Core
CATEGORY REPAIRABILITY: N.A.
REGISTRANT: American Cyanamid Co. (Tested by Hazleton Labs)
DATE DATA SUBMITTED: May 4, 1973
ADDITIONAL TEST DATA: Statistical analysis followed method of Litchfield and Wilcoxon.
EVALUATION CATEGORY RATIONALE: Test protocol reported for this study was acceptable. However, the LC_{50} value reported for this test was calculated from an insufficient number of mortality levels. Because only 20% mortality was observed at 4,640 ppm PROWL, the Environmental Safety Section will use LC_{50} > 4,640 ppm (instead of LC_{50} = 10,388 ppm) for hazard evaluation purposes.

103.1.3. Fish

DATA REVIEW NUMBER: (ES) F-1
TEST: Fish (Warmwater) acute 96-hour LC_{50}
CHEMICAL TESTED: PROWL (AC-92533, Technical (93.2%))
TEST SPECIES: Bluegill sunfish
RESULT:
(1) TL_{50} = 0.20 (0.16 - 0.24) ppm
(2) No effect level was 0.1 ppm.
(3) 100% mortality at 0.42 ppm.
(4) 24-hour TL_{50} = 0.71 (0.54 - 0.95) ppm
(5) Affected fish became dark and lethargic, lost equilibrium and expired.

EVALUATION CATEGORY: Supplemental
CATEGORY REPAIRABILITY: Yes
REGISTRANT: American Cyanamid Co. (Tested by Bionomics, Inc.)
DATE DATA SUBMITTED: Unknown
ADDITIONAL TEST DATA:
(1) Protocol followed Fish Bioassay Procedure in 1970 edition of Standard Methods (APHA).
(2) TL_{50} value calculated by linear regression after conversion of test concentrations to logs and percent mortality to probits.

EVALUATION CATEGORY RATIONALE: This study was classified Supplemental because the number of test fish per treatment was not reported. If the registrant has tested an adequate number of fish per treatment, this test may be upgraded to a core study.

DATA REVIEW NUMBER: (ES) F-2
TEST: Fish (Warmwater) acute 96-hour LC_{50}
CHEMICAL TESTED: PROWL (AC-92533, Technical (93.2%)
TEST SPECIES: Channel catfish
RESULT: (1) TL_{50} = 0.42 (0.31 - 0.56) ppm
(2) No effect level was 0.32 ppm.
(3) 100% mortality at 0.56 ppm.
(4) 24-hour TL_{50} = 0.87 (0.65 - 1.16) ppm.
(5) Affected fish became dark and lethargic, lost equilibrium and expired.
EVALUATION CATEGORY: Supplemental
CATEGORY REPAIRABILITY: Yes
REGISTRANT: American Cyanamid Co. (Tested by Bionomics, Inc)
DATE DATA SUBMITTED: Unknown
ADDITIONAL TEST DATA: Same comments as for (ES) VII F-1.
EVALUATION CATEGORY RATIONALE: Same comments as (ES) VII F-1.

DATA REVIEW NUMBER: (ES) F-3
TEST: Fish (Warmwater) acute 96-hour LC_{50}
CHEMICAL TESTED: PROWL ^{TM}3E
TEST SPECIES: Bluegill sunfish
RESULT: (1) TL_{50} = 104 (0.69 - 1.57) ppm.
(2) No effect level was 0.75 ppm.
(3) 100% mortality at 1.60 ppm.
(4) 24-hour TL_{50} = 1.66 (1.32 - 2.08) ppm.
(5) Affected fish became dark and lethargic, lost equilibrium and expired.
EVALUATION CATEGORY: Invalid
CATEGORY REPAIRABILITY: Yes
REGISTRANT: American Cyanamid Co. (Tested by Bionomics, Inc.)
DATE DATA SUBMITTED: May, 1974
ADDITIONAL TEST DATA:
(1) Protocol followed Fish Bioassay Procedure in 1971 edition of Standards Methods (APHA).
(2) TL_{50} value calculated by linear regression after conversion of test concentrations to logs and percent mortality to probits.
EVALUATION CATEGORY RATIONALE: This study was classified invalid because the test material used was not completely identified.

DATA REVIEW NUMBER: (ES) F-4
TEST: Fish (Warmwater) acute 96-hour LC_{50}
CHEMICAL TESTED: PROWL TM4E
TEST SPECIES: Bluegill sunfish
RESULT: (1) TL_{50} = 0.92 (0.71 - 1.20) ppm
(2) No effect level was 0.42 ppm.
(3) 100% mortality at 2.40 ppm.
(4) 24-hour TL_{50} = 1.24 (0.94 - 1.65) ppm.
(5) Affected fish became dark and lethargic, lost equilibrium and expired.
EVALUATION CATEGORY: Invalid
CATEGORY REPAIRABILITY: Yes
REGISTRANT: American Cyanamid Co. (Tested by Bionomics, Inc.)
DATE DATA SUBMITTED: May, 1974
ADDITIONAL TEST DATA:
(1) Protocol followed Fish Bioassay Procedure in 1971 edition of Standards Methods (APHA).
(2) TL_{50} value calculated by linear regression after conversion of test concentrations to logs and percent mortality to probits.
EVALUATION CATEGORY: This study was classified invalid because the test material used was not completely identified.

DATA REVIEW NUMBER: (ES) G-1
TEST: Fish (Coldwater) acute 96-hour LC_{50}
CHEMICAL TESTED: PROWL (AC-92533, Technical (93.2%))
TEST SPECIES: Rainbow trout
RESULT: (1) TL_{50} = 0.14 (0.11 - 0.17) ppm
(2) No effect level was 0.075 ppm.
(3) 100% mortality at 0.24 ppm.
(4) 24-hour TL_{50} = 0.19 (0.16 - 0.23) ppm.
(5) Affected fish became dark and lethargic, lost equilibrium and expired.
EVALUATION CATEGORY: Supplemental
CATEGORY REPAIRABILITY: Yes
REGISTRANT: American Cyanamid Co. (Tested by Bionomics, Inc.)
DATE DATA SUBMITTED: Unknown
ADDITIONAL TEST DATA: Same comments as for (ES) VII F-1.
EVALUATION CATEGORY RATIONALE: Same comments as (ES) VII F-1.

DATA REVIEW NUMBER: (ES) G-2
TEST: Fish (Coldwater) acute 96-hour LC_{50}
CHEMICAL TESTED: PROWL TM3E
TEST SPECIES: Rainbow trout
RESULT: (1) TL_{50} = 1.00 (0.78 - 1.29) ppm.
(2) No effect level was 0.42 ppm.
(3) 100% mortality at 2.10 ppm.
(4) 24-hour TL_{50} = 1.25 (0.99 - 1.58) ppm.
(5) Affected fish became dark and lethargic, lost equilibrium and expired.
EVALUATION CATEGORY: Invalid
CATEGORY REPAIRABILITY: Yes
REGISTRANT: American Cyanamid Co. (Tested by Bionomics, Inc.)
DATE DATA SUBMITTED: May, 1974
ADDITIONAL TEST DATA:
(1) Protocol followed Fish Bioassay Procedure in 1971 edition of Standards Methods (APHA).
(2) TL_{50} value calculated by linear regression after conversion of test concentrations to logs and percent mortality to probits.
EVALUATION CATEGORY RATIONALE: This study was classified invalid because the test material used was not completely identified.

DATA REVIEW NUMBER: (ES) G-3
TEST: Fish (Coldwater) acute 96-hour LC_{50}
CHEMICAL TESTED: PROWL TM4E
TEST SPECIES: Rainbow trout
RESULT: (1) TL_{50} = 0.52 (0.39 - 0.69) ppm.
(2) No effect level was 0.21 ppm.
(3) 100% mortality at 1.00 ppm.
(4) 24-hour TL_{50} = 1.07 (0.72 - 1.60) ppm.
(5) Affected fish became dark and lethargic, lost equilibrium and expired.
EVALUATION CATEGORY: Invalid
CATEGORY REPAIRABILITY: Yes
REGISTRANT: American Cyanamid Co. (Tested by Bionomics, Inc.)
DATE DATA SUBMITTED: May, 1974
ADDITIONAL TEST DATA:
(1) Protocol followed Fish Bioassay Procedure in 1971 edition of Standards Methods (APHA).
(2) TL_{50} value calculated by linear regression after conversion of test concentrations to logs and percent mortality to probits.
EVALUATION CATEGORY RATIONALE: This study was classified invalid because the test material used was not completely identified.

103.1.4 Aquatic Invertebrate

DATA REVIEW NUMBER: (ES) H-1
TEST: Aquatic invertebrate acute 48-hour LC_{50}
CHEMICAL TESTED: PROWL Technical (CL - 92,5533)
TEST SPECIES: Daphnia magna
RESULT: (1) LC_{50} = 0.28 (0.23 - 0.33) ppm.
(2) No effect level was 0.16 ppm.
(3) 100% mortality at 0.49 ppm.
(4) 24-hour LC_{50} = 0.52 (0.42 - 0.63) ppm.
EVALUATION CATEGORY: Core
CATEGORY REPAIRABILITY: N.A.
REGISTRANT: American Cyanamid Co. (Tested by Bionomics, Inc.)
DATE DATA SUBMITTED: May, 1976
ADDITIONAL TEST DATA:
(1) Protocol followed: EPA, 1975. Methods for acute toxicity tests with fish, macroinvertebrates and amphibians.
(2) Test compound was dissolved in acetone for introduction into dilution water.
(3) Water temperature was 21±1°C.
(4) Total of 15 test organisms per treatment.
(5) LC_{50} calculated from regression equation after conversion of test concentration and percent mortality to logarithms and probits.

104.0 Hazard Assessment

104.1.1 Adequacy of Data:

(1) Avian acute toxicity - Registrant has provided acceptable tests of avian acute oral LD_{50} and avian 8-day dietary LC_{50}.
(2) Fish acute toxicity - Tests of acute 96-hour LC_{50} for warmwater and coldwater fish were unacceptable because the registrant failed to either (1) properly identify the test material or (2) report the number of fish tested.
(3) Aquatic invertebrate acute toxicity - Registrant has provided an acceptable test of acute 48-hour LC_{50} for freshwater aquatic invertebrates.

104.1.3 Likelihood of Exposure to Non-target Organisms

Use of PROWL and SENCOR herbicides in tank mixtures or sequential application as either preplant incoporated or

preemergence treatment in soybean fields is expected to result in minimum hazard of exposure to non-target organisms. Relatively few birds and mammals utilize soybean fields during the planting and early growing season (Gusey, W. F., and L. D. Maturgo, 1972. Wildlife utilization of croplands. Shell Oil Co., Houston, pp. 211-223).

Aerial application of PROWL-SENCOR tank mixtures could expose the toxicant to non-target organisms in habitat adjacent to soybean fields due to drift from the target area. Preplant soil-incorporated treatment will reduce the amount of toxicant directly exposed to non-target organisms. Lab tests indicated that PROWL was of relatively low oral toxicity to birds (acute LD_{50} [mallard] = 1,421 mg/kg; dietary LC_{50} [mallard] = 10,399 ppm). SENCOR was moderately toxic to birds (acute LD_{50} [bobwhite quail] = 166 mg/kg; dietary LC_{50} [mallard] > 4,000 ppm). Maximum estimated residues which could potentially contaminate tall grass in edge habitat are approximately 150 ppm on foilage and 15 ppm on seeds at maximum application rates. Thus, it is unlikely that birds could acquire a lethal dose of either herbicide from feeding in contaminated habitat. However, drift of the herbicides to edges of soybean fields could temporarily eliminate some wildlife cover.

dietary LC_{50} (bob-wh. quail) = 4,187 ppm

Environmental chemistry studies indicated that neither PROWL nor SENCOR occurred in significant amounts in runoff water. Both of these herbicides are highly persistent in water. Bioaccumulation studies in channel catfish and fathead minnow indicated high accumulation-factors for PROWL (see review by N. J. Cook, Environmental Safety Section, 28 March 1977). Lab studies showed that PROWL was highly toxic to Daphnia magna (LC_{50} = 0.28 ppm). The registrant has not submitted acceptable studies of acute fish toxicity for PROWL. SENCOR is moderately toxic to fish (LC_{50} [bluegill] = 80 ppm; LC_{50} [rainbow trout] = 76 ppm). Due to low runoff potential, there is minimum hazard of contamination of aquatic environments with PROWL-SENCOR herbicides from soybean fields. If the tank mixtures are used in compliance with label directions, aquatic contamination should not occur.

105.0 Conclusions

(1) The Environmental Safety Section objects to the application for amended use of PROWL applied as a preplant incoporated treatment followed by sequential preemergence application

of SENCOR or PROWL plus SENCOR tank mixture applied as either preplant incorporated or preemergence treatments in soybeans due to inadequate toxicity data.

(2) The registrant has submitted acceptable toxicity tests for (1) avian acute oral LD_{50}, (2) avian 8-day dietary LC_{50} (mallard and bobwhite quail), and (3) acute 48-hour LC_{50} for freshwater aquatic invertebrate for PROWL. The fish acute 96-hour LC_{50} tests (warmwater and coldwater fish) with PROWL were unacceptable because the registrant did not report the number of fish tested and failed to identify the test material.

(3) Prior to consideration of the proposed amended use, the 96-hour LC_{50}'s for a coldwater species (rainbow trout) and a warmwater species (bluegill sunfish) of fish are required. These basic studies are required for the active ingredient (technical grade) of PROWL herbicide.

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EEEB-RD
22 September 1977