231341
RECORD NO.

128829
SHAUGHNESSY NO.

8
REVIEW NO.

EEB REVIEW

DEC 27 1989

DATE: IN 09/15/88 OUT _____

FILE OR REG. NO. 100-617

PETITION OR EXP. PERMIT NO. _____

DATE OF SUBMISSION 08/29/88

DATE RECEIVED BY EFED 09/14/88

RD REQUESTED COMPLETION DATE 12/05/88

EEB ESTIMATED COMPLETION DATE 12/05/88

RD ACTION CODE/TYPE OF REVIEW 360

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

DATA ACCESSION NO(S). 408118-02,01

PRODUCT MANAGER NO. R. Taylor(25)

PRODUCT NAME(S) (Imazapyr) Arsenal Herbicide

COMPANY NAME American Cyanamid Company

SUBMISSION PURPOSE Registrant response to previous EEB review plus submission of phyto-toxicity data to support forestry use.

SHAUGHNESSY NO.	CHEMICAL & FORMULATION	% A.I.
128829	Isopropylamine salt of Imazapyr	53.1

EEB REVIEW

Chemical: Imazapyr,isopropylamine salt.

100.1 Submission Purpose and Pesticide Use

American Cyanamid has submitted nontarget phytotoxicity data to support site preparation, conifer release, control of vegetation along forest roads, non-irrigation ditchbanks, and for the establishment and maintenance of wildlife openings.

100.2 Formulation Information

Active Ingredient
Isopropylamine salt of imazapyr*----------53.1%

Inert Ingredients----------46.9%

*Equivalent to 43% of the acid or 4.0 lbs acid per gallon

100.3 Application Methods, Directions, Rates

See attached label.

100.4 Target Organisms

Annual and perennial grasses, broadleaf weeds, and hardwood trees. See attached label for complete list.

100. Precautionary Labeling

Do not apply directly to any body of water.
Do not contaminate water by cleaning of equipment or disposal of waste.
Do not apply or drain or flush equipment on or near desirable trees or other plants, or in locations where the chemical may be washed or moved into contact with their roots.
Do not side trim desirable vegetation with this product.
Prevent drift of spray to desirable plants.

101 Hazard Assessment

101.1 Discussion

Granular Imazapyr is currently registered for use in noncrop areas, rights-of-way, storage areas, tank farms, fencerows (nonagricultural), commercial/industrial equipment, and conifer release.

The soluble concentrate and emulsifiable concentrate are registered for use on forest trees, ornamental turf, ditchbanks, noncrop areas, rights-of-way, industrial sites, storage yards, utility buildings, tank farms, paved areas, farm buildings, farmyards, fencerows (non agricultural), and commercial/industrial equipment. (NPIRS November 07, 1989).

This use will permit application for forest site preparation, conifer release, vegetation management along forest roads, ditchbanks, and establishment and maintenance of wildlife openings.

The potential exists for thousands of additional acres to be exposed.

Rates of application range from 0.375 to 1.25 lbs ai/A.

101.2 Likelihood of Adverse Effects to Nontarget Organisms

Environmental Fate

Imazapyr (isopropylamine salt) has been classified by the Environmental Fate and Ground Water Branch (EFGB) as 1) stable to degradation or metabolism in water and sediment under aerobic aquatic conditions found in the environment, 2) stable to microbial degradation in the the soil environment. Calculated half-life 5.9 years. Rotational crops and nontarget organisms will be exposed to parent Imazapyr in the environment, 3) binding to soil or sediment is not a factor in dissipation in the soil environment, and 4) it does not appear to photodegrade in aqueous solution with a half-life of 2.5 to 5.3 days in the laboratory under simulated natural sunlight.

Terrestrial

Imazapyr has been described as prctically nontoxic to mammals based on an acute oral LD_{50} value for the rat (both sexes) of >5000 mg/kg and a systemic NOEL of 400 mg/kg/day HDT (technical) for the rabbit.

The acid with an LD_{50} of >2150 mg/kg for the bobwhite quail and mallard duck may be characterized as practically non-toxic to birds.

With an LD_{50} of >2150 mg/kg (isopropylamine salt) for bobwhite quail and mallard duck, the material has been characterized as practically nontoxic on an acute oral basis. The LC_{50} for bobwhite quail and mallard duck (testing with the same salt) is >5000 ppm and may also be characterized as practically nontoxic.

Imazapyr acid was nontoxic to honey bees at 100 ug/bee in an acute contact study.

Following a single application of 2.5 pt Arsenal Herbicide® (1.25 lb acid equivalent) the following residues could be expected:

Substrate	Residue(ppm)
Short rangegrass	300.00
Long grass	137.50
Leaves and leafy crops	156.25
Forage	72.50
Pod containing seeds	15.00
Fruit	8.75

These residues are all significantly below avian LC_{50} values. The hazard to terrestrial species is not expected to be increased by this use.

Aquatic

The acid with an LC_{50} of >100 ppm for the bluegill sunfish, channel catfish, and rainbow trout may be characterized as practically nontoxic to freshwater fish.

The 48-hour LC_{50} for Daphnia magna using the acid was >100 ppm and may be characterized as practically nontoxic to aquatic invertebrates.

The isopropylamine salt of imazapyr with a 96-hr LC_{50} of >1000 mg/l to the bluegill sunfish has been characterized as practically nontoxic to warmwater fish. The 48-hr LC_{50} for Daphnia magna using the same salt was reported to be 750 mg/l and may also be characterized as practically nontoxic.

Assuming a direct application to water at 1.25 lb ae/a, the concentration in 6 feet of water would be 76.25 ppb. This value is substantially below that necessary to adversely effect aquatic organisms. Consequently, the hazard to aquatic species is not expected to be increased by this use.

Plants

Nontarget plant damage can occur from drift, volatility, or runoff. Since the herbicide has not been characterized as volatile (vapor pressure $<1.0 \times 10^{-5}$ mm Hg @ 25° C) EEB's major concern is from drift during aerial application and runoff following ground or aerial application.

Forest Runoff - Aquatic Plants

Using data obtained from SWRRB and EXAMS II models, from 9.486 to 0.002 ppb could be expected to runoff a forest site following application of 1.25 lb ae/a. If applied by air an additional 5% could drift resulting in a total water concentration of from 13.299 to 3.815 ppb.

Reported EC_{50} values for aquatic plants are: 92 ppm - Skeletonema costatum, 71 ppm - Selenastrum capricornutum, 41 ppm Navicula pelliculosa, 12.2 ppm - Anabaena flos-aquae, and 24 ppb Lemna gibba. Based on data currently available, aquatic nontarget plants would not be adversely effected following application to forest sites.

Forest Runoff - Terrestrial Plants

Based on the SWRRB model, runoff of Arsenal from forest sites onto other terrestrial sites will be minor and is not expected to adversely effect nontarget terrestrial plants.

Forest Drift - Terrestrial Plants

If 5% drift occured following an application of 1.25 lb ae/a (1.26 kg/ha), 28.35 gms would move from the site of application. Calculated EC_{25} values from Tier II vegetative vigor tests ranged from 1.1 to 32.9 gms/ha depending on test parameter. Certain nontarget plants could be expected to be adversely effected. Consequently, for the aerial uses of Arsenal, Tier III terrestrial plant testing is required.

Ditchbank Runoff - Aquatic Plants

Runoff following an application for ditchbank weed control was estimated to be 25%. Assuming the ditch is 5280 feet long and dry, a swath 8.25 feet is sprayed the length of the ditch, and 1.25 lb ae Arsenal is applied, 0.3125 lb ae would runoff resulting in a water concentration of 19.06 ppb in a pond 6 feet deep (this scenario does not take into account the dilution that would normally occur during a rainfall event). Based on these assumptions, the concentration of Imazapyr would be $< EC_{50}$'s for aquatic plants. Runoff from treated ditchbanks is not expected to adversely effect nontarget aquatic plants.

101.3 Endangered Species Considerations

Relying on the data currently available, exposure to Arsenal is expected to be hazardous to endangered or threatened plants. Application by ground equipment will significantly reduce this hazard, however aerial application is expected to increase the hazard.

101.4 Adequacy of Toxicity Data

Tier I and II terrestrial data requirements have been satisfied and have triggered Tier III terrestrial plant testing for the aerial uses.

101.5 Adequacy of Labeling

The following statement should be added to the "Environmental Hazard" section of the label:

"This herbicide is phytotoxic at extremely low concentrations. Nontarget plants may be adversely effected from drift".

EPA is developing a program to reduce or eliminate exposure to endangered species to a point where use does not result in jeopardy. The Agency will issue notice of any necessary labeling revisions when the program is developed.

102.0 Classification

Not currently classified.

103 Conclusions

EEB has completed a review of the proposed registration of Arsenal, to support use for site preparation, conifer release, control of vegetation along forest roads, non-irrigation ditchbanks, and for the establishment and maintenance of wildlife openings.

Data currently available indicate that the hazard to avian, aquatic, and mammalian species will be minimal. The hazard to nontarget plants including endangered or threatened species is expected to be increased from the aerial use of this herbicide. Tier III terrestrial plant testing has been triggered where the herbicide is applied by air.

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