

*File* 2-5-93

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To: Dennis Edwards  
 Product Manager 19  
 Registration Division (H7505C)

From: Anthony Maciorowski, Chief  
 Ecological Effects Branch/EFED (H7507C)

Attached, please find the EEB review of...

Reg./File # : 3125-URI  
 Chemical Name : NTN 33893 Imidacloprid  
 Type Product : Insecticide  
 Product Name : NTN 33893-2 Systemic Insecticide  
 Company Name : Miles Inc.  
 Purpose : Sec. 3 Registration

Action Code : 115 Date Due : 12/31/92  
 Reviewer : Dana Lateulere

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

## ECOLOGICAL EFFECTS PRELIMINARY REVIEW

Chemical: NTN 33893-2 Systemic Insecticide (Imidacloprid - Flowable)

### 100 Submission Purpose and Label Information

#### 100.1 Submission Purpose and Pesticide Use

Miles Inc. is requesting a Section 3 Registration for NTN 33893-2 Systemic Insecticide (Imidacloprid). The proposed use is for insect control in turf grasses (such as but not limited to, home lawns and commercial turf, golf courses, sod farms, airports, cemeteries, parks, playgrounds, athletic fields, and any other area where lawn or turfgrass can be infested with destructive soil insects), indoor and outdoor ornamentals (including trees, shrubs, evergreens, flowers, foliage plants and bulb crops), Christmas tree and wood production plantations, nurseries, plantscapes (interior and exterior) and garden center areas.

#### 100.2 Formulation Information

##### Active Ingredient:

1-[(6-Chloro-3-pyridinyl)methyl]-4,5-dihydro-N-nitro-1H-imidazol-2-amine .....21.4%

Inert Ingredients:.....78.6%  
100%

#### 100.3 Application Methods, Directions, Rates

##### Turf

Apply NTN 33893-2 Systemic Insecticide in sufficient water to provide adequate distribution in the treated area. The use of accurately calibrated equipment normally used for the application of turfgrass insecticides is required. Use equipment which will produce a uniform, coarse droplet spray, using a low pressure setting to eliminate off target drift.

Applications should not be made when turfgrass areas are waterlogged or the soil is saturated with water. The treated turf area must be in such a condition that the rainfall or irrigation will penetrate vertically in the soil profile. When lateral runoff occurs from the treated area, control will be adversely effected. Application cannot exceed a total of 2 pints (0.5 lb a.i.) per acre per year.

Optimum control will be achieved when applications are made prior to egg hatch of the target pests, followed by sufficient irrigation or rainfall to place the active ingredient in the upper 1 to 3 inches of soil.

##### Ornamentals

Application can be made by direct plant trunk injection, foliar applications or soil applications using injections, drenches, or plant growing media mixtures.

plant system.

The maximum application rate for any crop is 0.5 lb a.i. per acre per year. For optimum control, irrigation or rainfall should occur within 24 hours of the application to uniformly distribute the active ingredient through the top 1 to 3 inches of soil.

#### Environmental Fate and Groundwater Data

The following was taken from an EUP review by the EFGWB for NTN 33893: "The EFGWB is concerned about ground and surface water contamination because the hydrolysis and aerobic soil metabolism data indicate that imidacloprid is persistent and the leaching/adsorption/desorption data indicate that imidacloprid seems to be persistent and somewhat mobile..". NTN 33893 was stable at pH 5 and 7 buffers in the dark at 25°C, but degraded slightly at pH 9 with a half-life of 355 days. Photolytic degradation occurred quite rapidly in a sterile pH 7 buffer solution at 1 hour. However, major degradates were apparent; the degradates have not been addressed by the registrant in any form - neither eco-tox nor environmental fate.

A Simulated Run-off study was submitted to the EFGWB from Miles Inc. (MRID #422563-09). The test plots utilized 0.5 lb a.i. NTN 33893/A. The data from the four turf plots indicated a mean runoff of 15.18% and a maximum of 19.67%. The run-off results were as follows:

Plot #1	-	11.12%
Plot #2	-	12.81%
Plot #3	-	19.67%
Plot #4	-	17.07%

Based on these results the EFGWB estimated an average and a maximum Estimated Environmental Concentration (EEC); these will be used for the aquatic portion of this hazard assessment as a worst case scenario.

101.2

#### Likelihood of Adverse Effects to Nontarget Organisms

##### Toxicity Values

The following toxicity values have been determined for NTN 33893 technical:

BWQ	LD50 = 152.3 mg a.i./kg
	LC50 = 1535.87 mg a.i./L
	Reproduction LEL = 243 mg a.i./L
	NOEC = 126 mg a.i./L
MAL	LC50 = >4797 mg a.i./L
Reproduction	NOEC for eggshell thickness = <61 mg a.i./L
	LEL for other parameters = 128 mg a.i./L
	NOEC other parameters = 61 mg a.i./L

### Terrestrial

The following maximum expected residues on vegetation were determined (utilizing Kenega, 1973) for NTN 33893-2 Systemic Insecticide at 0.5 lb a.i./acre:

Short rangegrass	120.0 ppm
Long rangegrass	55.0 ppm
Leaves, leafy crops	62.5 ppm
Forage (alfalfa, clover and small insects)	29.0 ppm
Pod containing seeds	6.0 ppm
Fruit	3.5 ppm

A simulated turf study (MRID No. 422563-07) with NTN 33893 240FS (same formulation as -2 Systemic Insecticide) at a rate of 0.5 lb a.i./A was performed by the registrant to determine the magnitude of residues in treated turf verdure. Residues ranged from 40 to 45 ppm immediately after treatment and dissipated to 0.15 to 0.31 ppm 62 days after treatment.

Based on the toxicity values and the estimated environmental residues the acute Level of Concern (LOC) has been exceeded for House sparrows and similar songbirds for both non-endangered and Federally endangered species. The avian risk is of high concern and may warrant regulatory action.

i.e. House Sparrow

LD50 = 41.0 mg a.i./kg

LC50  $\approx$  142.7 ppm

1/5 LC50  $\approx$  28.54 ppm

1/2 LC50  $\approx$  71.35 ppm

Based on the toxicity values and the estimated environmental residues the chronic LOC has been exceeded for non-endangered as well as Federally endangered waterfowl due to the proposed use. The avian risk is of high concern and may warrant regulatory action.

i.e. Mallard Duck

Reproductive NOEC = 61 mg a.i./L

LEL = 128 mg a.i./L

Eggshell thickness NOEC = <61 mg a.i./L

LEL = 61 mg a.i./L

The Kenega residues for short rangegrass are estimated to be 120.0 ppm, twice as high as the NOEC for the Mallard duck reproductive effects and twice as high as the low effect level for eggshell thickness. The residues for leaves and leafy crops, 62.5 ppm, also exceed the NOEC (and LEL for eggshell thickness) for the Mallard duck.

Based on the turf grass residues obtained from the registrant, which are less than the Kenega values, there still may be risk to waterfowl. A NOEC has not been established for eggshell thickness in the Mallard duck, only that the NOEC is below 61 ppm. The residues submitted by the registrant (45 ppm after application) are not so low as to assume they fall below the

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cause growth, survival and/or reproductive effects as indicated in the laboratory. Therefore NTN 33893 represents a chronic risk at a level of concern to fish.

101.3 Endangered Species Concerns

As mentioned in the above sections, the proposed use may pose a high risk to endangered waterfowl and small song birds, also to aquatic invertebrates. Rainbow trout studies show chronic effects as a result of exposure to levels of 1 ppm a.i. NTN 33893. As a NOEC has not been established for a fish early life study, endangered fish species may also be of concern.

Based on the various wood production use sites associated with this petition there is concern for the Federally Endangered Red-Cockaded Woodpecker that inhabits over 200 counties in the Southcentral and Southeastern United States. Unless the registrant can demonstrate that the Woodpecker would not be affected by this use, limitations on NTN 33893 would have to be imposed to protect the Woodpecker. OPP can specify these limitations consistent with other pesticides used in Woodpecker areas. Alternatively, EPA can request consultation with the U.S. Fish and Wildlife Service.

The concern for the Red Cockaded Woodpecker stems from the systemic nature of the pesticide and the trunk injections. If the registrant submits verification that the residues available to the Woodpecker in the tree tissues or insects are below levels of concern, or if label restrictions clearly limit the use to areas not inhabited by the Woodpecker, OPP could alleviate the need for the afore mentioned limitations. [The level of concern is 3.05 mg a.i./L as determined from the Mallard acute oral toxicity test].

Alternatively, if the registrant could clearly define "wood production" for this proposal, EEB could research the areas effected and thus determine if the Woodpecker is in danger of exposure. At this time there is no information to suggest that the Woodpecker would not be at risk to exposure.

101.4 Adequacy of Toxicity Data

The toxicity database is adequate to assess the hazard for the proposed uses. A NOEC for a Fish Early Life Stage has not been established; a worst case scenario has been utilized. Note that a Terrestrial Field Study is being performed with a granular formulation on turf to determine field effects to songbirds; EEB is awaiting preliminary results. Also, a NOEC for eggshell thinning in Mallard ducks has not been established.

101.5 Adequacy of Labeling

The proposed use label should include the following statement: "This product is toxic to birds, fish and aquatic invertebrates", also the following wetlands statement, "Do not apply directly to water, areas where surface water is present or to intertidal areas below the mean high water mark".

eliminate all risk to non-target organisms but may limit the associated hazards.

It is suggested that this chemical be labeled as a Restricted Use Pesticide based on the aquatic toxicity and potential reproductive toxicity to waterfowl. EEB has no proposed mitigation to limit the chronic effects to waterfowl. Based on the systemic nature of the pesticide, incorporation will not eliminate the potential hazard. Post-registration field monitoring (including nests) for waterfowl is recommended based on the amplitude of turf in the waterfowl's diet and a lack of a discernable NOEC for reproductive effects. Also, concerns for the Federally Endangered Red-Cockaded Woodpecker need to be addressed as noted above.

Dana Lateulere, Biologist  
Ecological Effects Branch  
Environmental Fate and Effects Division

Signature:

Date:

*Dana Lateulere*  
2/5/93

Ann Stavola, Head Section V  
Ecological Effects Branch  
Environmental Fate and Effects Division

Signature:

Date:

*Ann Stavola*  
2/5/93

*af* Anthony F. Maciorowski, Chief  
Ecological Effects Branch  
Environmental Fate and Effects Division

Signature:

Date:

*Anthony F. Maciorowski*  
2/5/93

<sup>1</sup> Note to PM: At present there is no protocol for Avian Field Monitoring. EEB suggests the requirement for Field monitoring be postponed for one year at which time the appropriate guidance can be forwarded to the registrant.

For Dana L EEB

Instantaneous (spike) EEC assuming immediate complete mixing through a one hectare pond two meters deep. This is an initial value before any degradation take place and not a 24 hr, 48 hr or long term EEC.

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Average concentration in runoff from 4 plots  
 $= 0.0845 \text{ kg / HA}$

Maximum concentration in runoff from 1 plot  
 $= 0.1099 \text{ kg / HA}$

This is mostly dissolved (very little eroded soil) from turf so we can scale linearly to 10 HA.

A 1 HA pond 2 meters deep contains  
20,000,000 liters of water.

**EEC Calculation Sheet**for NTNH2O Solubility = 580 ppm15%

Note: H2O Solubility of:

&lt;1.0 ppm = 1% Runoff

1-100 ppm = 2% Runoff

≥ 100 ppm = 5% Runoff

Pyrethroids = 0.1% Runoff

**I. Un-incorporated ground application.**Runoff

$$\underline{.5} \text{ lb(s) a.i./A} \times \underline{0.615} \text{ (\% runoff)} \times \underline{10A} \text{ (from 10A drainage basin)} = \underline{.75} \text{ lb(s)}$$

EEC of 1 lb. a.i. direct application to 1A pond 6-foot deep = 61 ppb, 6-inch deep = 734 ppb. Therefore:

$$6 \text{ foot EEC} = 61 \text{ ppb} \times \underline{.75} \text{ (lb)} = \underline{45.75} \text{ ppb.} \div 1000 = \underline{\hspace{1cm}} \text{ ppm}$$

$$6 \text{ inch EEC} = 734 \text{ ppb} \times \underline{\hspace{1cm}} \text{ (lb)} = \underline{\hspace{1cm}} \text{ ppb.} \div 1000 = \underline{\hspace{1cm}} \text{ ppm}$$

**II. For incorporated ground application**Runoff

$$\underline{.5} \text{ lb(s) a.i./A} \div \underline{2.54} \text{ (cm depth of incorp.)} \times \underline{0.615} \text{ (\% runoff)} \times \underline{10A} = \underline{.295} \text{ lb(s)}$$

Therefore:

$$6 \text{ foot EEC} = 61 \text{ ppb} \times \underline{.295} \text{ (lb)} = \underline{18.01} \text{ ppb.} \div 1000 = \underline{\hspace{1cm}} \text{ ppm}$$

$$6 \text{ inch EEC} = 734 \text{ ppb} \times \underline{\hspace{1cm}} \text{ (lb)} = \underline{\hspace{1cm}} \text{ ppb.} \div 1000 = \underline{\hspace{1cm}} \text{ ppm}$$

**III. For aerial application (or mist blower).****A. Runoff**

$$\underline{.5} \text{ lb(s) a.i./A} \times \underline{0.6} \text{ (appl. efficiency)} \times \underline{0.615} \text{ (\% runoff)} \times \underline{10A} \text{ (basin)} = \underline{.45} \text{ lb(s) (total runoff)}$$

**B. Drift**

$$\underline{.5} \text{ lb(s) a.i./A} \times \underline{0.05} \text{ (5\% drift)} = \underline{.025} \text{ lb(s) total drift}$$

$$\text{Tot. loading} = \underline{.45} \text{ lb(s) (total runoff)} + \underline{.025} \text{ lb(s) (total drift)} = \underline{.475} \text{ lb(s)}$$

Therefore:

$$6 \text{ foot EEC} = 61 \text{ ppb} \times \underline{.475} \text{ (lb)} = \underline{28.98} \text{ ppb.} \div 1000 = \underline{\hspace{1cm}} \text{ ppm}$$

$$6 \text{ inch EEC} = 734 \text{ ppb} \times \underline{\hspace{1cm}} \text{ (lb)} = \underline{\hspace{1cm}} \text{ ppb.} \div 1000 = \underline{\hspace{1cm}} \text{ ppm}$$

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