



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

DEC 7 1993

DEC 7 1993

OFFICE OF  
PREVENTION, PESTICIDES AND  
TOXIC SUBSTANCES

MEMORANDUM

**SUBJECT:** Section 18: ID# 93AZ0007. Emergency Exemption for Use of ADMIRE 2 Flowable (Imidacloprid) on Tomatoes in Florida

Tox. Chem. No.: 497E  
PC No.: 129099  
Barcode No.: D196450  
Submission No.: S451533

**TO:** Rebecca Cool, Manager, PM Team 41  
Andrea Beard, Reviewer, PM Team 41  
Emergency Response and Minor Use Section/Registration  
Support Branch  
Registration Division (H7505C)

**FROM:** Sheryl K. Reilly, Ph.D. *Sheryl K. Reilly*  
Review Section II, Toxicology Branch I  
Health Effects Division (H7509C) *12-3-93*

**THRU:** Myron S. Ottley, Ph.D. *Myron S. Ottley*  
Review Section IV, Toxicology Branch I  
Health Effects Division (H7509C) *12/6/93*  
and  
Joycelyn E. Stewart, Ph.D. *JES*  
Section Head *12/6/93*  
Review Section II, Toxicology Branch I *KB*  
Health Effects Division (H7509C) *12/7/93*

**I. CONCLUSIONS**

The toxicology data requirements for imidacloprid (ADMIRE 2 Flowable) are complete for the issuance of a Section 18 emergency exemption by the State of Florida for the temporary use of imidacloprid to control Sweet Potato Whitefly on tomatoes. The margins of exposure (MOEs) for acute exposure were greater than 100. Imidacloprid is a "Group E" carcinogen, so there is no cancer risk associated with exposure to this chemical.

Toxicology Branch I has no objection to the issuance of this exemption.



## **II. ACTION REQUESTED**

In a letter dated June 1, 1993, the Florida Department of Agriculture requested an emergency exemption under Section 18 for the use of imidacloprid to control Sweet Potato Whitefly (SPWF, Bemisia tabaci) on tomatoes. The SPWF has become a serious economic pest on tomatoes, because the presence of SPWF at extremely low populations has resulted in severe widespread incidence of geminivirus in tomato producing areas.

This is the first request made by Florida for emergency use of imidacloprid on tomatoes. ADMIRE 2 Flowable (Miles, Inc.) is the formulation for the active ingredient imidacloprid. The pesticide will be used as a soil systemic treatment for SPWF, followed by foliar applications of Danitol 2EC and Monitor on maturing plants. The reason for using different insecticides with different modes of action to reduce the development of resistance to pesticides in SPWF. In addition, there are no Section 3 registered insecticides that provide adequate control of SPWF, and the most effective management of this pest has been by rotational application of several pesticides (Thiodan, Monitor, Asana, Ambush, Lorsban, and several crop oils).

The maximum estimated acreage to be treated in Florida is 50,000. A maximum of 1 application per crop per season will be made into the soil root zone underneath plastic mulch, at a rate of 0.25 oz. a.i. (16 oz Admire 2 Flowable) per acre, for a total of 12,500 lbs. a.i. per year. The preharvest interval will be at least 21 days.

## **III. TOXICOLOGY BRANCH I COMMENTS**

The toxicology data base for imidacloprid is sufficient to support the proposed Section 18 exemption.

## **IV. RISK/EXPOSURE ASSESSMENT**

This action was submitted to OREB (Occupational and Residential Exposure Branch; subordinate data package D196929/S451533) for determination of exposure estimates (see attached memo from Charles Lewis to S. Reilly, dated December 3, 1993). Acute MOEs were based on these exposure estimates, and the rabbit maternal and developmental NOEL of 24 mg/kg/d (see Toxicology Profile, below). Calculations were based on a dermal absorption of 100%, because no dermal absorption data is available for imidacloprid. Cancer risk is not quantitated, since imidacloprid is a group E carcinogen, and there is no Q<sub>1</sub>\* for this chemical.

Formulas used in calculations:

Acute MOE =

NOEL (24 mg/kg BW/d) ÷ Exposure (mg/kg BW/d)

OPERATION*	EXPOSURE (mg/kg/d)	ACUTE MOE
Mixer/Loaders	0.1514	159
Applicator GB Closed	0.0087	2759

Minimum clothing requirements are: long-sleeved shirt, long pants, shoes, socks, and chemically resistant gloves for each job function (Worker Protection Standard for Agricultural Pesticides).

#### V. SPECIAL TOXICOLOGY ISSUES AND PROBLEMS

1. Labelling. The labelling precautionary statements for ADMIRE 2 Flowable are governed by toxicity studies on the active ingredient.
2. Carcinogenicity. There is no cancer risk associated with exposure to this chemical, because the HED RfD Review Committee has determined that the test compound is a "Group E" carcinogen.
3. RfD. The RfD/Quality Assurance Peer Review Committee met on April 22, 1993 to assess the reference dose for this chemical. The Committee recommended that an RfD of 0.057 should be established, based upon a NOEL of 5.7 mg/kg/d in a chronic toxicity study in rats. An uncertainty factor of 100 was used to account for interspecies extrapolation and intraspecies variability.
4. Non-carcinogenic risk assessment. In a chronic/oncogenicity study, male rats exhibited increased thyroid lesions at 16.9 mg/kg/d and above, and females at 73 mg/kg/d (see attached Toxicology Profile, study # 100652/101931). In a developmental study in rabbits, 72 mg/kg/d of technical imidacloprid (administered on days 6-19 of gestation) increased the number of resorptions and abortions in the dams, and increased skeletal abnormalities and decreased body weight in the pups.
5. Mutagenicity/genetic toxicity comments. Most of the genotoxicity studies for imidacloprid were negative, although an in vitro chromosome aberration study (human lymphocytes) was positive at cytotoxic concentrations (Tox. Doc. #099262),

and an in vitro sister chromatid exchange mutagenicity study (CHO cells) was positive at cytotoxic doses (Tox. Doc. 102655).

6. Dermal Penetration. There are no available dermal penetration data for imidacloprid.

# V. TOXICOLOGY PROFILE

Technical NTN 33893

Guideline	Study; Company; Date; MRID #; Category; Classification	Study Results
81-1	<p>Acute oral LD50 Species: rat Bayer AG Instit. Fur Tox. Germ Study#: T 2033060 MRID: 420553-31</p> <p>Date: 12/15/89 CORE - ACCEPTABLE DOC#: 009375</p>	<p>Male Sprague-Dawley rats dosed at: 0, 50, 100, 250, 315, 400, 450, 500, 1800 mg/kg. Females dosed: 0, 100, 250, 315, 400, 475, 500, and 1800 mg/kg. LD50 (M) = 424 mg/kg (calculated). F &gt; 450, &lt; 475 mg/kg (estimated).</p> <p><i>Toxicity category II</i></p>
81-2	<p>Acute Dermal LD50 Species: rat Möbly Chem. Study#: T 5033063 MRID: 420553-32</p> <p>Date: 11/15/89 CORE - ACCEPTABLE DOC#: 009375</p>	<p>Sprague-Dawley rats dosed at 0 and 5000 mg/kg.n LD50 &gt; 5000 mg/kg (limit test). Necropsy Observations: None</p> <p><i>Toxicity category IV</i></p>
81-3	<p>Acute inhalation LC50 Species: rat Bayer AG Instit. Fur Tox. Germ Study#: 16777 MRID: 420553-33 42281-01</p> <p>Date: 06/06/88 CORE - ACCEPTABLE DOC#: 009375 New Document DER Attached</p>	<p>Wistar rats dosed at 69 mg/m3 aerosol, 1220, 2577, and 5323 dust. Contr received conditioned air or 20,000 uL Lutrol vehicle. LC50 &gt; 5323 mg/m3 (Tentative). upgraded</p> <p><i>Toxicity category IV</i></p>
81-4	<p>Primary eye irritation Species: rabbit Bayer AG Instit. Fur Tox. Germ Study#: T 8025515 MRID: 420553-34</p> <p>Date: 02/25/89 CORE - ACCEPTABLE DOC#: 009375</p>	<p>NZW rabbits given 0.1 mL of test substance in one eye. TIS: Primary Irrit. Index = 0. Non-irritating. Minimal redness (1 animal) &amp; swelling (1 animal) observed 1 hr. post-dosing; was completely gone at 24 hrs.</p> <p><i>Toxicity category IV</i></p>
81-5	<p>Primary dermal irritation Species: rabbit Bayer AG Instit. Fur Tox. Germ Study#: T 8025515 MRID: 420553-35</p> <p>Date: 02/25/88 CORE - ACCEPTABLE DOC#: 009375</p>	<p>4 hr dermal exposure to NZW rabbits at 500 mg/kg. PIS = 0.0 (non-irritating).</p> <p><i>Toxicity category IV</i></p>

# NTN 33893 Technical

Guideline	Study Identification	Study Results
82-2	<p>21-day Repeated Dose Dermal Species: Rabbit Bayer AG Dept. of Toxicology Study #: T 7029592 MRID: 422563-29</p> <p>Date: June 11, 1990 Core: Minimum DOC #s: DER Attached</p>	<p>NTN 33893 Technical was administered at 1000 mg/kg to shorn backs of 5 male and 5 female New Zealand White rabbits for 6 hours/day, 5 days/week for 3 weeks.</p> <p>NOEL    Systemic:    1000 mg/kg/day           Dermal:    1000 mg/kg/day</p> <p>LOEL    Systemic:    &gt; 1000 mg/kg/day           Dermal:    &gt; 1000 mg/kg/day</p>
83-1b	<p>Chronic Species: Dog RCC, Research &amp; Consulting Co. Study #: 100015 MRID: 422730-02</p> <p>Date: Oct. 19, 1989 Core: Minimum DOC #s: DER Attached</p>	<p>NTN 33893 Technical was administered in the diet to 4 male and 4 female Beagle dogs per group at 0, 200, and 1250 (increased to 2500 from week 17 onwards) ppm for 52 weeks.</p> <p>NOEL:    1250 ppm (41 mg/kg/d)</p> <p>LOEL:    2500 (72 mg/kg/d) Increased Cytochrome P-450 levels in males and females. Considered a threshold dose. 5000 ppm caused 50% mortality in rangefinding study.</p>
83-1a, 83-2a	<p>Chronic/Onco Species: Rat Bayer AG Study #: 100652           101931 MRIDs: 422563-31           422563-32</p> <p>Dates:    July 14, 1989,           Aug 19, 1991 Core: Minimum DOC #s: DER Attached</p>	<p>NTN 33893 Technical was administered in the diet to 50 male and 50 female Bor WISW (SPF Cpb) rats per group at 0, 100, 300, 900 and 1800 ppm for 104 weeks. The 1800 ppm dose group tested in a separate study with its own concurrent controls.</p> <p>NOEL:    <u>Chronic Effects</u>: 100 ppm (5.7 mg/kg/d in males, 7.6 mg/kg/d in females)</p> <p>LOEL:    <u>Chronic Effects</u>: 300 ppm Increased thyroid lesions in males at 300 ppm (16.9 mg/kg/d) and above and in females at 900 ppm (73 mg/kg/d) and above; Decr. body wt. gain in females at 300 ppm (24.9 mg/kg/d) and above; weight changes in liver, kidney, lung, heart, spleen, adrenals, brain and gonads in males and/or females at 900 ppm (51.3 mg/kg/d in males, 73.0 mg/kg/d in females) or 1800 ppm.</p> <p><u>Oncogenicity</u>: No apparent treatment-related effect at any dose.</p>
83-3	<p>Developmental Toxicity Species: Rabbit RCC, Research &amp; Consulting Co. Study #: 083518 MRID: 422563-38</p> <p>Date: Jan. 8, 1992 Core: Minimum DOC #s: DER Attached</p>	<p>NTN 33893 Technical was administered to 16 pregnant Chinchilla rabbits per group at 0, 8, 24, and 72 mg/kg/d during gestation days 6 through 19.</p> <p>Maternal</p> <p>NOEL    24 mg/kg/d</p> <p>LOEL    72 mg/kg/d. Decreased food consumption; at 72 mg/kg/d: decreased body weight, increased resorption, increased abortion, and death.</p> <p>Developmental</p> <p>NOEL    24 mg/kg/d</p> <p>LOEL    72 mg/kg/d. Decrease body weight, increased skeletal abnormalities.</p>

# NTN 33893 75% Formulation

Guideline	Study Identification	Study Results
83-1	Acute Oral LD50 Species: Rat Mobay Corp. Study #: 91-012-JJ MRID: 422563-12 Date: August 27, 1991 Core: Minimum DOC #: DER to be submitted with subsequent action	NTN 33893 75% Formulation was administered once by gavage to Sprague-Dawley rats (5/sex/dose) at 0, 1063, 2180, and 3170 mg/kg for males, and 0, 1063, 2180, 2750, and 3170 mg/kg for females. Animals were observed for 14 days.  LD50    Male    2591 mg/kg (calculated) Female   1858 mg/kg (calculated)  Toxicity Category: III
81-2	Acute Dermal LD50 Species: Rat Mobay Corp. Study #: 91-022-JH MRID: 422563-14 Date: August 21, 1991 Core: Minimum DOC #: DER to be submitted with subsequent action	NTN 33893 75% Formulation was administered once dermally for 24 hr to Sprague-Dawley rats (5/sex/dose) at 0 and 2000 mg/kg. Animals were observed for 14 days.  LD50 > 2000 mg/kg  Toxicity Category: III
81-3	Acute Inhalation Species: Rat Mobay Corp. Study #: 91-042-JZ MRID: 422563-16 Date: September 25, 1991 Core: Minimum DOC #: DER to be submitted with subsequent action	NTN 33893 75% Formulation was administered as a liquid aerosol by inhalation once for 4 hr to Sprague-Dawley rats (6/sex/dose) at 0, 2110, 2810, and 2990 mg/m3. Animals were observed for 14 days.  LC50    Male:    2650 mg/m3 (calculated) Female: 2750 mg/m3 (calculated)  NOEL    < 2110 mg/m3 LOEL    2110 mg/m3  Toxicity Category: III
81-4	Eye Irritation Species: Rabbit Mobay Corp. Study #: 91-335-JK MRID: 422563-18 Date: June 25, 1992 Core: Minimum DOC #: DER to be submitted with subsequent action	NTN 33893 75% Formulation was introduced into the conjunctival sac of the left eye of 6 male New Zealand White rabbits at 0.1 ml (44-46 mg). The right eye of each animal served as control. Animals were observed for 14 days.  TIS:    TIME                    1hr    24hr    48hr    72hr    7d    14d ----- IRRIT. SCORE   2.5    1.1       1       0.1       0       0  Toxicity Category: III
81-5	Primary Dermal Irritation Species: Rabbit Mobay Corp. Study #: 91-335-JG MRID: 422563-20 Date: August 15, 1991 Core: Minimum DOC #: DER to be submitted with subsequent action	NTN 33893 75% Formulation was administered for 4 hr once dermally to shaved backs of six male New Zealand White rabbits at 500 mg/animal, and observed for 7 days.  PIS:    1.08    Mild irritation at 72 hr.  Toxicity Category: IV
81-6	Dermal Sensitization Species: guinea pig Mobay Corp. Study #: 91-324-JC MRID: 422563-22 Date: August 23, 1991 Core: Minimum DOC #: DER to be submitted with subsequent action	NTN 33893 75% Formulation was administered, in 3 6-hr topical induction applications followed by one 24-hr topical challenge 14 days later, to shaved backs of 15 Hartley albino guinea pigs.  Conclusion:            Not a Sensitizer

NTM 33893 2.5% Granular

Guideline	Study Identification	Study Results																
81-1	Acute oral LD50 Species: rat Mobay Chem. Study#: 89-012-DY MRID: 420553-24  Date: 02/26/90 CORE - ACCEPTABLE DOC#s: 009375	LD50 > 4820 mg/kg (5000 mg/kg nominal, limit test) Necropsy Observations: None.  Toxicity category IV																
81-2	Acute Dermal LD50 Species: rabbit Mobay Chem. Study#: 89-025-DS MRID: 420553-25  Date: 01/15/90 CORE - ACCEPTABLE DOC#s: 009375	NZW rabbits dose at 0 and 2000 mg/kg. LD50 > 2000 mg/kg. Necropsy: None  Toxicity category III																
81-3	Acute inhalation LC50 Species: rat Mobay Chem. Study#: 89-042-DX MRID: 420553-26  Date: 02/26/90 CORE - ACCEPTABLE DOC#s: 009375 DER Attached	Sprague-Dawley rats dosed at 0 and 5092 mg/m3. LC50 > 5092 mg/m3 (95% C.L. intervals) Tentative. Necropsy: None Data submission is incomplete. Verification of particle size & distribution in exposure chamber not possible. See deficiencies section. Upgraded. Toxicity category IV																
81-4	Primary eye irritation Species: rabbit Mobay Chem. Study#: 89-335-DT MRID: 420553-27  Date: 01/15/90 CORE - ACCEPTABLE DOC#s: 009375	NZW rabbits received 0.1 mL of pulverized test substance/animal. Reversible irritation by 14 days. <table><tr><td>TIS</td><td>Time</td><td>1 hr</td><td>24 hr</td><td>48 hr</td><td>72 hr</td><td>7 d</td><td>14 d</td></tr><tr><td>Iris Irrit Score</td><td></td><td>2.3</td><td>1.2</td><td>1.0</td><td>0.5</td><td>0.2</td><td>0.0</td></tr></table> Toxicity Category II	TIS	Time	1 hr	24 hr	48 hr	72 hr	7 d	14 d	Iris Irrit Score		2.3	1.2	1.0	0.5	0.2	0.0
TIS	Time	1 hr	24 hr	48 hr	72 hr	7 d	14 d											
Iris Irrit Score		2.3	1.2	1.0	0.5	0.2	0.0											
81-5	Primary dermal irritation Species: rabbit Mobay Chem. Study#: 89-325-ED MRID: 420553-28  Date: 12/11/90 CORE - ACCEPTABLE DOC#s: 009375	4 hr dermal exposure to NZW rabbits at 50 mg/animal & observed for 72 hrs. PIS = 0.0. Nonirritating.  Toxicity Category IV																



NTN 33893 0.62% Granular

Guideline	Study Identification	Study Results
81-1	<p>Acute oral LD50 Species: rat Mobay Chem. MRID#: 420553-23</p> <p>Date: 09/30/91 DOC#: 009375</p>	<p>Study waived. Use data from study #89-012-DY (MRID 420553-24).</p> <p>Toxicity Category <u>IV</u></p>
81-2	<p>Acute Dermal LD50 Species: Mobay Chem. MRID#: 420553-23</p> <p>Date: 09/30/91 DOC#: 009375</p>	<p>Study waived. Use data from study #89-025-DS (MRID 420553-25).</p> <p>Toxicity Category <u>III</u></p>
81-4	<p>Primary eye irritation Species: rabbit Mobay Chem. MRID#: 420553-23</p> <p>Date: 09/30/91 DOC#: 009375</p>	<p>Study waived. Use data from study #89-335-DT (MRID 420553-27)</p> <p>Toxicity Category <u>II</u></p>
81-5	<p>Primary dermal irritation Species: Mobay Chem. MRID#: 420553-23</p> <p>Date: 09/30/91 DOC#: 009375</p>	<p>Study waived. Use data from study #89-325-ED (MRID 420553-28)</p> <p>Toxicity Category <u>II</u></p>
81-6	<p>Dermal sensitization Species: Mobay Chem. MRID#: 420553-23</p> <p>Date: 09/30/91 DOC#: 009375</p>	<p>Study waived. Use data from study #89-324-DN (MRID 420553-29) Not a sensitizer.</p>



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DEC 3 1993

MEMORANDUM

OFFICE OF  
PREVENTION, PESTICIDES AND  
TOXIC SUBSTANCES

SUBJECT: Exposure Assessment for Section 18 Use of Imidacloprid on Tomatoes.

FROM: Charles Lewis *Charles Lewis*  
Special Review and Registration Section II

TO: S. Reilly, Ph.D.  
Toxicology Branch I (7509C)

THRU: Mark I. Dow, Ph.D., Section Head *Mark I. Dow*  
Special Review and Registration Section II  
Larry C. Dorsey, Chief. *Larry C. Dorsey*  
Occupational and Residential Exposure Branch  
Health Effects Division (7509C)

The Occupational and Residential Exposure Branch (OREB) has been requested by Toxicology Branch I (TB I) to provide an exposure assessment for the proposed Section 18 use of imidacloprid on tomatoes in Florida. The assessment is attached.

DP Barcode: D196929

Pesticide Chemical Code: 129099

EPA Reg. No.: 94FL0001

PHED: Yes



Recycled/Recyclable  
Printed with Soy/Canola Ink on paper that  
contains at least 50% recycled fiber

## I. INTRODUCTION:

### A. Background:

Imidacloprid is the common name for 1-[(6-chloro-3-pyridinyl)methyl]-N-nitro-2-imidazolidinimine. The product to be used is Admire® 2 Flowable containing 2 lbs imidacloprid per gallon (EPA Reg. No. 3125-UEE). Miles, Inc. is the manufacturer. The purpose of the emergency exemption is to control the sweet potato whitefly (Bemisia tabaci) on plastic mulched fresh market tomatoes. Applications are to be made with ground equipment at a rate of 0.25 lb ai per acre. A maximum of 50,000 acres may be treated in Florida.

### Tox. Endpoints<sup>1</sup>

Maternal NOEL = 24 mg/kg/day from rabbit developmental toxicity study, Tox memo 009960.

No dermal penetration data are available for this chemical.

OREB has previously prepared an exposure assessment for this chemical.

In addition to Admire® 2 Flowable, Danitrol® 2.4 EC Insecticide plus Monitor as a foliar spray will be used in the program. TB I has not requested an exposure assessment for these two chemicals.

### B. Purpose:

OREB has been requested by TB I to provide an exposure assessment for the proposed Section 18 use of Admire® 2 Flowable (imidacloprid) on tomatoes in Florida.

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<sup>1</sup> Tox. endpoints provided by S. Reilly, Toxicology Branch I.

## II. DETAILED CONSIDERATIONS:

OREB used the following assumptions provided by Dr. Yuen-shaung Ng, Biological and Economic Analysis Division (BEAD) and the Pesticide Handlers Exposure Database, Version 1.01 (PHED) to develop the exposure assessment for tomatoes:

application rate 0.25 lb ai/A (from Florida submission);  
finish spray 10 gallons/A;  
350 gallon spray tank;  
26 foot spray boom;  
application speed of 4 mph;  
maximum spray run of 2000 feet;  
water station 600 feet from field;  
spray tank refill time 1.2 hours;  
spray time 6.4 hours;  
ferry/turn time 0.4 hours;  
8 hour work day;  
81 acres treated per day;  
20.25 lb ai applied per day.

### Mixer-loaders

Minimum clothing required by the Worker Protection Standard for Agricultural Pesticides requires long pants, long-sleeved shirt, shoes and socks. The information provided by Florida requires the following Personal Protection Equipment (PPE): splash-proof goggles and chemical resistant gloves. OREB has based the estimates of exposure on the assumption that minimum work clothing will be worn along with chemical resistant gloves. According to the BEAD scenario and PHED, estimated total exposure is 151.4  $\mu\text{g ai/kg BW/day}$ .<sup>2</sup>

### Applicators

With the same work clothing and PPE as for mixer/loaders, applicator estimated total exposure is 8.7  $\mu\text{g ai/kg BW/day}$ .<sup>3</sup>

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<sup>2</sup> 448.4848  $\mu\text{g/lb ai}$  (PHED total exposure value) X 20.25 lb ai/day = 9,081.82  $\mu\text{g ai/day}$ ; 9,081.82  $\mu\text{g ai/day} \div 60 \text{ kg BW} = 151.36 \mu\text{g ai/kg BW/day}$ .

<sup>3</sup> 25.6577  $\mu\text{g/lb ai}$  (PHED total exposure value) X 20.25 lb ai/day = 519.57  $\mu\text{g ai/day}$ ; 519.57  $\mu\text{g ai/day} \div 60 \text{ kg BW} = 8.66 \mu\text{g ai/kg BW/day}$ .

### III. CONCLUSIONS:

OREB has estimated the following total exposure for mixer/loaders and applicators using Admire® 2 Flowable to control sweet potato whitefly on tomatoes at a rate of 0.25 lb ai/A.

Mixer/loaders - 151.4  $\mu$ g ai/kg BW/day

Applicators - 8.7  $\mu$ g ai/kg BW/day

Note, the information provided with the Florida submission recommends use of splash-proof goggles. OREB does not currently have data that would quantify the degree of protection provided by this PPE. Consequently, the estimates of exposure for mixer/loaders and applicators do not include use of goggles.

cc: C. Lewis, OREB  
Correspondence File  
Chemical File (129099)  
Circulation

YSNG(BEAD) Estimate of Spray time/day by Various Application Methods

12/03/93

Site: TOMATOE

Chem: IMIDACLOPRID

Hrs/Day: 8.0 hr.

Appl. method: GROUND

Speed: 4.0 (increment: 1) mph

Tank capacity(TC): 350 (Increment: 50) gal Length of run(LR): 2000 ft.

Swath width(SW): 26 (Increment: 3) ft. Water station(WS): 200 yd.

Finish spray(FS): 10 (Increment: 5) gal/a. Refill time(RT): 9.0 min

\*\* Reccommand: Ground -- RT = 2-3 mins. per 100 gal TC; LR = 1000 ft; \*\*\*\*\*

WS = varies; Ferry speed = speed \* 2.0; Turning time = 0.25 min.

350	TC	4.0 mph				5.0 mph				6.0 mph				time in mins		
FS		10	15	20	25	-	10	15	20	25	-	10	15	20	25	<- Finish spray
	26	81	74	69	65		96	88	81	75		111	100	91	83	<- Acre treated
SW	26	385	356	332	310		368	336	309	286		352	318	289	266	<- Spray time
	26	72	101	125	146		87	119	146	169		100	135	164	188	<- Refill time
	26	21	21	22	22		24	24	24	24		27	26	25	25	<- Ferry/turn time
FS		10	15	20	25	-	10	15	20	25	-	10	15	20	25	<- Finish spray
	29	88	81	75	70		105	95	87	80		120	108	97	89	<- Acre treated
SW	29	378	347	321	299		360	326	298	274		343	307	278	254	<- Spray time
	29	79	110	135	157		95	129	157	181		108	146	176	200	<- Refill time
	29	21	22	22	22		24	24	24	24		27	26	25	25	<- Ferry/turn time

(E)ditting parameters/(H)ard copy/(Q)UIT :

(This is a ground application)

# APPLICATOR EXPOSURE

## 1A. Inhalation Exposure:

### SUMMARY STATISTICS FOR INHALATION EXPOSURES

EXPOSURE	DISTRIB. TYPE	Median	Mean	Coef of Var	Geo. Mean	Obs.
	Lognormal	844.7968	5127.6701	184.6024	<u>1252.4861</u>	56

95% C.I. on Geo. Mean: [41.171, 38102.5495]

Number of Records: 56

Data File: APPLICATOR

Subset Name: GB.OPEN.AIR.APPL

#### Subset Specifications for GB.OPEN.AIR.APPL

With Airborne Grade Equal to "A" "B" "C"

Subset originated from GB.OPEN.APPL

With Application Method Equal to 2 3 and

With Cab Type Equal to 1

Subset originated from APPL.FILE

## 2A. Dermal Exposure:

### SUMMARY STATISTICS FOR CALCULATED DERMAL EXPOSURES

SCENARIO: Long pants, long sleeves

PATCH	DISTRIB. TYPE	Median	Mean	Coef of Var	Geo. Mean	Obs.
LOCATION						
HEAD (ALL)	Lognormal	7.02	27.1548	188.6086	5.4023	77
NECK.FRONT	Lognormal	.705	3.3384	205.934	.5523	75
NECK.BACK	Lognormal	.3905	2.4527	199.368	.3761	74
UPPER ARMS	Other	.291	.291	0	.291	6
CHEST	Other	.71	6.6813	205.7953	1.621	39
BACK	Other	2.13	9.3188	181.4676	1.9108	24
FOREARMS	Lognormal	.726	4.719	151.5618	.8094	14
THIGHS	Other	.382	1.0641	165.5202	.5749	14
LOWER LEGS	Other	.238	1.615	232.805	.4201	14
FEET						

TOTAL DERM:

10.8911

0

Number of Records: 77

Data File: APPLICATOR

Subset Name: GB.OPEN.DERMA\_E.APPL

#### Subset Specifications for GB.OPEN.DERMA\_E.APPL

With Dermal Grade Uncovered Equal to "A" "B" "C" "D" "E"

Subset originated from GB.OPEN.APPL

With Application Method Equal to 2 3 and

With Cab Type Equal to 1

Subset originated from APPL.FILE

### 3A. Hand Exposure:

(with and without gloves)

#### SUMMARY STATISTICS FOR CALCULATED DERMAL EXPOSURES

SCENARIO: no gloves

PATCH	DISTRIB.		MICROGRAMS PER LB AI SPRAYED				
LOCATION	TYPE	Median	Mean	Coef of Var	Geo. Mean	Obs.	
HANDS	Lognormal	6.4599	55.3427	169.62	<u>12.3523</u>	22	

Number of Records: 30      Data File: APPLICATOR  
Subset Name: GB.OPEN.HANDABC.APPL

#### Subset Specifications for GB.OPEN.HANDABC.APPL

With Hand Grade Equal to "A" "B" "C"

Subset originated from GB.OPEN.APPL

With Application Method Equal to 2 3 and

With Cab Type Equal to 1

Subset originated from APPL.FILE

#### SUMMARY STATISTICS FOR CALCULATED DERMAL EXPOSURES

SCENARIO: gloves

PATCH	DISTRIB.		MICROGRAMS PER LB AI SPRAYED				
LOCATION	TYPE	Median	Mean	Coef of Var	Geo. Mean	Obs.	
HANDS	Lognormal	9.9266	18.1627	78.8363	<u>13.5141</u>	10	

Number of Records: 71      Data File: APPLICATOR  
Subset Name: GB.OPEN.HANDSA\_E.APPL

#### Subset Specifications for GB.OPEN.HANDSA\_E.APPL

With Hand Grade Equal to "A" "B" "C" "D" "E"

Subset originated from GB.OPEN.APPL

With Application Method Equal to 2 3 and

With Cab Type Equal to 1

Subset originated from APPL.FILE

### Applicator Total Exposure:

Long pants, long sleeves, no gloves: 24.4959 ug/lb ai

Long pants, long sleeves, gloves: 25.6577 ug/lb ai

### MIXER/LOADER EXPOSURE

### 1B. Inhalation Exposure:

#### SUMMARY STATISTICS FOR INHALATION EXPOSURES

	DISTRIB.		NANOGRAMS PER LB AI MIXED				
	TYPE	Median	Mean	Coef of Var	Geo. Mean	Obs.	
EXPOSURE	Lognormal	567.3838	33561.7846	369.5727	<u>871.5879</u>	24	

95% C.I. on Geo. Mean: [10.8305, 70141.6268]

Number of Records: 24

Data File: MIXER/LOADER

Subset Name: SOLIDS.AIR.MLOD

#### Subset Specifications for SOLIDS.AIR.MLOD

With Airborne Grade Equal to "A" "B"

Subset originated from SOLIDS.MLOD

With Solid Type Equal to 1 2 3

Subset originated from MLOD.FILE



## 2B. Dermal Exposure:

### SUMMARY STATISTICS FOR CALCULATED DERMAL EXPOSURES

SCENARIO: Long pants, long sleeves, no gloves

PATCH	DISTRIB.	MICROGRAMS PER LB AI MIXED				Obs.
LOCATION	TYPE	Median	Mean	Coef of Var	Geo. Mean	
HEAD (ALL)	Normal	37.18	56.7225	100.7641	21.2457	55
NECK.FRONT	Normal	9.03	11.6133	97.4727	4.3796	55
NECK.BACK	Lognormal	2.431	4.399	126.5469	1.246	55
UPPER ARMS	Lognormal	105.4875	824.694	195.8269	211.7187	6
CHEST	Lognormal	15.0875	408.9304	299.2262	8.0635	12
BACK	Lognormal	15.0875	421.9767	294.5983	6.6877	12
FOREARMS	Lognormal	134.1285	192.4505	97.2022	132.4924	4
THIGHS	Lognormal	16.044	23.684	136.7518	3.9707	10
LOWER LEGS	Other	.238	8.0444	125.2797	1.3939	10
FEET						0

TOTAL DERM: 432.7528

Number of Records: 57  
Data File: MIXER/LOADER

Subset Name: SOLIDS.DERM.MLOD

### Subset Specifications for SOLIDS.DERM.MLOD

With Dermal Grade Uncovered Equal to "A" "B" "C" "D" "E"

Subset originated from SOLIDS.MLOD

With Solid Type Equal to 1 2 3

Subset originated from MLOD.FILE

## 2C. Hand Exposure:

### SUMMARY STATISTICS FOR CALCULATED DERMAL EXPOSURES

SCENARIO: gloves

PATCH	DISTRIB.	MICROGRAMS PER LB AI MIXED				Obs.
LOCATION	TYPE	Median	Mean	Coef of Var	Geo. Mean	
HANDS	Lognormal	13.3336	20.7645	107.2205	<u>14.8604</u>	24

Number of Records: 36  
Data File: MIXER/LOADER

Subset Name: SOLIDS.HANDSABC.MLOD

### Subset Specifications for SOLIDS.HANDSABC.MLOD

With Hand Grade Equal to "A" "B" "C"

Subset originated from SOLIDS.MLOD

With Solid Type Equal to 1 2 3

Subset originated from MLOD.FILE

### Mixer/Loader Total Exposure:

Long pants, long sleeves, gloves: 448.4848 ug/lb ai ✓

MClock/OREB  
2/24/93