



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

JAN 24 1994

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Section 18: ID# 94FL0003. Emergency Exemption for Use
of ADMIRE 2 Flowable (Imidacloprid) on Peppers in Florida

Tox. Chem. No.: 497E
PC No.: 129099
Barcode No.: D197701
Submission No.: S454583

TO: Rebecca Cool, Manager, PM Team 41
Andrea Beard, Reviewer, PM Team 41
Emergency Response and Minor Use Section/Registration
Support Branch
Registration Division (7505C)

FROM: Sheryl K. Reilly, Ph.D. *Sheryl K Reilly 1/11/94*
Review Section II, Toxicology Branch I
Health Effects Division (7509C)

THRU: Myron S. Ottley, Ph.D. *MSO 1/12/94*
Review Section IV, Toxicology Branch I
Health Effects Division (7509C)

and
Joycelyn E. Stewart, Ph.D. *JES 1/15/94 15B 1/24/94*
Section Head
Review Section II, Toxicology Branch I
Health Effects Division (H7509C)

I. CONCLUSIONS

The toxicology data requirements are complete for the issuance of a Section 18 emergency exemption by the State of Florida for the temporary use of imidacloprid (ADMIRE 2 Flowable) to control thrips on peppers. The margins of exposure (MOEs) for acute exposure are greater than 100 for mixer-loaders and applicators (ground), if 10% dermal absorption is assumed. Imidacloprid is a "Group E" carcinogen, so there is no cancer risk associated with exposure to this chemical.



II. ACTION REQUESTED

In a letter dated December 6, 1993, the Florida Department of Agriculture requested an emergency exemption under Section 18 for the use of imidacloprid to control thrips (Thrips palmi) on peppers. This is the first request made by Florida for this use.

ADMIRE 2 Flowable (Miles, Inc.) is the formulation for the active ingredient, imidacloprid. The pesticide will be applied once per growing season with ground equipment either prior to transplanting, during transplanting or after transplanting, within the root zone of the plants. The maximum estimated acreage to be treated in Florida is 20,000. The rate of application will be 16-32 fl. oz. of ADMIRE 2 Flowable per acre (0.25-0.5 lb. a.i./acre).

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 D197896) for determination of exposure estimates (see attached memo from Charles Lewis to S. Reilly, dated January 5, 1994). Acute MOEs were based on these exposure estimates, the rabbit maternal and developmental NOEL of 24 mg/kg/d, and dermal absorption of 100% (see Toxicology Profile, below). A 21-day dermal study indicated that virtually none of the chemical was absorbed dermally (NOEL = 1000 mg/kg/day, HDT). Thus, the adjusted acute MOEs were based on a conservative estimate of 10% dermal absorption. Cancer risk is not quantitated, since imidacloprid is a group E carcinogen, and there is no Q₁* for this chemical.

Formulas used in calculations:

Acute MOE = NOEL (24 mg/kg BW/d) + Exposure (mg/kg BW/d)

Adjusted Acute MOE = NOEL + (Exposure x % estimated dermal absorption)

OPERATION*	EXPOSURE (mg/kg/d)	ACUTE MOE	Adjusted Acute MOE
Mixer/Loaders	0.3027	79.3	793
Applicator GB Closed	0.0173	1387.3	13,873

* Minimum clothing required by the Worker Protection Standard for Agricultural Pesticides are: long-sleeved shirt, long pants, shoes, socks. In addition, the application from Florida recommends chemical resistant gloves and splash-proof goggles, and when exposure is potentially excessive, a respirator approved for dusts and mists. OREB does not currently have data that would quantify the protection provided by the goggles.

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.

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#s: 009375</p>	<p>Male Sprague-Dawley rats dosed at: 0, 50, 100, 250, 315, 400, 450, 51800 mg/kg. Females dosed: 0, 100, 250, 315, 400, 475, 500, and 1800 mg/kg.</p> <p>LD50 (M) = 424 mg/kg (calculated). F > 450, < 475 mg/kg (estimated).</p> <p><i>Toxicity category II</i></p>
81-2	<p>Acute Dermal LD50 Species: rat Hobey Chem. Study#: T 5033063 MRID: 420553-32</p> <p>Date: 11/15/89 CORE - ACCEPTABLE DOC#s: 009375</p>	<p>Sprague-Dawley rats dosed at 0 and 5000 mg/kg.n LD50 > 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#s: 009375</p> <p>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.</p> <p>LC50 > 5323 mg/m3 (Tentative).</p> <p><i>upgraded</i></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#s: 009375</p>	<p>NZW rabbits given 0.1 mL of test substance in one eye.</p> <p>TIS: Primary Irrit. Index = 0. Non-irritating. Minimal redness (1 animal) & 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#s: 009375</p>	<p>4 hr dermal exposure to NZWrabbits 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: > 1000 mg/kg/day Dermal: > 1000 mg/kg/day</p>
83-1b	<p>Chronic Species: Dog RCC, Research & 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. <u>Oncogenicity:</u> No apparent treatment-related effect at any dose.</p>
83-3	<p>Developmental Toxicity Species: Rabbit RCC, Research & 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#: 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#: 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#: 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#: 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#: 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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WASHINGTON, D.C. 20460

JAN 5 1994

MEMORANDUM

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

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

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 peppers in Florida. The assessment is attached.

DP Barcode: D197896

Pesticide Chemical Code: 129099

EPA Reg. No.: 94FL0003

PHED: Yes; M.Clock, OREB 2-24-93



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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 melloid thrip (Thrips palmi) on peppers. Applications may be made with ground equipment prior to transplanting, during transplanting, or after transplanting. The pesticide should be placed within 2 to 4 inches of the plant and incorporated to a depth of 1 inch. A maximum of 20,000 acres may be treated in Florida at a rate of 0.25 to 0.50 lb ai/A. A limit of 0.50 lb ai/A may be used per year.

Tox. Endpoints¹

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, Agri-Mek® 0.15 EC as a foliar spray will be used in the program. TB I has not requested an exposure assessment for this chemical.

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 peppers in Florida.

¹ 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 peppers:

application rate 0.50 lb ai/A (from Florida submission);
finish spray 10 gallons/A;
application speed of 4 mph;
8 hour work day;
81 acres treated per day;
40.50 lb ai applied per day.

Mixer-loaders

Minimum clothing required by the Worker Protection Standard for Agricultural Pesticides includes: long pants, long-sleeved shirt, shoes and socks. The information provided by Florida recommends long-sleeved shirt, trousers, chemical resistant gloves, and splash-proof goggles. When potential exposure to the product is excessive, a respirator approved for dusts and mists is recommended.

OREB does not currently have data that would enable it to quantify the degree of protection provided by splash-proof goggles. Consequently, this estimate of exposure has been based on the assumption that minimum work clothing will be worn along with chemical resistant gloves. Therefore, according to the BEAD scenario and PHED, estimated total exposure is 302.7 μg ai/kg BW/day.²

Applicators

With the same work clothing and PPE as for mixer/loaders, applicator estimated total exposure is 17.3 μg ai/kg BW/day.³

² 448.4848 $\mu\text{g}/\text{lb}$ ai (PHED total exposure value) X 40.50 lb ai/day = 18,163.63 μg ai/day; 18,163.63 μg ai/day \div 60 kg BW = 302.73 μg ai/kg BW/day.

³ 25.6577 $\mu\text{g}/\text{lb}$ ai (PHED total exposure value) X 40.50 lb ai/day = 1,039.14 μg ai/day; 1,039.14 μg ai/day \div 60 kg BW = 17.32 μg ai/kg BW/day.

III. CONCLUSIONS:

OREB has estimated the following total exposure for mixer/loaders and applicators using Admire® 2 Flowable to control the melloon thrip (Thrips palmi) on peppers at a maximum rate of 0.50 lb ai/A.

Mixer/loaders - 302.7 µg ai/kg BW/day

Applicators - 17.3 µg ai/kg BW/day

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

In addition, the Section 18 review recently completed by OREB for use of this chemical in Texas on cucurbits was done based on a maximum application rate of 0.25 lb ai/A. This Section 18 in Florida is for a maximum application rate of 0.50 lb ai/A. Consequently, the estimates of exposure for use of imidacloprid in Florida are 2X the estimates of exposure in Texas.

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

YSNG(BEAD) Estimate of Spray time/day by Various Application Methods 01/04/94

Site: PEPPERS 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: 3) gal/a. Refill time(RT): 9.0 min
 ** Recommend: 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 13 16 19 - 10 13 16 19 - 10 13 16 19 -	10 13 16 19 - 10 13 16 19 - 10 13 16 19 -	10 13 16 19 - 10 13 16 19 - 10 13 16 19 -	Finish spray
26	81 77 73 70 96 91 86 82 111 104 98 92 -	81 77 73 70 96 91 86 82 111 104 98 92 -	81 77 73 70 96 91 86 82 111 104 98 92 -	Acre treated
SW 26	385 367 351 336 368 348 330 314 352 331 311 294 -	385 367 351 336 368 348 330 314 352 331 311 294 -	385 367 351 336 368 348 330 314 352 331 311 294 -	Spray time
26	72 90 106 120 87 107 125 141 100 122 141 158 -	72 90 106 120 87 107 125 141 100 122 141 158 -	72 90 106 120 87 107 125 141 100 122 141 158 -	Refill time
26	21 21 22 22 24 24 24 24 27 26 26 26 -	21 21 22 22 24 24 24 24 27 26 26 26 -	21 21 22 22 24 24 24 24 27 26 26 26 -	Ferry/turn time
FS	10 13 16 19 - 10 13 16 19 - 10 13 16 19 -	10 13 16 19 - 10 13 16 19 - 10 13 16 19 -	10 13 16 19 - 10 13 16 19 - 10 13 16 19 -	Finish spray
29	88 84 80 76 105 99 93 88 120 112 105 99 -	88 84 80 76 105 99 93 88 120 112 105 99 -	88 84 80 76 105 99 93 88 120 112 105 99 -	Acre treated
SW 29	378 359 342 326 360 339 320 303 343 321 301 283 -	378 359 342 326 360 339 320 303 343 321 301 283 -	378 359 342 326 360 339 320 303 343 321 301 283 -	Spray time
29	79 98 115 130 95 116 135 152 108 132 152 170 -	79 98 115 130 95 116 135 152 108 132 152 170 -	79 98 115 130 95 116 135 152 108 132 152 170 -	Refill time
29	21 21 22 22 24 24 24 24 27 26 26 25 -	21 21 22 22 24 24 24 24 27 26 26 25 -	21 21 22 22 24 24 24 24 27 26 26 25 -	Ferry/turn time

(Editing parameters/(H)ard copy/(O)UT : (this is a ground application)

APPLICATOR EXPOSURE

1A. Inhalation Exposure:

SUMMARY STATISTICS FOR INHALATION EXPOSURES

EXPOSURE	DISTRIB. TYPE	Median	Mean	NANOGRAMS PER LB AI SPRAYED 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	MICROGRAMS PER LB AI SPRAYED 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				Obs.
LOCATION	TYPE	Median	Mean	Coef of Var	Geo. Mean	
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				Obs.
LOCATION	TYPE	Median	Mean	Coef of Var	Geo. Mean	
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				Obs.
	TYPE	Median	Mean	Coef of Var	Geo. Mean	
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.	Median	Mean	Coef of Var	Geo. Mean	Obs.
LOCATION	TYPE					
HEAD (ALL)	Normal	37.18	56.7225	100.7641	21.2457	
NECK.FRONT	Normal	9.03	11.6133	97.4727	4.3796	
NECK.BACK	Lognormal	2.431	4.399	126.5469	1.246	
UPPER ARMS	Lognormal	105.4875	824.694	195.8269	211.7187	
CHEST	Lognormal	15.0875	408.9304	299.2262	8.0635	1
BACK	Lognormal	15.0875	421.9767	294.5983	6.6877	1
FOREARMS	Lognormal	134.1285	192.4505	97.2022	132.4924	
THIGHS	Lognormal	16.044	23.684	136.7518	3.9707	1
LOWER LEGS	Other	.238	8.0444	125.2797	1.3939	1
FEET						

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.	Median	Mean	Coef of Var	Geo. Mean	Obs.
LOCATION	TYPE					
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