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

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: **Section 18: ID# 94TX0004**. Emergency Exemption for Use of ADMIRE 2 Flowable (Imidacloprid) on Cucurbits in Texas

Tox. Chem. No.:	497E
PC No.:	129099
Barcode No.:	D197593
Submission No.:	S453965

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 1/5/94
Review Section II, Toxicology Branch I
Health Effects Division (7509C)

THRU: Myron S. Ottley, Ph.D.
Review Section IV, Toxicology Branch I
Health Effects Division (7509C) MSOttley 1/5/94
and
Joycelyn E. Stewart, Ph.D.
Section Head
Review Section II, Toxicology Branch I
Health Effects Division (H7509C) 1/5/94

I. CONCLUSIONS

The toxicology data requirements are complete for the issuance of a Section 18 emergency exemption by the State of Texas for the temporary use of imidacloprid (ADMIRE 2 Flowable) to control sweet potato whitefly on cucurbits (cucumbers, melons, and squash). The margins of exposure (MOEs) for acute exposure are 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 November 24, 1993, the Texas Department of

Agriculture requested an emergency exemption under Section 18 for the use of imidacloprid to control sweet potato whitefly (SPWF), Bemesia tabaci Gennadius) on cucurbits. This is the first request made by Texas for this use. Alternative products for control of the pest include endosulfan and oxamyl at the highest rate, and multiple applications of lindane, however, under very heavy infestations, only endosulfan applied twice weekly at high rates is of any benefit, and its use is limited to only 3 lbs. a.i./acre per year.

ADMIRE 2 Flowable (Miles, Inc.) is the formulation for the active ingredient. The pesticide will be used once per growing season at planting, as an in-furrow spray administered in the root zone. The maximum estimated acreage to be treated in Texas is 38,000. The rate of application will be 16 fl. oz. of ADMIRE 2 Flowable per acre per growing season. This is equivalent to 0.25 lb. a.i./acre). For double cropped land, a maximum of 32 fl. oz. of Admire 2 (0.5 lb. a.i.) may be used per acre per year.

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 D197899) 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, 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_1^* for this chemical.

Formula 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
Applicators	0.0087	2759

* Minimum personal protective clothing are not specified in the application, but assumed to include minimal work clothing, splash-proof goggles and chemically resistant gloves, based on Texas' use of imidacloprid on tomatoes in a previous Sec. 18 request (OREB memo, C. Lewis, December 3, 1993).

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

NTN 33893 Technical

Guideline	Study Identification	Study Results
82-2	21-day Repeated Dose Dermal Species: Rabbit Bayer AG Dept. of Toxicology Study #: T 7029592 MRID: 422563-29 Date: June 11, 1990 Core: Minimum DOC#s: DER Attached	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. NOEL Systemic: 1000 mg/kg/day Dermal: 1000 mg/kg/day LOEL Systemic: >1000 mg/kg/day Dermal: >1000 mg/kg/day
83-1b	Chronic Species: Dog RCC, Research & Consulting Co. Study #: 100015 MRID: 422730-02 Date: Oct. 19,1989 Core: Minimum DOC #s: DER Attached	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. NOEL: 1250 ppm (41 mg/kg/d) 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.
83-1a, 83-2a	Chronic/Onco Species: Rat Bayer AG Study #: 100652 101931 MRIDs: 422563-31 422563-32 Dates: July 14, 1989, Aug 19, 1991 Core: Minimum DOC #s: DER Attached	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. NOEL: Chronic Effects: 100 ppm (5.7 mg/kg/d in males, 7.6 mg/kg/d in females) LOEL: Chronic Effects: 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. Oncogenicity: No apparent treatment-related effect at any dose.
83-3	Developmental Toxicity Species: Rabbit RCC, Research & Consulting Co. Study #: 083518 MRID: 422563-38 Date: Jan. 8, 1992 Core: Minimum DOC #s: DER Attached	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. Maternal NOEL 24 mg/kg/d LOEL 72 mg/kg/d. Decreased food consumption; at 72 mg/kg/d: decreased body weight, increased resorption, increased abortion, and death. Developmental NOEL 24 mg/kg/d LOEL 72 mg/kg/d. Decrease body weight, increased skeletal abnormalities.

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

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

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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 Cucurbits.

FROM: 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
Special Review and Registration Section II

Larry C. Dorsey, Chief
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 cucurbits in Texas. The assessment is attached.

DP Barcode: D197899

Pesticide Chemical Code: 129099

EPA Reg. No.: 94TX0004

PHED: Yes

I. INTRODUCTION:

A. Background:

Imidacloprid is the common name for 1-[(6-chloro-3-pyridinyl)methyl]-N-nitro-2-imidazoli-dinimine. 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 cucurbits: cucumbers, squash, cantaloupes, honeydew melons and watermelons. Applications are to be made with ground equipment at planting as an in-furrow spray at or below seed level or at time of transplant/seeding as a post-seeding drench, transplant drench, or hill drench. A maximum of 38,000 acres may be treated in Texas at a rate of 0.25 lb ai per acre. Two applications may be used per year on double cropped land.

Tox. Endpoints [1]

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, Capture® 2 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 cucurbits in Texas.

[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 cucurbits:

application rate 0.25 lb ai/A (from Texas submission);
finish spray 10 gallons/A;
application speed of 4 mph;
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 Texas with this request does not specify the type of work clothing that will be worn or Personal Protection Equipment (PPE) required. In a previous Section 18 review (OREB C.Lewis, December 3, 1993) conducted for a Texas use of imidacloprid on tomatoes, the following PPE was required: splash-proof goggles and chemical resistant gloves.

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 151.4 µg ai/kg BW/day.[2]

Applicators

With the same work clothing and PPE as for mixer/loaders, applicator estimated total exposure is 8.7 µg ai/kg BW/day.[3]

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[2] 448.4848 µg/lb ai (PHED total exposure value) X 20.25 lb ai/day = 9,081.82 µg ai/day; 9,0818.82 µg ai/day ÷ 60 kg BW = 151.36 µg ai/kg BW/day.

[3] 25.6577 µg/lb ai (PHED total exposure value) X 20.25 lb ai/day = 519.57 µg ai/day; 519.57 µg ai/day ÷ 60 kg BW = 8.66 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 sweet potato whitefly on cucurbits at a rate of 0.25 lb ai/A.

Mixer/loaders - 151.4 µg ai/kg BW/day

Applicators - 8.7 µg ai/kg BW/day

Note, the information provided with the Texas submission does not recommend specific PPE. OREB has assumed that minimum work clothing would be worn along with chemical resistant gloves. 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, on double cropped land, up to 0.5 lb ai/A may be applied per year.

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

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

---------- 01/03/94

Site: CUCURBITS Chem: IMDACLOPRID 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

** Recommand: 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	<- Finish spray
26	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	<- Spray time
26	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	<- Ferry/turn time
FS	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	<- Acre treated
SW 29	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	<- Refill time
29	21	21	22	22	24	24	24	24	27	26	26	25	<- Ferry/turn time

(E)diting parameters/(H)ard copy/(Q)UIT : (This is a ground application)

APPLICATOR EXPOSURE

1A. Inhalation Exposure:

SUMMARY STATISTICS FOR INHALATION EXPOSURES

EXPOSURE	DISTRIB. TYPE	NANOGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
	Lognormal	844.7968	5127.6701	184.6024	1252.4861	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 LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
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 LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
HANDS	Lognormal	6.4599	55.3427	169.62	12.3523	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 LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
HANDS	Lognormal	9.9266	18.1627	78.8363	13.5141	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. TYPE	NANOGRAMS PER LB AI MIXED Median	Mean	Coef of Var	Geo. Mean	Obs.
EXPOSURE	Lognormal	567.3838	33561.7846	369.5727	871.5879	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 LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI MIXED Median	Mean	Coef of Var	Geo. Mean	Obs
HEAD (ALL)	Normal	37.18	56.7225	100.7641	21.2457	5
NECK.FRONT	Normal	9.03	11.6133	97.4727	4.3796	5
NECK.BACK	Lognormal	2.431	4.399	126.5469	1.246	5
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 LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI MIXED Median	Mean	Coef of Var	Geo. Mean	Obs.
HANDS	Lognormal	13.3336	20.7645	107.2205	**14.8604**	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