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

JAN 6 1994

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OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: **Section 18: ID# 94MI0002**. Emergency Exemption for Use of ADMIRE 2 Flowable (Imidacloprid) on Potatoes in Michigan

Tox. Chem. No.:	497E
PC No.:	129099
Barcode No.:	D197468
Submission No.:	S454691

TO: Rebecca Cool, Manager, PM Team 41
Libby Pemberton, 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 1/3/94
Review Section II, Toxicology Branch I
Health Effects Division (7509C)

THRU: Myron S. Ottley, Ph.D. MSOttley 1/3/94
Review Section IV, Toxicology Branch I
Health Effects Division (7509C)
and
Joycelyn E. Stewart, Ph.D. Karl Baetcke for 1/5/93
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 Michigan for the temporary use of imidacloprid (ADMIRE 2 Flowable) to control pesticide-resistant Colorado potato beetles on potatoes. 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 December 1, 1993, the Michigan Department of Agriculture requested an emergency exemption under Section 18 for the use of imidacloprid to control Colorado potato beetle (CPB, Leptinotarsa decemlineata) on potatoes. This is the first request made by Michigan for this use. Most of the CPB populations in southern and central Michigan are resistant to all available synthetic insecticides. Alternative products for control of highly-resistant CPB include cryolite and BT products, however, BT products are only useful against very young larvae, and CPB control with cryolite is less than optimal.

ADMIRE 2 Flowable (Miles, Inc.) is the formulation for the active ingredient. The pesticide will be used once per growing season, as an at-planting soil systemic treatment for CPB. The maximum estimated acreage to be treated in Michigan is 30,000. The rate of application will be 0.9-1.3 fl. oz. of ADMIRE 2 Flowable per 1000 feet of row (6.39-9.23 g a.i./1000 row feet). This is equivalent to 13.8 to 20 fl. oz. of formulated product per acre, with 34 inches between rows (0.216 to 0.313 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 D197683) for determination of exposure estimates (see attached memo from to S. Reilly, dated December , 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_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, open pour	0.012	2,000
Applicator, open cab	0.011	2,182

* Minimum clothing requirements for Applicators are long pants, short-sleeved shirt, and no gloves; Mixer/Loader exposure is based on wearing long pants, long sleeves, and gloves (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/day and above, and females at 73 mg/kg/day (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 Institut. 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, 50 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 Institut. Fur Tox. Germ Study#: 16777 MRID: 420553-33 422891-01 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 Institut. 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 Institut. 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

DEC 27 1993

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM:

SUBJECT: EXPOSURE ESTIMATE FOR THE PROPOSED USE OF IMIDACLOPRID ON POTATOES TO CONTROL THE COLORADO POTATO BEETLE

FROM: Bruce F. Kitchens, Chemist

TO: Sheryl K. Reilly, Toxicologist
Toxicology Branch I
Health Effects Division (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)

Please find below, the OREB review of:

DP Barcode: D197683

Pesticide Chemical Code: 129099

EPA Reg. No.: 94MI0002

EPA MRID No.: N/A

Review Time: 4-days

PHED: Yes Version 1.01 Run # 19

I. INTRODUCTION:

A. Background:

Michigan requests a section 18 specific exemption to use the formulation Admire 2 Flowable (a.i. imidacloprid) to control the Colorado Potato Beetle (CPB) on potatoes. Michigan states that an emergency situation exists because of the CPB's resistance to almost all synthetic insecticides and an extreme build up in the CPB population levels. Michigan believes that severe economic losses will result from failure to control the CPB.

Imidacloprid is a systemic insecticide used to control a broad spectrum of insects. Admire 2 Flowable is formulated at 2 lbs ai/gal. For this section 18 use, Admire 2 Flowable is applied at the rate of 0.216 - 0.313 lbs ai/acre. The maximum amount of formulation applied per acre per season is 0.3 lbs. The maximum number of applications is one (1). A total of 9,375 lbs active ingredient is needed to treat 30,000 acres. The application method is in furrow at planting via ground equipment. This section 18 use period is from March 15, 1994 through June 15, 1994. Use sites for Admire 2 Flowable are the central and southern part of the Lower Peninsula.

The tox endpoint of concern is maternal/developmental toxicity with a NOEL of 24 mg/kg/day in the rabbit. Imidacloprid is a tox category II chemical for oral toxicity and tox category III for dermal toxicity.

B. Purpose:

This review evaluates mixer/loader/applicator exposure from the specified section 18 use of imidacloprid on potatoes to control the Colorado Potato Beetle.

II. DETAILED CONSIDERATIONS:

OREB uses the following assumptions to calculate estimated worker exposure:

II. DETAILED CONSIDERATIONS: (con't)

TABLE 1. ASSUMPTIONS

Mixer loader weighs	60 kg
Applicator weighs	60 kg
Acres treated/day	90[1]
Avg. farm size	500 acres[2]
Application rate	0.313 lb ai/A
Maximum # applications	1
App. GB open cab exposure	22.5 µg/lb ai
Mixer/loader open pour exposure	25.9 µg/lb ai
Adjustment for Dermal Exposure	None

Calculations:

Active Ingredient Handled per Day:

90 acre/day x 0.313 lb ai/A = **28.2 lb ai/day**

Applicator Exposure is:

28.2 lb ai/day x 22.5 µg/lb ai ÷ 60 kg = **10.6 µg/kg/day**

Mixer/loader Exposure is:

28.2 lb ai/day x 25.9 µg/lb ai ÷ 60 kg = **12.2 µg/kg/day**

III. CONCLUSIONS:

OREB concludes that the following exposures may occur from the use of imidacloprid on potatoes to control the Colorado Potato Beetle.

Applicator open cab ..... 10.6 µg/kg/day
Mixer/loader open pour ..... 12.2 µg/kg/day

Applicator exposure is based on the wearing of long pants, short sleeves, and no gloves. Mixer/loader exposure is based on the wearing of long pants, long sleeves, and gloves. These PPE are in agreement with the PPE required by the Worker Protection Standards (WPS).

IV. REFERENCES:

1. OREB Memorandum: "Evaluate Emergency Exemption Section 18 From the State of Michigan For the Use of TRIGARD 75 WP (CYROMAZINE) To Control the Colorado Potato Beetle (CPB) in Potatoes", DP Barcode D176382, June 19, 1992.

2. Michigan section 18 application, page 4, 1994.

cc: B. Kitchens
Chemical File: **Imidacloprid**
Circulation
Correspondence

APPENDIX A. PHED RUNS

Run #19
6/3/93

APPLICATOR EXPOSURE

GROUNDBOOM/OPEN CAB

Total Exposure for workers wearing long pants, short sleeves, no gloves:
Inhalation: 0.37 ug/lb ai
Dermal/body: 9.73 ug/lb ai
Hands: 12.35 ug/lb ai
Total: 22.45 ug/lb ai

INHALATION EXPOSURE:

	DISTRIB. TYPE	NANOGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
EXPOSURE	Lognormal	483.3333	665.933	88.5362	**373.5249**	13

Number of Records: 13
Data File: APPLICATOR Subset Name: GB.OP.AIR.APPL

Subset Specifications for GB.OP.AIR.APPL
With Airborne Grade Equal to "A" "B"
Subset originated from GB.OP.APPL
With Application Method Equal to 2 3 and
With Cab Type Equal to 1 and
Subset originated from APPL.FILE

DERMAL EXPOSURE

SCENARIO: Long pants, short sleeves

PATCH LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
HEAD (ALL)	Lognormal	2.73	13.9146	247.9999	2.825	57
NECK.FRONT	Lognormal	.3	1.65	244.8909	.3045	55
NECK.BACK	Lognormal	.1595	1.2397	246.9468	.2015	54
UPPER ARMS	Other	.291	.291	0	.291	6
CHEST	Other	.71	6.8697	205.236	1.5676	37
BACK	Other	2.13	9.4075	186.9849	1.7338	22
FOREARMS	Lognormal	2.783	9.5993	171.8344	2.6519	57
THIGHS	Other	.382	1.0641	165.5202	.5749	14
LOWER LEGS	Other	.238	1.615	232.805	.4201	14
FEET						0
TOTAL DERM:	**9.7339**					

Number of Records: 57
Data File: APPLICATOR Subset Name: G.OP.DERMA_D.APPL

Subset Specifications for G.OP.DERMA_D.APPL

With Dermal Grade Uncovered Equal to "A" "B" "C" "D"
Subset originated from GB.OP.APPL
With Application Method Equal to 2 3 and
With Cab Type Equal to 1 and
Subset originated from APPL.FILE

DERMAL EXPOSURES

SCENARIO: No clothing (total deposition)

PATCH LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
HEAD (ALL)	Lognormal	.13	.3664	116.4028	.2468	11
NECK.FRONT	Lognormal	.015	.0832	219.1106	.0319	11
NECK.BACK	Normal	.011	.025	98.4	.0182	11
UPPER ARMS	Lognormal	.582	.8201	85.1847	.6039	11
CHEST	Lognormal	.355	1.9686	219.1405	.7551	11
BACK	Normal	.355	.8068	98.5622	.5877	11
FOREARMS	Other	.121	.209	68.9474	.1766	11
THIGHS	Lognormal	.764	2.483	184.2489	1.0965	8
LOWER LEGS	Lognormal	.476	2.0771	248.5196	.6046	11
FEET						0
TOTAL DERM:	4.2916					

Number of Records: 11
Data File: APPLICATOR Subset Name: GB.CLSD.DRMA_D.APPL

SCENARIO: Long pants, short sleeves

PATCH LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
HEAD (ALL)	Lognormal	.13	.3664	116.4028	.2468	11
NECK.FRONT	Lognormal	.015	.0832	219.1106	.0319	11
NECK.BACK	Normal	.011	.025	98.4	.0182	11
UPPER ARMS						0
CHEST						0
BACK						0
FOREARMS	Other	.121	.209	68.9474	.1766	11
THIGHS						0
LOWER LEGS						0
FEET						0
TOTAL DERM:	0.4247					

Number of Records: 11
Data File: APPLICATOR Subset Name: GB.CLSD.DRMA_D.APPL

Subset Specifications for GB.CLSD.DRMA_D.APPL
With Dermal Grade Uncovered Equal to "A" "B" "C" "D"
Subset originated from GB.CLSD.APPL
With Application Method Equal to 2 3 and
With Cab Type Equal to 3 4
Subset originated from APPL.FILE

HAND EXPOSURE

SCENARIO: no gloves

PATCH LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
HANDS	Lognormal	8.3966	43.6448	206.8178	7.3384	12

Number of Records: 14
Data File: APPLICATOR Subset Name: GB.CLSD.HDA_D.APPL

HAND EXPOSURE

SCENARIO: no gloves

PATCH LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs
HANDS	Lognormal	2.2666	12.7278	206.1244	3.0849	2:

Number of Records: 28
Data File: APPLICATOR Subset Name: AER.HDA_C.APPL

Subset Specifications for AER.HDA_C.APPL

With Hand Grade Equal to "A" "B" "C"
Subset originated from AERIAL.APPL
With Application Method Equal to 5 6
Subset originated from APPL.FILE

MIXER/LOADER EXPOSURE

OPEN MIX/LIQUIDS

Total Exposure for workers wearing long pants, long sleeves, gloves:
Inhalation: 0.44 ug/lb ai
ermal/body: 21.1 ug/lb ai
Hands*: 4.34 ug/lb ai
Total Exposure: 25.88 ug/lb ai
*Combined geometric mean of two hand estimates.

INHALATION EXPOSURE:

	DISTRIB. TYPE	NANOGRAMS PER LB AI MIXED Median	Mean	Coef of Var	Geo. Mean	Obs
EXPOSURE	Lognormal	367.0709	2552.6287	144.4647	443.4466	4(

Number of Records: 40
Data File: MIXER/LOADER Subset Name: LIQ.OP.X.AIR.MLOD

Subset Specifications for LIQ.OP.X.AIR.MLOD
With Airborne Grade Equal to "A" "B"
Subset originated from LIQ.OP.X4081.MLOD
Without Study Code Equal to 4081
Subset originated from LIQ.OPEN.MLOD
With Mixing Procedures Equal to 1
Subset originated from LIQ.MLOD
With Liquid Type Equal to 1 2 3 4 5
Subset originated from MLOD.FILE

HAND EXPOSURES

CENARIO: gloves

PATCH LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI MIXED Median	Mean	Coef of Var	Geo. Mean	Obs
HANDS	Lognormal	19.697	106.6871	118.8365	**32.6518**	1

Number of Records: 19
Data File: MIXER/LOADER
Subset Name: LIQ.OP.X.RNS.MLOD

Subset Specifications for LIQ.OP.X.RNS.MLOD
With Hand Grade Equal to "A" "B" "C" and
With Hand Measuring Method Equal to 1
Subset originated from LIQ.OP.X4081.MLOD
Without Study Code Equal to 4081
Subset originated from LIQ.OPEN.MLOD
With Mixing Procedures Equal to 1
Subset originated from LIQ.MLOD
With Liquid Type Equal to 1 2 3 4 5
Subset originated from MLOD.FILE

***Combined Geometric Mean of the two hand estimates: 4.34 ug/lb ai**

CLOSED MIX/LIQUIDS

.otal Exposure for workers wearing long pants, long sleeves, gloves:
Inhalation: 0.06 ug/lb ai
Dermal/hands: 2.25 ug/lb ai
Hands: 1.33 ug/lb ai
Total Exposure: 3.64 ug/lb ai

Total Exposure for workers wearing no clothing, gloves:
Inhalation: 0.06 ug/lb ai
Dermal/body: 29.54 ug/lb ai
Hands: 1.33 ug/lb ai
Total Exposure: 30.93 ug/lb ai

INHALATION EXPOSURES

	DISTRIB. TYPE	NANOGRAMS PER LB AI MIXED Median	Mean	Coef of Var	Geo. Mean	Obs.
EXPOSURE	Lognormal	58.9667	82.8768	92.3632	**59.8581**	1

Number of Records: 13
Data File: MIXER/LOADER
Subset Name: LIQ.CL.AIR.MLOD

Subset Specifications for LIQ.CL.AIR.MLOD
With Airborne Grade Equal to "A" "B" "C" "D"
Subset originated from LIQ.CLSD.MLOD
With Liquid Type Equal to 1 2 3 4 5 and
.th Mixing Procedures Equal to 2 3
Subset originated from MLOD.FILE

Subset Specifications for LIQ.CL.HND.MLOD
With Hand Grade Equal to "A" "B" "C" "D"
Subset originated from LIQ.CLSD.MLOD
With Liquid Type Equal to 1 2 3 4 5 and
With Mixing Procedures Equal to 2 3
Subset originated from MLOD.FILE

Note regarding the data used in this exposure assessment:

The data cited here do not meet Agency requirements based on the data quality (grades) and number of replicates according to the PHED Data Reporting Guidelines. These data must not be used to support registration or reregistration as they are not acceptable according to current OREB policy.