



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

497E
CASWELL FILE

JUN 14 1993

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Section 18: ID# 93AZ0003. Emergency Exemption for Use of CONFIDOR 2 Flowable (Imidacloprid) on Cotton in Arizona

Tox. Chem. No.: 497E
PC No.: 129099
Barcode No.: D191404
Submission No.: S440617

FROM: Sheryl K. Reilly, Ph.D. *Sheryl K Reilly* 6/14/93
Review Section II, Toxicology Branch I
Health Effects Division (H7509C)

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

THRU: Myron S. Ottley, Ph.D.
Review Section IV, Toxicology Branch I
Health Effects Division (H7509C)

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Myron S. Ottley 6/14/93

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I. CONCLUSIONS

The toxicology data requirements for imidacloprid (CONFIDOR 2 Flowable Systemic Insecticide) are complete for the issuance of a Section 18 emergency exemption by the State of Arizona for the temporary use of imidacloprid to control Sweet Potato Whitefly on cotton, between July 5 and October 15, 1993. Toxicology Branch I has no objection to the issuance of this exemption.

The margins of exposure (MOEs) for acute exposure under all application scenarios (ground and aerial) were greater than 100. The MOEs were calculated assuming 100% dermal absorption in humans,



which is unlikely to occur, especially when protective clothing is worn, as per the requirements of the Worker Protection Standards.

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 May 11, 1993, the Arizona Department of Agriculture requested an emergency exemption under Section 18 for the use of imidacloprid to control Sweet Potato Whitefly (Bemisia tabaci) on cotton, between July 5 and October 15, 1993. The cotton growers have no registered pesticides that will control these pests.

This is the first request made by Arizona for emergency use of imidacloprid on cotton. CONFIDOR 2 Flowable Systemic Insecticide (Miles) is the formulation for the active ingredient imidacloprid.

The total estimated cotton acreage to be treated in Arizona is 300,000. A maximum of 5 applications per season will be made, by air or ground equipment, at a rate of 0.05 lb. a.i. (3 oz.) imidacloprid per acre, for a total of 75,000 lbs. a.i., or approximately 33,000 gallons of formulated product. The preharvest interval will be approximately 14 days.

III. TOXICOLOGY BRANCH I COMMENTS

The toxicology data base for imidacloprid is sufficient to support the proposed Section 18 exemption. Refer to the draft toxicology profile for technical imidacloprid (NTN 33893), attached.

Miles Inc. has a pending section 3 application to register CONFIDOR 2 Flowable for use on cotton (Pesticide Petition No. 3F4169; Food Additive Petition No. 3H5655).

IV. RISK/EXPOSURE ASSESSMENT

This action was submitted to OREB (Occupational and Residential Exposure Branch; subordinate data package D191574/S440617) for determination of exposure estimates (see attached memo from Bruce F. Kitchens to Sheryl K. Reilly, Ph.D., dated June 14, 1993). Acute MOEs were based on these exposure estimates, and the rabbit maternal and developmental NOEL of 24 mg/kg/d (HED Doc. #009960). 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 (Actual) =

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

OPERATION*	EXPOSURE (mg/kg/d)	ACUTE MOE	PROTECTIVE CLOTHING SCENARIO
Applicator GB ⁻⁻⁻ Open	0.000938	25,586	long pants, short sleeves
Applicator GB Closed	0.000488	49,180	none (total deposition)
Aerial Applicator	0.00145	16,552	long pants, short sleeves
Mix/Load GB Open	0.00108	22,222	long pants, long sleeves, gloves
Mix/Load GB Closed	0.00129	18,605	gloves only
Mix/Load, Aerial Open	0.00648	3,704	long pants, long sleeves, gloves
Mix/Load, Aerial, Closed	0.00773	3,105	gloves only

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).

GB = ground boom
Open = open pour
Closed = closed pour

The acute MOEs for actual exposure are greater than 100 in all operations, even though a dermal absorption of 100% is assumed, because no dermal absorption data is available. Given the protective clothing requirements, the actual MOEs are anticipated to be even greater than calculated for these application scenarios.

V. SPECIAL TOXICOLOGY ISSUES AND PROBLEMS

1. Labelling. The labelling precautionary statements for CONFIDOR 2 Flowable Systemic Insecticide 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 intra-species 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 (see attached Tox. Profile, study # 083518), 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 (HED Doc. #099262), and an in vitro sister chromatid exchange mutagenicity study (CHO cells) was positive at cytotoxic doses (HED Doc. 102655).

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



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OFFICE OF
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TOXIC SUBSTANCES

MEMORANDUM:

SUBJECT: SECTION 18 REQUEST TO USE THE ACTIVE INGREDIENT
IMIDACLOPRID (CONFIDOR 2 FLOWABLE) ON COTTON TO CONTROL
SWEETPOTATO WHITEFLIES

FROM: Bruce F. Kitchens, Chemist

Bruce F. Kitchens

TO: Sheryl K. Reilly, Ph.D
Toxicology Branch I
Health Effects Division (H7509C)

THRU: Mark I. Dow, Ph.D., Section Head
Special Review and Registration Section II

Steven M. Knott
4/21

Larry C. Dorsey, Chief
Occupational and Residential Exposure Branch
Health Effects Division (H7509C)

Larry Dorsey

Please find below, the OREB review of:

DP Barcode: D191574

Pesticide Chemical Code: 129099

EPA Reg. No.: 93AZ003

EPA MRID No.: N/A

Review Time: 3 days

PHED: YES:Version 1.01, Run #19



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I. INTRODUCTION:

Arizona requests a section 18 specific exemption for the use of the active ingredient imidacloprid, trade name Confidor 2 Flowable. Confidor 2 Flowable is a systemic insecticide used to control the sweet potato whitefly on cotton. Miles, Inc. manufactures Confidor 2 Flowable.

The application rate for Confidor 2 Flowable is 0.05 lbs a.i./A. There is a maximum number of 5 applications per year. The total acreage to be treated for this section 18 is 300,000 acres, while the total active ingredient for this specified acreage is 75,000 lbs. Spray season begins July 5, 1993 and ends October 13, 1993. Confidor 2 Flowable will be used in the following Arizona counties:

LaPaz	Pima
Maricopa	Pinal
Mohave	Yuma

The tox endpoints of concern are maternal and developmental toxicity with NOELs of 24 mg/kg/day.

A. Background:

OREB estimated residential and occupational exposure for imidacloprid as a termiticide in a memo dated March 9, 1993. In this memo OREB estimated that occupants of a treated dwelling could be exposed to approximately 0.1 ng/m³ of imidacloprid in the air immediately after treatment. The air concentrations after 90 days are within the same order of magnitude as they are after treatment. Air concentration does not appear to decrease rapidly. PCO exposures are estimated at 0.02 mg/kg/day. These estimates assume that the PCO treats two (2) houses a day and weighs 70 kg.

OREB evaluated a new chemical screen for imidacloprid (NTN 33893). OREB was not able to determine whether the chemical would pass or fail the screen due to an incomplete tox profile.

B. Purpose:

This document estimates worker exposure for the proposed use of imidacloprid in Arizona on cotton to control whiteflies. OREB estimates exposure for the following:

Applicator:	<u>Groundboom</u>	open cab & closed cab
	<u>Aerial</u>	
Mixer/loader:	<u>Groundboom</u>	open loading & closed loading
	<u>Aerial</u>	open loading & closed loading

II. DETAILED CONSIDERATIONS:

OREB will use the following assumptions to estimate worker exposure:

TABLE 1. ASSUMPTIONS

Mixer loader weighs.....	60 kg
Applicator weighs.....	60 kg
Application rate.....	0.05 lb/A
Max No. Applications.....	5
Avg. Farm size.....	334 acres
Acres treated per day.....	50 GB
Acres treated per day.....	300 Aerial
App. GB open cab exposure.....	22.5 µg/lb ai
App. GB closed cab exposure.....	11.7 µg/lb ai
Applicator aerial exposure.....	5.78 µg/lb ai
Mixer/loader open exposure.....	25.9 µg/lb ai
Mixer/loader closed exposure.....	30.9 µg/lb ai
Adjustment for Dermal absorption...	None

Calculations:

Applicator - Groundboom Open Cab

AI sprayed per day:

$$50 \text{ acres/day} \times 0.05 \text{ lb ai/A} =$$

$$2.5 \text{ lb ai/day}$$

Exposure then becomes:

$$2.5 \text{ lb ai/day} \times 22.5 \text{ µg/lb ai} \div 60 \text{ kg} =$$

$$0.938 \text{ µg/kg/day}$$

Applicator - Groundboom Closed

Amount of active ingredient sprayed per day remains the same as calculated for groundboom open cab.

Exposure then becomes:

$$2.5 \text{ lb ai/day} \times 11.7 \text{ µg/lb ai} \div 60 \text{ kg} =$$

$$0.488 \text{ µg/kg/day}$$

Applicator - Aerial

AI spray per day:

$$300 \text{ acres/day} \times 0.05 \text{ lbs ai/A} =$$

$$15 \text{ lb ai/day}$$

Exposure then becomes:

$$15 \text{ lb ai/day} \times 5.78 \text{ µg/lb ai} \div 60 \text{ kg} =$$

$$1.45 \text{ µg/kg/day}$$

Calculations (con't)

Mixer/loader - Groundboom open pour

AI handled per day:

$$50 \text{ acres/day} \times 0.05 \text{ lb ai/A} =$$

2.5 lb ai/day

Exposure then becomes:

$$2.5 \text{ lb ai/day} \times 25.9 \text{ } \mu\text{g/lb ai} \div 60 \text{ kg} =$$

1.08 $\mu\text{g/kg/day}$

Mixer/loader - Groundboom closed pour

The amount of active ingredient handled per day remains the same as calculated for M/L - groundboom open pour.

Exposure then becomes:

$$2.5 \text{ lb ai/day} \times 30.9 \text{ } \mu\text{g/lb ai} \div 60 \text{ kg} =$$

1.29 $\mu\text{g/kg/day}$

Mixer/loader - aerial open pour

AI handled per day:

$$300 \text{ acres/day} \times 0.05 \text{ lb ai/A} =$$

15 lb ai/day

Exposure then becomes:

$$15 \text{ lb ai/day} \times 25.9 \text{ } \mu\text{g/lb ai} \div 60 \text{ kg} =$$

6.48 $\mu\text{g/kg/day}$

Mixer/loader - aerial closed pour

The amount of active ingredient handled per day remains the same as calculated for M/L - aerial open pour.

Exposure then becomes:

$$15 \text{ lb ai/day} \times 30.9 \text{ } \mu\text{g/lb ai} \div 60 \text{ kg} =$$

7.73 $\mu\text{g/kg/day}$

III. CONCLUSIONS:

OREB concludes that the following worker exposures may result from the use of Confidor 2 Flowable on cotton. Inhalation exposures are included in these estimates.

TABLE 2. ESTIMATED IMIDACLOPRID WORKER EXPOSURES		
JOB FUNCTION	EXPOSURE $\mu\text{g/kg/day}$	CLOTHING SCENARIO
Applicator GB open	0.938	long pants, short sleeves
Applicator GB closed	0.488	no clothes (total deposition)
Aerial Applicator	1.45	long pants, short sleeves
Mix/load GB open	1.08	long pants, long sleeves, gloves
Mix/load GB closed	1.29	no clothes, gloves
Mix/load Aerial open	6.48	long pants, long sleeves, gloves
Mix/load Aerial closed	7.73	no clothes, gloves

The label attached to this action did not specify what personal protective equipment (PPE) should be employed when handling Confidor 2 Flowable. The Worker Protection Standards (WPS) indicate that the signal word dictates the PPE in the absence of label specified PPE. Since the signal word is "Caution" the following PPE should be used:

- long sleeved shirt and long pants
- shoes and socks
- chemical resistant gloves

IV. REFERENCES:

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:

EXPOSURE	DISTRIB.	Median	NANOGRAMS PER LB AI SPRAYED			Obs.
	TYPE		Mean	Coef of Var	Geo. Mean	
	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	Median	MICROGRAMS PER LB AI SPRAYED			Obs.
			Mean	Coef of Var	Geo. Mean	
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
Cab Type Equal to 1 and
Subset originated from APPL.FILE

EXPOSURE

SCENARIO: no gloves

PATCH LOCATION	DISTRIB. TYPE	Median	Mean	COEF OF VAR	MICROGRAMS PER LB AI SPRAYED Geo. Mean	Obs.
HANDS	Lognormal	6.4599	55.3427	169.62	12.3523	22

Number of Records: 30

Data File: APPLICATOR

Subset Name: GB.OP.HDABC.APPL

Subset Specifications for GB.OP.HDABC.APPL

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

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

GROUNDBOOM APPLICATION/CLOSED CAB

Total Exposure for workers wearing no clothing, no gloves:

Inhalation: 0.09 ug/lb ai

Dermal/body: 4.29 ug/lb ai

Hands: 7.34 ug/lb ai

Total: 11.72 ug/lb ai

Total Exposure for workers wearing long pants, short sleeves, no gloves:

Inhalation: 0.09 ug/lb ai

Dermal/body: 0.42 ug/lb ai

Hands: 7.34 ug/lb ai

Total: 7.85 ug/lb ai

INHALATION EXPOSURES

EXPOSURE	DISTRIB. TYPE	Median	Mean	COEF OF VAR	NANOGRAMS PER LB AI SPRAYED Geo. Mean	Obs.
	Lognormal	36.1635	362.2118	154.0302	85.1506	23

Number of Records: 23

Data File: APPLICATOR

Subset Name: GB.CLSD.AIR.APPL

Subset Specifications for GB.CLSD.AIR.APPL

With Airborne Grade 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

AL EXPOSURES

SCENARIO: No clothing (total deposition)

PATCH	DISTRIB.	MICROGRAMS		PER LB AI SPRAYED			
LOCATION	TYPE	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	DISTRIB.	MICROGRAMS		PER LB AI SPRAYED			
LOCATION	TYPE	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	
THIGHS						0	
BACK						0	
FOREARMS	Other	.121	.209	68.9474	.1766	11	
THIGHS						0	
LOWER LEGS						0	
FEET						0	
TOTAL DERM:		5.4247					

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	DISTRIB.	MICROGRAMS		PER LB AI SPRAYED			
LOCATION	TYPE	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

Subset Specifications for GB.CLSD.HDA D.APPL
 Hand Grade 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

AERIAL APPLICATION

Total Exposure for workers wearing long pants, short sleeves, no gloves:
 Inhalation: 0.19 ug/lb ai
 Dermal/body: 2.51 ug/lb ai
 Hands: 3.08 ug/lb ai
Total: 5.78 ug/lb ai

INHALATION EXPOSURE

EXPOSURE	DISTRIB.	Median	NANOGRAMS PER LB AI SPRAYED			Obs.
	TYPE		Mean	Coef of Var	Geo. Mean	
EXPOSURE	Lognormal	156.3625	543.7511	226.6519	192.4707	25

Number of Records: 25

Data File: APPLICATOR

.Subset Name: AER.AIR.APPL

Subset Specifications for AER.AIR.APPL
 Airborne Grade Equal to "A" "B" "C"
 Subset originated from AERIAL.APPL
 With Application Method Equal to 5 6
 Subset originated from APPL.FILE

DERMAL EXPOSURES

SCENARIO: Long pants, short sleeves

PATCH LOCATION	DISTRIB.	Median	MICROGRAMS PER LB AI SPRAYED			Obs.
	TYPE		Mean	Coef of Var	Geo. Mean	
HEAD (ALL)	Other	.39	1.2734	178.0587	.4735	44
NECK.FRONT	Other	.045	.0982	151.3238	.0479	44
NECK.BACK	Other	.0275	.0584	166.7808	.0304	36
UPPER ARMS	Other	.291	.291	0	.291	6
CHEST	Other	.355	.3905	28.758	.3805	10
BACK	Other	.355	.355	0	.355	10
FOREARMS	Other	.4235	1.0499	214.5347	.3641	34
THIGHS	Other	.382	.382	0	.382	6
LOWER LEGS	Other	.238	.238	0	.238	6
FEET						0
TOTAL DERM:		2.507				

Number of Records: 44

Data File: APPLICATOR

Subset Name: AE.DMA_C.APPL

Subset Specifications for AE.DMA_C.APPL
 Dermal Grade Uncovered Equal to "A" "B" "C"
 Subset originated from AERIAL.APPL
 With Application Method Equal to 5 6
 Subset originated from APPL.FILE

EXPOSURE

SCENARIO: no gloves

PATCH	DISTRIB.		MICROGRAMS PER LB AI SPRAYED				
LOCATION	TYPE	Median	Mean	Coef of Var	Geo. Mean	Obs.	
HANDS	Lognormal	2.2666	12.7278	206.1244	3.0849	22	

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

Hand/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.		NANOGRAMS PER LB AI MIXED				
	TYPE	Median	Mean	Coef of Var	Geo. Mean	Obs.	
EXPOSURE	Lognormal	367.0709	2552.6287	144.4647	443.4466	40	

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

EXPOSURES

SCENARIO: gloves

PATCH LOCATION	DISTRIB. TYPE	Median	MICROGRAMS PER LB AI MIXED Mean	Coef of Var	Geo. Mean	Obs.
HANDS	Lognormal	19.697	106.6871	118.8365	32.6518	13

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

ED MIX/LIQUIDS

Total 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

EXPOSURE	DISTRIB. TYPE	Median	NANOGRAMS PER LB AI MIXED Mean	Coef of Var	Geo. Mean	Obs.
EXPOSURE	Lognormal	58.9667	82.8768	92.3632	59.8581	13

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
Liquid Type Equal to 1 2 3 4 5 and
With Mixing Procedures Equal to 2 3
Subset originated from MLOD.FILE

AL EXPOSURE:

SCENARIO: Long pants, long sleeves

PATCH LOCATION	DISTRIB. TYPE	Median	Mean	Coef of Var	Geo. Mean	Obs.
HEAD (ALL)	Other	.52	10.4098	249.4006	1.3465	132
NECK.FRONT	Other	.21	3.2831	440.3917	.2987	120
NECK.BACK	Other	.044	.7621	279.0972	.099	123
UPPER ARMS	Other	3.201	3.3801	105.3578	1.4066	26
CHEST	Other	5.68	20.0883	282.0089	3.6217	75
BACK	Other	5.68	15.8685	181.2339	3.7667	60
FOREARMS	Lognormal	3.63	8.663	125.8167	2.896	42
THIGHS	Other	1.91	8.9917	207.7694	2.2648	39
LOWER LEGS	Other	.952	2.8496	123.7963	1.1634	37
FEET						0
TOTAL DERM:		21.093				

Number of Records: 132

Data File: MIXER/LOADER

Subset Name: LIQ.OP.X.DRM.MLOD

Subset Specifications for LIQ.OP.X.DRM.MLOD

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

Subset originated from LIQ.OP.X4081.MLOD

Without Study Code Equal to 4081

Subset originated from LIQ.OPEN.MLOD

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 EXPOSURE

SCENARIO: gloves

PATCH LOCATION	DISTRIB. TYPE	Median	Mean	Coef of Var	Geo. Mean	Obs.
HANDS	Lognormal	.0625	96.5471	253.4793	.5764	13

Number of Records: 21

Data File: MIXER/LOADER

Subset Name: LIQ.OP.X.GLV.MLOD

Subset Specifications for LIQ.OP.X.GLV.MLOD

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

With Hand Measuring Method Equal to 2

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

AL EXPOSURES

SCENARIO: Long pants, long sleeves

PATCH LOCATION	DISTRIB. TYPE	Median	Mean	Coef of Var	Geo. Mean	Obs.
HEAD (ALL)	Lognormal	.52	1.2814	136.9752	.7042	14
NECK.FRONT	Lognormal	.0675	.3632	245.0991	.0881	14
NECK.BACK	Other	.0385	.2239	313.4882	.0454	14
UPPER ARMS						0
CHEST	Other	.71	.71	0	.71	1
BACK	Other	.71	.71	0	.71	1
FOREARMS						0
THIGHS						0
LOWER LEGS						0
FEET						0
TOTAL DERM:	2.2508	2.046	3.2885		2.2577	

Number of Records: 14

Data File: MIXER/LOADER

Subset Name: LIQ.CL.DERM.MLOD

SCENARIO: No clothing (total deposition)

PATCH LOCATION	DISTRIB. TYPE	Median	Mean	Coef of Var	Geo. Mean	Obs.
HEAD (ALL)	Lognormal	.52	1.2814	136.9752	.7042	14
FRONT	Lognormal	.0675	.3632	245.0991	.0881	14
BACK	Other	.0385	.2239	313.4882	.0454	14
UPPER ARMS	Lognormal	1.164	1.8291	136.2091	1.0931	14
CHEST	Lognormal	1.5975	8.5707	245.9309	1.985	14
BACK	Other	1.2425	7.2014	314.6485	1.3949	14
FOREARMS	Lognormal	1.089	22.3159	330.5137	1.8704	14
THIGHS	Lognormal	29.605	153.4821	209.664	20.195	14
LOWER LEGS	Lognormal	1.19	7.6343	166.509	2.3231	13
FEET						0
TOTAL DERM:	29.5399	36.514	202.902		29.6992	

Number of Records: 14

Data File: MIXER/LOADER

Subset Name: LIQ.CL.DERM.MLOD

Subset Specifications for LIQ.CL.DERM.MLOD

With Dermal Grade Uncovered 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

HAND EXPOSURES

SCENARIO: gloves

PATCH LOCATION	DISTRIB. TYPE	Median	Mean	Coef of Var	Geo. Mean	Obs.
HANDS	Lognormal	1.3909	2.9299	112.3247	1.3275	13

Number of Records: 13

Data File: MIXER/LOADER

Subset Name: LIQ.CL.HND.MLOD

et Specifications for LIQ.CL.HND.MLOD
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.