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CASWELL FILE

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

JUL 12 1993

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: **Section 18: ID# 93AZ0007**. Emergency Exemption for Use of CONFIDOR 2 Flowable (Imidacloprid) on Lettuce in Arizona

Tox. Chem. No.: 497E
PC No.: 129099
Barcode No.: D192379 422
Submission No.: S441955

FROM: Sheryl K. Reilly, Ph.D. Sheryl K. Reilly 7/2/93
Review Section II, Toxicology Branch I
Health Effects Division (H7509C)

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

THRU: Myron S. Ottley, Ph.D. MSOttley 7/6/93
Review Section IV, Toxicology Branch I
Health Effects Division (H7509C)

Joycelyn E. Stewart, Ph.D. 7/12/93 JMcGaw
Section Head
Review Section II, Toxicology Branch I
Health Effects Division (H7509C)

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 head and leaf lettuce between August 10, 1993 and May 15, 1994. 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 June 1, 1993, the Arizona Department of Agriculture requested an emergency exemption under Section 18 for the use of imidacloprid to control Sweet Potato Whitefly (Bemesia tabaci) on head and leaf lettuce, between August 10, 1993 and May 15, 1994. The lettuce growers have no registered pesticides that will satisfactorily control these pests when they become numerous.

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

The total estimated acreage to be treated in Arizona is 55,500 (50,000/head lettuce, and 5,500/leaf lettuce). A maximum of 1 application per crop per season (2 crops per season) will be made, by ground equipment, at a rate of 2.5 to 5 dry oz. a.i. (10-20 fl oz. of the formulation) imidacloprid per acre, for a total of 27,750 lbs. a.i. per year. The preharvest interval will be at least 20 days.

III. TOXICOLOGY BRANCH I COMMENTS

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

IV. RISK/EXPOSURE ASSESSMENT

This action was submitted to OREB (Occupational and Residential Exposure Branch; subordinate data package D192507/S441953) for determination of exposure estimates (see attached memo from Bruce F. Kitchens to Sheryl K. Reilly, Ph.D., dated July 1, 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 Q_1^* for this chemical.

Formulas used in calculations:

Acute MOE (Actual) =

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

OPERATION*	EXPOSURE (mg/kg/d)	ACUTE MOE	PROTECTIVE CLOTHING SCENARIO
Applicator GB Open	0.0059	4068	long pants, short sleeves
Applicator GB Closed	0.0031	7742	none (total deposition)
Mix/Load GB Open	0.0068	3529	long pants, long sleeves, gloves
Mix/Load GB Closed	0.0081	2963	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, 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 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 (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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WASHINGTON, D.C. 20460

JUL 1 1993

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM:

SUBJECT: SECTION 18 REQUEST FROM ARIZONA TO USE THE ACTIVE INGREDIENT IMIDACLOPRID (CONFIDOR 2 FLOWABLE) ON BROCCOLI, CAULIFLOWER, CABBAGE, AND HEAD & LEAF LETTUCE 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 Mark I Dow
Special Review and Registration Section II

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

Please find below, the OREB review of:

DP Barcode: D192506,D192507

Pesticide Chemical Code: 129099

EPA Reg. No.: 93AZ0007,93AZ0005

EPA MRID No.: N/A

Review Time: 2 days

PHED: YES:Version 1.01, Run #19

I. INTRODUCTION:

Arizona requests two section 18 specific exemptions for the use of the active ingredient imidacloprid, trade name Confidor 2 Flowable. Confidor 2 Flowable is a systemic insecticide that will be used to control the sweet potato whitefly on broccoli, cauliflower, and cabbage in the first section 18 (93AZ0007) and head & leaf lettuce in the second section 18 (93AZ0005). Miles, Inc. manufactures Confidor 2 Flowable.

The maximum application rate is 0.313 lbs a.i./A (5.0 dry oz. ai/A) for Confidor 2 Flowable in both section 18 requests. Pesticide application is via ground equipment for both requests. From this point in this memo both requests will be treated as one single document since the maximum application rates are the same for both requests. Where there are differences between the section 18s it will be noted. There is a maximum number of 2 applications per year. The total acreage to be treated for 93AZ0007 is 16,600 acres with a maximum of 8300 lbs a.i. The total acreage to be treated for 93AZ0005 is 55,000 acres with a maximum of 27,750 lbs a.i. Spray season begins August 10, 1993 and ends May 15, 1994. Confidor 2 Flowable will be used in the following Arizona counties:

LaPaz	Pinal
Maricopa	Yuma
Pima	

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

A. Background:

OREB estimated worker exposure in a recent section 18 request from Arizona (D191574 6/14/93) for the use of Confidor 2 Flowable on cotton. Exposure estimates derived from PHED will serve as background for this section 18.

B. Purpose:

This document estimates worker exposure for the proposed uses of imidacloprid in Arizona on broccoli, cauliflower, cabbage, and head & leaf lettuce to control the sweet potato whitefly. OREB estimates exposure for the following:

Applicator: Groundboom open cab & closed cab

Mixer/loader: Groundboom 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	0.313 lb ai/A
Max No. Applications	2
App. GB open cab exposure	22.5 µg/lb ai
App. GB closed cab exposure	11.7 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

TABLE 2. AVERAGE FARM SIZE AND AVERAGE ACRE TREATED PER DAY[1]

CROP	AVG FARM SIZE	AVG ACRES PER DAY
Broccoli	158	50
Cabbage	37	50
Cauliflower	230	50
Lettuce	497	50

1. 1987 Agricultural Census: Arizona

Calculations:

Applicator - Groundboom Open Cab

AI sprayed per day:

50 acres/day x 0.313 lb ai/A = **15.7 lb ai/day**

Exposure then becomes:

15.7 lb ai/day x 22.5 µg/lb ai ÷ 60 kg = **5.9 µg/kg/day**

Calculations: (con't)

Applicator - Groundboom Closed

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

Exposure then becomes:

15.7 lb ai/day x 11.7 µg/lb ai ÷ 60 kg = **3.1 µg/kg/day**

Mixer/loader - Groundboom open pour

AI handled per day:

50 acres/day x 0.313 lb ai/A = **15.7 lb ai/day**

Exposure then becomes:

15.7 lb ai/day x 25.9 µg/lb ai ÷ 60 kg = **6.8 µg/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:

15.7 lb ai/day x 30.9 µg/lb ai ÷ 60 kg = **8.1 µg/kg/day**

III. CONCLUSIONS:

OREB concludes that the following worker exposures may result from the use of Confidor 2 Flowable on broccoli, cabbage, cauliflower, and head & leaf lettuce. Inhalation exposures are included in these estimates. See Appendix A for PHED runs.

TABLE 3. ESTIMATED IMIDACLOPRID WORKER EXPOSURES		
JOB FUNCTION	**EXPOSURE µg/kg/day**	**CLOTHING SCENARIO**
Applicator GB open	5.9	long pants,short sleeves
Applicator GB closed	3.1	no clothes (total deposition
Mix/load GB open	6.8	long pants, long sleeves, gloves
Mix/load GB closed	8.1	no clothes, gloves

Note that the clothing scenario for each exposure estimate represents the best data set available in PHED.

The exposure estimates apply to all of the individual crops. In this case the application method and the application rates are the same for each crop. One exception is the total acreage treated per day for cabbage. The exposure estimates presented are slightly higher than what the actual estimates for cabbage treated at the lower acres/day.

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:

	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
Cab Type Equal to 1 and
Subset originated from APPL.FILE

DERMAL EXPOSURE

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.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

	DISTRIB. TYPE	**NANOGRAMS** PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
EXPOSURE	Lognormal	36.1635	362.2118	154.0302	[redacted]	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

[illegible]AL 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
[illegible]R ARMS						0
[illegible]T						0
BACK						0
FOREARMS	Other	.121	.209	68.9474	.1766	11
THIGHS						0
LOWER LEGS						0
FEET						0
TOTAL DERM:	[illegible]					

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

[illegible]TCH ATION	DISTRIB. TYPE	MICROGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
h[illegible]DS	Lognormal	8.3966	43.6448	206.8178	[illegible]	12

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

et 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

	DISTRIB. TYPE	NANOGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
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"
et 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. TYPE	MICROGRAMS PER LB AI SPRAYED Median	Mean	Coef of Var	Geo. Mean	Obs.
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

et 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 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**	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:
lation: 0.44 ug/lb ai
al/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**	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

DERMAL EXPOSURE:

SCENARIO: Long pants, long sleeves

PATCH LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI MIXED 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
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 EXPOSURE

SCENARIO: gloves

PATCH LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI MIXED 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

EXPOSURES

SCENARIO: 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**	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

	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**	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 EXPOSURES

SCENARIO: Long pants, long sleeves

PATCH LOCATION	DISTRIB. TYPE	MICROGRAMS PER LB AI MIXED 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	MICROGRAMS PER LB AI MIXED 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	MICROGRAMS PER LB AI MIXED 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.