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

JAN 11 1994

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: **Section 18: ID# 94WA0002**. Emergency Exemption for Use of Provado (Imidacloprid) on Apples in Washington

Tox. Chem. No.:	497E
PC No.:	129099
Barcode No.:	D197650
Submission No.:	S454701

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 1/10/94
Review Section II, Toxicology Branch I
Health Effects Division (7509C)

THRU: Myron S. Ottley, Ph.D. MSOttley 1/10/94
Review Section IV, Toxicology Branch I
Health Effects Division (7509C)
and
Joycelyn E. Stewart, Ph.D. 1/10/94 KP 1/10/94
Section Head
Review Section II, Toxicology Branch I
Health Effects Division (H7509C)

I. CONCLUSIONS

The toxicology data requirements are complete for the issuance of a Section 18 emergency exemption by the State of Washington for the temporary use of imidacloprid (Provado) to control aphids on apples. 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 6, 1993, the Washington Department of Agriculture requested an emergency exemption under Section 18 for the use of imidacloprid to control green apple and spirea

aphids (Aphis pomi De Geer and Aphis spiraecola Patch, respectively) on apples. This is the first request made by Washington for this use. The alternative products for control of aphids include dimethoate and endosulfan, which are toxic to natural enemies of aphids, and thus impede efforts at integrated pest management. There is evidence of pest resistance to endosulfan.

Provado (Miles, Inc.) is the formulation for the active ingredient. The pesticide will be applied by ground or by air, up to 5 times per growing season. The maximum estimated acreage to be treated in Washington is 160,980. The rate of application will be 6.4 fl. oz. of Provado (0.1 lbs. a.i./acre) per application, between May 1 and September 15, 1994. The preharvest interval will be at least 7 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 D197895) for determination of exposure estimates (see attached memo from Charles Lewis to S. Reilly, dated January 6, 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-Ground	0.00023	1.04×10^5
Applicator-Ground	0.00543	4420
Mixer/Loaders-Aerial	0.00254	9449
Applicators-Aerial	0.00118	20,339

* 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).

V. SPECIAL TOXICOLOGY ISSUES AND PROBLEMS

1. Labelling. The labelling precautionary statements for Provado 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 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: 420553-33 422[illegible]-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. Con 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 an & 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.

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JAN 6 1994

MEMORANDUM

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

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

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 apples in Washington. The assessment is attached.

DP Barcode: D197895

Pesticide Chemical Code: 129099

EPA Reg. No.: 94WA0002

PHED: Yes; Mixer/loaders, Run # 11; Applicators, air-blast, Run # 2; Applicators, aerial, Run # 10.

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 green apple aphid (Aphis pomi) and spirea aphid (Aphis spiraecola) on bearing and non-bearing apples. Applications may be made with ground (air-blast) or aerial equipment. A maximum of 160,980 acres may be treated in Washington at a rate of 0.1 lb ai/A. A limit of 0.50 lb ai/A may be used per year.

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.

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 apples in Washington.

[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 apples:

Ground Equipment (air-blast)

application rate 0.10 lb ai/A (from Washington submission);
finish spray 400 gallons/A;
8 hour work day;
10 acres treated per day;
1.0 lb ai applied per day.

Aerial Equipment (helicopter)

application rate 0.10 lb ai/A (from Washington submission);
finish spray 10 gallons/A;
3 hour work day;
111 acres treated per day;
11.1 lb ai applied per day.

Mixer-loaders

Minimum clothing required by the Worker Protection Standard for Agricultural Pesticides includes: long pants, long-sleeved shirt, shoes and socks. The information provided by Washington with this request does not specify the type of work clothing that will be worn or Personal Protection Equipment (PPE) required.

OREB's estimates of exposure are 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 for mixer/loaders of air-blast equipment is 0.2 μg ai/kg bw/day. Estimated total exposure for mixer/loaders of aerial equipment is 2.5 μg ai/kg bw/day.

Applicators

With the same work clothing and PPE as for mixer/loaders, applicator estimated total exposure for air-bast equipment is 5.4 μg ai/kg bw/day. For aerial equipment, estimated total exposure is 1.2 μg ai/kg bw/day.

III. CONCLUSIONS:

OREB has estimated (TABLE 1), the total exposure for mixer/loaders and applicators using Admire® 2 Flowable to control green apple aphids (Aphis pomi) and spirea aphids (Aphis spiraecola) on bearing and non-bearing apples. The calculated values are based on a single application of 0.10 lb ai/A. However, up to 5 applications per year may be made at this rate.

TABLE 1. Estimates of exposure (μg ai/kg bw/day) for mixer/loaders and applicators of imidacloprid on apples in Washington.

Equipment Type	Mixer/loader	Applicator
Air-blast	0.2 μg ai/kg bw/day	5.4 μg ai/kg bw/day
Aerial	2.5 μg ai/kg bw/day	1.2 μg ai/kg bw/day

CALCULATIONS

Mixer/loaders

Ground Equipment

13.7 µg/lb ai handled (PHED value, run # 11, for mixer/loader, open loading, wearing gloves) X 1.0 lb ai/day = 13.7 µg ai/day ÷ 60 kg bw = 0.23 µg ai/kg bw/day.

Aerial Equipment

13.7 µg/lb ai handled (PHED value, run # 11, for mixer/loader, open loading, wearing gloves) X 11.1 lb ai/day = 152.07 µg ai/day ÷ 60 kg bw = 2.54 µg ai/kg bw/day.

Applicators

Ground Equipment

325.98 µg/lb ai (PHED value, run # 2, for air-blast applicator, wearing gloves) X 1.0 lb ai/A = 325.98 µg ai/day ÷ 60 kg bw = 5.43 µg ai/kg bw/day.

Aerial Equipment

6.4 µg/lb ai (PHED value, run # 10, for fixed-wing aircraft, not wearing gloves) X 11.1 lb ai/A = 71.04 µg ai/day ÷ 60 kg bw = 1.18 µg ai/kg bw/day.

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

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

---------- 01/06/94

Site: APPLES Chem: IMIDACLOPRID Hrs/Day: 8.0 hr.

Appl. method: GROUND Speed: 3.0 (increment: 1) mph

Tank capacity(TC): 500 (Increment: 50) gal Length of run(LR): 600 ft.

Swath width(SW): 28 (Increment: 3) ft. Water station(WS): 200 yd.

Finish spray(FS): 400 (Increment: 50) 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.

500 TC	3.0 mph				4.0 mph				5.0 mph				time in mins
FS	400	450	500	550	- 400	450	500	550	- 400	450	500	550	<- Finish spray
28	10	9	8	8	11	10	9	8	11	10	9	8	<- Acre treated
SW 28	63	57	52	48	49	44	40	37	40	36	33	30	<- Spray time
28	387	393	398	403	405	410	415	418	417	421	425	428	<- Refill time
28	29	29	28	28	24	24	23	23	21	21	20	20	<- Ferry/turn time

FS	400	450	500	550	- 400	450	500	550	- 400	450	500	550	<- Finish spray
31	10	9	8	8	11	10	9	8	11	10	9	8	<- Acre treated
SW 31	58	52	47	43	45	40	37	34	37	33	30	27	<- Spray time
31	392	398	403	407	410	415	419	422	421	425	429	432	<- Refill time
31	29	28	28	28	24	23	23	23	21	20	20	20	<- Ferry/turn time

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

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

01/06/94

Site: APPLES Chem: IMIDACLOPRID Hrs/Day: 3.0 hr.

Appl. method: AERIAL Speed: 30.0 (increment: 5) mph

Tank capacity(TC): 300 (Increment: 50) gal Length of run(LR): 600 ft.

Swath width(SW): 50 (Increment: 3) ft. Water station(WS): 200 yd.

Finish spray(FS): 10 (Increment: 10) gal/a. Refill time(RT): 9.0 min

** Recommand: Aerial -- RT = 1-2 min. per 100 gal TC; LR = 2640 ft(.5 mile); **
Hrs/day=2-4; WS=8800 yd(5 miles); Ferry speed=speed; Turning time=0.25 min.

300 TC	30.0 mph				35.0 mph				40.0 mph				time in mins
FS	10	20	30	40	10	20	30	40	10	20	30	40	<- Finish spray
50	111	71	52	41	115	72	53	41	118	73	53	42	<- Acre treated
SW 50	36	23	17	13	32	20	15	11	29	18	13	10	<- Spray time
50	100	128	141	148	103	131	143	150	106	133	145	152	<- Refill time
50	42	28	21	17	43	28	21	17	44	28	21	17	<- Ferry/turn time
FS	10	20	30	40	10	20	30	40	10	20	30	40	<- Finish spray
53	114	72	52	41	118	73	53	42	121	75	54	42	<- Acre treated
SW 53	35	22	16	12	31	19	14	11	28	17	12	9	<- Spray time
53	103	130	142	150	106	133	145	152	108	135	146	153	<- Refill time
53	41	27	20	16	42	27	20	16	42	27	20	16	<- Ferry/turn time

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