



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

OFFICE OF  
PESTICIDES AND TOXIC SUBSTANCES

May 29, 1987

MEMORANDUM

SUBJECT: Transmittal of Exposure Parameters of Bidrin®  
(Dicrotophos)

FROM: Yuen-shaung NG, Ph.D. Entomologist *Y.S. NG*  
Science Support Branch  
Benefits and Use Division  
(TS-768-C)

TO: Curt Lunchick, Acting Chief  
Exposure Assessment Branch  
Hazard Evaluation Division (TS-769-C)

THRU: Arnold Aspelin, Ph.D., Chief *A. Aspelin*  
Science Support Branch  
Benefits and Use Division (TS-768-C)

Attached are the projected exposure parameters for applying Bidrin® (Dicrotophos) to cotton. These parameters cover both ground and aerial applications.

If I can be of further assistance, please do not hesitate to call me at #557-2991 or #557-9710, my room number is 1016E.

Attachment

cc: Al Jennings, BUD w/o attachment  
E. D. Thomas, SSB/BUD  
Laurie Lewis, EAB/HED  
Marilyn Mautz, RD

Projected parameters and data for application exposure for applying dicotophos (Bidrin) to cotton.

\*\*\*\*\* AERIAL APPLICATION \*\*\*\*\*

NG06/05/87

*ROW*	*** PARAMETERS ***	*** DATA ***	*REF.*
1.	EXPOSURE ASSESSMENT FOR -----	Dicotophos	
2.	TRADEMARK -----	Bidrin 8	# 1
3.	SITE: -----	Cotton	# 1
4.	PEST(S):-----	Major cotton insects (e.g. aphids, thrips, fleahoppers, mites, boll weevil)	# 1
5.	STATE(S) -----	Cotton producing states	# 1
6.	FORMULATION(S) -----	Water Miscible	# 1
7.	Label signal word -----	Danger poison	# 1
8.	Amount applied		# 1
	Early season -----	1.6 - 3.2 fl. oz/acre	# 1
	Late season -----	4.0 - 8.0 fl. oz/acre	# 1
9.	Maximum applications/season -	3 per season	# 1
10.	Season applied and the stage(s) of plant growth -----	Early and late season	# 1

RESTRICTIONS AND LIMITATIONS:

11.	This is a restricted use pesticides, extremely toxic to fish, bird, and other wildlife. Do not spray border areas. This product is highly to bees.		# 1
12.	Re-entry time -----	48 hrs	# 1
13.	Protection requirments -----	protective gloves, clothings and respirator for all operators.	# 1
14.	Pre-harvest interval(s) -----	30 days	# 1
16.	Others -----	Do not graze livestock on treated	# 1

fields, or feed treated gin trash.

TYPE AND METHOD OF APPLICATION:

\*\*\* Assumption:

1. Pilot and mixer/loader both exist.
2. All crops on the average farm (field) sprayed.
3. Nurse tank is used.

17.	Method of application -----	Aerial		
18.	Equipment -----	Fixed wing aircraft		# 4
19.	Tank capacity -----	150-350	gal	# 4
20.	Tank capacity (avg.) .....	280.000	gal	# 4
21.	Application speed -----	95-150	mph	# 4
22.	Application speed (avg.) .....	110.000	mph	# 4
23.	Vol./wt. finished material/area (avg.).....	2.000	gal/acre	# 5
24.	Area treated/tankful -----	140.000	acres	# 5
25.	Avg. # application/season ....	2.000		# 5
26.	Theoretical maximum # application/season -----	3.000		# 5

TREATED AREA:

27.	Farm size (avg.) .....	265.000	acres	# 2
28.	Spray unit (estimate) .....	80.000	acres	# 5
29.	Swath width .....	65.000	ft	# 4
30.	Length of run -----	1866.762	ft	# 5
31.	Swath run/load -----	50.259		# 5
32.	Length of run (adj.) -----	1866.76	ft	# 5

APPLICATION TIME:

33.	Application time/tankful -----	9.692	mins	# 5
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Bidrin...Cotton...Aerial application

34.	# turns/tankful -----	49.259		# 5
35.	Turning time .....	35.000	secs	# 5
36.	Total turntime/tankful -----	28.734	mins	# 5
36.	Elapsed time to spray full tank-	38.427	mins	# 5

FERRYING AND LOADING TIME:

38.	Ferrying distance (approx.) ...	5.000	miles	# 5
39.	Ferrying speed .....	120.000	mph	# 4
40.	Ferry time (round trip) -----	5.000	mins	# 5
41.	Landing and take-off time .....	10.000	mins	# 5
42.	Total ferrying time -----	15.000	mins	# 5
43.	Refill-transfer time .....	10.000	mins	# 5
44.	Nurse tank (avg.) -----	1500.00	gals	# 5
45.	Time for mix nurse tank (approx.)	32.00	mins	# 5
46.	Nurse tank mixing time allocated to mixer/loader by spray tankful	5.973	mins	# 5

EXPOSURE TIME:

47.	Hours/DAY suitable for application (approx.).....	6.000	hrs	# 5
48.	# tankfuls/DAY (approx.) -----	5.676		# 5
49.	# tankful/DAY (adj.) -----	6.00		# 5
50.	Hours/DAY suitable for application (adj.) -----	6.34	hrs	# 5
51.	Area treated/DAY -----	840.000	acres	# 5

Total exposure time for operator(s)/DAY  
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52.	(1). Pilot exposure time/DAY (treatment, truning) -----	3.843	hrs	# 5
53.	(2). Pilot exposure time/DAY,			

Bidrin...Cotton...Aerial application

	(refill time) -----	1.00	hrs	# 5
54.	(3). Pilot exposure time/DAY (ferry, landing, take off)	1.50	hrs	# 5
55.	(4). Pilot exposure time/DAY, Total -----	6.34	hrs	# 5
56.	(5). Mixer/loader exposure time/ DAY (mixing nurse tank and transfer time) -----	1.597	hrs	# 5

Total exposure time for operator(s)/ONE APPLICATION/FARM

55.	Farm size (avg.) .....	265.000	acres	# 2
57.	(1). Pilot exposure time (treatment, truning time) -	1.212	hrs	# 5
58.	(2). Pilot exposure time (refill time) -----	0.315	hrs	# 5
59.	(3). Pilot exposure time (ferry, landing and take off).-----	0.473	hrs	# 5
60.	(4). Total pilot exposure time/application/farm ----	2.00	hrs	# 5
61.	(5). Mixer/loader exposure time (mixing nurse tank and transfer time) -----	30.235	mins	# 5

Total exposure time for applicator(s)/SEASON/FARM

62.	Farm size (avg.) .....	265.000	acres	# 2
63.	Avg. # of application -----	2.00		# 5
64.	Acres treated/season/farm	530.000	acres	# 5
65.	(1). Pilot exposure time (treatment, truning time) -	2.425	hrs	# 5
66.	(2). Pilot exposure time (refill time) -----	0.631	hrs	# 5
63.	(3). Pilot exposure time			

Bidrin...Cotton...Aerial application

	(ferry, landing and take off time) -----	0.946	hrs	# 5
64.	(4). Total Pilot exposure time/season/farm -----	4.00	hrs	# 5
65.	(5). Mixer/loader exposure time (mixing nurse tank transfer time) -----	1.008	hrs	# 5

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66. REFERENCE:

- # 1. Du Pont 1987 label for Bidrin 8
- # 2. EPA estimates
- # 3. State recommendations
- # 4. Hazelrigg G.A. Jr., and Clyne F. 1979. A study of the cost-effect markets for technology agricultural aircraft. NASA Contrator Report 1
- # 5. Ng, 1986
- # 6. Ag. Stat. 1984

\*\*\*\*\*Projected parameters and data for application exposure for applying dicotophos (Bidrin) to cotton

\*\*\*\*\* GROUND APPLICATION \*\*\*\*\*

NG 06/05/86

*ROW*	*** PARAMETERS ***	*** DATA ***	*REF.*
1.	EXPOSURE ASSESSMENT FOR -----	Dicotophos	# 1
2.	TRADEMARK -----	Bidrin 8	# 1
3.	SITE: -----	Cotton	# 1
4.	PEST(S):-----	Major cotton insects (e.g. aphids, thrips, fleahoppers, mites, boll weevil)	# 1
5.	STATE(S) -----	Cotton producing states	# 1
6.	LABEL SUMMARY :		
7.	Formulation(s) -----	Water miscible	# 1
8.	Label signal word -----	Danger poison	# 1
9.	Range of rate applied:		
10.	Early season -----	1.6 - 3.2 fl. oz/acre	# 1
11.	Late season -----	4.0 - 8.0 fl. oz./acre	# 1
12.	Maximum applications/season --	3 per season	# 1
13.	Season applied and the stage(s) of plant growth -----	Early season or late seasonmer	# 1
14.	Restrictions and limitations:	Restricted use pesticide	# 1
15.	Re-entry time -----	48 hrs.	# 1
16.	Protective clothing -----	Protective gloves, clothings and respirator for all operators	# 1
17.	Pre-harvest interval(s) -----	30 days	# 1
18.	Feed and forage interval(s) ---	Do not graze or feed animals on treated fields, or feed treated gin trash.	# 1
19.	Others -----	Toxic to fishes, birds, wildlifes	# 1

and bees

20. The following data and calculations are based on these assumptions:

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21. \* Assumptions:

1. Spray operator and mixer/loader are different person.
2. All plants on the average farm sprayed.
3. Nurse tank is used.

22. \*\*\*\*\* TYPE AND METHOD OF APPLICATION:

23. Method of application ----- Ground application # 1

24. Equipment ----- Hydraulic sprayer # 1

25. Tank capacity:

26. (range) ----- 250 - 1000 gal # 5

27. (avg.) ----- 500 gal # 5

28. Application speed:

29. (range) ----- 2 - 5 mph # 5

30. (avg. miles per hour) ----- 4.00 mph # 5

31. (avg. feet per hour) ----- 21120.00 ftph # 5

32. Vol. finished material:

33. (avg.) ----- 60.00 gal/acre # 6

34. Area treated/tankful ----- 8.33 acre # 2

35. Avg. Number of application/season ----- 2.00 # 6

36. \*\*\*\*\* TREATED AREA:

37. Farm size (avg.) ----- 265.00 acre # 3,4

38. Spray unit (estimate) ----- 5.00 acre # 6

39. Swath width: ft # 6

40. (range) ----- 20 - 60 # 6



Bidrin...Cotton...Ground application

41.	(avg.) -----	60.00	ft	# 6
42.	Length of run (approx.)-----	466.69	ft	# 2
43.	Swath runs/tank (approx.) -----	12.96		# 2
44.	Swath runs/tank (adj.) -----	13		# 6
45.	Length of run (adj.) -----	465.38	ft	# 2
46.	***** APPLICATION TIME:			
47.	Application time/tankful -----	17.19	min	# 2
48.	# turns/tankful -----	12.00		# 2
49.	Turning time -----	60.00	sec	# 6
50.	Total turntime/tankful -----	12.00	min	# 2
51.	Elapsed time to spray full tank -	29.19	min	# 2
52.	***** FERRYING AND LOADING TIME:			
53.	Ferrying distance (approx.) ---	2640.00	ft	# 6
54.	Ferrying speed -----	4.00	mph	# 6
55.	Ferry time (round trip) -----	15.00	min	# 2
56.	Nurse tank (avg.) -----	2000.00	gal	# 6
57.	Time for mix nurse tank (approx.)	32.00	min	# 6
58.	Nurse tank mixing time allocated to mixer/loader by spray tankful.	8.00	min	# 2
59.	Refill-transfer time -----	8.00	min	# 6
60.	Total time for loading a full apray tank -----	16.00	min	# 2
61.	***** EXPOSURE TIME:			
62.	Hours/DAY suitable for application (approx.) -----	8.00	hr	# 6
63.	# tankfuls/DAY (approx) -----	7.98		# 2
64.	# tankfuls/DAY (adj.) -----	8.00		# 2

65.	Hours/DAY suitable for application (adj.) -----	8.03	hr	# 2
66.	Area treated/DAY -----	66.67	acre	# 2
67.	TOTAL EXPOSURE TIME FOR APPLICATOR(S)/DAY *****			
68.	1. Ferry time/day -----	120.00	min	# 2
69.	2. Turning time/day -----	96.00	min	# 2
70.	3. Treatment time/day -----	137.50	min	# 2
71.	4. Mixing tank & transfer/day	128.00	min	# 2
72.	5. Total operation time/day -	481.50	min	# 2
73.	TOTAL EXPOSURE TIME FOR APPLICATOR(S)/ONE APPLICATION/FARM *****			
74.	Farm size (avg.) -----	265.00	acre	# 2
75.	1. Ferry time -----	477.00	min	# 2
76.	2. Turning time -----	381.60	min	# 2
77.	3. Treatment time -----	546.56	min	# 2
78.	4. Mixing tank, transfer time	508.80	min	# 2
79.	5. Total operation time ----	1913.96	min	# 2
80.	TOTAL EXPOSURE TIME FOR APPLICATOR(S)/SEASON/FARM *****			
81.	Farm size (avg.) -----	265.00	acre	# 2
82.	Avg. # of application -----	2.00		# 2
83.	Acres treated/season/farm ---	530.00	acre	# 2
84.	1. Ferry time -----	954.00	min	# 2
85.	2. Turning time -----	763.20	min	# 2
86.	3. Treatment time -----	1093.13	min	# 2
87.	4. Mixing tank, transfer time	1017.60	min	# 2

88. 5. Total operation time ---- 3827.92 min # 2

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89. \*\*\*\*\* REFERENCE:

- # 1. Du Pont 1987 label for Bidrin 8
- # 2. Calculated by Ng, 1986
- # 3. 1983 Census of Agriculture, U.S. Dept. Commerce, Bureau of the Census.
- # 4. EPA estimates, 1986. Economic Analysis Branch, BUD/OPP
- # 5. FMO Fundamentals of Machine Operation-Crop Chemicals. Deere Company 1976.
- # 6. Ng, estimates, 1986