D174181, D174183, D174185
DPBARCODE (RECORD)
081901
SHAUGHNESSY NO

REVIEW NO.

EEB REVIEW

DATE IN: 02-10-92 OUT: OCT 28 1992

CASE # : 030292, 048311, 048333
SUBMISSION # : S410905, S410908, S410909
ID # : 050534-00008, 050534-00157, 050534-00188

DATE OF SUBMISSION 01-21-92

DATE RECEIVED BY EFED 02-07-92

SRRD/RD REQUESTED COMPLETION DATE 06-05-92

EEB ESTIMATED COMPLETION DATE 06-05-92

SRRD/RD **ACTION** CODE/TYPE OF REVIEW 330 - New Use Amend.

MRID #(S)

DP TYPE 001 - Submission Related Data Package

PRODUCT MANAGER, NO. C. Giles-Parker (22)

PRODUCT NAME(S) Bravo 500, Bravo 90 DG, Bravo 720

TYPE PRODUCT F R I N H D Fungicide

COMPANY NAME ISK Biotech Corp.

SUBMISSION PURPOSE Review proposed use on passion fruit

INCLUDE USE(S)

COMMON CHEMICAL NAME Chlorothalonil

DP BARCODE: D174185

CASE: 048333 DATA PACKAGE RECORD DATE: 02/06/92
SUBMISSION: S410909 BEAN SHEET Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REGISTRATION ACTION: 330 TECH-NEW F/F USE AMND
CHEMICALS: 081901 Chlorothalonil (tetrachloroisophthalonitrile) 54.0000%

ID#: 050534-00188 BRAVO 720
COMPANY: 050534 ISK BIOTECH CORP
PRODUCT MANAGER: 22 CYNTHIA GILES-PARKER 703-305-5540 ROOM: CM2 227
PM TEAM REVIEWER: JAMES STONE 703-305-7391 ROOM: CM2 247
RECEIVED DATE: 01/21/92 DUE OUT DATE: 07/29/92

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 174185 EXPEDITE: N DATE SENT: 02/06/92 DATE RET.: / /
CHEMICAL: 081901 Chlorothalonil (tetrachloroisophthalonitrile)
DP TYPE: 001 Submission Related Data Package
ADMIN DUE DATE: 06/05/92 CSF: N LABEL: Y

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	02/07/92	/ /
BRAN: EEB	02/10/92	/ /
SECT:	/ /	/ /
REVR :	/ /	/ /
CONTR:	/ /	/ /

* * * DATA REVIEW INSTRUCTIONS * * *

Are there non-target organism concerns from the proposed use on Passion Fruit?

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
173996	TSCB	02/04/92	06/03/92	Y	N	Y

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

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

MEMORANDUM

SUBJECT: Chlorothalonil- Registration on Passion Fruit
DP Barcodes: 174181, 174183, and 174185
ID Nos: 050534-00008, -00157, and -00188

FROM: Douglas J. Urban, Acting Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C) 10/28/92

TO: Cynthia Giles-Parker, PM 22
Fungicide\Herbicide Branch
Registration Division (H7505C)

ICI Americas, Inc. is requesting the registration of chlorothalonil (Bravo 500, 720, and 90DG) on passion fruit. This pesticide was approved for use on passion fruit in Hawaii only (in June 1978). EEB has no record of a prior risk analysis for this use. The current proposed registration removes the restriction on locale.

EEB has reviewed the proposed registration and has concluded that both acute and chronic effects to aquatic organisms may occur. According to ISK Biotech, the majority of passion fruit production is in Florida, with limited production in some other states and Puerto Rico. Yet, the available laboratory data indicates that chlorothalonil is very highly toxic to aquatic organisms.

There is also the possibility of chronic reproductive hazard to avian life. Chlorothalonil apparently does not photodegrade and chronic exposure to avian life is expected. An explanation as to the significance of the discoloration observed in the avian reproduction studies is necessary to alleviate this concern.

Endangered species concerns also arise. Endangered birds may be affected on a chronic basis. Aquatic endangered species are expected to be at risk both on an acute and a chronic basis.

If you have any questions, please contact Heather Mansfield (305-5064).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

MEMORANDUM

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If you have any questions, please contact Heather Mansfield (305-5064).

CONCURRENCES								
SYMBOL	H7507C	H7507C	H-7507C					
SURNAME	H. Mansfield	Vaughan	D. Urban					
DATE	5/22/92	10-27-92	10/28/92					

DP BARCODE: D174181

CASE: 030292 DATA PACKAGE RECORD DATE: 02/06/92
SUBMISSION: S410905 BEAN SHEET Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REGISTRATION ACTION: 330 TECH-NEW F/F USE AMND
CHEMICALS: 081901 Chlorothalonil (tetrachloroisophthalonitrile) 40.4000%

ID#: 050534-00008 BRAVO 500
COMPANY: 050534 ISK BIOTECH CORP
PRODUCT MANAGER: 22 CYNTHIA GILES-PARKER 703-305-5540 ROOM: CM2 227
PM TEAM REVIEWER: JAMES STONE 703-305-7391 ROOM: CM2 247
RECEIVED DATE: 01/21/92 DUE OUT DATE: 07/29/92

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 174181 EXPEDITE: N DATE SENT: 02/06/92 DATE RET.: / /
CHEMICAL: 081901 Chlorothalonil (tetrachloroisophthalonitrile)
DP TYPE: 001 Submission Related Data Package
ADMIN DUE DATE: 06/05/92 CSF: N LABEL: Y

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	02/07/92	/ /
BRAN: EEB	02/10/92	/ /
SECT:	/ /	/ /
REVR :	/ /	/ /
CONTR:	/ /	/ /

* * * DATA REVIEW INSTRUCTIONS * * *

Are there non target organism concerns for proposed use on Passion Fruit.

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
173993	TSCB	02/04/92	06/03/92	Y	N	Y
174182	EFGB	02/06/92	06/05/92	Y	N	Y

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DP BARCODE: D174183

CASE: 048311
SUBMISSION: S410908

DATA PACKAGE RECORD
BEAN SHEET

DATE: 02/06/92
Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REGISTRATION ACTION: 330 TECH-NEW F/F USE AMND
CHEMICALS: 081901 Chlorothalonil (tetrachloroisophthalonitrile) 90.0000%

ID#: 050534-00157 BRAVO 90 DG
COMPANY: 050534 ISK BIOTECH CORP
PRODUCT MANAGER: 22 CYNTHIA GILES-PARKER 703-305-5540 ROOM: CM2 227
PM TEAM REVIEWER: JAMES STONE 703-305-7391 ROOM: CM2 247
RECEIVED DATE: 01/21/92 DUE OUT DATE: 07/29/92

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 174183 EXPEDITE: N DATE SENT: 02/06/92 DATE RET.: / /
CHEMICAL: 081901 Chlorothalonil (tetrachloroisophthalonitrile)
DP TYPE: 001 Submission Related Data Package
ADMIN DUE DATE: 06/05/92 CSF: N LABEL: Y

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	02/07/92	/ /
BRAN: EEB	02/10/92	/ /
SECT:	/ /	/ /
REVR :	/ /	/ /
CONTR:	/ /	/ /

* * * DATA REVIEW INSTRUCTIONS * * *

Are there non-target organism concerns from the proposed use on Passion Fruit?

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
173994	TSCB	02/04/92	06/03/92	Y	N	Y
174184	EFGB	02/06/92	06/05/92	Y	N	Y

Ecological Effects Branch Review

CHLOROTHALONIL
(BRAVO 500, BRAVO 90 DG, BRAVO 720)

100.0 Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

ICI Americas, Inc., is requesting the registration of chlorothalonil (tetrachloroisophthalonitrile) on passion fruit. This pesticide was approved for use on passion fruit in Hawaii only (in June 1978). The current proposed registration removes the restriction of locale. EEB has no record of any risk analysis being performed for this use.

100.2 Formulation Information

ACTIVE INGREDIENT: chlorothalonil, formulated into three products:

Bravo 500 (50534-8) .....40.4% a.i. (liquid)
Bravo 720 (50534-188) .....54.0% a.i. (liquid)
Bravo 90 DG (50534-157).....90.0% a.i. (dissolvable granular)

100.3 Application Methods, Direction, Rates

Bravo 500 would be applied at a rate of 2 3/4 pts/acre, or 1.43 lbs a.i.
(Calculation-- 4.17 lbs a.i./gallon)

Bravo 720 would be applied at a rate of 2 pts/acre, or 1.5 lbs a.i.
(Calculation--6.0 lbs a.i./gallon)

Bravo 90 DG would be applied at a rate of 1 1/2 lbs/acre, or 1.35 lbs a.i.

With all three formulations, ground equipment will be used. Applications are to begin in late bloom an should be repeated at 14 day intervals until weather conditions no longer favor disease development. These formulations should not be applied within 7 days of harvest.

100.4 Target Organisms

Alternaria fruit and leaf spot

Anthracnose

100.5 Precautionary Labeling

ENVIRONMENTAL HAZARDS: This pesticide is toxic to fish, aquatic invertebrates, and marine/estuarine organisms. Runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Do not apply when weather conditions favor drift from treated area.

101.0 Hazard Assessment

101.1 Discussion

101.2 Likelihood of Adverse Effects to Nontarget Organisms

Terrestrial

Avian Toxicity

The available data indicate chlorothalonil is practically nontoxic to waterfowl on an acute oral basis (mallard LD_{50} > 4640 mg/kg). The degradate, DS-3701 is considered to be moderately toxic (LD_{50} = 158 mg/kg).

Chlorothalonil may be characterized as practically nontoxic to upland game birds and waterfowl on a subacute dietary basis (bobwhite and mallard LC_{50} > 10,000 ppm).

Both a mallard and a bobwhite reproduction study were conducted on chlorothalonil. The bobwhite study produced a NOEL of < 1000, but > 50 ppm as discoloration was noted in all test levels. At nominal dietary concentrations of 5,000 and 10,000 ppm, there were overt signs of toxicity and marked reproductive effects. The mallard study produced a NOEL of 1000 ppm, with discoloration of the skin on the head and body noted at 5000 and 10000 ppm. Reproduction studies performed with the degradate produced NOELs of 50 ppm and 100 ppm for mallards and bobwhite, respectively. In the mallard study, there was a reduction in egg shell thickness at 100 ppm and body weight, food consumption, gonad development, number of eggs laid, embryonic development, egg shell thickness, hatchability, and hatchling survival at 250 ppm. In the bobwhite study, fewer eggs were laid by the 250 ppm group.

Mammalian Toxicity

Chlorothalonil is practically nontoxic to mammals on an acute oral basis (LD_{50} = 10,000 mg/kg for rats and 5,000 mg/kg for dogs). A rat reproduction study produced a NOEL of 15,000 ppm.

An acute oral dog study with DS-3701 produced an LD_{50} of 100 mg/kg.

Aquatic

Freshwater Organisms

Chlorothalonil is very highly toxic to both warmwater and coldwater fish on an acute basis (LC_{50} = 23 µg/L for fathead minnow, 43 µg/L for catfish, and 47 µg/L for rainbow trout). The degradate can be characterized as slightly toxic to fish (LC_{50} = 16 ppm for bluegill sunfish).

A fathead minnow life cycle study produced a NOEL of 3 ppb and a

LOEL of 6.5 ppb.

This chemical is very highly toxic on an acute basis to freshwater invertebrates as well, with a *Daphnia magna* LC_{50} = 70 µg/L. DS-3701 is slightly toxic to invertebrates, with a Daphnia magna LC_{50} = 26 ppm.

A *Daphnia magna* life cycle study produced a NOEL of 39 ppb and a LOEL of 79 ppb.

Marine/Estuarine Organisms

The available data indicate that chlorothalonil is very highly toxic to the estuarine/marine life (LC_{50} = 32 ppb for sheepshead minnow, 3.6 ppb for oysters, and 165 ppb for shrimp).

Environmental Fate Data

The following environmental fate data was excerpted from an earlier EEB review (D. Rieder 8/13/91):

Chlorothalonil degrades at a moderate rate in most soils, with a half-life of less than 30 days. Lack of moisture tends to slow down the degradation process. Rate of breakdown increases as the temperature rises from 21°C to 39°C. Aged chlorothalonil is slightly mobile to mobile in most soils.

DS-3701, the major degradate of chlorothalonil, is extremely persistent with no dissipation observed within 90 days. The degradate also leaches in many types of soil.

Chlorothalonil is stable to hydrolysis for 30 days at pH 5 and 7. At pH 9, 10% will degrade to 2,4,5,6-tetrachloroisophthalamide in 30 days. The half-life in flooded sandy loam (sediment) was 5-15 days.

Water solubility is 6 ppm.

DS-3701 is stable to hydrolysis.

Both chlorothalonil and DS-3701 are stable to photodegradation on surfaces.

Based on information from crop residue studies, the value of 7.5% will be used to estimate exposure levels of the degradate.

The bioconcentration of chlorothalonil in bluegill sunfish plateaus at 60 to 200x in edible tissue and 900 to 3000x in nonedible tissues. DS-3701 bioconcentration in bluegill plateaus at 50x in edible tissue and 250x in nonedible tissues. Residues of both parent and degradate declined to less than 50% after 7 to 10 days in clean water.

RESIDUES AND RISK ASSESSMENT

Effects on Terrestrial Organisms

A. Avian

Using the Kenaga nomograph, the following terrestrial residues are expected based on a single application of 1.5 lbs a.i./acre (maximum rate):

SHORT RANGE GRASS	LONG RANGE GRASS	LEAVES	FORAGE	PODS, SEEDS, & INSECTS	FRUIT
360 ppm	165 ppm	188 ppm	87 ppm	18 ppm	11 ppm

As the degradate is estimated to be 7.5% of the parent compound, the following residues of DS-3701 are expected from a single maximum application:

SHORT RANGE GRASS	LONG RANGE GRASS	LEAVES	FORAGE	PODS, SEEDS, & INSECTS	FRUIT
27 ppm	12 ppm	14 ppm	7 ppm	1 ppm	.8 ppm

According to the above tables, the expected residues on terrestrial food items of the parent or the degradate should not pose a hazard to nontarget species on an acute basis. However, chlorothalonil is persistent in the environment and the expected terrestrial residues do surpass the bobwhite NOEL.

In addition, applications of chlorothalonil can be repeated every 14 days. To account for multiple applications, the EPA Fate computer program was employed. The calculated EECs surpassed the reproductive NOELS for both bobwhites and mallards. The expected residue on short grass also surpassed the mallard NOEL for the degradate (attachment B).

B. Mammalian

Chlorothalonil is practically nontoxic to mammals on an acute oral basis (rat LD_{50} = 10000 mg/kg). A rat reproduction study produced a NOEL of 15,000 ppm.

The exposure is expected to be well below the NOEL of 15,000 ppm

reported for the rat 90-day-chronic feeding study. Therefore, the parent compound does not raise concern for mammalian species.

Effects on Aquatic Organisms

A single application of chlorothalonil with a mist blower will produce both drift and runoff that may enter the aquatic environment. The following parameters were used in calculating the aquatic estimated environmental concentration (EEC) of a one acre pond that is 6' or 6" deep:

maximum application rate = 1.5 lbs
% runoff = 2% (water solubility = 6 ppm)
size of treated area = 10 acre drainage basin
conversion factor
1 acre pond, 6' deep = 61 ppb
1 acre pond, 6" deep = 734 ppb

$$1.5lbs(runoff) \times 0.6(appl.effic.) \times 0.02(runoff) \times 10(acredrainagebas$$

$$1.5lbs \times 0.05(\%drift) = .075lbs(totaldrift)$$

$$Totalloading = .18lb + .075lb = .255lb$$

$$\frac{6'pond = 61ppb \times .255lb = 15.6ppb}{6''pond = 734ppb \times .255lb = 187ppb}$$

EECs for both the 6' and 6" pond surpass the restricted use hazard triggers for freshwater fish and invertebrates (fathead minnow, catfish, rainbow trout, and *Daphnia magna) and* estuarine/marine life (sheepshead minnow, oyster, and shrimp). With a half-life of approximately 30 days, a single application of chlorothalonil also raises concerns of chronic toxicity. Both EECs surpass the NOEL and LOEL for fathead minnows. The EEC for a 6" pond, indicative of wetlands, surpasses the NOEL and LOEL for *Daphnia magna*. Not only are all aquatic restricted use and chronic triggers surpassed, but the use of chlorothalonil on passion fruit is also a high risk concern as EECs exceed ½ of the LC_{50} (see table on following page).

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SPECIES	ACUTE HAZARD TRIGGERS (PPB)			CHRONIC HAZARD TRIGGERS (PPB)	
	1/2 LC_{50}	1/10 LC_{50}	1/20 LC_{50}	NOEL	LOEL
Fathead minnow	11.5	2.3	1.2	3	6.5
Catfish	21.5	4.3	2.2		
Rainbow trout	23.5	4.7	2.4		
Daphnia magna	35	7	3.5	39	79
Sheepshead minnow	16	3.2	1.6		
Oyster	1.8	.36	.18		
Shrimp	82.5	16.5	8.3		

EECs (PPB)	
6 ~~ff~~	6 in
15.6	187

In summary, both acute and chronic concerns arise for freshwater and estuarine/marine organisms from a single use of chlorothalonil at the maximum rate on passion fruit. Environmental concerns are compounded by the multiple applications that may be repeated at 14 day intervals.

Endangered Species Consideration.

The available data indicate that use of chlorothalonil on passion fruit will pose a hazard to avian life on a chronic basis. Hazard to both freshwater and marine/estuarine endangered nontarget organisms is expected, both on an acute and chronic basis.

101.4 Adequacy of Toxicity Data

No additional data was submitted to support this use pattern.

The following information is necessary to adequately assess the hazard from chlorothalonil's use on passion fruit:

- an explanation of the significance of the discoloration observed in the avian reproduction studies
- aquatic field testing

The above items have been requested by prior EEB reviews.

101.5 Adequacy of Labeling

The following labeling would be required at the time of registration:

A. Outdoor Uses

The following hazard statement should appear on the label:

This pesticide is very highly toxic to fish, aquatic invertebrates, and marine/estuarine organisms. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high-water mark. Drift and runoff may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwater rinsate.

Notify State and/or Federal authorities and ISK Biotech Corporation immediately if you observe any adverse environmental effects due to the use of this product.

B. Manufacturing Use

This pesticide is very highly toxic to fish, aquatic invertebrates, and marine/estuarine organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or public water unless this product is specifically identified and addressed in an NPDES permit. Do not discharge effluent containing this product to sewer systems without previously notifying the sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

102.0 Classification

The Restricted Use Criteria for aquatic organisms has been exceeded. Therefore, this pesticide is required to be classified as a "Restricted Use Pesticide."

103.0 Conclusions

The proposed registration of chlorothalonil is for use as fungicide on passion fruit. According to ISK Biotech, the majority of passion fruit production is in Florida, with limited production in some other states and Puerto Rico. Yet, the available laboratory data indicates that chlorothalonil is very highly toxic to aquatic organisms. Both acute and chronic effects to aquatic organisms are expected.

EEB is concerned about this proposed registration as every aquatic EEC calculated exceeds various restricted triggers. Chlorothalonil must be classified as a restricted use pesticide.

Endangered species concerns also arise. Aquatic endangered species are expected to be at risk both on an acute and a chronic basis. Endangered birds may also be affected on a chronic basis.

There is also the possibility of chronic reproductive hazard to avian life. Chlorothalonil apparently does not photodegrade and chronic exposure to avian life is expected. An explanation as to the significance of the discoloration observed in the avian reproduction studies is necessary to alleviate this concern.

Heather Mansfield, Zoologist, Section 2
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)

Heather Mansfield 5/22/92

Allen Vaughan, Acting Head, Section 2
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)

Allen W. Vaughan 10.27.92

Douglas J. Urban, Acting Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)

Douglas J. Urban 10/28/92

Attachment A

EEC CALCULATION SHEET

I. For un-incorporated ground application

A. Runoff

___lb(s) x 0.0_ (_% runoff) x 10 (A) (from 10 A. drainage basin) = _____lb(s) (tot.runoff)

EEC of 1 lb a.i. direct application to 1 A. pond 6-foot deep = 61 ppb

Therefore, EEC = 61 ppb x ____(lb) = _____ ppb

II. For incorporated ground application

A. Runoff

___lb(s) ÷ _____ (cm) (depth of incorporation) x 0.0_ (_% runoff) x 10 (A) (10 A d.basin) = _____lb(s) (tot.runoff)

Therefore, EEC = 61 ppb x _____(lbs) = _____ppb

III. For aerial application (or mist blower)

A. Runoff

1.5 lb(s) x 0.6 (appl. efficiency) x 0.02 (_% runoff) x 10 (A) (10 A. d.basin) = .18 lb(s) (tot.runoff)

B. Drift

1.5 lb(s) x 0.05 (5 % drift) = .075 lb(s) (tot. drift)

Tot. loading = .18 lb(s) (tot. runoff) + .075 lb(s) (tot. drift) = .255 lb(s)

Therefore, EEC = 61 ppb x .255 (lbs) = 15.6 ppb

734 ppb .255 = 187 ppb

Attachment B

DAILY ACCUMULATED PESTICIDE RESIDUES---MULTP. APPL.

Chemical name	CHLOROTHANIL
Initial concentration (ppm)	360 shortg. ss
Half-life	30
A number of application	8
Application interval	14
Length of simulation (day)	100

DAY	RESIDUE (PPM)
0	360
1	351.7776
2	343.743
3	335.8919
4	328.2201
5	320.7236
6	313.3982
7	306.2402
8	299.2456
9	292.4108
10	285.7322
11	279.2061
12	272.829
13	266.5975
14	620.5085
15	606.3361
16	592.4873
17	578.9548
18	565.7315
19	552.8102
20	540.184
21	527.8462
22	515.7902
23	504.0095
24	492.4979
25	481.2492
26	470.2575
27	459.5168
28	809.0214
29	790.5433
30	772.4873
31	754.8436
32	737.603
33	720.7561
34	704.294
35	688.208
36	672.4893
37	657.1295
38	642.1207
39	627.4546
40	613.1236
41	599.1198
42	945.4359
43	923.8421

44	902.7415
45	882.1228
46	861.9751
47	842.2876
48	823.0497
49	804.2513
50	785.8821
51	767.9325
52	750.393
53	733.254
54	716.5065
55	700.1414
56	1044.15
57	1020.302
58	996.998
59	974.2264
60	951.9751
61	930.2321
62	908.9854
63	888.2242
64	867.9371
65	848.1134
66	828.7425
67	809.814
68	791.3178
69	773.2441
70	1115.583
71	1090.103
72	1065.205
73	1040.876
74	1017.102
75	993.8716
76	971.1715
77	948.99
78	927.3149
79	906.1351
80	885.4389
81	865.2154
82	845.4539
83	826.1438
84	1167.275
85	1140.614
86	1114.562
87	1089.106
88	1064.231
89	1039.923
90	1016.172
91	992.9622
92	970.2828
93	948.1215
94	926.4664
95	905.3059
96	884.6287
97	864.4238
98	1204.68
99	1177.165
100	1150.279
Maximum residue ----------	1204.68
Average residue ----------	761.2103

DAILY ACCUMULATED PESTICIDE RESIDUES---MULTP. APPL.

Chemical name ----------	CHLOROTHANIL
Initial concentration (ppm) -----	165
Half-life ----------	30
A number of application --------	8
Application interval ----------	14
Length of simulation (day) -----	100

DAY	RESIDUE (PPM)
0	165
1	161.2314
2	157.5489
3	153.9504
4	150.4342
5	146.9983
6	143.6408
7	140.3601
8	137.1543
9	134.0216
10	130.9606
11	127.9695
12	125.0466
13	122.1905
14	284.3997
15	277.904
16	271.5567
17	265.3543
18	259.2936
19	253.3714
20	247.5843
21	241.9295
22	236.4038
23	231.0043
24	225.7282
25	220.5726
26	215.5347
27	210.6119
28	370.8015
29	362.3323
30	354.0567
31	345.97
32	338.068
33	330.3466
34	322.8014
35	315.4287
36	308.2243
37	301.1844
38	294.3053
39	287.5834
40	281.015
41	274.5966
42	433.3248
43	423.4276
44	413.7565

45	404.3063
46	395.0719
47	386.0485
48	377.2312
49	368.6152
50	360.196
51	351.9691
52	343.9301
53	336.0748
54	328.3988
55	320.8981
56	478.5688
57	467.6383
58	456.9574
59	446.5205
60	436.322
61	426.3563
62	416.6183
63	407.1028
64	397.8045
65	388.7186
66	379.8403
67	371.1647
68	362.6873
69	354.4035
70	511.309
71	499.6306
72	488.219
73	477.0681
74	466.1719
75	455.5245
76	445.1203
77	434.9538
78	425.0194
79	415.3119
80	405.8262
81	396.5571
82	387.4997
83	378.6492
84	535.0009
85	522.7815
86	510.8411
87	499.1735
88	487.7723
89	476.6316
90	465.7453
91	455.1077
92	444.713
93	434.5557
94	424.6305
95	414.9319
96	405.4548
97	396.1942
98	552.1451
99	539.5341
100	527.2111
Maximum residue ----------	552.1451
Average residue ----------	348.8882

DAILY ACCUMULATED PESTICIDE RESIDUES---MULTP. APPL.

Chemical name ----------	CHLOROTHANIL
Initial concentration (ppm) -----	27
Half-life ----------	30
A number of application --------	8
Application interval ----------	14
Length of simulation (day) -----	100

Deg. date - Sorghum

DAY	RESIDUE (PPM)
0	27
1	26.38332
2	25.78072
3	25.19189
4	24.61651
5	24.05427
6	23.50486
7	22.96801
8	22.44342
9	21.93081
10	21.42991
11	20.94046
12	20.46217
13	19.99482
14	46.53813
15	45.47521
16	44.43655
17	43.42162
18	42.42987
19	41.46076
20	40.5138
21	39.58846
22	38.68426
23	37.80071
24	36.93734
25	36.09369
26	35.26931
27	34.46376
28	60.67661
29	59.29075
30	57.93655
31	56.61328
32	55.32022
33	54.05671
34	52.82205
35	51.6156
36	50.43669
37	49.28472
38	48.15905
39	47.0591
40	45.98427
41	44.93399
42	70.9077
43	69.28816
44	67.70561
45	66.15921