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

AUG 5 1994

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Chlorothalonil Reregistration: List A Case No. 0097: Chemical No. 081901: ISK-Biotech's Submission of Residue Chemistry Data in Response to 7/91 DCI: Analytical Methods, Storage Stability, Label Amendments, Field Trial Data and Processing Study: DP Barcodes [CBRS Nos.]:
D194461 [12393], D194462 [12403], D194480 [12428], D194481 [12429], D194482 [12430], D194483 [12431], D194484 [12432], D194485 [12423], D194486 [12422], D194487 [12421], D194488 [12420], D194685 [12462], D194690 [12475], D194691 [12476], D194692 [12477], D194693 [12478], D194695 [12479], D194696 [12480], D195417 [12618], D202280 [13586], D202282 [13587], D202285 [13588], D202288 [13589], D202290 [13590]:
MRID Nos. 428759-08 through -27.

FROM: William Smith, Chemist
Reregistration Section I
Chemistry Branch II: Reregistration Support (CBRS)
Health Effects Division (HED) 7509C

THROUGH: Paula A. Deschamp, Section Head
Reregistration Section I
Chemistry Branch II: Reregistration Support
Health Effects Division 7509C

TO: Walter Waldrop/Andrew Ertman (PM-71)
Reregistration Branch
Special Review & Reregistration Division (SRRD) 7508W

and

Cynthia Giles-Parker/James Stone (PM-22)
Registration Division (RD) 7505C

Attached is the review of residue chemistry data submitted in support of reregistration of chlorothalonil. This information was reviewed by Dynamac Corporation under supervision of CBRS, HED. The data assessment has undergone secondary review in the Branch and has been revised to reflect Agency policies.

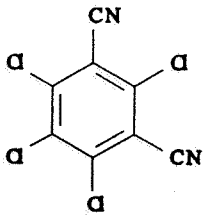
RD, please note that all of the proposed label amendments are acceptable to CBRS except for the proposal for green onion uses.

Attachment: Chlorothalonil CBRS No. 12393...; DP Barcode D194461.... Registrant's Response to 7/91 Chlorothalonil DCI.

cc (with attachment): W. Smith (CBRS), Chlorothalonil Reg. Std. File, SF, circulation, Dynamac.
cc (without attachment): RF.

H7509C:CBRS:WOS:wos:CM#2:Rm805A:703-305-5353: 07/28/94
RDI: PDeschamp:07/28/94: MMetzger:08/04/94 EZager:08/04/94

CHLOROTHALONIL



Shaughnessy No. 081901; Case 0097

DP Barcodes [CBRS Nos.]: D194461 [12393], D194462 [12403], D194480 [12428], D194481 [12429], D194482 [12430], D194483 [12431], D194484 [12432], D194485 [12423], D194486 [12422], D194487 [12421], D194488 [12420], D194685 [12462], D194690 [12475], D194691 [12476], D194692 [12477], D194693 [12478], D194695 [12479], D194696 [12480], D195417 [12618], D202280 [13586], D202282 [13587], D202285 [13588], D202288 [13589] and D202290 [13590].

Task 4

REGISTRANT'S RESPONSE TO RESIDUE CHEMISTRY DATA REQUIREMENTS

BACKGROUND

A Data Call-In Notice (DCI) dated 7/31/91 listed numerous residue chemistry data requirements for the reregistration of chlorothalonil, including storage stability data, label amendments, and crop field trial data. In response, ISK Biotech Corporation submitted storage stability data on nine crops (1993; MRIDs 42875910 through 42875918), field trial data on 10 crops (1986-1993; MRIDs 42875919 through 42875927) and amendments to eight product labels. In addition, the registrant has submitted validation data and a description of an independent laboratory validation study for a modified method that determines chlorothalonil and its hydroxy metabolite, SDS-3701, in/on representative oily and non-oily matrices (1992 and 1993; MRIDs 42875908 and 42875909). These submissions are reviewed in this report for adequacy in fulfilling outstanding residue chemistry data requirements.

Tolerances for residues in/on raw agricultural commodities are currently expressed in terms of the combined residues of chlorothalonil (2,4,5,6-tetrachloroisophthalonitrile) and its hydroxy metabolite, SDS-3701 (4-hydroxy-2,5,6-trichloroisophthalonitrile) [40 CFR §180.275 (a) and (b)]. An adequate GC/electron capture detection (ECD) enforcement method is available for determining residues of chlorothalonil and SDS-3701 in/on plant commodities and is listed as Method I in the Pesticide Analytical Manual (PAM), Vol. II.

Codex MRLs (CXL) for residues in broccoli, Brussels sprouts, cabbage, cauliflower, and onions are set at the same level as U.S. tolerances. However, the Codex MRLs are expressed in terms of chlorothalonil per se. A Codex MRL (Step 8) is proposed for bananas at a level lower than the U.S. tolerance. Codex MRLs (CXL) for peanuts and peanuts, whole, are established at levels lower and higher, respectively, than the U.S. tolerance for peanuts. No Codex MRL has been established or proposed for plums or prunes. Issues pertaining to compatibility of U.S. tolerances with Codex MRLs will be addressed at the issuance of the RED.

CONCLUSIONS AND RECOMMENDATIONS

Residue Analytical Methods

1a. The submitted GC/ECD method (1992; 42875908) is adequate for collecting data on residues of chlorothalonil and SDS-3701 in/on peanuts, potatoes, and tomatoes.

1b. The registrant has submitted a successful independent laboratory validation of the GC/ECD method for peanuts, potatoes, and tomatoes. The limit of detection for both analytes was reported as 0.01 ppm; however, background interference was reported at lower concentrations for chlorothalonil in peanut hulls and for SDS-3701 in tomatoes and peanut hulls. Contingent upon a successful Agency method trial, we will consider this method for publication in PAM II.

Storage Stability Data

2a. The submitted data regarding the storage stability of chlorothalonil, metabolites SDS-3701 and SDS-46851, and impurities hexachlorobenzene (HCB) and pentachlorobenzonitrile (PCBN) over a 4-year period indicate that residues are stable in/on carrots, celery, cherries, cucumbers, potatoes, soybeans, tomatoes and wheat grain. Residues in/on peanuts appear to decrease at the rate of ca. 9% per year, based on the registrant's statistical analyses.

2b. Translating from the storage stability of samples of celery, cucumbers, and carrots, we conclude that residues did not decline in onions (MRID 42875922), cauliflower (MRID 42875922), broccoli (MRID 42875923), Brussels sprouts (MRID 42875924), and cabbage (MRIDs 42875920, -21, and -23) samples from the submitted field tests with storage intervals of 120-1304 days.

2c. The storage stability data from cherries will be used to support the conclusion that residues did not decline in/on bananas stored 33 days or plums and prunes stored for 274-280 days (MRID 42875927).

2d. The storage stability data from peanuts support the conclusion that the residues would not have declined enough in field trial samples stored for ~1 year (MRID 42875925) to change our recommendations concerning tolerances.

2e. The adequacy of these storage stability data for validating other existing residue studies will be determined when complete information on sample storage intervals and conditions are available. To ensure that all pertinent data are accounted for, we strongly suggest that the registrant submit a comprehensive report of storage intervals and conditions for all samples (identified by MRID number) for which residue data have been submitted to support tolerances.

Magnitude of the Residue in Plants

3. The proposal to amend all pertinent labels to contain a 7-day PHI for potatoes is acceptable. These proposed label amendments satisfy the 7/31/91 DCI requirement for a longer PHI. No additional data are required provided that the registrant amends labels as proposed.

4. The proposal to amend all pertinent labels to state that "Green onions, leeks and shallots should be washed to reduce levels of surface residues prior to entry into commercial channels of trade" is not acceptable as an alternative to increasing the tolerance. The registrant must propose either a higher tolerance on green onions or a longer PHI, which is supported by appropriate field trial data.

5. The proposal to amend all pertinent labels to contain a 7-day PHI for broccoli is acceptable and satisfies the 7/31/91 DCI requirement for a longer PHI. Submitted data confirm data that were reviewed in the

1983 Residue Chemistry Chapter indicating that combined residues of chlorothalonil and SDS-3701 are not likely to exceed the 5 ppm tolerance 7 days following treatment at a total seasonal rate of 9 lb ai/A. No additional data are required provided that the registrant amends labels as proposed.

6. The proposal to amend all pertinent labels to contain a 7-day PHI for Brussels sprouts is acceptable and satisfies the 7/31/91 DCI requirement for a longer PHI. Submitted data confirm data reviewed in the 1988 Draft FRSTR indicating that residues of chlorothalonil and SDS-3701 are not likely to exceed the established 5 ppm tolerance 7 days after the last of multiple applications at the maximum registered use rate. No additional data are required provided that the registrant amends labels as proposed.

7. The proposal to amend all pertinent labels to contain a 7-day PHI for cabbage is acceptable and satisfies the 7/31/91 DCI requirement for a longer PHI. Submitted data confirm data reviewed in the 1988 Draft FRSTR indicating that combined residues of chlorothalonil and SDS-3701 are not likely to exceed the 5 ppm tolerance 7 days following the last of multiple applications at the maximum registered rate. No additional data are required provided that the registrant amends labels as proposed.

8. The proposal to amend all pertinent labels to contain a 7-day PHI for cauliflower is acceptable and satisfies the 7/31/91 DCI requirement for a longer PHI. Submitted data confirm data reviewed in the 1988 Draft FRSTR indicating that combined residues of chlorothalonil and SDS-3701 are not likely to exceed the 5 ppm tolerance 7 days following the last of multiple applications at the maximum registered rate. No additional data are required provided that the registrant amends labels as proposed.

9a. The proposal to specify a maximum seasonal rate of 9 lb ai/A for beans (snap) on all pertinent labels is acceptable and satisfies the 7/31/91 DCI requirements for succulent beans.

9b. Current label restrictions against treated bean fields being grazed or the feeding of treated plant parts to livestock must be removed. It is now Agency policy [Table II (June, 1994) of the Pesticide Assessment Guidelines, Subdivision O, Residue Chemistry] that such a livestock feeding restriction is undesirable and impractical. Therefore, the registrant must propose suitable tolerances for bean forage and straw/hay. These tolerance proposals must be supported by adequate residue data.

10. The submitted plum processing study is adequate. Combined residues of chlorothalonil and SDS-3701 do not concentrate in dry and reconstituted prunes. No additional data are required.

11. The registrant has complied with the 7/31/91 DCI by submitting an English translation (from Spanish) of the 6 lb/gal FlC (BRAVO 720) label listing uses for aerial applications to bananas grown for importation into the U.S.; no PHI is specified. Data from a test conducted in Colombia, at the maximum use rate currently on labels, support the established tolerances of 0.5 ppm on bananas and 0.05 ppm on banana pulp. A decision on the adequacy of residue data for uses on bananas with no PHI will be made on review of the remainder of the banana field trial data under preparation by the registrant.

12a. The submitted data on peanut nutmeats are adequate. These data as well as data reviewed in the 1988 Draft FRSTR support the established tolerance of 0.3 ppm in or on peanuts.

12b. The registrant must propose a tolerance for residues in/on peanut hulls. For a maximum seasonal rate of ~8 lb ai/A and a 14-day PHI, a tolerance of 3 ppm would be appropriate. A 2-ppm tolerance would require a 21-day PHI.

12c. Current label restrictions against livestock feeding on treated peanut plants, threshings or hay must be removed. It is now Agency policy [Table II (June, 1994) of the Pesticide Assessment Guidelines, Subdivision O, Residue Chemistry] that such a livestock feeding restriction is undesirable and impractical. Therefore, the registrant must propose a suitable tolerance for peanut hay, which is

supported by adequate residue data.

13. The data submitted on grass seed and screenings partially fulfill the requirements of the DCI. The registrant must propose a tolerance with regional registration for the combined residues of chlorothalonil and SDS-3701 in or on grass seed screenings. The available data indicate that a tolerance level of 75 ppm would be appropriate. In the absence of residue data from the state of MO, labels must be revised to restrict the use of chlorothalonil on grass grown for seed to the states of WA, OR and ID.

DETAILED CONSIDERATIONS

Residue Analytical Methods

ISK Biotech Corporation submitted validation data (1993; MRID 42875908) for a GC/ECD method for determining residues of chlorothalonil and its metabolite SDS-3701 in/on peanuts, potatoes, and tomatoes. The submitted GC method is similar to Method I in PAM, Vol. II with minor modifications. In Method I, chlorothalonil and SDS-3701 are extracted simultaneously, partitioned into an organic fraction, and separated by Florisil column chromatography; whereas, in the submitted method, chlorothalonil and SDS-3701 are either extracted from the crop matrix separately and purified, or are extracted simultaneously from the crop matrix, but are purified from separate aliquots of the extract. Both methods use column chromatography for purification and GC/ECD for analysis of residues. The submitted method validation study was conducted by Ricerca, Inc. (Painesville, OH). The reported method limit of detection is 0.01 ppm for both chlorothalonil and SDS-3701.

For analysis of non-oily crop matrices (i.e., tomatoes and potatoes), residues of chlorothalonil and SDS-3701 are extracted simultaneously with acetone:10 N H_2SO_4 (95:5, v:v) and the acidic extract is divided for separate analyses of chlorothalonil and SDS-3701. For analysis of chlorothalonil, the acidic acetone is diluted with water, and residues are partitioned into petroleum ether, concentrated, and reconstituted in hexane:methylene chloride (CH_2Cl_2; 80:20, v:v). Residues are then cleaned up using a Florisil column eluted with CH_2Cl_2:hexane:acetonitrile (ACN; 50:48.5:1.5, v:v:v). Residues are concentrated and redissolved in toluene for GC/ECD analysis. For analysis of SDS-3701, the acidic acetone extract is diluted with water, and the acetone is evaporated. Residues are redissolved in 0.4 M $NaHCO_3$, adjusted to pH 4.5, and partitioned with petroleum ether. The aqueous-soluble residues are acidified (pH <2), and NaCl is added to obtain a 30% solution (w:v). Residues are then partitioned into diethyl ether, concentrated, and methylated with diazomethane. Methylated residues are concentrated, redissolved in CH_2Cl_2, and eluted through an activated alumina column with CH_2Cl_2. The solvent is evaporated, and methylated SDS-3701 is redissolved in toluene and analyzed by GC/ECD.

For analysis of oily crop matrices (e.g., peanuts), residues of chlorothalonil and SDS-3701 are extracted separately. SDS-3701 is extracted and analyzed as described above for non-oily matrices. Chlorothalonil is extracted into ACN, diluted with water, acidified, and partitioned into petroleum ether. Residues in the ether fraction are then cleaned up and analyzed as described above for chlorothalonil.

For validation of the above method, representative oily (peanuts) and non-oily (potatoes and tomatoes) crops were fortified with chlorothalonil and SDS-3701. Fortification levels and method recoveries are presented in Table 1. Representative chromatograms were also provided. Residues of chlorothalonil and SDS-3701 were nondetectable (<0.01 ppm) in/on all untreated samples. The data indicate that the GC/ECD method is adequate for collecting data on residues of chlorothalonil in/on oily and non-oily crop matrices.

Table 1. Method validation recoveries from potato, tomato, and peanut matrices fortified with chlorothalonil and SDS-3701. Analyses performed by Ricerca, Inc.

Matrix	Compound	Fortification levels (ppm)	No. of samples	% Recovery
Potatoes	chlorothalonil	0.03-15	8	73-96
	SDS-3701	0.03-0.5	4	83-117
Tomatoes	chlorothalonil	0.03-5.0	12	67-131[a]
	SDS-3701	0.03-0.5	11	74-112
Peanut nutmeats	chlorothalonil	0.03, 1.0	4	73-116
	SDS-3701	0.03, 1.0	3	73-92
Peanut hulls	chlorothalonil	0.03, 1.0	4	80-121
	SDS-3701	0.03, 0.5	3	93-120

[a] Two tomato samples fortified with chlorothalonil at 0.32 and 0.047 ppm had recoveries of 67 and 131% respectively. Without these samples, the recoveries ranged 76-110%.

The registrant also submitted an independent laboratory validation study (1993; MRID 42875909) for the above GC/ECD method using the same crop matrices. The study was conducted by Colorado Analytical Research and Development Corporation (CARDC). After conducting two unsuccessful method trials, in which recoveries of SDS-3701 from peanut nutmeats and tomatoes were low, CARDC contacted ISK Biotech and Ricerca and made minor modifications to the method. These modifications consisted of evaporating acetone from the initial extract using rotary film evaporation instead of a N_2 stream, and eluting methylated SDS-3701 residues through the alumina column with CH_2Cl_2:acetone (98:2, v:v) instead of CH_2Cl_2. Using these modifications, CARDC conducted a third method trial that was successful.

Fortification levels and recoveries of chlorothalonil and SDS-3701 from the third method trial are presented in Table 2. In addition, the validating laboratory provided sample calculations and representative chromatograms. Apparent residues of chlorothalonil and SDS-3701 were $\leq$0.01 ppm (limit of detection) in/on all untreated samples except the following: three untreated tomato samples had apparent residues of SDS-3701 of 0.02 ppm, one untreated peanut nutmeat sample had apparent residues of chlorothalonil of 0.02 ppm, and three untreated peanut hull samples had apparent residues of chlorothalonil of 0.02 ppm and SDS-3701 of 0.05-0.06 ppm.

An adequate GC/electron capture detection (ECD) enforcement method is available for determining residues of chlorothalonil and SDS-3701 in/on plant commodities and is listed as Method I in the Pesticide Analytical Manual (PAM), Vol. II. We have previously concluded (W.T. Chin 2/22/91) that the method described in the present submission appears to be better methodology than method I in PAM II. Contingent upon a successful Agency method trial, this improved method should be published in PAM II.

Table 2. Independent laboratory method validation recoveries from potato, tomato, and peanut untreated samples fortified with chlorothalonil and SDS-3701.

Matrix	Compound	Fortification level (ppm)	% Recovery[a]
Potatoes	chlorothalonil	0.03	78.1-80.9
		1.0	77.5-85.7
		10.0	87.1-88.7
	SDS-3701	0.03	71.6-90.4
		0.1	60.2-75.5
		0.5	82.2-84.6
Tomatoes	chlorothalonil	0.03	75.3-94.5
		0.5	83.0-84.6
		2.0	74.6-90.0
	SDS-3701	0.03	150.5-178.1[b]
		0.2	83.4-100.5
		0.5	76.6-88.1
Peanut nutmeats	chlorothalonil	0.03	86.5-99.7
		1.0	85.0-96.2
	SDS-3701	0.03	80.5-91.7
		0.5	80.5-87.1
Peanut hulls	chlorothalonil	0.03	141.1-158.0[b]
		1.0	99.1-105.0
	SDS-3701	0.03	201.4-239.3[b]
		0.5	76.0-80.5

[a] Data presented are from the analysis of three samples for each crop and fortification level.
[b] Recoveries from the 0.03-ppm fortification were inflated because of the presence of background interference in this matrix.

In conjunction with the current storage stability and residue studies, ISK Biotech Corp. submitted concurrent method recovery data (1986-1993, MRIDs 42875910-18, 42875920-25) for chlorothalonil, SDS-3701, SDS-46851, HCB, and PCBN from cucumbers, carrots, celery, cherries, peanuts, potatoes, soybeans, tomatoes, wheat grain, cabbage, cauliflower, bulb onions, broccoli, and Brussels sprouts. Concurrent method recovery data (1993; MRIDs 42875919, 42875926-27) for chlorothalonil, SDS-3701, and HCB from bananas, grass, and prune residue studies were also submitted.

The GC/ECD methods employed for data collection in these studies are all variations of Method I in PAM, Vol. II and the GC/ECD method described above, and thus are essentially a single GC/ECD method. This method has been previously reviewed (W. Chin, 2/22/91), and includes provisions for the analysis of PCBN, HCB, and SDS-46851. Residues of HCB and PCBN are extracted into the organic layer along with chlorothalonil and are separated by Florisil chromatography prior to GC/ECD analysis. Residues of SDS-46851 are extracted along with SDS-3701, and both metabolites are methylated and then separated by alumina column chromatography prior to quantitation by GC/ECD.

Concurrent method recoveries from the storage stability and residue studies are presented in Tables 2 and 3, respectively. The limits of detection were reported as 0.01 ppm each for chlorothalonil and SDS-3701, 0.03 ppm for SDS-46851, 0.003 ppm for HCB, and 0.005 ppm for PCBN. However, we note that background interference occurred at lower concentrations in peanut hulls and tomatoes for chlorothalonil and SDS-3701. In these cases the practical limits of detection would be higher than claimed by the registrant.

These data indicate that the GC/ECD method is adequate for collecting data on residues of chlorothalonil, SDS-3701, SDS-46851, HCB, and PCBN in/on cucumbers, carrots, celery, cherries, potatoes, soybeans, tomatoes, wheat grain, cabbage, cauliflower, bulb onions, broccoli, Brussels sprouts, and peanuts. This method is also adequate for collecting data on residues of chlorothalonil, SDS-3701, and HCB in/on bananas, grass, and prunes.

Table 3. Concurrent method recoveries of chlorothalonil, SDS 3701, SDS-46851, PCBN, and HCB from fortified untreated samples of carrots, celery, cherries, cucumbers, potatoes, soybeans, tomatoes, and wheat grain.

Commodity	MRID	Compound	Fortification Range (ppm)	Number of samples[a]	% Recovery
Carrots	42875911	chlorothalonil	0.03-15.0	39 (2)	60-123
		SDS-3701	0.03-0.50	39 (2)	63-122
		SDS-46851	0.06-0.50	37 (12)	64-148
		HCB	0.01-0.05	39 (4)	63-126
		PCBN	0.015-0.20	39 (7)	66-140
Celery	42875912	chlorothalonil	0.03-50.0	27	70-117[b]
		SDS-3701	0.03-5.0	28	72-113[b]
		SDS-46851	0.06-5.0	26 (1)	67-115[b]
		HCB	0.01-0.50	27 (2)	68-130[b]
		PCBN	0.015-1.0	27 (3)	78-124[b]
Cherries	42875913	chlorothalonil	0.029-25.02	27 (1)	71-133
		SDS-3701	0.028-2.12	27 (4)	61-128
		SDS-46851	0.055-2.12	26 (3)	72-140
		HCB	0.009-0.212	25 (3)	64-103
		PCBN	0.015-0.408	26 (5)	62-128
Cucumbers	42875910	chlorothalonil	0.03-50.0	30 (2)	72-133
		SDS-3701	0.03-0.50	28 (3)	63-126
		SDS-46851	0.06-0.50	30 (4)	65-132
		HCB	0.01-0.50	10 (2)	68-80
		PCBN	0.015-1.0	29 (1)	60-120
Peanuts	42875914	chlorothalonil	0.03-20	39 (2)	75-125
		SDS-3701	0.03-0.50	39 (4)	60-114
		SDS-46851	0.06-0.50	41 (4)	63-123
		HCB	0.010-0.050	42 (4)	67-130
		PCBN	0.015-0.500	40 (3)	67-127
Potatoes	42875915	chlorothalonil	0.03-15	52 (5)	61-130
		SDS-3701	0.03-0.50	50 (3)	66-130
		SDS-46851	0.06-0.50	50 (2)	70-127
		HCB	0.01-0.05	53 (4)	67-122
		PCBN	0.015-0.20	53 (6)	67-150

(continued; footnotes follow)

Table 3 *(continued)*.

Commodity	MRID	Compound	Fortification Range (ppm)	Number of samples[a]	% Recovery
Soybeans	42875916	chlorothalonil	0.03-40	28 (2)	66-107
		SDS-3701	0.03-0.5	28 (3)	60-112
		SDS-46851	0.06-0.5	27 (1)	50-110
		HCB	0.01-0.20	28 (2)	63-120
		PCBN	0.015-0.50	28 (2)	73-128
Tomatoes	42875917	chlorothalonil	0.03-22.2	28	72-120
		SDS-3701	0.028-0.50	26 (2)	70-128
		SDS-46851	0.051-0.50	28 (5)	63-127
		HCB	0.009-0.050	27 (2)	60-100
		PCBN	0.013-0.50	26 (9)	66-156
Wheat grain	42875918	chlorothalonil	0.03-60	27	78-108
		SDS-3701	0.03-0.5	27	70-103
		SDS-46851	0.06-0.5	28 (1)	65-120
		HCB	0.01-0.06	28 (1)	70-121
		PCBN	0.015-1	28 (3)	73-126

[a] Number of samples outside of the acceptable 70-120% recovery range is listed in parentheses.
[b] Recoveries corrected by the registrant for apparent residues in/on untreated samples of 0.01-0.09 ppm.

Table 4. Concurrent method recoveries from untreated commodity samples fortified with chlorothalonil, SDS-3701, SDS-46851, HCB, and PCBN.

		Chlorothalonil		SDS-3701		SDS-46851		HCB		PCBN	
Commodity	MRID	Fortification (ppm)	% Recovery	Fortification (ppm)	% Recovery	Fortification (ppm)	% Recovery	Fortification (ppm)	% Recovery	Fortification (ppm)	% Recovery
Bananas	42875919										
whole[a]		0.03-1.0	90-102	0.03-0.2	76-120	--	--	0.0005-0.05	80-112	--	--
pulp[a]		0.03-0.5	80-120	0.03-0.2	73-120	--	--	0.0005-0.05	86-120	--	--
Broccoli	42875923	0.03-5.0	67-75	0.03, 0.1	100	0.06, 0.1	85, 110	0.1-0.5	66-80	0.015-0.1	67-92
Brussels sprouts	42875924	0.03-5.0	67-81	0.03-0.5	67-86	0.06-0.5	68-83	0.1-0.5	70-80	0.015-0.1	79-80
Bulb onions	42875922	0.03-5.0	70-123	0.03-0.5	67-94	0.06-0.5	64-124	0.01-0.05	80-130	0.015-0.1	60-132
Cabbage	42875920 - 42875922	0.03-5.0	64-123	0.03-0.5	62-120	0.05-0.5	62-115	0.01-0.05	60-110	0.015-0.1	63-118
Cauliflower	42875922	0.03-5.0	70-114	0.03-0.5	89-110	0.06-0.5	80-128	0.01-0.05	78-92	0.015-0.1	87-129
Grass seeds, screenings, and straw[a]	42875926	0.10-100	80-115[c]	0.03-1.0	70-120[d]	--	--	0.0005-0.05	78-118	--	--
Peanuts	42875925										
nutmeats		0.03-0.1	73-110	0.03-0.5	72-120	0.06-1.0	65-120	0.0005-0.03	70-90[b]	0.015-0.1	84-118
hulls		0.03-2.0	86-120[c]	0.03-2.0	79-126[d]	0.06-0.5	74-120[e]	0.0005-0.5	80-105[b]	0.015-0.1	75-120
Plums, prunes, reconstituted prunes[a]	42875927	0.03-1.0	80-103	0.03-0.2	87-100	--	--	0.0005-0.05	74-120	--	--

[a] These commodities were not fortified with SDS-46851 or PCBN.
[b] Recoveries corrected for apparent residues of HCB in/on unfortified untreated sample.
[c] Recoveries corrected for apparent residues of chlorothalonil in/on unfortified untreated sample.
[d] Recoveries corrected for apparent residues of SDS-3701 in/on unfortified untreated sample.
[e] Recoveries corrected for apparent residues of SDS-46851 in/on unfortified untreated sample.

Storage Stability Data

ISK Biotech (1993; MRIDs 42875910-18) submitted data pertaining to the stability of chlorothalonil, its metabolites SDS-3701 and SDS-46851, and the formulation impurities HCB and PCBN in/on cucumbers, carrots, celery, cherries, peanuts, potatoes, soybeans, tomatoes, and wheat grain in frozen storage. Field testing, under the direction of ISK Biotech, was conducted in the states listed in Table 5 using the 6 lb/gal FlC formulation (BRAVO 720). The formulation batch (TMSLOUE) contained 54.2% chlorothalonil, 0.025% HCB, and 0.643% PCBN.

Table 5. Summary of application rates and field trial locations for storage stability studies performed on carrots, celery, cherries, cucumbers, peanuts, potatoes, tomatoes, soybeans, and wheat grain.

Commodity (location of field trial)	Application rate (lb/A)	Number of applications	Maximum theoretical seasonal rate[a]
Carrots (WI)	15	11	8x
Celery (WI)	2.25	16	0.8x
Cherries (NY)	3.094	10	2x
Cucumbers (OH)	2.25	3	0.6x
Cucumbers (OH)	6.75	1	--
Peanuts (GA)	9-10.725	11	9x
Potatoes (WI)	11.25	15	15x
Soybeans (MO)	15	8	27x
Tomatoes (OH)	2.25	8	1.1x
Tomatoes (OH)	6.75	1	--
Wheat grain (MO)	11.25	7	NA[b]

[a] Maximum theoretical rate based on foliar applications after planting of seedlings.
[b] NA = Not applicable; not registered for use on wheat.

A composite sample was harvested for each commodity from both treated and untreated plots. Subsamples of each commodity were randomly taken from the composite harvest. The unhomogenized samples were shipped to Ricerca, Inc., Painesville, OH for storage and analysis. Upon receipt at the analytical laboratory 0-7 days after harvest, two treated samples and one untreated sample were analyzed unfrozen, representing the zero-time sample. The remaining samples were frozen, and two treated and one untreated sample were taken for analysis at intervals beginning after one day. The currently submitted data represent an interim report covering storage intervals of up to 4 years. The registrant intends to extend the study to 6 years. Sample storage temperatures ranged from -23 to -7 C. Residue data on target analytes found above the limits of detection in/on all commodities are summarized in Tables 6-14. Other details and conclusions to specific crops are presented in the following paragraphs. Residues varied considerably from one sample to another; therefore, the registrant used statistical methods in an attempt to determine if variation was significantly related to time of storage. Regression analyses, assuming both zero order and first order decay processes, were performed.

Carrots: Of the 14 untreated carrot samples analyzed over the 4 years of the study, 9 samples bore apparent chlorothalonil residues of 0.01-0.17 ppm, 2 samples bore apparent PCBN residues of 0.006-0.014 ppm, 1 sample bore apparent SDS-3701 residues of 0.01 ppm, and 1 sample bore apparent SDS-46851 residues of 0.06 ppm. All residues were nondetectable in/on the other untreated samples. Residues of SDS-46851 in/on treated carrots were nondetectable in/on 25 of the 28 samples analyzed; in the remaining 3 samples the residue levels

ranged from 0.03-0.10 ppm. The results of residue analysis for chlorothalonil, SDS-3701, PCBN, and HCB are summarized in Table 6. There was no significant downward trend in chlorothalonil, SDS-3701, HCB, or PCBN residues in/on carrots.

Celery: Of the 14 untreated celery samples analyzed over the 4 years of the study, 8 samples bore apparent chlorothalonil residues of 0.01-0.09 ppm. All residues were nondetectable in/on the other untreated samples. Residues of SDS-46851 in/on treated samples were nondetectable in/on 11 of the 14 samples analyzed; in the remaining 3 samples the residue levels ranged from 0.04-0.14 ppm. The results of residue analysis for chlorothalonil, SDS-3701, PCBN, and HCB are summarized in Table 7. Although the data were variable, no significant downward trend was seen for residues of any compound.

Cherries: Of the 14 untreated cherry samples analyzed over the 4 years of the study, 1 sample bore apparent chlorothalonil residues of 0.01 ppm. All other residues were nondetectable in/on the other untreated samples. Residues of SDS-46851 were at or below the limit of detection in/on all of the samples analyzed. The results of residue analysis for chlorothalonil, SDS-3701, PCBN, and HCB are summarized in Table 8. Although the data were variable, no significant downward trend was observed for residues of any compound.

Cucumbers: Of the 23 untreated cucumber samples analyzed over the 4 years of the study, three samples bore apparent chlorothalonil residues of 0.01-0.02 ppm. All residues were nondetectable in/on the other untreated samples. Residues of HCB in/on treated samples were nondetectable (<0.003 ppm) during the first 91 days of storage; therefore, the registrant terminated sample analysis for HCB after the 91st day. Residues of SDS-3701 were <0.01-0.02 ppm in/on 10 of the 15 samples and nondetectable in/on the remaining samples. Residues of SDS-46851 were at or below the limit of quantitation in/on 2 of the 15 samples and nondetectable in the remaining samples. The detectable metabolite residues occurred primarily at the longer storage intervals; therefore it can be concluded that SDS-3701 and SDS-46851 did not decline in storage. The results of residue analysis for chlorothalonil and PCBN are summarized in Table 9. There was no significant downward trend in chlorothalonil or PCBN residues in/on cucumbers.

Peanuts: The 20 untreated samples bore apparent chlorothalonil residues of 0.03-0.63 ppm. Apparent SDS-3701 residues were 0.01-0.03 ppm in/on seven untreated samples, apparent PCBN residues were 0.005-0.020 ppm in/on nine untreated samples, and apparent SDS-46851 residues were 0.04-0.07 ppm in/on four untreated samples. HCB residues were nondetectable in/on all untreated samples. Concurrent method recoveries were conducted for each compound at each sampling interval. The results of residue analysis are summarized in Table 10. Statistical analysis of the data indicated that chlorothalonil declined ~9% per year over the four years of the study. SDS-3701 increased 95% per year, from 0.06 ppm to 0.57 ppm over the 4-year period. SDS-46851 also increased from 0.11 ppm to 0.47 ppm, although no trend was significant at the 5% level.

Potatoes: Of the 20 untreated samples analyzed over the 4 years of the study, three bore apparent chlorothalonil residues of 0.02 ppm and one sample bore apparent PCBN residues of 0.014 ppm. All other residues were nondetectable in/on the untreated samples. The results of residue analysis are summarized in Table 11. HCB residues were nondetectable (<0.003 ppm) in/on all samples; therefore, the stability of HCB in/on potatoes in frozen storage cannot be determined. Statistical analysis of the data indicated that residues of chlorothalonil and PCBN each declined ~60% over the four years of the study. Based on fitted linear regressions, ~70% of chlorothalonil and PCBN residues were present after 2 years. The results of an interim study indicated that these residues were stable during the first year of the study. SDS-3701 and SDS-46851 were stable over the 4-year study period.

Soybeans: Of the 14 untreated soybean samples analyzed over the 4 years of the study, two samples bore apparent chlorothalonil residues of 0.02 and 0.05 ppm and one sample bore apparent residues of SDS-3701 at 0.01 ppm. All residues were nondetectable in/on the other untreated samples. Residues of SDS-46851 were at or below the limit of detection in/on all of the samples analyzed. The results of residue analysis for

chlorothalonil, SDS-3701, PCBN, and HCB are summarized in Table 12.

Tomatoes: Of the 16 untreated tomato samples analyzed over the 4 years of the study, seven samples bore apparent chlorothalonil residues ranging from 0.01-0.02 ppm. All residues were nondetectable in/on the other untreated samples. Residues of SDS-46851 were nondetectable in/on all of the samples analyzed. The results of residue analysis for chlorothalonil, SDS-3701, PCBN, and HCB are summarized in Table 13.

Wheat grain: Of the 15 untreated wheat grain samples analyzed over the 4 years of the study, six samples bore apparent chlorothalonil residues ranging from 0.01-0.04 ppm and one sample bore apparent residues of PCBN at 0.006 ppm. All residues were nondetectable in/on the other untreated samples. Residues of SDS-46851 were nondetectable in/on all of the samples analyzed. The results of residue analysis for chlorothalonil, SDS-3701, PCBN, and HCB, which had not declined after four years in storage, are summarized in Table 14.

Table 6. Storage stability of residues of chlorothalonil, SDS-3701, PCBN, HCB in/on carrots bearing field-incurred residues from treatment at 8x (MRID 42875911).

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	Chlorothalonil			
0	1.02-2.70 (mean = 1.84)	103.0	1.78	(100)
1	0.99-1.27 (mean = 1.11)	97.0	1.14	64
7	1.20-1.78 (mean = 1.55)	85.3	1.81	102
33	0.80-1.15 (mean = 1.02)	101.7	1.01	57
90	0.75-1.23 (mean = 1.00)	97.3	1.03	58
180	1.20-1.57 (mean = 1.41)	83.3	1.69	95
271	1.20-1.43 (mean = 1.32)	88.7	1.48	83
363	1.17-1.29 (mean = 1.22)	88.5	1.38	78
546	0.68-2.21 (mean = 1.41)	88.5	1.59	89
729	1.06-2.46 (mean = 1.78)	91.7	1.94	109
894	0.64-1.31 (mean = 0.93)	95.0	0.97	54
1123	1.04-2.47 (mean = 1.63)	105.0	1.55	87
1305	1.03-1.17 (mean = 1.07)	91.3	1.17	66
1463	0.86-3.40 (mean = 1.85)	82.5	2.25	126
	SDS-3701			
0	0.08-0.12 (mean = 0.10)	86.0	0.12	(100)
1	0.80-0.10 (mean = 0.09)	90.7	0.10	83
7	0.80-0.11 (mean = 0.09)	91.7	0.10	83
33	0.09-0.11 (mean = 0.10)	103.0	0.10	83
90	0.05-0.09 (mean = 0.08)	96.7	0.08	67
180	0.10-0.13 (mean = 0.12)	83.7	0.14	117
271	0.04-0.09 (mean = 0.06)	79.5	0.08	67
363	0.06-0.16 (mean = 0.10)	102.5	0.10	83
546	0.07-0.11 (mean = 0.09)	82.0	0.11	92
729	0.09-0.15 (mean = 0.12)	109.0	0.11	92
894	0.06-0.11 (mean = 0.08)	74.0	0.10	83
1123	0.05-0.08 (mean = 0.07)	76.3	0.09	75
1305	0.11-0.15 (mean = 0.13)	97.7	0.13	108
1463	0.08-0.11 (mean = 0.09)	90.0	0.10	83
	PCBN			
0	0.091-0.135 (mean = 0.114)	99.0	0.115	(100)
1	0.079-0.099 (mean = 0.086)	104.7	0.082	71
7	0.091-0.114 (mean = 0.102)	103.0	0.099	86
33	0.068-0.132 (mean = 0.097)	119.7	0.081	70
90	0.073-0.113 (mean = 0.091)	94.7	0.096	83
180	0.068-0.086 (mean = 0.079)	103.0	0.076	66
271	0.073-0.089 (mean = 0.079)	81.0	0.097	84

(continued; footnotes follow)

Table 6 *(continued)*.

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	PCBN continued			
363	0.087-0.120 (mean = 0.102)	85.0	0.120	104
546	0.081-0.132 (mean = 0.102)	76.0	0.134	117
729	0.072-0.107 (mean = 0.088)	106.0	0.083	72
894	0.048-0.087 (mean = 0.063)	99.0	0.063	55
1123	0.087-0.109 (mean = 0.100)	100.0	0.100	87
1309	0.073-0.108 (mean = 0.093)	94.3	0.099	86
1463	0.061-0.109 (mean = 0.085)	89.0	0.096	83
	HCB			
0	0.004-0.005 (mean = 0.005)	98.7	0.005	(100)
1	0.004-0.005 (mean = 0.004)	101.5	0.004	80
7	0.005-0.006 (mean = 0.005)	105.3	0.005	100
33	0.004-0.005 (mean = 1.42)	94.0	0.005	100
90	0.003-0.005 (mean = 0.004)	83.3	0.005	100
180	0.003 (mean = 0.003)	78.3	0.004	80
271	0.003-0.004 (mean = 0.003)	74.3	0.004	80
363	0.003-0.004 (mean = 0.004)	101.5	0.004	80
546	<0.003-0.004 (mean = 0.003)	70.0	0.004	80
729	<0.003-0.005 (mean = 0.004)	86.7	0.004	80
894	<0.003 (mean = <0.003)	70.0	<0.003	<60
1123	0.003-0.004 (mean = 0.004)	101.7	0.004	80
1305	0.003-0.006 (mean = 0.004)	75.0	0.006	120
1463	<0.003-0.003 (mean = 0.003)	80.0	0.003	60

[a] Recoveries after storage calculated by the reviewer by dividing the residue in stored samples by the zero-day residue using corrected mean residue levels.

Table 7. Storage stability of residues of chlorothalonil, SDS-3701, PCBN, HCB in/on celery bearing field-incurred residues from treatment at 0.8x (MRID 42875912).

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	Chlorothalonil			
0	3.21-4.91 (mean = 4.01)	96.0	4.17	(100)
1	4.41-8.64 (mean = 5.80)	99.5	5.83	140
7	4.99-7.52 (mean = 6.23)	109.0	5.71	137
28	7.69-10.08 (mean = 8.78)	112.0	9.00	216
91	5.32-9.20 (mean = 6.82)	87.5	7.79	187
181	7.02-9.43 (mean = 8.26)	107.5	7.68	184
280	3.87-5.38 (mean = 4.61)	74.0	6.23	149
364	7.96-13.92 (mean = 10.85)	94.0	11.54	277
546	5.40-9.09 (mean = 7.45)	84.0	8.86	212
729	6.27-8.66 (mean = 7.61)	98.5	7.73	185
911	4.96-7.88 (mean = 6.56)	99.0	6.63	159
1114	3.28-5.59 (mean = 4.36)	82.5	5.28	127
1266	4.39-6.42 (mean = 5.22)	75.0	6.95	167
1459	5.41-10.27 (mean = 7.84)	102.0	7.69	184
	SDS-3701			
0	<0.01-0.01 (mean = 0.01)	76.5	0.02	(100)
1	0.02-0.03 (mean = 0.03)	86.0	0.03	150
7	<0.01-0.01 (mean = 0.01)	86.0	0.01	50
28	0.08-0.12 (mean = 0.10)	89.0	0.11	550
91	0.04-0.10 (mean = 0.07)	105.0	0.07	350
181	0.04 (mean = 0.04)	91.0	0.04	200
280	0.01-0.02 (mean = 0.02)	92.0	0.02	100
364	0.08-0.16 (mean = 0.12)	75.5	0.16	800
546	0.01-0.03 (mean = 0.02)	107.0	0.02	100
729	0.02-0.04 (mean = 0.03)	96.5	0.03	150
911	0.02-0.03 (mean = 0.03)	97.0	0.03	150
1114	0.03 (mean = 0.03)	98.5	0.03	150
1266	0.02-0.03 (mean = 0.03)	93.5	0.03	150
1459	0.05-0.06 (mean = 0.05)	76.0	0.07	350
	PCBN			
0	0.052-0.072 (mean = 0.061)	102.5	0.060	(100)
1	0.053-0.113 (mean = 0.084)	101.0	0.083	138
7	0.043-0.069 (mean = 0.055)	111.0	0.049	82
28	0.089-0.120 (mean = 0.103)	120.0	0.086	143
91	0.065-0.112 (mean = 0.084)	95.0	0.089	148
181	0.085-0.109 (mean = 0.099)	95.0	0.104	173
280	0.034-0.048 (mean = 0.041)	90.5	0.046	77

(continued; footnotes follow)

Table 7 *(continued)*.

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	PCBN continued			
364	0.083-0.135 (mean = 0.106)	95.0	0.111	185
546	0.097-0.134 (mean = 0.117)	114.5	0.102	170
729	0.078-0.092 (mean = 0.085)	102.5	0.083	138
911	0.062-0.088 (mean = 0.077)	101.0	0.076	127
1114	0.065-0.091 (mean = 0.080)	108.5	0.074	123
1266	0.064-0.095 (mean = 0.078)	92.0	0.085	142
1459	0.073-0.130 (mean = 0.101)	105.5	0.096	160
	HCB			
0	<0.003 (mean = <0.003)	85.5	<0.003	(100)
1	<0.003-0.004 (mean = <0.003)	100.0	<0.003	--[b]
7	<0.003 (mean = <0.003)	93.0	<0.003	--[b]
28	<0.003-0.005 (mean = 0.003)	118.0	0.003	--[b]
91	0.003-0.004 (mean = 0.003)	100.5	0.003	--[b]
181	0.004 (mean = 0.004)	82.5	0.005	--[b]
280	<0.003 (mean = <0.003)	87.0	<0.003	--[b]
364	0.003-0.006 (mean = 0.005)	74.0	0.006	--[b]
546	0.004-0.005 (mean = 0.005)	92.0	0.005	--[b]
729	0.003-0.004 (mean = 0.004)	88.5	0.004	--[b]
911	<0.003-0.004 (mean = 0.003)	72.0	0.003	--[b]
1114	<0.003-0.004 (mean = 0.003)	90.0	0.003	--[b]
1266	<0.003-0.005 (mean = <0.003)	87.0	0.003	--[b]
1459	<0.003-0.005 (mean = 0.003)	90.0	0.003	--[b]

[a] Recoveries after storage calculated by the reviewer by dividing the residue in stored samples by the zero-day residue using corrected mean residue levels.

[b] Percent recovery after storage cannot be determined using a nondetectable value as the time-zero residue level.

Table 8. Storage stability of residues of chlorothalonil, SDS-3701, PCBN, HCB in/on **cherries** bearing field-incurred residues from treatment at 2x (MRID 42875913).

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	Chlorothalonil			
0	5.11-17.04 (mean = 10.76)	83.5	12.89	(100)
1	10.29-21.47 (mean = 15.71)	87.5	17.95	139
7	10.50-18.54 (mean = 14.68)	99.0	14.83	115
30	9.05-16.06 (mean = 13.18)	90.5	14.56	113
86	17.99-22.63 (mean = 20.15)	85.0	23.71	184
195	7.60-13.69 (mean = 10.03)	108.5	9.25	72
272	8.06-11.18 (mean = 9.65)	79.5	12.13	94
363	15.58-19.34 (mean = 17.97)	74.5	24.12	187
545	9.83-20.48 (mean = 16.87)	85.5	19.73	153
727	13.75-27.00 (mean = 21.49)	99.0	21.70	168
910	10.69-22.23 (mean = 16.01)	92.0	17.40	135
1091	17.75-32.33 (mean = 24.35)	111.5	21.84	169
1269	10.22-22.20 (mean = 16.77)	81.0	20.7	161
1457	20.47-23.64 (mean = 22.21)	99.5	22.32	173
	SDS-3701			
0	0.01-0.04 (mean = 0.03)	76.0	0.03	(100)
1	0.03-0.04 (mean = 0.04)	78.0	0.05	167
7	0.02 (mean = 0.02)	72.5	0.03	100
30	0.02-0.03 (mean = 0.03)	72.5	0.04	133
86	0.03-0.04 (mean = 0.03)	103.5	0.03	100
195	0.02-0.03 (mean = 0.03)	71.5	0.04	133
272	0.05-0.07 (mean = 0.06)	107.0	0.06	200
363	0.05-0.06 (mean = 0.06)	103.5	0.06	200
545	0.03-0.07 (mean = 0.06)	83.5	0.07	233
727	0.02-0.04 (mean = 0.03)	98.0	0.03	100
910	0.02-0.05 (mean = 0.04)	90.5	0.04	133
1091	0.02-0.05 (mean = 0.03)	115.0	0.03	100
1269	0.02-0.05 (mean = 0.03)	76.0	0.04	133
1457	0.03-0.05 (mean = 0.05)	92.5	0.05	167
	PCBN			
0	0.096-0.279 (mean = 0.187)	78.5	0.238	(100)
1	0.152-0.253 (mean = 0.203)	86.0	0.235	99
7	0.100-0.197 (mean = 0.146)	94.0	0.156	66
30	0.153-0.287 (mean = 0.206)	87.5	0.235	99
86	0.113-0.172 (mean = 0.137)	70.0	0.196	82
195	0.084-0.155 (mean = 0.110)	80.0	0.138	58
272	0.077-0.107 (mean = 0.091)	84.5	0.107	45

(continued; footnotes follow)

Table 8 *(continued)*.

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	PCBN continued			
363	0.086-0.146 (mean = 0.113)	72.5	0.156	66
545	0.098-0.220 (mean = 0.167)	75.0	0.222	93
727	0.153-0.291 (mean = 0.233)	103.0	0.226	95
910	0.092-0.230 (mean = 0.180)	94.5	0.171	76
1091	0.206-0.346 (mean = 0.274)	109.0	0.251	105
1269	0.086-0.208 (mean = 0.140)	106.0	0.132	55
1457	0.197-0.305 (mean = 0.245)	97.0	0.252	106
	HCB			
0	0.003-0.013 (mean = 0.007)	76.5	0.009	(100)
1	0.004-0.010 (mean = 0.007)	80.0	0.008	89
7	<0.003-0.005 (mean = <0.003)	69.0	0.003	33
30	0.004-0.007 (mean = 0.005)	74.5	0.007	78
86	0.005-0.008 (mean = 0.006)	68.5	0.009	100
195	<0.003 (mean = <0.003)	97.0	ND[b]	<33
272	<0.003-0.005 (mean = 0.003)	78.0	0.003	33
363	0.004-0.005 (mean = 0.004)	91.5	0.005	56
545	0.004-0.008 (mean = 0.007)	70.0	0.009	100
727	0.006-0.010 (mean = 0.008)	72.0	0.011	122
910	<0.003-0.005 (mean = 0.004)	73.5	0.005	56
1091	0.007-0.013 (mean = 0.009)	88.5	0.010	111
1269	0.005-0.010 (mean = 0.007)	101.5	0.007	78
1457	0.005-0.009 (mean = 0.008)	92.5	0.008	89

[a] Recoveries after storage calculated by the reviewer by dividing the residue in stored samples by the zero-day residue using corrected mean residue levels.

[b] ND = Not detected.

Table 9. Storage stability of residues of chlorothalonil and PCBN in/on cucumbers bearing field-incurred residues from treatment at 0.6x (MRID 42875910).

Storage Period (days)	Chlorothalonil				PCBN			
	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
0	0.47-1.36 (mean = 0.91)	115.5	0.79	(100)	0.009-0.019 (mean = 0.010)	96.5	0.015	(100)
1	1.02-1.49 (mean = 1.25)	118.0	1.06	134	ND[b] -0.014 (mean = 0.010)	100.5	0.009	60
7	1.56-3.11 (mean = 2.32)	113.5	2.05	259	0.014-0.045 (mean = 0.030)	104.5	0.028	187
28	1.05-1.76 (mean = 1.42)	89.5	1.59	201	0.013-0.021 (mean = 0.020)	101.5	0.017	113
91	0.65-2.02 (mean = 1.32)	81.5	1.62	205	0.012-0.028 (mean = 0.020)	107.5	0.018	120
182	0.78-2.34 (mean = 1.56)	90.5	1.72	218	0.009-0.024 (mean = 0.020)	102.5	0.017	113
276	1.01-1.75 (mean = 1.31)	104.0	1.26	159	0.013-0.020 (mean = 0.020)	97.5	0.017	113
360	0.49-0.77 (mean = 0.60)	74.5	0.80	101	<0.005 -0.006 (mean = 0.005)	67.0	<0.005	<33
552	1.86-2.31 (mean = 2.15)	115.5	1.86	235	0.018-0.021 (mean = 0.020)	105.5	0.018	120
727	0.31-0.43 (mean = 0.39)	84.0	0.47	59	<0.005-0.005 (mean = 0.005)	76.0	<0.005	<33
805	1.24-1.92 (mean = 1.59)	92.5	1.72	218	0.019-0.024 (mean = 0.020)	96.0	0.022	147
910	0.49-1.65 (mean = 1.07)	84.5	1.26	159	0.006-0.016 (mean = 0.010)	85.5	0.013	87
1098	1.73-1.78 (mean = 1.76)	96.5	1.83	232	0.013-0.015 (mean = 0.014)	84.0	0.017	113

(continued; footnotes follow)

Table 9 *(continued)*.

Storage Period (days)	Chlorothalonil				PCBN			
	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
1296	0.81-1.27 (mean = 1.06)	114.0	0.93	118	0.009-0.012 (mean = 0.010)	112.5	0.009	60
1463	1.09-1.36 (mean = 1.23)	84.0	1.47	186	0.014-0.020 (mean = 0.020)	120.0	0.014	93

[a] Recoveries after storage calculated by the reviewer by dividing the residue in stored samples by the zero-day residue using corrected mean residue levels.

[b] ND = not detected.

Table 10. Storage stability of residues of chlorothalonil, SDS-3701, SDS-46851, and PCBN in/on peanuts bearing field-incurred residues from treatment at 9x (MRID 42875914).

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	Chlorothalonil			
0	11.64-15.02 (mean = 13.00)	100.5	12.94	(100)
2	11.95-13.47 (mean = 12.74)	97.0	13.13	101
7	11.67-13.85 (mean = 12.92)	104.0	12.43	96
28	12.13-18.83 (mean = 15.40)	107.0	14.39	111
83	13.71-15.82 (mean = 14.84)	100.3	14.79	114
174	11.14-15.65 (mean = 13.33)	90.5	14.72	114
267	7.75-8.75 (mean = 8.25)	75.0	11.00	85
301	6.52-9.29 (mean = 8.10)	115.0	7.04	54
329	6.58-7.91 (mean = 7.27)	101.5	7.17	55
363	5.79-7.35 (mean = 6.74)	106.5	6.33	49
427	9.13-10.92 (mean = 10.00)	118.0	8.47	65
486	11.58-12.81 (mean = 12.18)	116.5	10.45	81
546	10.03-11.76 (mean = 10.48)	96.0	10.91	84
602	6.65-11.59 (mean = 8.76)	97.5	8.98	69
665	6.20-9.01 (mean = 7.74)	97.0	7.98	62
728	5.20-12.05 (mean = 8.55)	89.5	9.55	74
903	10.20-11.10 (mean = 10.73)	111.5	9.62	74
1133	7.61-8.64 (mean = 8.24)	80.5	10.23	79
1254	7.47-9.61 (mean = 8.39)	96.0	8.74	68
1450	7.40-8.18 (mean = 7.87)	87.5	9.00	70
	SDS-3701			
0	0.03-0.09 (mean = 0.06)	80.0	0.08	(100)
2	0.07-0.08 (mean = 0.08)	73.5	0.11	138
7	0.09-0.11 (mean = 0.10)	87.5	0.12	150
28	0.09-0.17 (mean = 0.13)	93.5	0.14	175
83	0.14-0.18 (mean = 0.0.15)	67.7	0.23	288
174	0.06-0.08 (mean = 0.08)	97.5	0.08	100
267	0.16-0.21 (mean = 0.18)	88.5	0.21	263
301	0.21-0.30 (mean = 0.24)	70.5	0.34	425
330	0.20-0.35 (mean = 0.28)	70.0	0.40	500
363	0.12-0.24 (mean = 0.19)	80.0	0.23	288
427	0.28-0.33 (mean = 0.31)	78.0	0.39	488
489	0.41-0.48 (mean = 0.45)	92.0	0.49	613
546	0.28-0.35 (mean = 0.32)	82.0	0.39	488
609	0.28-0.37 (mean = 0.32)	74.0	0.43	538
665	0.26-0.47 (mean = 0.35)	74.0	0.47	588
729	0.19-0.47 (mean = 0.34)	81.0	0.42	525

(continued; footnotes follow)

Table 10 *(continued)*.

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	SDS-3701 continued			
906	0.31-0.46 (mean = 0.39)	78.5	0.50	625
1126	0.33-0.43 (mean = 0.36)	72.0	0.49	613
1259	0.44-0.59 (mean = 0.50)	100.0	0.50	625
1455	0.52-0.66 (mean = 0.57)	74.0	0.76	950
	SDS-46851			
0	0.10-0.12 (mean = 0.11)	77.5	0.14	(100)
2	0.11-0.16 (mean = 0.14)	96.5	0.14	100
7	0.19-0.21 (mean = 0.20)	107.0	0.19	136
28	0.22-0.35 (mean = 0.31)	74.5	0.41	293
83	0.19-0.21 (mean = 0.21)	80.7	0.25	179
174	0.13-0.20 (mean = 0.17)	100.0	0.17	121
267	0.36-0.49 (mean = 0.43)	96.5	0.44	314
301	0.07-0.16 (mean = 0.11)	74.0	0.15	107
311	0.21-0.27 (mean = 0.24)	96.0	0.25	179
330	0.14-0.25 (mean = 0.20)	84.0	0.24	171
363	0.23-0.31 (mean = 0.27)	74.5	0.36	257
427	0.16-0.25 (mean = 0.21)	76.0	0.27	193
489	0.21-0.26 (mean = 0.24)	79.0	0.30	214
546	0.23-0.26 (mean = 0.25)	72.5	0.34	243
609	0.24-0.39 (mean = 0.31)	94.0	0.33	236
665	0.18-0.34 (mean = 0.26)	82.0	0.32	229
729	0.21-0.27 (mean = 0.24)	113.5	0.21	150
906	0.19-0.23 (mean = 0.22)	88.5	0.24	171
1126	0.11-0.16 (mean = 0.14)	86.5	0.16	114
1259	0.10-0.38 (mean = 0.23)	81.5	0.28	200
1268	0.11-0.12 (mean = 0.12)	95.0	0.12	86
1459	0.41-0.58 (mean = 0.47)	80.0	0.58	414
	HCB			
0	0.009-0.011 (mean = 0.010)	72.0	0.014	(100)
2	0.009-0.010 (mean = 0.009)	72.0	0.013	93
7	0.008-0.009 (mean = 0.008)	81.0	0.010	71
28	0.009-0.011 (mean = 0.010)	71.0	0.014	100
83	0.011-0.012 (mean = 0.012)	71.3	0.016	114
174	0.011-0.012 (mean = 0.012)	67.5	0.017	121
267	0.008-0.011 (mean = 0.010)	113.0	0.008	57
301	0.008-0.010 (mean = 0.009)	84.0	0.010	71
329	0.005-0.007 (mean = 0.006)	121.5	0.005	36

(continued; footnotes follow)

Table 10 *(continued)*.

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	HCB continued			
363	0.006-0.007 (mean = 0.007)	90.5	0.007	50
427	0.008-0.010 (mean = 0.009)	72.5	0.012	86
486	0.011-0.013 (mean = 0.012)	75.0	0.016	114
549	0.017-0.020 (mean = 0.019)	86.5	0.022	157
602	0.010-0.011 (mean = 0.010)	97.5	0.011	79
665	0.010-0.012 (mean = 0.011)	70.0	0.016	114
728	0.007-0.011 (mean = 0.010)	97.0	0.010	71
905	0.012-0.020 (mean = 0.015)	94.0	0.016	114
1133	0.009-0.011 (mean = 0.010)	78.0	0.013	93
1254	0.007-0.010 (mean = 0.008)	79.0	0.010	71
1450	0.010 (mean = 0.010)	73.5	0.014	100
	PCBN			
0	0.230-0.284 (mean = 0.253)	95.0	0.266	(100)
2	0.201-0.276 (mean = 0.247)	104.5	0.237	89
7	0.141-0.221 (mean = 0.188)	88.0	0.214	80
28	0.218-0.266 (mean = 0.240)	90.0	0.266	100
83	0.345-0.376 (mean = 0.354)	87.7	0.404	152
174	0.316-0.340 (mean = 0.330)	95.0	0.347	130
267	0.175-0.210 (mean = 0.191)	97.0	0.197	74
301	0.209-0.236 (mean = 0.226)	94.0	0.240	90
329	0.208-0.283 (mean = 0.243)	102.5	0.237	89
363	0.171-0.217 (mean = 0.198)	89.5	0.222	83
427	0.272-0.311 (mean = 0.291)	102.0	0.285	107
486	0.242-0.257 (mean = 0.249)	107.0	0.232	87
546	0.251-0.255 (mean = 0.254)	81.0	0.313	118
602	0.220-0.262 (mean = 0.245)	95.5	0.256	96
665	0.199-0.285 (mean = 0.241)	98.5	0.244	92
728	0.294-0.376 (mean = 0.333)	109.0	0.305	115
903	0.224-0.242 (mean = 0.235)	92.0	0.255	96
1133	0.217-0.240 (mean = 0.227)	105.5	0.215	81
1254	0.110-0.180 (mean = 0.140)	90.5	0.155	58
1450	0.226-0.237 (mean = 0.231)	103.5	0.223	84

[a] Recoveries after storage calculated by the reviewer by dividing the residue in stored samples by the zero-day residue using corrected mean residue levels.

Table 11. Storage stability of residues of chlorothalonil, SDS-3701, SDS-46851, and PCBN in/on potatoes bearing field-incurred residues from treatment at 15x (MRID 42875915).

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	Chlorothalonil			
0	1.04-2.49 (mean = 1.75)	78.3	2.24	(100)
1	1.79-2.79 (mean = 2.18)	90.7	2.40	107
7	1.22-1.77 (mean = 1.47)	87.7	1.67	75
30	1.05-2.68 (mean = 1.81)	82.3	2.20	98
90	0.91-1.85 (mean = 1.32)	111.3	1.18	53
180	0.79-4.79 (mean = 2.73)	111.0	2.46	110
270	1.05-1.27 (mean = 1.13)	94.0	1.20	54
363	1.50-2.10 (mean = 1.83)	82.0	2.23	100
549	0.2-0.62 (mean = 0.42)	77.7	0.54	24
572	0.50-1.02 (mean = 0.67)	87.3	0.77	34
577	0.60-0.72 (mean = 0.66	97.0	0.68	30
631	0.76-1.82 (mean = 1.06)	84.7	1.25	56
633	0.78-0.86 (mean = 0.82)	90.3	0.91	41
714	1.26-2.08 (mean = 1.70)	95.0	1.79	80
869	1.06-1.80 (mean = 1.40)	86.5	1.62	72
1099	0.27-0.47 (mean = 0.38)	108.7	0.35	16
1135	0.68-1.77 (mean = 1.20)	77.0	1.56	70
1292	0.64-0.83 (mean = 0.74)	79.0	0.93	42
1448	0.39-1.78 (mean = 0.98)	85.5	1.14	51
	SDS-3701			
0	0.20-0.35 (mean = 0.27)	102.3	0.27	(100)
1	0.17-0.24 (mean = 0.21)	91.3	0.22	81
7	0.23-0.26 (mean = 0.25)	116.7	0.21	78
30	0.18-0.19 (mean = 0.18)	94.7	0.19	70
90	0.08-0.17 (mean = 0.13)	82.3	0.16	59
180	0.11-0.28 (mean = 0.19)	81.7	0.23	85
270	0.24-0.31 (mean = 0.28)	113.7	0.24	89
363	0.14-0.26 (mean = 0.20)	95.3	0.19	70
549	0.12-0.20 (mean = 0.16)	89.7	0.17	63
572	0.13-0.15 (mean = 0.14)	81.0	0.17	63
631	0.14-0.24 (mean = 0.19)	72.3	0.26	96
714	0.32-0.44 (mean = 0.37)	107.0	0.35	130
869	0.09-0.37 (mean = 0.23)	88.7	0.26	96
1099	0.04-0.15 (mean = 0.10)	105.3	0.09	33
1135	0.17-0.26 (mean = 0.20)	95.0	0.21	78
1292	0.15-0.22 (mean = 0.18)	92.3	0.20	74
1448	0.08-0.22 (mean = 0.16)	91.5	0.17	63

(continued; footnotes follow)

Table 11 *(continued)*.

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
		SDS-46851		
0	0.14-0.24 (mean = 0.19)	104.7	0.18	(100)
1	0.15-0.17 (mean = 0.16)	109.7	0.15	83
7	0.17-0.19 (mean = 0.19)	114.7	0.16	89
30	0.21-0.24 (mean = 0.23)	111.0	0.20	111
90	0.18-0.19 (mean = 0.19)	104.0	0.18	100
180	0.15-0.19 (mean = 0.17)	98.7	0.17	94
270	0.13-0.15 (mean = 0.14)	120.0	0.12	67
363	0.09-0.13 (mean = 0.11)	95.7	0.11	61
549	0.18-0.22 (mean = 0.20)	99.0	0.20	111
572	0.14-0.19 (mean = 0.16)	103.7	0.15	83
631	0.16-0.21 (mean = 0.18)	107.0	0.17	94
714	0.17-0.19 (mean = 0.18)	107.0	0.17	94
869	0.12-0.17 (mean = 0.14	104.0	0.14	78
891	0.12-0.15 (mean = 0.14)	79.0	0.17	94
1099	0.08-0.17 (mean = 0.14)	73.5	0.19	106
1135	0.11-0.16 (mean = 0.13)	84.7	0.16	89
1292	0.13-0.17 (mean = 0.15)	92.7	0.16	89
1448	0.11-0.17 (mean = 0.14)	80.0	0.17	94
		PCBN		
0	0.024-0.051 (mean = 0.037)	113.3	0.032	(100)
1	0.021-0.031 (mean = 0.026)	91.0	0.029	91
7	0.025-0.031 (mean = 0.029)	100.7	0.028	88
30	0.018-0.042 (mean = 0.029)	85.7	0.033	103
90	0.014-0.022 (mean = 0.018	111.7	0.016	50
180	0.012-0.074 (mean = 0.041)	101.7	0.040	125
270	0.017-0.019 (mean = 0.018)	95.3	0.019	59
363	0.016-0.031 (mean = 0.026)	89.7	0.029	91
549	0.006-0.013 (mean = 0.009)	76.0	0.012	38
572	0.007-0.014 (mean = 0.010)	77.7	0.013	41
577	0.010-0.012 (mean = 0.011)	85.3	0.013	41
631	<0.005	74.0	--	--
714	0.024-0.036 (mean = 0.030)	96.0	0.032	100
869	0.017-0.027 (mean = 0.024)	95.7	0.025	78
1099	<0.005-0.009 (mean = 0.005)	106.0	0.005	16
1135	0.014-0.027 (mean = 0.021)	101.0	0.021	66
1292	0.013-0.015 (mean = 0.014)	93.0	0.015	47
1148	0.010-0.031 (mean = 0.018)	81.0	0.023	72

[a] Recoveries after storage calculated by the reviewer by dividing the residue in stored samples by the zero-day residue using corrected mean residue levels.

Table 12. Storage stability of residues of chlorothalonil, SDS-3701, PCBN, HCB in/on soybeans bearing field-incurred residues from treatment at 27x (MRID 42875916).

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	Chlorothalonil			
0	7.54-18.51 (mean = 11.31)	94.5	11.97	(100)
1	5.94-24.96 (mean = 16.19)	92.5	17.50	146
7	26.89-36.31 (mean = 31.62)	83.0	38.09	318
34	10.70-15.21 (mean = 13.15)	95.5	13.77	115
87	23.90-27.22 (mean = 26.08)	103.0	25.32	212
181	16.88-28.08 (mean = 22.14)	90.5	24.46	204
272	17.24-21.16 (mean = 19.36)	97.0	19.96	167
363	10.44-15.65 (mean = 12.91)	82.5	15.64	131
542	11.94-19.49 (mean = 15.59)	85.5	18.24	152
723	9.84-11.82 (mean = 10.91)	97.0	11.25	94
913	7.37-19.54 (mean = 13.72)	71.0	19.32	161
1092	10.29-12.25 (mean = 11.47)	79.5	14.43	121
1280	16.56-27.06 (mean = 21.11)	84.5	24.98	209
1498	16.82-21.30 (mean = 18.88)	79.5	23.75	198
	SDS-3701			
0	0.01-0.04 (mean = 0.02)	80.5	0.02	(100)
1	0.02-0.05 (mean = 0.04)	83.5	0.04	200
7	0.02-0.04 (mean = 0.03)	102.5	0.03	150
34	0.06-0.08 (mean = 0.07)	68.5	0.10	500
87	0.06-0.09 (mean = 0.07)	75.0	0.10	500
181	0.02-0.06 (mean = 0.04)	74.5	0.06	300
272	0.07-0.09 (mean = 0.08)	72.0	0.10	500
363	0.05-0.10 (mean = 0.08)	70.0	0.11	550
545	0.04-0.07 (mean = 0.06)	63.5	0.09	450
723	0.04 (mean = 0.04)	71.5	0.06	300
911	0.05-0.14 (mean = 0.09)	81.0	0.11	550
1093	0.04-0.05 (mean = 0.05)	95.0	0.05	250
1280	0.06-0.17 (mean = 0.11)	110.0	0.10	500
1498	0.06-0.09 (mean = 0.08)	74.0	0.10	500
	PCBN			
0	0.121-0.196 (mean = 0.166)	81.5	0.203	(100)
1	0.093-0.313 (mean = 0.208)	80.0	0.259	128
7	0.235-0.359 (mean = 0.298)	110.0	0.271	133
34	0.289-0.344 (mean = 0.319)	110.5	0.288	142
87	0.224-0.252 (mean = 0.239)	97.0	0.247	122
181	0.118-0.258 (mean = 0.189)	110.0	0.172	85
272	0.278-0.288 (mean = 0.284)	116.0	0.245	121

(continued; footnotes follow)

Table 12 *(continued)*.

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	PCBN continued			
363	0.170-0.240 (mean = 0.210)	104.5	0.201	99
542	0.157-0.246 (mean = 0.201)	112.0	0.180	89
723	0.106-0.129 (mean = 0.121)	98.0	0.123	61
913	0.156-0.331 (mean = 0.251)	121.0	0.207	102
1092	0.126-0.155 (mean = 0.143)	103.5	0.138	68
1280	0.210-0.348 (mean = 0.279)	120.0	0.232	114
1498	0.222-0.253 (mean = 0.234)	85.0	0.275	135
	HCB			
0	0.005-0.011 (mean = 0.008)	86.0	0.009	(100)
1	0.004-0.012 (mean = 0.008)	71.5	0.011	122
7	0.010-0.011 (mean = 0.011)	78.5	0.013	144
34	0.012-0.013 (mean = 0.012)	90.0	0.014	156
87	0.009-0.010 (mean = 0.010)	110.0	0.009	100
181	0.004-0.010 (mean = 0.007)	75.0	0.009	100
272	0.008 (mean = 0.008)	82.5	0.010	111
363	0.005-0.008 (mean = 0.007)	78.5	0.008	89
542	0.005-0.007 (mean = 0.006)	75.0	0.008	89
723	0.004 (mean = 0.004)	80.0	0.005	55
913	0.005-0.011 (mean = 0.008)	88.0	0.009	100
1092	0.004-0.005 (mean = 0.005)	91.0	0.005	56
1280	0.006-0.011 (mean = 0.009)	87.5	0.010	111
1498	0.007-0.008 (mean = 0.007)	72.5	0.010	111

[a] Recoveries after storage calculated by the reviewer by dividing the residue in stored samples by the zero-day residue using corrected mean residue levels.

Table 13. Storage stability of chlorothalonil, SDS-3701, PCBN, HCB residues in/on tomatoes bearing field-incurred residues from treatment at 1.1x. (MRID 42875917)

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	Chlorothalonil			
0	6.69-11.29 (mean = 8.83)	83.5	10.57	(100)
1	8.90-12.44 (mean = 10.81)	105.5	10.24	97
7	12.91-17.83 (mean = 15.51)	107.5	14.43	137
30	8.03-13.49 (mean = 10.32)	98.5	10.47	99
92	9.44-12.17 (mean = 10.37)	99.5	10.42	99
174	9.72-14.38 (mean = 11.16)	110.0	10.15	96
274	6.66-12.60 (mean = 9.54)	100.0	9.54	90
363	7.71-10.92 (mean = 9.60)	85.5	11.23	106
546	9.75-11.69 (mean = 10.68)	105.5	10.12	96
723	5.35-12.14 (mean = 7.99)	85.0	9.40	89
916	7.25-15.84 (mean = 11.44)	96.5	11.85	112
1100	7.33-15.76 (mean = 10.41)	92.0	11.31	107
1275	9.01-14.23 (mean = 10.98)	100.5	10.93	103
1449	7.22-10.12 (mean = 8.76)	97.0	9.03	85
	SDS-3701			
0	0.03-0.07 (mean = 0.06)	90.0	0.07	(100)
1	0.03-0.05 (mean = 0.04)	92.0	0.05	71
7	0.05-0.09 (mean = 0.07)	85.0	0.08	114
30	0.03-0.06 (mean = 0.04)	79.0	0.05	71
92	<0.01-0.10 (mean = 0.05)	117.0	0.04	57
174	0.02-0.05 (mean = 0.04)	77.5	0.05	71
274	<0.01-0.03 (mean = 0.02)	82.0	0.02	29
363	0.05-0.07 (mean = 0.06)	94.5	0.06	86
546	0.03-0.08 (mean = 0.05)	116.5	0.04	57
723	0.02-0.06 (mean = 0.04)	86.0	0.04	57
916	0.02-0.10 (mean = 0.06)	118.0	0.05	71
1107	0.06-0.10 (mean = 0.09)	109.0	0.08	114
1275	0.03-0.06 (mean = 0.05)	123.0	0.04	57
1456	0.03-0.05 (mean = 0.04)	87.0	0.04	57
	PCBN			
0	0.076-0.128 (mean = 0.103)	95.5	0.107	(100)
1	0.086-0.144 (mean = 0.111)	78.5	0.142	133
7	0.150-0.208 (mean = 0.181)	106.0	0.171	160
30	0.084-0.138 (mean = 0.105)	84.0	0.125	117
92	0.072-0.165 (mean = 0.123)	129.5	0.095	89
174	0.142-0.194 (mean = 0.158)	113.0	0.139	130
274	0.090-0.154 (mean = 0.122)	115.5	0.106	99

(continued; footnotes follow)

Table 13 *(continued)*.

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	PCBN continued			
363	0.092-0.126 (mean = 0.113)	83.0	0.136	127
546	0.113-0.130 (mean = 0.121)	144.5	0.084	79
723	0.086-0.160 (mean = 0.108)	105.0	0.103	96
916	0.041-0.089 (mean = 0.066)	120.5	0.055	51
1100	0.097-0.186 (mean = 0.128)	137.0	0.094	88
1275	0.109-0.160 (mean = 0.128)	85.0	0.151	141
1449	0.075-0.104 (mean = 0.092)	78.0	0.117	109
	HCB			
0	0.003-0.005 (mean = 0.004)	75.0	0.005	(100)
1	0.004-0.005 (mean = 0.005)	81.5	0.006	120
7	0.005-0.007 (mean = 0.006)	79.0	0.008	160
30	0.004-0.006 (mean = 0.005)	84.5	0.006	120
92	<0.003-0.005 (mean = 0.003)	78.0	0.004	80
174	0.005-0.007 (mean = 0.006)	93.5	0.006	120
274	<0.003-0.004 (mean = 0.003)	76.5	0.003	60
363	0.003-0.006 (mean = 0.004)	65.5	0.006	120
546	0.004-0.005 (mean = 0.005)	86.5	0.005	100
723	<0.003-0.005 (mean = <0.003)	73.0	ND[b]	<60
916	<0.003-0.007 (mean = 0.004)	85.5	0.005	100
1100	0.003-0.006 (mean = 0.005)	95.5	0.005	100
1275	0.004-0.006 (mean = 0.005)	77.0	0.006	120
1449	0.003-0.004 (mean = 0.004)	71.5	0.005	100

[a] Recoveries after storage calculated by the reviewer by dividing the residue in stored samples by the zero-day residue using corrected mean residue levels.

[b] ND = Not detected.

Table 14. Storage stability of chlorothalonil, SDS-3701, PCBN, HCB residues in/on **wheat grain** bearing field-incurred residues. (MRID 42875918)

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
	Chlorothalonil			
0	41.76-46.51(mean = 44.28)	88.5	50.03	(100)
1	40.20-49.89 (mean = 44.35)	94.0	47.18	94
7	47.44-54.40 (mean = 51.68)	103.5	49.93	100
30	51.51-59.75 (mean = 54.28)	99.5	54.55	109
91	38.42-46.70 (mean = 43.33)	95.0	45.61	91
179	44.98-51.67 (mean = 49.06)	91.0	53.91	108
273	41.04-53.83 (mean = 47.15)	98.5	47.86	96
362	38.71-50.25 (mean = 45.16)	104.5	43.21	86
544	42.53-48.29 (mean = 45.53)	91.0	50.04	100
728	33.34-45.15 (mean = 39.94)	81.5	49.01	98
901	34.75-40.09 (mean = 38.13)	86.5	44.08	88
1095	37.85-45.92 (mean = 41.60)	105.0	39.62	79
1274	40.77-53.58 (mean = 47.87)	90.5	52.90	106
1468	39.83-44.56 (mean = 41.47)	83.5	49.66	99
	SDS-3701			
0	0.17-0.18 (mean = 0.18)	86.0	0.20	(100)
1	0.11-0.20 (mean = 0.15)	92.5	0.16	80
7	0.14-0.23 (mean = 0.18)	82.5	0.22	110
30	0.17-0.19 (mean = 0.18)	83.5	0.21	105
91	0.09-0.16 (mean = 0.12)	91.5	0.13	65
179	0.11-0.14 (mean = 0.13)	80.0	0.16	80
273	0.12-0.14 (mean = 0.13)	76.0	0.17	85
362	0.13-0.16 (mean = 0.14)	75.0	0.19	95
544	0.19-0.24 (mean = 0.21)	82.5	0.25	125
728	0.15-0.17 (mean = 0.16)	84.5	0.19	95
924	0.13-0.14 (mean = 0.14)	86.5	0.16	80
1095	0.18-0.20 (mean = 0.19)	100.0	0.19	95
1274	0.18-0.19 (mean = 0.19)	91.5	0.20	100
1468	0.13-0.15 (mean = 0.14)	70.0	0.20	100
	PCBN			
0	0.314-0.592 (mean = 0.487)	81.5	0.597	(100)
1	0.490-0.627 (mean = 0.555)	85.0	0.653	109
7	0.523-0.598 (mean = 0.556)	119.5	0.465	78
30	0.511-0.593 (mean = 0.533)	97.5	0.547	92
91	0.458-0.708 (mean = 0.533)	100.0	0.533	89
179	0.494-0.545 (mean = 0.523)	87.0	0.601	101
273	0.473-0.561 (mean = 0.513)	106.0	0.484	81

(continued; footnotes follow)

Table 14 *(continued)*.

Storage Period (days)	Residue Level (ppm)	Fresh Fortification Recovery (%)	Corrected Mean Residue Level (ppm)	Recovery after Storage (%)[a]
PCBN continued				
362	0.440-0.530 (mean = 0.480)	95.5	0.503	84
544	0.437-0.545 (mean = 0.511)	111.5	0.458	77
728	0.447-0.596 (mean = 0.540)	112.5	0.480	80
901	0.422-0.578 (mean = 0.516)	122.5	0.421	71
1095	0.393-0.459 (mean = 0.433)	108.5	0.399	67
1274	0.471-0.614 (mean = 0.556)	91.5	0.607	102
1468	0.488-0.550 (mean = 0.512)	83.5	0.613	103
HCB				
0	0.014-0.016 (mean = 0.015)	80.0	0.018	(100)
1	0.011-0.019 (mean = 0.015)	85.0	0.018	100
7	0.013-0.015 (mean = 0.014)	76.0	0.018	100
30	0.016-0.018 (mean = 0.017)	81.5	0.021	117
91	0.013-0.017 (mean = 0.015)	70.0	0.021	117
179	0.019-0.021 (mean = 0.020)	87.5	0.023	128
273	0.012-0.018 (mean = 0.014)	76.0	0.019	106
362	0.012-0.014 (mean = 0.013)	84.0	0.016	89
544	0.017-0.021 (mean = 0.020)	110.0	0.018	100
728	0.012-0.017 (mean = 0.015)	92.5	0.016	89
901	0.013-0.016 (mean = 0.015)	95.0	0.015	83
1095	0.015-0.018 (mean = 0.017)	120.5	0.014	78
1274	0.015-0.020 (mean = 0.018)	113.5	0.016	89
1468	0.017-0.019 (mean = 0.018)	90.0	0.019	106

[a] Recoveries after storage calculated by the reviewer by dividing the residue in stored samples by the zero-day residue using corrected mean residue levels.

Magnitude of the Residue In Plants

Root and Tuber Vegetables Group

Potatoes: A tolerance of 0.1 ppm has been established for the combined residues of chlorothalonil and its metabolite SDS-3701 in/on potatoes [40 CFR §180.275(a)].

The 1991 DCI required data depicting residues of chlorothalonil and SDS-3701 in/on potatoes harvested 0 days following the last of multiple foliar applications of the 90% DF, a WP, or a FlC formulation. Alternatively, a 7-day PHI was to be imposed. Additionally, the registrant was to propose a maximum seasonal application rate or number of applications per season.

In letters dated August 9-11, 1993, ISK Biotech stated that it is specifying a maximum seasonal rate of 9 lb ai/A and a 7-day PHI for potatoes on all pertinent labels. For the 6 lb/gal FlC (BRAVO 720), a 1.13 lb ai/application rate is also specified. These proposed label amendments fulfill the data requirements for potatoes specified in the DCI. No additional data are required provided that the registrant amends labels as proposed.

Bulb Vegetables Group

Onions (dry bulb): A tolerance of 0.5 ppm has been established for the combined residues of chlorothalonil and its metabolite SDS-3701 in/on dry-bulb onions [40 CFR §180.275(a)].

ISK Biotech (1991; MRID 42875922) submitted data from one test conducted in NY depicting residues of chlorothalonil, SDS-3701, SDS-46851, PCBN, and HCB in/on onions (dry bulb) harvested 7 days after the last of 11 weekly foliar applications. The 6 lb/gal FlC (BRAVO 720) formulation was applied using a combination of 0.75 and 1.5 lb ai/A applications, for a total seasonal application rate of 10.5 lb ai/A. Applications were made using ground equipment at 30 gal/A. The formulation (Batch USSOSNBF) contained 54.2% chlorothalonil, 0.214% PCBN, and 0.006% HCB.

One treated and one untreated onion sample were harvested and stored frozen for 1292 days (3.5 years) prior to analysis by Ricerca, Inc. Residues were determined using the GC/ECD method described earlier in this report. Apparent residues were nondetectable (<0.01 ppm, chlorothalonil and SDS-3701; <0.03 ppm, SDS-46851; <0.003 ppm, HCB; and <0.005 ppm, PCBN) in/on the untreated sample. Duplicate analyses of a single treated sample detected residues of chlorothalonil at 0.03 and 0.04 ppm; residues of SDS-3701, HCB, and PCBN were nondetectable.

These data together with data reviewed in the 1983 Residue Chemistry Chapter and the 1988 FRSTR support the established tolerance for the combined residues of chlorothalonil and SDS-3701 in/on dry bulb onions.

Onions (green): A tolerance of 5.0 ppm has been established for the combined residues of chlorothalonil and its metabolite SDS-3701 in/on green onions [40 CFR §180.275(a)].

Data reviewed in the 1988 draft FRSTR indicated that residues may be tolerance exceeding on green onions harvested at 14 days (the currently established PHI) following the last of three foliar applications at the maximum registered rate; therefore, the 1991 DCI required that the registrant propose a longer PHI or propose an increase in the tolerance for green onions.

In letters dated August 9-11, 1993, ISK Biotech stated that it is deleting uses on onions (green bunching), leeks, and shallots due to the potential for tolerance exceeding levels on these RACs. In a subsequent letter of April 14, 1994, ISK withdrew its request to delete these uses and proposed the following alternative labeling to avoid tolerance exceeding residues: "Green onions, leeks and shallots should be washed to reduce levels of surface residues prior to entry into commercial channels of trade". The registrant proposed this alternative language

because residues of chlorothalonil occur on the surface and washing is expected to reduce any residues of chlorothalonil on the harvested crop to levels within the established tolerance. Furthermore, they point out that washing of these crops prior to entry into commercial channels of trade is a common agricultural practice which is necessary to remove dust and dirt.

The registrant's proposal is not acceptable. Tolerances must be set on the RAC in the form in which it is sampled for enforcement purposes. The data requirements as stated in the 1991 DCI remain in effect. We should point out that although the reduction in residues by washing may not be taken into account in setting the tolerance for residues on green onions, it may be factored into estimation of anticipated residues for purposes of risk assessment.

Brassica Leafy Vegetables Group

Broccoli: A tolerance of 5 ppm has been established for the combined residues of chlorothalonil and its metabolite SDS-3701 in/on broccoli [40 CFR §180.275(a)].

The 1991 DCI required that the registrant either propose a longer PHI or propose an increase in the tolerance for broccoli.

In letters dated August 9-11, 1993, ISK Biotech stated that it is specifying a 7-day PHI for broccoli on all pertinent labels. In addition, broccoli is being added to the 82.5% DF formulation label because it was inadvertently omitted from the label when the product was first approved. The registrant also stated that it was adding Chinese broccoli to the 19.1% FlC and 75% WP formulation labels.

ISK Biotech (1988; MRID 42875923) submitted data from a test conducted in NY depicting residues of chlorothalonil, SDS-3701, SDS-46851, PCBN, and HCB in/on broccoli harvested 7 days after the last of eight weekly foliar applications. The 6 lb/gal FlC (BRAVO 720) formulation was applied at 1.13 lb ai/A/application using ground equipment at 29 gal/A for a total seasonal application rate of 9 lb ai/A. The formulation (Batch USSOSNBF) contained 54.2% chlorothalonil, 0.214% PCBN, and 0.006% HCB.

One treated and one untreated broccoli sample were harvested and stored frozen for ~4 months prior to analysis by Ricerca. Residues were determined using the GC/ECD method described earlier in this report. Apparent residues were nondetectable (<0.01 ppm, chlorothalonil and SDS-3701; <0.03 ppm, SDS-46851; <0.003 ppm, HCB; and <0.005 ppm, PCBN) in/on the untreated sample. Duplicate analyses of a single treated sample detected chlorothalonil (2.41 and 2.7 ppm), SDS-3701 (0.01 and 0.02 ppm), SDS-46851 (0.07 ppm), HCB (0.003 ppm), and PCBN (0.019 ppm).

The proposed label amendments satisfy the DCI requirement for a longer PHI. Data from the test conducted in NY on broccoli are adequate. The NY data as well as data reviewed in the 1983 Residue Chemistry Chapter and the 1988 Draft FRSTR indicate that combined residues of chlorothalonil and SDS-3701 are not likely to exceed the 5 ppm tolerance 7 days following the last of multiple applications totaling 9 lb ai/A.

Brussels sprouts: A tolerance of 5 ppm has been established for the combined residues of chlorothalonil and its metabolite SDS-3701 in/on Brussels sprouts [40 CFR §180.275(a)].

The 1991 DCI required that the registrant either propose a lower application rate and/or a longer PHI or propose an increase in the tolerance.

The 6 lb/gal FlC formulation (BRAVO 720; EPA Reg. No. 50534-188) is registered for repeated foliar applications to Brussels sprouts using ground or aerial equipment at a maximum of 1.5 lb ai/A/application with a 7- to 10-day retreatment interval. Minimum application volumes for ground and aerial applications are 20 and 5 gal/A, respectively. The current label does not specify a PHI, a maximum number of applications, or a

maximum seasonal application rate.

In letters dated August 9-11, 1993, ISK Biotech stated that it is specifying a 7-day PHI for Brussels sprouts on all pertinent labels.

ISK Biotech (1988; MRID 42875924) submitted data from one test conducted in NY depicting residues of chlorothalonil, SDS-3701, SDS-46851, PCBN, and HCB in/on Brussels sprouts harvested 7 days after the last of nine weekly foliar applications for a total seasonal rate of 10.2 lb ai/A. The 6 lb/gal FlC (BRAVO 720) formulation was applied at 1.13 lb ai/A/application using ground equipment at 29 gal/A. The formulation (Batch Number USSOSNBF) contained 54.2% chlorothalonil, 0.214% PCBN, and 0.006% HCB.

One treated and one untreated Brussels sprout sample were harvested and stored frozen for ~4 months prior to analysis by Ricerca, Inc. Residues were determined using the GC/ECD method described earlier in this report. Apparent residues were nondetectable (<0.01 ppm chlorothalonil and SDS-3701, <0.03 ppm SDS-46851, <0.003 ppm HCB, and <0.005 ppm PCBN) in/on the untreated and the treated samples.

The proposed label amendments satisfy the DCI requirement for a longer PHI. The NY data as well as data reviewed in the 1988 Draft FRSTR indicate that combined residues of chlorothalonil and SDS-3701 are not likely to exceed the 5 ppm tolerance 7 days following multiple applications at the maximum registered use rate. No additional data are required provided that the registrant amends labels as proposed.

Cabbage: A tolerance of 5 ppm has been established for the combined residues of chlorothalonil and its metabolite SDS-3701 in/on cabbage [40 CFR §180.275(a)].

The 1991 DCI required that the registrant either propose a longer PHI or propose an increase in the tolerance for cabbage.

In letters dated August 9-11, 1993, ISK Biotech stated that it is specifying a 7-day PHI for cabbage on all pertinent labels. In addition, Chinese cabbage (tight-headed varieties only) is being added to the 19.1% flowable and the 75% WP.

The registrant also submitted data (1986; MRID 42875921; 1987; MRID 42875920, and 1991; MRID 42875922) from 8 tests conducted in GA (1), NY (3), and FL (4) depicting residues of chlorothalonil, SDS-3701, SDS-46851, HCB, and PCBN in/on cabbage following broadcast applications of the 4.17 lb/gal FlC and the 6 lb/gal FlC formulations.

In tests conducted in NY (2) and GA (1) (MRID 42875921), chlorothalonil (4.17 lb/gal FlC) was applied at 7-day intervals at 1.2 lb ai/A using ground equipment. The samples were harvested 7 days after the ninth application in GA and on the day of the eighth and eleventh applications in NY. One treated sample was collected at each harvest and one untreated sample was collected from each test site. The chlorothalonil formulation Batch No. was not specified and the concentrations of HCB and PCBN were not reported.

In tests conducted in NY (1) (MRID 42875922) and FL (4) (MRID 42875920), chlorothalonil (6 lb/gal FlC) was applied at 7-day intervals at 1.13 lb ai/A using ground and air equipment. The samples were harvested 7 days after the eighth ground application in NY and on the day of the eleventh ground or air application in FL. The chlorothalonil formulation (Batch USSOSNBF) contained 54.2% chlorothalonil, 0.006% HCB, and 0.214% PCBN.

At each harvest date, the samples were shipped frozen on dry ice to the analytical laboratories where they were maintained frozen until analysis. According to the information provided, the samples from NY and GA (MRID 42875921) were stored frozen for approximately 8 and 11 months, respectively, prior to the completion of the analyses by Analytical Biochemistry Laboratories, Inc., Columbia, MO. The samples from FL (MRID

42875920) were analyzed within one month of harvest and the samples from NY (MRID 42875922) were stored for 1304 days (3.6 years at an unspecified temperature) prior to extraction and analysis by Ricerca, Inc.

One untreated sample from each test site and one treated sample from each test were analyzed. Residues were determined using the GC/ECD method described earlier in this report. Apparent residues were nondetectable in/on 5 untreated samples (<0.01-<0.03 ppm, chlorothalonil and SDS-3701; <0.03 ppm, SDS-46851; <0.003-<0.004 ppm, HCB; and <0.005-<0.008 ppm PCBN). Data depicting residues detected in/on cabbage are presented in Table 15.

Table 15. Residues of chlorothalonil, its metabolites, and HCB and PCBN found in cabbage harvested following ground/aerial applications.

Formulation	Location	Application Rate, lb ai/A[a]	Total Applied (lb ai/A)	PHI (Days)	Residues Found (ppm)[b]				
					Chlorothalonil	SDS-3701	SDS-46851	HCB	PCBN
6 lb/gal FlC	NY	1.13 (8)	9.0	7	1.61, 2.03	ND,[c] ND	ND, ND	ND, ND	0.014, 0.016
4.17 lb/gal FlC	NY	1.2 (8)	9.6	0	6.1, 6.8	ND, ND	ND, ND	ND, ND	0.017, 0.020
4.17 lb/gal FlC	NY	1.2 (11)	13.2	0	5.4, 6.4	ND, ND	ND, ND	ND, 0.004	0.034, 0.035
4.17 lb/gal FlC	GA	1.2 (9)	10.8	7	ND, ND	ND, ND	ND, ND	ND, ND	ND, ND
6 lb/gal FlC	FL	1.13 (11)	12.4	0	0.03, 0.03	ND, ND	ND, ND	ND, ND	ND, ND
6 lb/gal FlC	FL	1.13 (11)	12.4[d]	0	0.23, 0.23	ND, ND	ND, ND	ND, ND	ND, ND
6 lb/gal FlC	FL	1.13 (11)	12.4[d]	7	ND, ND	ND, ND	0.059, 0.059	ND, ND	ND, ND
6 lb/gal FlC	FL	1.13 (11)	12.4	7	ND, ND	ND, ND	0.060, 0.061	ND, ND	ND, ND

[a] Number of applications in parentheses.
[b] Duplicate analyses of one sample.
[c] ND = Not detected.
[d] Aerial applications.

The proposed label amendments satisfy the DCI requirement for a longer PHI. Data from the tests conducted in NY, GA and FL on cabbage are adequate. These data as well as data reviewed in the 1988 Draft FRSTR indicate that combined residues of chlorothalonil and SDS-3701 are not likely to exceed the 5 ppm tolerance 7 days following the last of multiple applications at the maximum registered rate. No additional data are required provided that the registrant amends labels as proposed.

Cauliflower: A tolerance of 5 ppm has been established for the combined residues of chlorothalonil and its metabolite SDS-3701 in/on cauliflower [40 CFR §180.275(a)].

The 1991 DCI required that the registrant propose a longer PHI, propose an increase in the tolerance, or submit data reflecting multiple foliar applications at the maximum rate from tests conducted in CA.

In letters dated August 9-11, 1993, ISK Biotech stated that it is specifying a 7-day PHI for cabbage on all pertinent labels.

The registrant also submitted data (1991; MRID 42875922) from one test conducted in NY depicting residues of chlorothalonil, SDS-3701, SDS-46851, PCBN, and HCB in/on cauliflower harvested 7 days after the last of eight weekly foliar applications. The 6 lb/gal formulation (BRAVO 720) was applied at 1.13 lb ai/A/application using ground equipment at 29 gal/A, for a seasonal rate of 9 lb ai/A. The formulation (Batch USSOSNBF) contained 54.2% chlorothalonil, 0.214% PCBN, and 0.006% HCB.

One treated and one untreated cauliflower sample were harvested and stored for 1304-1309 days (3.6 years) prior to analysis by Ricerca. Residues were determined using the GC/ECD method described earlier in this report. Apparent residues were nondetectable (<0.01 ppm, chlorothalonil and SDS-3701; <0.03 ppm, SDS-46851; <0.003 ppm, HCB; and <0.005 ppm, PCBN) in/on the untreated samples. Duplicate analyses of a single treated sample detected chlorothalonil (0.98 and 1.1 ppm) and PCBN (0.008 and 0.009 ppm); residues of SDS-3701, SDS-46851, and HCB were nondetectable.

The proposed label amendments satisfy the DCI requirement for a longer PHI. Data from the test conducted in NY on cauliflower are adequate. The NY data as well as data reviewed in the 1988 Draft FRSTR indicate that combined residues of chlorothalonil and SDS-3701 are not likely to exceed the 5 ppm tolerance 7 days following the last of multiple applications at the maximum registered rate. No additional data are required provided that the registrant amends labels as proposed.

Legume Vegetables Group

Beans (succulent): A tolerance of 5 ppm has been established for residues of chlorothalonil and its metabolite SDS-3701 in/on snap beans [40 CFR §180.275(a)].

The 1991 DCI required additional residue data on succulent beans, or, alternatively, label amendments restricting use to four applications per year at 2.25 lb ai/A/application.

In letters dated August 9-11, 1993, ISK Biotech stated that it is specifying a maximum seasonal rate of 9 lb ai/A for beans (snap) on all pertinent labels. The proposed label amendments satisfy the DCI requirements for succulent beans.

We note that current labels contain a restriction against grazing of livestock on treated fields or the feeding of treated plant parts. It is now Agency policy that such livestock feeding restrictions are undesirable and impractical. Therefore, the registrant must propose a suitable tolerance for bean forage and straw/hay and remove livestock feeding restrictions from use directions for beans. The proposed tolerances must be supported by suitable residue data.

Stone Fruits Group

Plums (fresh prunes) processing: A tolerance of 0.2 ppm has been established for the combined residues of chlorothalonil and its metabolite SDS-3701 in/on plums or prunes [40 CFR §180.275(a)].

The 1991 DCI required a processing study on plums/prunes.

In response to the DCI, ISK Biotech (1993; MRID 42875927) submitted data from three tests conducted in CA depicting residues of chlorothalonil, SDS-3701, and HCB in/on dry and reconstituted prunes processed from plums treated with four or five foliar applications of the 6 lb/gal FlC formulation (BRAVO 720) at 3 lb ai/A/application (for a total of 12 and 15 lb ai/A, respectively) and five applications of the 82.5% DF formulation (BRAVO 825) at 3.13 lb ai/A/application (for a total of 15.7 lb ai/A) in 100 gal/A. Applications were made at early bloom (80% popcorn), full bloom, petal fall, shuck split, and 5 weeks after petal fall. A single composite sample from each of the untreated and treated plots was harvested 99 days after 5 applications of either the 6 lb/gal FlC or 82.5% DF and 132 days after four applications of the 6 lb/gal FlC. The samples for processing were maintained for 2 days at ambient temperatures until transport to the processing facility. The processing facility (National Food Laboratory, Dublin, CA) maintained the samples under refrigeration (2 °C) for five days. The RAC and processed samples were stored (-18 C) for approximately 9 months prior to completion of analyses. Samples from one FlC formulation test and the DF formulation test were dried to 5% moisture during processing instead of 18% moisture, which is the usual commercial procedure for prunes.

The 6 lb/gal FlC formulation (Batch Number 029249) contained 53.6% chlorothalonil, 0.28% PCBN, and 0.014% HCB. The 82.5% DF formulation (Batch Number ASC-66518-0101-1207) contained 81.2% chlorothalonil, 0.44% PCBN, and 0.029% HCB.

Analysis of one untreated and one treated sample of the RAC and of each processed fraction (dried prunes and reconstituted prunes) from each test were performed by Ricerca. Residues were determined using the GC/ECD method described earlier in this report. Apparent residues were nondetectable (<0.01 ppm, chlorothalonil and SDS-3701; <0.00025 ppm, HCB) in/on the untreated samples. Duplicate analyses of the treated RAC samples from the FlC formulation tests detected residues of chlorothalonil (<0.01-0.05 ppm). Residues of chlorothalonil were nondetectable (<0.01 ppm) in/on the treated RAC sample from the DF formulation test and in each of the dry and reconstituted prune samples. Residues of SDS-3701 and HCB were nondetectable (<0.01 and <0.00025 ppm) in/on the RAC and each of the dry and reconstituted prune samples.

The submitted plum processing study is adequate. The submitted data indicate that combined residues of chlorothalonil and SDS-3701 do not concentrate in dry and reconstituted prunes. No additional data are required.

Miscellaneous Commodities

Bananas: A tolerance of 0.5 ppm has been established for the combined residues of chlorothalonil and its metabolite SDS-3701 in/on bananas (not more than 0.05 ppm in edible pulp) [40 CFR §180.275(a)].

The 1991 DCI required English translations of all labels bearing use directions for bananas grown for importation into the U.S. In addition, a 2-day PHI was required to be consistent with the existing supporting data.

In lieu of establishment of a 2-day PHI, ISK Biotech has chosen to support the existing use pattern, i.e., with no PHI. Data reviewed here are from one test conducted in Santa Marta, Magdalena, Colombia. Data from tests conducted in Panama, Honduras, Guatemala and Costa Rica are in preparation.

The registrant also submitted an English translation (from Spanish) of the 6 lb/gal FlC label. The 6 lb/gal FlC formulation (BRAVO 720) that lists uses for aerial applications to bananas grown for importation into the U.S. at a maximum of 9.2 lb ai/A/application in 5-14 gal/A. Applications may be repeated at 7- to 35-day intervals. The current label does not specify a PHI, a maximum number of applications, or a maximum seasonal application rate.

Data were submitted (1993; MRID 42875919) depicting residues of chlorothalonil, SDS-3701, and HCB in/on bananas harvested on the day of the last of 20 aerial applications of the 6 lb/gal FlC formulation at 1.5 lb ai/A/application with a 10-day retreatment interval. The formulation (Batch Number 022015GLP) contained 53.8% chlorothalonil, 0.255% PCBN, and 0.018% HCB.

Samples were shipped to the U.S. and were received by the analytical laboratory (Ricerca) within 3 days of harvest. The samples were not shipped frozen, in accordance with typical shipping practices for commercial banana importation. Upon receipt by the analytical laboratory, the pulp was removed from half the samples. All the samples (whole bananas and pulp) were stored frozen until completion of analyses one month later.

One treated and one untreated whole banana and pulp sample were assayed for residues using the GC/ECD method described earlier in this report. Apparent residues were nondetectable (<0.01 ppm chlorothalonil and SDS-3701, and <0.00025 ppm HCB) in/on the untreated and the treated samples.

Data from the test conducted in Colombia on bananas support the established tolerances of 0.5 ppm on bananas and 0.05 ppm on banana pulp. A decision on the adequacy of the 0-day PHI residue data for bananas in support of the current tolerances will be made on review of the remainder of the banana field trial data.

Peanuts: A tolerance of 0.3 ppm has been established for the combined residues of chlorothalonil and its metabolite SDS-3701 in/on peanuts [40 CFR §180.275(a)]. A 14-day PHI is currently in effect for peanuts treated with chlorothalonil.

The 1991 DCI did not require further field trials but did require that a tolerance for residues in/on peanut hulls must be proposed, noting that the available data would support a tolerance level of 1 ppm. The 1988 draft FRSTR also stated that the available data on the FlC formulation supported the established tolerance for residues of chlorothalonil and SDS-3701 in/on peanuts. However, the FRSTR required that the registrant submit data pertaining to the analysis of the formulation batch used in the tests reporting detectable levels of HCB and PCBN. As an alternative to these data, the option was available for the registrant to submit new field trial data and a batch analysis for the formulation applied. The present submission included field trial data and an analysis of formulation applied; therefore, it fulfills the second option.

ISK Biotech (1993; MRID 42875925) submitted data from six tests conducted in GA (2), and AL (1), FL (1), NC (1), and OK (1) depicting residues of chlorothalonil, SDS-3701, SDS-46851, PCBN and HCB in/on peanuts harvested 14 or 21 days after the last of 7-8 foliar applications made at 14-day intervals. The 6 lb/gal FlC formulation was applied at 1.13 lb ai/A/application for a total seasonal application rate of 7.9 or 9 lb ai/A using ground equipment at 20 gal/A. The formulation (Batch Number 029249) contained 53.6% chlorothalonil, 0.28% PCBN, and 0.014% HCB.

Two treated and one untreated peanut sample were harvested and stored frozen (ca - 20 C) for 280-356 days prior to analysis by Ricerca. Residues were determined using the GC/ECD method described earlier in this report and are presented in Tables 17 and 18. Combined residues of chlorothalonil and SDS-3701 were <0.01-0.06 ppm in/on 24 peanut nutmeat samples harvested 14-21 days after the final application of a FlC formulation. Combined residues were 0.25-2.45 ppm and 0.29-1.15 ppm in/on 12 peanut hull samples harvested 14 and 21 days, respectively, after the final application. Residues of HCB were found on nutmeats and hulls at all six field trial locations. The levels of HCB was not correlated with the application levels of chlorothalonil residues and were found in untreated check plots at levels as high as those from treated plots.

Geographic representation is adequate. The test states of GA (45%), AL (13%), FL (5%), NC (9%), and OK (5%) accounted for approximately 77% of the 1991 U.S. peanut production (1992, *Agricultural Statistics*).

The data on peanut nutmeats are adequate and support the established tolerance of 0.3 ppm.

The registrant must propose a tolerance for the combined residues of chlorothalonil and SDS-3701 in/on peanut hulls. For a maximum seasonal rate of ~8 lb ai/A and a 14-day PHI, a tolerance of 3 ppm would be appropriate. A 2 ppm tolerance would require a 21-day PHI.

We note that current labels contain a restriction against feeding of livestock on treated peanut plants or peanut hay. It is now Agency policy that such a livestock feeding restriction is undesirable and impractical. Therefore, the registrant must propose a suitable tolerance for peanut hay and remove livestock feeding restrictions from use directions for peanuts. The proposed tolerance must be supported by acceptable residue data.

Table 16. Residues of chlorothalonil, its metabolites, and HCB and PCBN found in peanut hulls from peanuts harvested following applications of the 6 lb/gal FlC.

Location	Number of Applications	Total Applied (lb ai/A)	PHI (Days)	Residues Found (ppm)[a]					
				Chlorothalonil	SDS-3701	Combined Residues[b]	SDS-46851	HCB	PCBN
GA	Control	NA[c]	NA	ND[d], ND	ND, ND	ND, ND	ND, ND	0.00084, 0.00089	ND, ND
GA	Control	NA	NA	0.04, 0.06	ND, ND	0.05, 0.07	ND, ND	0.00051, 0.00057	ND, ND
AL	Control	NA	NA	0.28, 0.33	0.04, 0.05	0.32, 0.38	ND, ND	0.00071, 0.00075	ND, ND
FL	Control	NA	NA	0.03, 0.03	ND, ND	0.04, 0.04	ND, ND	0.00063, 0.00075	ND, ND
NC	Control	NA	NA	0.02, 0.03	ND, ND	0.03, 0.04	ND, ND	0.00026, 0.00028	ND, ND
OK	Control	NA	NA	0.02, 0.02	ND, ND	0.03, 0.03	ND, ND	0.0021, 0.0021	ND, ND
GA	7	7.9	14	0.77, 0.81	0.16, 0.18	0.93, 0.99	0.03, 0.04	0.00091, 0.00092	0.011, 0.011
GA	7	7.9	14	0.12, 0.13	0.13, 0.14	0.25, 0.27	0.03, 0.03	0.00053, 0.00055	ND, ND
AL	7	7.9	14	0.53, 0.54	0.12, 0.14	0.65, 0.68	0.04, 0.05	0.00061, 0.00066	0.006, 0.009
FL	7	7.9	14	0.71, 0.74	1.22, 1.71	1.93, 2.45	0.09, 0.16	0.0012, 0.0012	0.006, 0.006
NC	7	7.9	15	0.41, 0.41	0.09, 0.10	0.50, 0.51	0.08, 0.10	0.00057, 0.00061	0.006, 0.008
OK	8	9.0	14	1.03, 1.23	0.64, 0.78	1.67, 2.01	ND, ND	0.0037, 0.0038	0.027, 0.030
GA	7	7.9	21	0.31, 0.41	0.11, 0.16	0.42, 0.57	0.03, 0.03	0.00083, 0.00084	0.005, 0.006
GA	7	7.9	21	0.19, 0.20	0.19, 0.21	0.38, 0.41	0.06, 0.07	0.00058, 0.00059	ND, ND
AL	7	7.9	21	0.36, 0.48	0.62, 0.67	0.98, 1.15	0.13, 0.15	0.00095, 0.00097	0.010, 0.011
FL	7	7.9	21	0.21, 0.26	0.08, 0.11	0.29, 0.37	0.08, 0.11	0.00050, 0.00075	ND, ND
NC	7	7.9	22	0.70, 0.89	0.06, 0.07	0.76, 0.96	0.06, 0.07	0.00060, 0.00083	0.007, 0.010
OK	8	9.0	21	0.30, 0.32	0.33, 0.38	0.63, 0.70	ND, ND	0.0025, 0.0026	0.008, 0.009

[a] Residues values represent single assays each for duplicate field samples, except for results from OK which represent duplicate assays of a single field sample.

[b] Combined residues of chlorothalonil and SDS-3701.

[c] NA = Not applicable.

[d] ND = Not detected (<0.01 ppm, chlorothalonil and SDS-3701; <0.00025 ppm, HCB; <0.005 ppm PCBN).

Table 17. Residues of chlorothalonil, its metabolites, and HCB and PCBN found in peanut nutmeats from peanuts harvested following applications of the 6 lb/gal FlC.

Location	Number of Applications	Total Applied (lb ai/A)	PHI (Days)	Residues (ppm)[a]					
				Chlorothalonil	SDS-3701	Combined Residues[b]	SDS-46851	HCB	PCBN
GA	Control	NA[c]	NA	ND[d], ND	ND, ND	ND, ND	ND, ND	0.00052, 0.00054	ND, ND
GA	Control	NA	NA	ND, ND	ND, ND	ND, ND	ND, ND	0.00030, 0.00030	ND, ND
AL	Control	NA	NA	ND, ND	ND, ND	ND, ND	ND, ND	0.00059, 0.00064	ND, ND
FL	Control	NA	NA	ND, ND	ND, ND	ND, ND	ND, ND	0.00037, 0.00041	ND, ND
NC	Control	NA	NA	ND, ND	ND, ND	ND, ND	ND, ND	0.00092, 0.0011	ND, ND
OK	Control	NA	NA	ND, ND	ND, ND	ND, ND	ND, ND	0.0010, 0.0011	ND, ND
GA	7	7.9	14	ND, ND	ND, ND	ND, ND	ND, ND	0.00055, 0.00060	ND, ND
GA	7	7.9	14	ND, ND	ND, ND	ND, ND	ND, 0.03	0.00050, 0.00060	ND, ND
AL	7	7.9	14	ND, ND	ND, ND	ND, ND	ND, ND	0.00059, 0.00059	ND, ND
FL	7	7.9	14	ND, ND	ND, ND	ND, ND	ND, ND	0.00054, 0.00057	ND, ND
NC	7	7.9	15	ND, ND	ND, ND	ND, ND	0.03, 0.06	0.0012, 0.0013	ND, ND
OK	8	9.0	14	0.05, 0.05	ND, ND	0.06, 0.06	ND, ND	0.0013, 0.0013	ND, ND
GA	7	7.9	21	ND, ND	ND, ND	ND, ND	0.03, 0.05	0.00063, 0.00064	ND, ND
GA	7	7.9	21	ND, ND	ND, ND	ND, ND	ND, ND	0.00040, 0.00050	ND, ND
AL	7	7.9	21	ND, ND	ND, ND	ND, ND	0.09, 0.16	0.00072, 0.00072	ND, ND
FL	7	7.9	21	ND, ND	ND, ND	ND, ND	ND, ND	0.00035, 0.00037	ND, ND
NC	7	7.9	22	ND, ND	ND, ND	ND, ND	0.04, 0.04	0.00092, 0.0012	ND, ND
OK	8	9.0	21	ND, ND	ND, ND	ND, ND	ND, ND	0.0014, 0.0014	ND, ND

[a] Residues values represent single assays each for duplicate field samples, except for results from OK which represent duplicate assays of a single field sample.

[b] Combined residues of chlorothalonil and SDS-3701.

[c] NA = Not applicable.

[d] ND = Not detected (<0.01 ppm, chlorothalonil and SDS-3701; <0.00025 ppm, HCB; <0.005 ppm PCBN).

Crops Grown Solely for Seed

No tolerances have been established for the combined residues of chlorothalonil and its metabolite SDS-3701 in/on grass commodities.

The 1991 DCI required residue data on grass seed and seed screenings reflecting the registered treatment of grass grown for seed. The registrant was given the option of submitting data from OR and MO or of proposing a regional tolerance for the Pacific Northwest supported by data from only OR.

ISK Biotech (1993; MRID 42875926) submitted data from a test conducted in OR depicting residues of chlorothalonil, SDS-3701, SDS-46851, and HCB in/on grass straw, screenings, and seed harvested 37 days after the last of three postemergence applications. The 6 lb/gal FlC formulation was applied at 1.5 lb ai/A/application in 10 gal/A, at 14- and 18-day intervals using aerial equipment. The formulation (Batch TMSLOUE) contained 54.2% chlorothalonil, 0.643% PCBN, and 0.025% HCB.

One treated and one untreated sample each of the grass seed and screenings and two treated and untreated samples of the grass straw were harvested and stored frozen (temperature unspecified) for 1335 days (3.6 years) prior to analysis by Ricerca. Residues were determined using the GC/ECD method described earlier in this report. Residues of chlorothalonil, SDS-3701, and HCB are presented in Table 18.

Table 18. Residues of chlorothalonil, its metabolites, and HCB and PCBN found in grass grown for seed following applications of the 6 lb/gal FlC.

Matrix	Residues (ppm)			
	Chlorothalonil	SDS-3701	Combined Residues[a]	HCB
Straw (C)[b]	0.19[c]	0.02, 0.03	0.21, 0.03	ND[d]
Screenings (C)	0.17	ND	0.018	ND
Seed (C)	0.030	ND	0.031	ND
Straw (T)[b]	29.8, 51.6	0.73, 1.12	30.5, 52.7	0.016, 0.021
Screenings (T)	71.8	0.76	72.6	0.030
Seed (T)	43.46	0.49	44	0.021

[a] Combined residues of chlorothalonil and SDS-3701.
[b] C = control; T = treated samples.
[c] Underlined figures represent mean values from duplicate or triplicate determinations obtained from the sample composite field sample.
[d] ND = Not detected (<0.01 ppm, SDS-3701; <0.00025 ppm, for HCB).

The data submitted on grass seed and screenings partially fulfill the requirements of the DCI. The registrant must propose a tolerance with regional registration for the combined residues of chlorothalonil and SDS-3701 in or on grass seed screenings. The available data indicate that a tolerance level of 75 ppm would be appropriate. In the absence of residue data from the state of MO, labels must be revised to restrict the use of chlorothalonil on grass grown for seed to the WA, OR and ID.

We note that current labels contain a livestock feeding restriction associated with uses on grass grown for seed. It is now Agency policy that a livestock feeding restriction on grasses is undesirable and impractical. However, in this case we believe that the limitation of the use to grasses grown for seed makes it unlikely that residues would occur on grass forage or hay not under grower control. Therefore, in lieu of tolerances on grass forage and hay, the current feeding restriction is acceptable.

MASTER RECORD IDENTIFICATION NUMBERS

The citations for the MRID documents referred to in this review are presented below.

42875900 ISK Biotech Corp. (1993) Submission of Residue Data in Response to the Data Call-In for Chlorothalonil. Transmittal of 27 studies.

42875908 Kenyon, R. (1992) Analytical Procedure for the Determination of Residues of Tetrachloroisophthalonitrile (Chlorothalonil, SDS-2787) and 2,5,6-Trichloro-4-Hydroxyisophthalonitrile (SDS-3701) in Peanuts, Potatoes and Tomatoes--1992: Lab Project Number: 5453-92-0396-MD-001: SDS-2787: SDS-3701. Unpublished study prepared by Ricerca, Inc. 38 p.

42875909 Vorndam, P. (1993) Final Method Validation Report: Chlorothalonil Independent Laboratory Method Validation: Lab Project Number: ISK-5453-93-301-00: SDS-2787: SDS-3701. Unpublished study prepared by Colorado Analytical R&D Corp. 142 p.

42875910 Wiedmann, J. (1993) Residues of Tetrachloroisophthalonitrile (Chlorothalonil, SDS-2787), SDS-3701, SDS-46851, HCB and PCBN in Cucumbers from a Stability Study (Field Incurred)--1988--Four Year Interim Report: Lab Project Number: 3064-88-0093-CR-002: 88-0093: SDS-2787. Unpublished study prepared by Ricerca, Inc. 113 p.

42875911 Rose, C. (1993) Residues of Tetrachloroisophthalonitrile (Chlorothalonil, SDS-2787), SDS-3701, SDS-46851, HCB and PCBN in Carrots from a Stability Study (Field Incurred)--1988--Four Year Interim Report: Lab Project Number: 88-096. Unpublished study prepared by Ricerca, Inc. 137 p.

42875912 King, C. (1993) Residues of Tetrachloroisophthalonitrile (Chlorothalonil, SDS-2787), SDS-3701, SDS-46851, HCB and PCBN in Celery from a Stability Study (Field Incurred)--1988: Four Year Interim Report: Lab Project Number: 3064-88-0136. Unpublished study prepared by Ricerca, Inc. 138 p.

42875913 King, C. (1993) Residues of Tetrachloroisophthalonitrile in Cherries from a Stability Study (Field Incurred)--1988: Four Year Interim Report: Lab Project Number:3064-88-0068. Unpublished study prepared by Ricerca, Inc. 134 p.

42875914 King, C. (1993) Determination of Residues of Tetrachloroisophthalonitrile (Chlorothalonil, SDS-2787), SDS-3701, SDS-46851, HCB and PCBN in Peanuts from a Stability Study (Field Incurred)--1988: Four Year Interim Report: Lab Project Number: 3064-88-0160. Unpublished study prepared by Ricerca, Inc. 145 p.

42875915 King, C. (1993) Residues of Tetrachloroisophthalonitrile in Potatoes from a Stability Study (Field Incurred)--1988: Four Year Interim Report: Lab Project Number: 88-0095. Unpublished study prepared by Ricerca, Inc. 148 p.

42875916 Kenyon, R. (1993) Determination of Residues of Tetrachloroisophthalonitrile (Chlorothalonil, SDS-2787), SDS-3701, SDS-46851, HCB and PCBN in Soybeans from a Stability Study (Field Incurred)--1988: Four Year Interim Report: Lab Project Number: 3064-88-0097. Unpublished study prepared by Ricerca, Inc. 124 p.

42875917 Kenyon, R. (1993) Determination of Residues of SDS-3701, SDS-46851, HCB and PCBN in Tomatoes from a Stability Project Number: 3064-88-0083. Unpublished study prepared by Ricerca, Inc. 122 p.

42875918 Kenyon, R. (1993) Determination of Residues of Tetrachloroisophthalonitrile (Chlorothalonil, SDS-2787), SDS-3701, SDS-46851, HCB and PCBN in Wheat Grain from a Stability Study (Field Incurred)--1988: Four Year Interim Report: Lab Project Number: 3064-88-0070. Unpublished study prepared by Ricerca, Inc. 120 p.

42875919 King, C. (1993) Determination of Residues of SDS-3701, and HCB on Bananas: Part. 1 Bananas from Columbia: Lab Project Number: 5529-92-0515-CR-001: 1-92-106: ISK-92-001-00. Unpublished study prepared by Ricerca, Inc. 303 p.

42875920 King, C.; Ballee, D. (1987) Residues of SDS-3701, SDS-46851, HCB and PCBN on Cabbage--Florida--1987: Lab Project Number: 1423-86-0095-CR-002: SDS-2787. Unpublished study prepared by Ricerca, Inc. 55 p.

42875921 Marks, A. (1986) Determination of Residues of SDS-3701, SDS-46851, HCB and PCBN on Cabbage: Lab Project Number: 34536: 1163-86-0017-CR-002. Unpublished study prepared by Analytical Bio-Chemistry Labs, Inc. 86 p.

42875922 King, C. ; Prince, P. ; Ballee, D. (1991) Residues of SDS-3701, SDS-46851, HCB and PCBN in Cabbage, Bulb Onions and Cauliflower--1987: Lab Project Number: 1717-87-0119. Unpublished study prepared by Ricerca, Inc. 83 p.

42875923 King, C. ; Ballee, D. (1988) Residues of SDS-3701, SDS-46851, HCB and PCBN on Broccoli--1987: Lab Project Number: 1715-88-0122. Unpublished study prepared by Ricerca, Inc. 50 p.

42875924 King, C.; Ballee, D. (1988) Residues of SDS-3701, SDS-46851, HCB and PCBN on Brussels Sprouts--1987: Lab Project Number: 1716-88-0003. Unpublished study prepared by Ricerca, Inc. 50 p.

42875925 King, C. (1993) Magnitude of Residues of SDS-3701, SDS-46851, HCB and PCBN on Peanuts following Applications of Bravo 720--1991: Lab Project Number: 5064-92-0123. Unpublished study prepared by Ricerca, Inc. 611 p.

42875926 King, C. (1993) Magnitude of Residues of SDS-3701 and HCB on Grass Seed, Screenings and Straw--1989: Lab Project Number: 5339-92-0226: 5339-92-0226-CR-001. Unpublished study prepared by Ricerca, Inc. 166 p.

42875927 King, C. (1993) Determination of the Magnitude of Residues, SDS-3701 and HCB on Prunes--Processing Study--1992: Lab Project Number: 5485-93-0022-CR-001: 5485-93-0022. Unpublished study prepared by Ricerca, Inc. 321 p.