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

Feb 21, 1995

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM:

SUBJECT: The HED Chapter of the Reregistration Eligibility Decision Document (RED) for Captan, N-trichloromethylthio-4-cyclohexene-1,2-dicarboximide. Case# 0120, Chemical Code 081301; Reg. Group A).

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and

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Please find attached the Human Health Assessment for the Captan Reregistration Eligibility Decision Document (RED). This chapter includes the Hazard Assessment from P. Chin in TB1 (ATTACHMENT I), the Occupational/Residential Exposure Assessment from J. Evans in OREB (ATTACHMENT IIa,b), the Product and Residue Chemistry Assessments from C. Olinger and S. Funk in CSRS (ATTACHMENT IIIa,b,c), and the Dietary Risk Analysis from J. Wintersteen in SAB (ATTACHMENT IV).

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Attachments
cc:
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P. Chin
J. Evans
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J. Wintersteen
K. Whitby

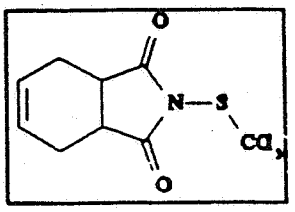
SCIENCE ASSESSMENT OF CAPTAN

A. PRODUCT CHEMISTRY ASSESSMENT

The product chemistry data base for captan is incomplete. A Summary of the Product Chemistry data base and data gaps may be found in Appendix I attached to this document. To maintain continued registration of captan following issuance of the RED, the product chemistry data gaps must be fulfilled. These data are considered confirmatory.

1. Identification of the Active Ingredient

Captan [(N-trichloromethylthio-4-cyclohexene-1,2-dicarboximide) (trade names: Merpan, Orthocide, Vondcaptan, Vancide-89 and SR-46)] belongs to the chemical class of dicarboximides or chlorinated organosulfur compounds.



Empirical Formula:	$C_9H_8Cl_3NO_2S$
Molecular Weight:	300.61
CAS Registry No.:	133-06-2
Shaughnessy No.:	081301

Technical captan is a white to buff powder with a melting point of 158-164° C and a vapor pressure of less than 10^{-6} mm Hg at 25° C. Captan is practically insoluble in water, and is soluble in acetone, ethanol, kerosene, xylene, chloroform, and benzene.

2. Other Product Chemistry Issues

A search of the Reference Files System (REFS) conducted 11/30/93 identified eight manufacturing-use products (MPs) registered under Shaughnessy No. 081301. These includes the Drexel Chemical Company 90% FI (EPA reg. No. 19713-258), the Gustafson 90% technical captan(90% T; EPA Reg. No. 7501-24), the Makhteshim Chemical Works Ltd. 90% technical captan (90% T; EPA Reg. No. 11678-1), and 5 products from Zeneca Inc., formerly ICI Americas, Inc., (92% T, Reg. No. 10182-262; 90% T, EPA Reg. No. 10182-197; 90% T, EPA Reg. No. 10182-293; 88.92% F.I., EPA Reg. No. 10182-198; 87% F.I., EPA Reg. No. 10182-298). All 8 MPs are subject to a reregistration eligibility decision.

B. Human Health Assessment

1. Toxicology Assessment

The toxicological data base is adequate and will support reregistration.

a. Acute Toxicity

Acute toxicity values and categories for captan are summarized in the following table.

ACUTE TOXICITY VALUES - CAPTAN TECHNICAL

TEST	RESULT	TOXICITY CATEGORY
81-1: Oral LD50; Rat; MRID Nos. 001148 & 00054789; Technical captan	LD50 = 9 g/kg (M)	IV
81-2: Dermal LD50; Rabbit; MRID Nos. 400214-01; Technical captan (86.94%)	LD50 > 2 g/kg	III
81-3: Inhalation LC50; Rat; MRID No. 258791; Captan (87% a.i.)	LC50 = 0.72 mg/L (M) LC50 = 0.87 mg/L (F)	III
81-4: Primary Eye Irritation; Rabbit; MRID No. 00128621; Captan 90% concentrate (85.1% a.i.)	Unwashed eyes PIS = 70/110 at 7 days, PIS = 16/110 at 21 days (irreversible corneal opacity). Washed eyes PIS = 0/110 at 7 days	I
81-5: Primary Dermal Irritation; Rabbit; MRID No.400214-01; Captan (86.94% a.i.)	Not an irritant at 3 days	IV
81-6: Dermal Sensitization; Guinea pig; MRID No. 00054791; Technical Captan	Moderate skin sensitizer	N/A

The above studies satisfy the acute toxicity data requirements (81-1 to 81-6) for captan.

b. Subchronic Toxicity

The toxicological data requirements (82-1) for 90-day feeding studies in rodents and nonrodents (dog) are satisfied by a two year chronic/oncogenicity feeding study in rats (MRID Nos. 00130316, 00129163 and 00129164; Accession Nos. 250667 and 250668) and a one-year dog feeding study (MRID No. 408936-04), respectively (see B.1

d. and B.1.c below).

In a 21-day dermal toxicity study, New Zealand White rabbits were exposed to captan at doses of 0, 12.5, 110 or 1000 mg/kg/day. The NOEL for systemic toxicity was 110 mg/kg/day and the LEL for systemic toxicity was 1000 mg/kg/day, based on reduced body weight, body weight gain and food consumption (MRID No. 402732-01). The NOEL for dermal irritation was less than 12.5 mg/kg/day (LDT). The LEL for dermal irritation was equal to or less than 12.5 mg/kg/day, based on acanthosis and hyperkeratosis. This study satisfies the guideline toxicological data requirement for a 21-day dermal toxicity study (82-2) in rabbits.

In a 90-day inhalation toxicity study, Wistar rats were exposed to captan (88.7%) at 0, 0.13, 0.60, 5.06, or 12.98 µg/L for 13 weeks (6 hrs/day, 5 days/week). No systemic toxicity was seen at the highest dose tested. Therefore, the NOEL/LEL were greater than 12.98 µg/L (HDT). Local irritation was observed at all doses tested. The local irritation LEL was equal to or less than 0.13 µg/L (LDT), based on squamous hyperplasia in the larynx of females (MRID No. 412344-02). This study satisfies the toxicological guideline data requirement for a 90-day inhalation toxicity study (82-4) in rats.

c. Chronic Toxicity

The required chronic toxicity study in rodents (83-1) is satisfied by a chronic/carcinogenicity feeding study in rats [MRID Nos. 00130316, 00129163 and 00129164; Accession No. 250667 and 250668]. The results of this study are detailed in 1d below.

In a chronic toxicity feeding study in non-rodents, Beagle dogs were dosed with captan at doses of 0, 12.5, 60 or 300 mg/kg/day in capsules daily for one year (MRID No. 408936-04). The NOEL for systemic toxicity was 60 mg/kg/day and the LEL was 300 mg/kg/day, based on emesis and soft/mucoid stools. This guideline study satisfies the toxicological data requirement for a chronic feeding study [83-1] in non-rodent.

d. Carcinogenicity

Rats were tested in the following two carcinogenicity studies:

In the first study, a chronic/carcinogenicity feeding study, Charles River CD strain rats (70/sex/group) were fed diets containing 0, 500, 2000 or 5000 ppm captan (0, 25, 100 or 250 mg/kg/day) for 2 years [MRID Nos. 00130316, 00129163 and 00129164; Accession Nos. 250667 and 250668]. The NOEL for systemic effects was 25 mg/kg/day. The LEL of 100 mg/kg/day was based on hepatocellular hypertrophy (males); increased relative organ weight for kidneys (males and females), increased relative organ weight for heart, brain, liver and thyroid/parathyroid (males) and decreased body weight for

males (12%) and females (19%) when compared to controls. The Cancer Peer Review document dated 12/29/86 indicated that the MTD was apparently exceeded at 100 mg/kg/day based on decreased body weight. There was a dose-related trend for combined adenomas and carcinomas of the kidney in male rats. The percent incidence of combined adenomas and carcinomas of the kidney was 1, 1, 4, and 6% for 0, 25, 100 and 250 mg/kg/day groups, respectively. There was no increased incidence of renal cortical/tubular cell neoplasias in females.

In the second study, a carcinogenicity feeding study, Wistar rats (50/sex/group) were fed diets containing 0, 125, 500 or 2000 ppm captan (0, 6.25, 24 or 98 mg/kg/day) for 30 months [Accession No. 260078]. The NOEL/LEL for systemic toxicity were equal to or greater than 2000 ppm (HDT). There was no increase in the incidence of renal cortical/tubular cell neoplasms. There was a slight but statistically significant increase in uterine sarcomas (4/50 vs 0/48 in controls) in the high dose group [The MTD was apparently approached at the high dose (10% body weight decrease).]

The above studies, when combined, satisfy the toxicological data requirement [83-5 or 83-1a and 83-2a] for a chronic/carcinogenicity feeding study in rats.

Mice were tested in the following three carcinogenicity studies:

In a carcinogenicity study conducted in B6C3F1 mice (50/sex/treated group; 10/sex/matched controls; 65/sex for pooled controls), mice were fed diets containing 0, 6,000 and 16,000 ppm captan (0, 900, and 2,400 mg/kg/day) for 80 weeks followed by no treatment for 33 weeks (National Cancer Institute, 1977. Bioassay of Captan for Possible Carcinogenicity. Technical Report Series No. 15). The NOEL for systemic toxicity was 6000 ppm and the LEL for systemic toxicity was 1,6000 ppm based on decreased mean body weight from the matched controls (about 10% less in both sexes). There was no treatment related increase in mortality and the MTD was apparently approached at 16,000 ppm. Male and female mice had an increased incidence in combined duodenal adenoma/polyps or adenocarcinomas at the 16,000 ppm level, with the first reported tumor at 91 weeks. A positive linear trend in males ($p=0.08$) and the Fisher exact test in high-dosed males gave a probability level of 0.009. There was a minimal increase in hyperplasia of the duodenal mucosa noted in the high dose males.

In a second study, ICR derived CD-1 Charles River mice (80/sex/group) were initially fed diets containing 0, 2,000,

6,000 or 10,000 ppm of captan for 4 weeks. Subsequently captan concentrations were increased to 0, 6000, 10,000 or 16,000 ppm (900, 1,500 or 2,400 mg/kg/day for females and at 900, 1,000 or 2,400 mg/kg/day for males) for the remainder of the study (Accession No. 00068076). The NOEL for systemic toxicity was not established. The LEL for systemic toxicity was 6000 ppm, the lowest dose tested, based on decreased body weight gain and food consumption (no quantitative information was available). Both high dose males and females weighed 25% less than controls. In high dose males and females, the mortality was higher, suggesting that the MTD was exceeded. At week 75, the survival in males was 68% (high-dose), 75% (mid-dose), 79% (low-dose) and 83% (controls). There was an increased ($p<0.001$) incidence of small intestinal (primarily duodenal) adenomas/polyps and carcinomas at all dose levels. The incidences of duodenal tumors for males and females, respectively, were 2.7% and 2.8% (control), 27% and 31% (low-dose), 29% and 25% (mid-dose), and 52% and 38% (high-dose). A positive dose-related trend for an increased incidence of duodenal tumors in both sexes ($p<0.005$) was also observed. Proliferative duodenal changes appeared to occur earlier in the high dose males. There was also a statistically significant increase in gastric and duodenal hyperplasia in both sexes and in jejunal hyperplasia in females. Stomach neoplasias were not reported. This study satisfies the toxicological data requirement for a carcinogenicity study [83-2 (b)] in mice.

In a third study, Charles River CD-1 mice (100/sex/group) were fed diets containing 0, 100, 400, 800 or 6,000 ppm captan (0, 15, 60, 120, or 900 mg/kg/day) and the study was terminated at 22 months due to increased mortality in the high dose males (MRID No. 00126845). The survival in males was 15% (high-dose) and 36% (controls) at week 75 and 7% (high-dose) and 25% (controls) at 22 months. The NOEL for systemic toxicity was 800 ppm and the LEL for systemic toxicity was 6000 ppm based on increased mortality in males and reduced weight gain throughout the study (males and females). There was a small increase in small intestinal tumors (benign and malignant) in the male (6%) and female (8%) high dose groups (controls = 0%). The results of an Agency audit of this study suggested that there "was a problem with achieving and maintaining the appropriate dose levels throughout the study" (Copley memo 4/23/86 to Jacoby (PM 21), Registration Division).

Carcinogenicity Classification

Captan was classified as a Group B2 "probable human carcinogen" based on the following evidence (memo R. Engler; 12/29/86):

1. Captan produced an increased incidence of renal

cortical/tubular cell neoplasms in male Charles River CD rats and an increased incidence of uterine sarcomas in female Wistar rats.

2. Captan produced an increased incidence of intestinal neoplasms in B6C3F1 mice, ICR-derived CD-1 mice and in Charles River CD-1 mice.
3. Captan demonstrated mutagenic activity and it is structurally related to two carcinogens (captafol and folpet), which also have mutagenic activity.

The Q_1* was 3.6×10^{-3} $(mg/kg/day)^{-1}$ (geometric mean) based on findings of duodenum/jejunum-ileum adenomas/carcinomas in mice of both sexes, in the ICR-derived CD-mice study. The other carcinogenic studies were included in the weight of the evidence classifying captan as a B2 carcinogen. A laboratory audit discovered inadequacies in achieving and maintaining of dose levels in the Charles River CD-1 mice study. An Agency's Scientific Advisory Panel considered the carcinogenic effects in the rat to be equivocal (memo E. Rinde, 7/20/88 and PD 4).

e. Developmental Toxicity

A developmental toxicity study was conducted with New Zealand White rabbits (20 rabbits/group) (MRID No. 41826901). Captan was administered by oral gavage at doses of 0, 3, 10, 30 or 100 mg/kg/day from gestation days 7 through 19. The maternal NOEL was 10 mg/kg/day and the maternal LEL was 30 mg/kg/day, based on reduced body weight gain, decreased food consumption, and anorexia in the does. The developmental NOEL was 10 mg/kg/day and the developmental LEL was 30 mg/kg/day, based on increased incidence of skeletal defects (27 pre-sacral vertebrae) ($p < 0.01$) in both fetuses and litters at 30 and 100 mg/kg/day. In addition, there was increased post-implantation loss ($p < 0.01$), reduced mean fetal weight ($p < 0.05$) and increased manus score (altered growth) ($p < 0.01$) at 100 mg/kg/day. This study satisfies the guideline data requirement for a developmental toxicity study (83-3) in rabbits.

Another developmental toxicity study was conducted with Golden Syrian hamsters (30/group) (MRID No. 00086803). Hamsters were treated by oral intubation on days 5 through 10 of gestation with 0, 50, 200 or 400 mg/kg/day of captan. The maternal NOEL/LEL were considered to be 50 and 200 mg/kg/day based upon reduced body weight gain and increased mortality. The developmental NOEL/LEL were considered to be 200 and 400 mg/kg/day based upon increased incidences of delayed ossification, decreased weight and increased resorptions. This study satisfies the guideline data requirement for a developmental toxicity study (83-3) in a second species.

f. Reproductive Toxicity

One- and three-generation reproduction studies were conducted

in COBS CD rats (MRID Nos. 00120315 & 00125293). In the one-generation study, captan was administered in the diet at dose levels of 0, 6, 12.5 or 25 mg/kg/day to male and female rats. For this study, 15 males were mated with 30 females. No compound related effects were seen. This study by itself does not satisfy Subdivision F guidelines because it is only a one-generation reproduction study.

In the three-generation study, the dose levels tested were 0, 25, 100, 250 or 500 mg/kg/day. For this study, 15 males were mated with 30 females. Maternal toxicity NOEL/LEL were considered to be 12.5 and 25 mg/kg/day based on decreased body weight gain and food consumption. Reproductive toxicity NOEL/LEL were considered to be 12.5 and 25 mg/kg/day based on decreased pup litter weights. Pup survival was reduced at 250 mg/kg/day or higher.

These two studies, when considered together, satisfy the toxicological guideline data requirement for a reproductive toxicity study (83-4) in rats.

g. Mutagenicity

Acceptable studies for mutagenicity fulfill all three categories for mutagenicity testing (under pre-1991 guidelines) and there are no data gaps. Captan can produce mutagenic events in bacteria, eukaryotic microorganisms, and mammalian cells in culture.

The following is a summary of the mutagenic potential of captan.

a) Gene mutation - Captan (50% technical) was not mutagenic in vivo in host-mediated assays in mice or rats with the target bacterial cultures of S. typhimurium hisG46 or TA1950, respectively (MRID No. 00131715). In these assays, mice were treated with captan orally at 1 g/kg or subcutaneously at 0.5 g/kg and rats were treated with captan orally at 2 g/kg following intraperitoneal injection of bacterial cultures.

Captan at 0, 1, 5, 10, 15 or 25 µg/plate induced point mutations in E. coli and S. typhimurium strains TA100, TA1535, TA1537 and TA1538 in the absence and presence of metabolic activation (MRID No. 00114210).

b) DNA damage/repair - Captan was negative in an assay for unscheduled DNA synthesis (UDS) in WI-38 (human fibroblast) cells at concentrations up to severely cytotoxic levels (50^{-6} M in the absence of metabolic activation; 1000 x 10^{-6} M in the presence of metabolic activation) (MRID No.00244432).

c) Structural chromosome aberrations - Captan was not mutagenic for inducing structural chromosome aberrations in human fetal fibroblasts exposed to captan at 3 or 4 µg/mL dosage levels. Also, captan was not positive for inducing chromosomal aberrations in bone-marrow cells of the male rats treated orally up to 2 g/kg captan in a single dose, or five doses of up to 0.8 g/kg (MRID No. 00131725).

Captan was positive for inducing structural chromosome aberrations in Chinese hamster cells at 4.5×10^{-5} M and above (MRID No. 00131727).

h. Metabolism

The absorption, distribution, metabolism, and excretion of captan were studied in groups of rats administered a single oral gavage of 10 or 500 mg/kg ^{14}C-captan (labeled at 2-C and 7-C positions) or repeated oral dosing of 10 mg/kg unlabeled captan followed by a single dose of 10 mg/kg ^{14}C-captan on day 15 (MRID Nos. 415054-01 to 415054-04). Captan was rapidly absorbed, metabolized and eliminated in rats for all dosing regimens. There were no remarkable sex-, dose- or treatment-related differences in the absorption, distribution and elimination of captan in rats. The urine was the main route of elimination regardless of dosing regimen. Total recovery of radioactivity in the urine and feces was 69.3-90.8% and 7.3-25.0% of the administered dose, respectively in the various groups. The tissues, expired air and cage washes contained less than 0.8% for all dose groups. The identities of urinary and fecal metabolites of captan are described in detail below. This study satisfies the toxicological guideline data requirement for a metabolism study (85-1) in rats.

The following is a summary of metabolism studies of captan in rats cited in the Position Document 2/3 (PD 2/3 June 1985). According to the Agency PD 2/3, the initial step in the metabolism of captan appears to be hydrolysis of captan into two different parts, via cleavage of the N-S bond, to form THPI (tetrahydrophthalimide) and a derivative of the trichloromethylthio side chain. A major site of the hydrolytic cleavage of captan is the gastrointestinal tract, although the process also occurs in blood. For each of the two different metabolites formed by the hydrolysis of captan, analysis of 0-48 hour rat urine has indicated the presence of a separate metabolic pathway.

For the pathway involving the trichloromethylthio side chain group, a total of 4 urinary metabolites were found. The metabolites identified were thiophosgene, thiazolidine-2-thione-4-carboxylic acid, and dithiobis (methanesulfonic acid) and its disulfide monoxide derivative (Position Document 2/3, June 1985).

For the THPI pathway, a total of 7 urinary metabolites were found (MRID Nos. 415054-01 to 415054-04). The primary metabolite was THPI which was formed from the cleavage of the trichloromethylthio moiety. THPI represented 5.7 to 15.4% of the urinary radioactivity. Six other metabolites identified were 3-OH THPI, 5-OH THPI, THPI-epoxide, THPI-diol, cyclohexene acid amide, and 3-OH-cyclohexene acid amide.

Five metabolites and one unidentified compound were found in the feces. The unidentified compound is suggested to be the parent compound; however data were inadequate to show that it was unmetabolized captan. The primary metabolite was THPI which represented 30 to 39% of the fecal radioactivity. Five other metabolites identified were 3-OH THPI, 5-OH THPI, THPI-diol, cyclohexene acid amide, and 3-OH-cyclohexene acid amide.

i. Dermal Absorption Study

In a dermal absorption study, male Sprague-Dawley rats were exposed to 2 doses (0.5 or 5 mg/animal) of ring ^{14}C-labeled captan. At 1, 2, 4 and 8 hours after dosing, 4 animals from each dose were sacrificed. The skin at the application site, blood sample, total urine and feces and residual carcass were collected and analyzed for radioactivity. A maximum daily dermal absorption rate of captan was approximately 10% based upon 1.3%/hour for 8 hours at 5 mg/animal. At 0.5 mg/animal, captan was absorbed at 0.9%/hour. This study satisfies the guideline requirement 85-2 for a dermal penetration study [MRID No. 00117083; Accession No. 249333].

j. Other Toxicological Considerations

In June 1980, the Agency issued the PD 1 based on concerns that Captan may produce other chronic or delayed toxic effects to organs and functions of the body including the lungs, central nervous system, hematopoietic system, metabolism, kidneys, reproductive systems and others. At the time available data suggested that captan may have teratogenic, fetotoxic and hypersensitivity effects.

In June 1985, the Agency issued the PD 2/3 based on human health concerns for captan which included carcinogenicity, reproductive effects and teratogenicity. On September 26, 1985, the FIFRA Scientific Advisory Panel (SAP) concurred with the Agency, that captan is carcinogenic at high levels in the mouse intestine and that the carcinogenicity data in the rat kidney were equivocal. On February 24, 1989, the Agency issued the Position Document 4 (PD 4) which 1) confirmed the carcinogenicity effects of captan in mice, 2) stated that "EPA's preliminary risk assessment for reproductive effects was based on a three-generation study in rats and a one-generation rat study; while neither the three- nor the one-generation study was adequate in itself due to the dose

selection in each study, each stud. provided sufficient information for EPA to reach a scientific conclusion on reproductive toxicity potential of captan" and 3) stated that "EPA's assessment that captan is not teratogenic in the hamster or the rat was reviewed by the SAP in September, 1985 and the Panel concurred with EPA's judgement."

k. Reference Dose (RfD)

A RfD was established for captan at 0.13 mg/kg/day, based on a NOEL of 12.5 mg/kg/day from two complementary reproductive toxicity studies in rats (MRID Nos. 120315 and 125293) and an uncertainty factor of 100 (to account for inter-species extrapolation and intra-species variability). The critical effect, decreased pup body weight, was observed at the LEL of 250 mg/kg/day (memo G. Ghali;01/31/94).

l. Developmental neurotoxicity

The RfD Committee recommended a developmental neurotoxicity study for captan be conducted based on the findings of encephalocoele and dilation of brain ventricles in rabbits and exencephaly in hamsters. However, rereview of DERs and study report revealed that the incidence of encephalocoele and dilation of brain ventricles in the rabbit developmental toxicity is limited to one fetus at the highest dose tested, and that exencephaly in the hamster developmental toxicity study occurred in the control group only. Because neurotoxicity was not observed in a dose related fashion in the treated animals in the developmental toxicity studies in either rabbits or hamsters, Toxicology Branch I is <u>not</u> requiring a developmental neurotoxicity study (Paul Chin Memorandum dated 1/11/95).

2. Exposure Assessment

a. Dietary Exposure

(1). <u>GLN 171-3; Directions for Use</u>: There are 29 end-use products (EP) of captan currently registered by Zeneca for food/feed crops *[Source: REFS search conducted 1/24/95]*. Only WP, FLC, and WDG formulations are registered for foliar applications. Dusts, in addition to the aforementioned formulation classes, are registered for seed treatment. A comprehensive summary of registered food/feed use patterns based on these product labels may be found in the Residue Chemistry Chapter (Attachment III-b; pps. 7-19; Table A; EPA Reg. Nos. 10182-145, -146, -147, -148, -149, -161, -164, -165, -166, -176, -190, -200, -290, -291, -292, -296, -297, -302, -303, -304, -311, -312, -316, -318, -319, -320, -321, -333, -364; uses permitted under CA930007 for foliar application to pears and SC920001 for chemigation of strawberries were also used). Zeneca has requested voluntary cancellation of 10182-153, -313 and

-314 in a letter dated 10/25/93 and products 10182-289, -295, -305, and -315 in a letter dated 2/24/94.

The following labels must be revised to include a maximum annual use rate and pre-harvest interval: 10182-165 and 10182-149. The two labels must specify that the annual rate includes any post-harvest sprays. The directions for post-harvest dip for apples, cherries and pears must be modified on label 10182-165. The feeding restrictions for almond hulls must be removed from label 10182-165 because such a restriction is not practical.

(2). GLN 171-4 (a): Plant Metabolism: The qualitative nature of the residue in plants is adequately understood based on acceptable lettuce and tomato metabolism studies. These studies indicated that captan is cleaved at the N-S bond to form THPI, which is further metabolized. The metabolite of the cleaved side chain is carbon dioxide (CO_2), which may be reincorporated into plant constituents. Captan is the major residue in tomato fruits and lettuce comprising 55-81% of the total radioactive residue (TRR). Minor residues include 1,2,3,6-tetrahydrophthalimide (THPI), (4-9% of the TRR), captan epoxide, (0.4%), and THPI epoxide (0.9%). Bis(trichloromethyl) disulfide, *trans*-3-hydroxy-1,2,6-trihydrophthalimide (3-OH-THPI) and *trans*-5-hydroxy-1,2,6-trihydrophthalimide (5-OH-THPI) may be present at very low levels. The residue of concern in raw and processed plant commodities is captan *per se*.

(3). GLN 171-4 (b): Animal Metabolism: The qualitative nature of the residue in animals is adequately understood, based on acceptable poultry and ruminant metabolism studies with cyclohexyl ring-labeled (CHR) [^{14}C]captan and trichloromethyl-labeled (TCM) [^{14}C]captan. No captan was detected in tissues, milk, or eggs. The major residues in goat muscle, liver, kidney and milk are 3-OH-THPI and 5-OH-THPI; in addition THPI was a major residue in goat fat. THPI was the major residue in hen matrices. Captan metabolism in livestock proceeds through rapid cleavage of the trichloromethyl moiety, followed by oxidation and hydroxylation of the cyclohexyl ring. The trichloromethyl carbon is taken up into the single carbon pool and incorporated into natural constituents. Sufficient data are available to assess the dietary risk from animal commodities bearing captan residues. The residues of concern in animals are captan and THPI.

(4). GLN 171-4 (c/d): Residue Analytical Methods - Plants and Animals: Adequate methodology is available for enforcement of tolerance residues of captan *per se* in/on plant commodities. A GC/electron capture detection (EC) method included in PAM, Vol. II as Method I is the preferred enforcement method. Other methods in PAM Vol. II that use colorimetry to analyze surface residues from plant tissues are not acceptable. Data submitted to support crop tolerances and in response to the DCI (residue reduction) were

collected using the following GC methods: Chevron Methods No. RM-1K-1 and RM-1K-2 for captan and THPI, Stauffer Method No. RRC-76-30R for captan and RRC-78-20 for THPI, and Zeneca (formerly ICI) Method No. WRC 89-51 for captan and THPI.

Zeneca Method No. 166 for quantifying THPI in meat and milk has been validated for use in tolerance enforcement. This method has also been used for data collection and is adequate for that purpose.

Captan is completely recovered (>80%) using PAM Vol. I Multiresidue Protocol E, Section 211.1 for oily matrices and partially recovered (50-85%) using Protocol E Section 212.1 for non-oily matrices. Captan is completely recovered using Multiresidue Protocol D (Luke Method; 232.4). THPI is completely recovered through Protocol D, but not through Protocol E (PESTDATA, PAM, Vol. 1, Appendix, 8/93).

(5). GLN 171-4 (e): Storage Stability: Storage stability studies have been conducted with crop matrices. The stability of captan is somewhat dependent on the extent of sample preparation. Captan *per se* is stable for periods of 3-14 months in whole almonds, apples, apple juice, apple sauce, grape dry pomace, raisins, spinach, strawberries, sugar beet tops, tomato dry pomace, and tomato sauce, and for 3 months in cherries and wheat forage. Captan *per se* was not stable in almonds, corn grain, or spinach that had been ground prior to fortification or in beet tops, whole corn grain, cucumbers, lettuce, potatoes, soybean seed and forage, or tomatoes. As captan degrades to THPI, which exhibits greater stability, the total captan plus THPI residues can show the overall stability of total residues. Captan plus THPI residues were stable for 9-15 months on whole almonds, apples, apple juice, applesauce, beet tops, cherries, cucumbers, grape dry pomace, raisins, soybean forage, chopped spinach, strawberries, sugar beet tops, tomato dry pomace, tomato sauce, and wheat forage. Combined residues were stable for 3-6 months in lettuce, potatoes, and soybean grain, and for 1-2 months in ground almonds, ground corn grain, and finely chopped spinach. The data are adequate to support the residue data submitted to support foliar applications and seed treatments. Additional storage stability data may be required to support any new magnitude of residue data submitted in the future.

Sufficient storage stability data are available to support the residue data for milk. Additional data are required to demonstrate the stability of THPI residues in animal tissues. These data are considered confirmatory since the milk data give a preliminary indication of the stability of THPI residues in animal commodities.

(6). GLN 171-4 (k): Magnitude of the Residue in Plants: All data requirements for magnitude of the residue in plants have been evaluated. Requirements for confirmatory field trials on caneberries and on strawberries in FL remain outstanding. Otherwise, all data are adequate to reassess captan tolerances in

light of canceled and revised uses. Field data on fruit and nut orchard crops and grapes are available reflecting multiple foliar applications of WP, FLC, or WDG formulations with appropriate PHIs and geographic representation. Data on postharvest fruit dip are available for apples, cherries, and pears. Data from seed treatments using WP/FLC and D formulations on representative crop seed and potato seed pieces indicate that these uses will not result in detectable residues of captan in/on edible commodities.

Data from a minimum of two additional field trials are required for reregistration of raspberries, dewberries and blackberries. Additional field trials for strawberries grown in FL are required due to an increase of incidences of fruit with over-tolerance residues. A minimum of three field trials must be conducted on strawberries in FL. The maximum single application rate and maximum seasonal rate to be proposed by the registrant must be used on strawberries grown using drip irrigation as typically employed in FL. Berries must be harvested the day of the final application, unless the registrant intends to propose a different pre-harvest interval for FL. These data are considered confirmatory.

(7). GLN 171-4 (1): Magnitude of the Residue in Processed Food/Feed: All data requirements for magnitude of the residue in processed food/feed have been evaluated and deemed adequate to determine the extent to which residues concentrate in food/feed items upon processing of the raw agricultural commodity. Captan residues tend to concentrate in raisins and raisin waste. Residues tend to reduce or convert to THPI in all other processed commodities.

(8). GLN 171-4 (1): Magnitude of the Residue in Meat, Milk, Poultry, and Eggs: Cattle feeding studies have been evaluated and found adequate to satisfy ruminant feeding study data requirements. Using Table II (June, 1994), the maximum theoretical dietary burden for dairy cattle is 54 ppm and beef cattle is 111 ppm, based on residue contributions from wet apple pomace (40% dry matter), raisin waste, and almond hulls. The feeding study data represent daily dietary levels of 10, 30 or 100 ppm and are adequate for assessing the established tolerances and establishing a new tolerance for milk.

A poultry feeding study is not required. Using the revised Table II to the Subdivision O Residue Chemistry Guidelines, the only poultry feed items which remain are those grown from captan treated seed. Since residues of captan and THPI are not detectable in the poultry feed items, poultry feeding studies and tolerances will not be required.

(9). GLN 171-5 Reduction of Residue: Data pertaining to reduction of captan residues on plant commodities were submitted in response to the Special Review of captan. Studies conducted on apples, cantaloupe, cucumbers, grapefruit, lemons, lettuce, oranges,

squash, strawberries, and spinach indicate that residues are substantially reduced by washing and are almost non-detectable after peeling. Cooking studies on celery, cucumbers, squash, and spinach indicate that residues of captan are almost non-detectable after cooking, with a corresponding increase in the THPI residues.

(10). GLNs 165-1 and 165-2: Confined/Field Rotational Crops: Confined rotational crop studies were reviewed previously by EFGWB and judged unacceptable due to low field application rates. However, since the EFGWB review, captan use patterns have become more restrictive, such that the only uses pertinent to rotational crops are seed treatments. There are no captan uses on annual crops. The studies have been reconsidered under the current use patterns, and it has been concluded that no detectable residues of captan or THPI are likely in rotated crops and that no field rotational crop data or tolerances for rotated crops are required.

(11). Other Dietary Exposure Considerations - Anticipated Residues

CBRS provided anticipated residues (ARs) for use in chronic dietary risk evaluation and separate ARs for upper bound carcinogenicity risk assessment. ARs for use in the acute dietary risk assessment were also provided (S. Funk memo, 9/22/94). ARs for some commodities were higher than the tolerance or reassessed tolerance for that commodity, e.g., grapes (reassessed tol = 10 ppm, AR = 23 ppm), raisins (reassessed tol = 20 ppm, AR = 46 ppm) and strawberries (tol = 25 ppm, AR = 75 ppm). CBRS explains this unusual situation in a C. Olinger memo dated 10/26/94. All acute ARs recommended by CBRS were used in the acute dietary analysis, whether or not the value was higher than the tolerance or reassessed tolerance for reregistration.

BEAD provided a Quantitative Usage Analysis for Captan (Kathleen Vinlove memo, 3/31/94) which provided ranges of percent of site treated for certain agricultural uses. When a range was provided the highest value was used in the DRES analysis. When anticipated residues were provided from survey or monitoring data no percent of crop treated data was incorporated into DRES as per CBRS recommendation. When no information was available to the contrary, 100 percent of crops were assumed treated with captan. This could lead to an overestimation of exposure.

High end anticipated residues were supplied by CBRS in a S. Funk memo, 9/22/94. Published uses of captan and uses supported in reregistration were included in the acute analysis. High end ARs were used to calculate the high-end exposure for the subgroup of concern. Some raw agricultural commodities had acute ARs above tolerance level.

An October 26, 1994 Memorandum from C. Olinger addressed the acute anticipated residue which are higher than the reassessed tolerance for the following commodities: caneberries, strawberries

and grapes.

Although, the current tolerance for caneberries (blackberries and raspberries) is set at 25 ppm captan; the calculated anticipated residue is 28 ppm. The acute anticipated residues are based on limited field trial data and it was recommended that the risk assessment should be based on this value. The tolerance will be reassessed when the outstanding field trial data have been submitted.

The existing tolerance for strawberries is 25 ppm. However to calculate the acute risk a value of 75 ppm based on FDA monitoring data should be used, since it appears there is some chance that strawberries bearing such high residues may reach the market. Using a similar logic as applied to strawberries, it was recommended that grapes have a reassessed tolerance of 10 ppm, but the acute risk assessment should be done with the 23 ppm value because FDA monitoring data show higher residues for important commodities.

In summary, the residues of captan on RACS that were assumed to be over tolerance level for Acute ARs in the dietary risk evaluations were:

1. Blackberries
2. Blueberries
3. Dewberries
4. Grapes
5. Raspberries
6. Strawberries

b. Occupational/Residential Exposure

Captan is formulated into wettable powders (WP), water-dispersable granules (WDG) and liquid flowable concentrates (FLC) for foliar application to food plants by aerial and ground equipment (airblast and ground boom) and to field grown ornamental and golf course turf by ground boom. These formulations may also be applied to greenhouse ornamental, fruit/nut trees in home gardens, home lawn and dichondra and directly to the soil around plants in greenhouses, using ground equipment such as backpack/knapsack, low pressure hand wand and garden hose-end sprayer. WP, FLC and dust formulations may be applied to seeds, as a slurry or dust or directly into planter boxes. Several dust, WP and FLC formulations are registered for both professional and private use (Luis report; 08/30/94). Application rates (single/seasonal) for food/feed uses may be found in attachment IIIb (pps. 7-19). Application rates used in the occupational/residential exposure assessment are listed in Table 2 and 3.

c. Mixer/Loader/Applicator Exposure

Mixer/loader/applicator (i.e., handler) exposure study

requirements are addressed by Subdivision U of the Pesticide Assessment Guidelines. Handlers exposure data requirements are triggered based on the potential for exposure and the toxicological significance of the active ingredient and end-use products. Captan meets both the exposure criteria (see below) and the toxicity criteria (carcinogenic potential and adverse developmental effects) for triggering a requirement of handlers' exposure data. The routes of exposure are both dermal and inhalation.

Handlers' exposure may be expressed as the daily dose (DD), in mg/kg/day, according to the following equation:

$$DD = \frac{\text{U.E. x lb ai/cycle x amount treated x absorption rate}}{\text{handler's kg body weight}}$$

where -
- U.E (the unit of exposure) = mg/lb ai handled
- absorption rates are 1.3% (dermal) and 100% (inhalation)
- handler's body weight = 70 kg (60 kg for short term)
- handlers wear PPE* as currently required.
- For mixers/loaders, a 80% protection factor was included to account for respirators which are on current labelling

* Handler PPE includes chemical resistant gloves, long-sleeved shirt, and long pants. For mixer/loaders supporting aerial applications, coveralls over long-sleeved shirts and long pants are also required when handling wettable powders.

Table 2 addresses short term exposure, and use the same exposure scenarios and dermal absorption as the chronic exposure with the following differences. A maximum of 20 acres per day rather than 40 acres per day was assumed to be the maximum acreage per day for airblast applicators. The 40 acres for mixer/loaders supporting airblast applications was retained based on the possibility of a single mixer/loader assisting two airblast applicators. For mixer/loader/applicators using hose-end sprayers a 90% protection factor was used instead of the standard 50%. This is based on the fact that data for this scenario indicates high hand exposure.

A summary of the assumptions related to chronic (i.e. cancer) exposure scenarios (type of formulation and use sites), data source (i.e., PHED), PPE and equipment, application rates (day/season) and amount/acres treated per day/season may be found in the OREB Chapter (Attachment II a, b). Estimated daily dermal and inhalation doses may be found in Table 3.

HED is not assessing the following handler exposure associated with ornamental plant dips (i.e., azaleas cuttings), because the exposure is expected to be mitigated by the use of chemical

resistant gloves, as required by the Special Review and stated on current labels.

Post-application exposure study requirements (i.e., reentry) are addressed by Subdivision K of the Pesticide Assessment Guidelines. Captan meets both the exposure criteria (see below) and the toxicity criteria (carcinogenic potential) for triggering a requirement of post-application exposure data. Based on captan pattern of use, there is a potential for significant reentry worker exposure as a result of its foliar application to food plants (i.e., almonds, apples, apricots, blueberries, cherries, grapes, nectarines, peaches, pears, plums, and strawberries), ornamental and lawn/dichondra. Because captan is not volatile, the route of exposure is primarily dermal.

Foliar dislodgeable residue (FDR) data were submitted by the captan task force for strawberries (MRID#s 40988601, 40966502), apples (MRID# 40823902), grapes (MRID#s 40988603, 40985601, 43012903) and peaches (MRID#s 40988604, 40966501). In these studies, a WP formulation was applied at maximal seasonal rates on strawberries, apples and peaches. The application rate used on grapes (18 lbs ai/acre/season) exceeded the maximal rate (12 lbs ai/acre/season). EPA also funded 5 FDR studies in which typical seasonal application rates were used (references at the end of this document).

No post-application exposure data are available for the use of captan by private individuals (private grower, home gardener, home owner applying captan to lawns). Consequently, the post-application exposure and carcinogenic risk assessment will address only the commercial/industrial uses of captan. Foliar dislodgeable residue data and dermal exposure data are required.

Worker Exposure Due to Food Uses

Strawberries Use: Workers' average daily exposure (AADE) may be estimated based on dermal exposure only, since 1) captan is not volatile and 2) inhalation exposure appears to be only a small fraction of total exposure (see Table 4). AADEs are estimated based on reentry exposure of 1, 2, 3, 4, 5 or 9 days post application in the task force studies and 2, 3, 4 or 48 days in the EPA funded studies. Estimated AADEs value may be found in Table 4. In the task force studies, AADEs based on reentry exposure of 1 to 3 days post application are comparable. Although maximal application rates are used in the task force studies and typical application rates in the EPA funded studies, the AADE was slightly higher in the EPA funded studies than in the task force studies, for the data based on a REI of 2 days.

Apples, Grapes and Peaches Uses: Workers' AADEs are estimated based on an REI of 12 hours (assuming 60 days of harvesting for apples), and a REI of 14 days for peaches (assuming 60 days of

harvesting). For grapes, AADEs are estimated based on either a 30-day REI plus 80 days of harvesting or a 14-day REI plus 30 days of cane pulling. Estimated AADE values may be found in Table 5.

No FDR data are available for the following uses:

- Terrestrial commercial agricultural non-food uses [i.e., foliar applications to azaleas, begonias, camelias, carnations, chrysanthemums, conifers, dichondra, gladiolus, grasses (lawns, lawn seed beds), ornamental flowering plants and roses]. For these uses, HED estimates workers' exposure using FDR data from the task force strawberry study (MRID # 40988601), based on the similarity of application rates. The typical task considered is harvesting and bundling flowers. Transfer coefficients used are 4000 cm^2 for chrysanthemum and 10000 cm^2 for carnations (according to Brower et al.;1992).

HED is not assessing the following post-application exposure due to non-agricultural uses (in-plant additive for paints, plastics, rubber, adhesives and cosmetics and use in pet powders). Post-application exposure associated with these uses were evaluated (PD 2/3) and considered to be negligible. The cosmetic use is under FDA purview.

There are no appropriate data available to address reentry to home lawns following applications of captan. Because of the numerous uncertainties in potential exposure levels and recognition that a reentry interval is not practical or enforceable in residential situations, HED recommends that the home turfgrass and dichondra uses be ineligible for reregistration at this time. Data needed to support these uses are those related to post-application reentry to be generated in the turfgrass foliar dissipation (GL 132-1a) and dermal passive dosimetry (Gl 133-3) studies. These studies must be conducted concurrently.

3. Risk Characterization

a. Dietary Risk

The DRES chronic analysis used tolerance level residues to calculate the Theoretical Maximum Residue Contribution (TMRC) for the overall U.S. population and 22 population subgroups. Refinements in residue information and percent of crop treated were considered in calculating the Anticipated Residue Contribution (ARC) for those same population groups. These exposure estimates were then compared to the RfD for captan.

Chronic Dietary Risk from Supported Uses of Captan for Reregistration

Using Tolerances:

The Theoretical Maximum Residue Contribution (TMRC) and percent of reference dose for the overall U.S. population from published tolerances as well as reassessed tolerances being supported in reregistration are listed below.

Subgroup	Exposure(mg/kg/day)	%Reference Dose
U.S. population	0.035844	28
Non-nursing Infants	0.303975	234

Using Anticipated Residues:

The Anticipated Residue Contribution (ARC) and the percent of reference dose for the overall U.S. population from published uses supported in reregistration are listed below.

Subgroup	Exposure(mg/kg/day)	%Reference Dose
U.S. population	0.001012	1
Non-nursing Infants	0.004537	4

When only the uses supported in reregistration are considered the ARCs for the U.S. population and all DRES subgroups are well below the Reference Dose. The chronic dietary risk posed from captan is not of concern when published commodities and commodities recommended through reregistration are considered.

Carcinogenic Risk

The upper bound carcinogenic risk from food uses of captan were calculated using the following equation:

$$\text{Upper Bound Cancer Risk} = \text{Dietary Exposure (ARC)} \times Q_1^*$$

Based on a Q^* of 0.0036 $(mg/kg/day)^{-1}$, the upper bound dietary cancer risk was calculated to be 1.2×10^{-6}, contributed through all the recommended uses for captan for reregistration. A summary of commodity contributions by raw agricultural commodity (RAC) for the overall U.S. population subgroup is in Attachment IV as Table 4. The upper bound cancer risk from captan is within the range of risk that the Agency generally considers as negligible.

Acute Risk

A risk assessment is required for an acute dietary (one day) exposure based on developmental toxicity in rabbits. The endpoint for acute dietary risk assessment is the NOEL (10 mg/kg/day). The LEL (30 mg/kg/day) from the developmental study was based upon increased post-implantation loss, reduced mean fetal weight, and increased skeletal defects in fetuses (Toxicology Endpoint Selection Document for Captan, P. Chin and K. Baetcke memo,

10/14/94).

The acute dietary risk analysis evaluates individual exposure using food consumption data obtained from respondents in the USDA 77-78 Nationwide Food Consumption Survey (NFCS) and estimates the distribution of single day exposures through the diet for the U.S. population and certain subgroups. The analysis assumes uniform distribution of captan in the commodity supply. Since the toxicological effect to which high end exposure is being compared to in this analysis is developmental toxicity, the subgroup of concern is Females 13+ which represents women of child bearing age. For substances whose acute NOEL is based on animal studies, the Agency is not generally concerned unless the MOE is below 100.

The estimated percent of consumers that will consume at least one of the published or recommended commodities for reregistration is, 99% of the population. The high end MOE and an estimate of the 95th percentile MOE are listed below for the Females 13+ subgroup:

High End Exposure = 0.3 mg/kg/day
NOEL/Exposure = 10 mg/kg/day ÷ 0.3 mg/kg/day = 33

Exposure from estimated 95th Percentile = 0.10 mg/kg/day
NOEL/Exposure = 10 mg/kg/day ÷ 0.1 mg/kg/day = 100

Characterization of Dietary Risk

To the extent that this analysis uses anticipated residues, percent-crop-treated information and recommended (not published) tolerances, it is not a "worst-case" picture of the chronic dietary exposure to captan. The chronic non-cancer dietary risk from exposure of captan appears to be of minimal concern, with all DRES subgroups having ARC values well below the RfD.

The upper bound carcinogenic risk from captan, 1.2×10^{-6}, is within the range of risk that the Agency generally considers as negligible.

Although acute dietary risk appears to be of concern for the highest exposed individual, the exposure estimate is somewhat unrealistic in that it includes the unlikely assumption that each person is exposed to tolerance-level residues on all commodities consumed. The high end estimate of acute dietary risk is therefore probably higher than what actually occurs in the real world.

b. Occupational/Residential Risk

The HED Toxicological Endpoint Selection Committee (10/14/94) concluded that the toxicological endpoint for short term occupational risk assessment is the 10 mg/kg/day NOEL from

the rabbit developmental toxicity study (MRID 41826901).

Margins of Exposure generally indicate no short-term risk concern with the exception of mixer/loaders supporting aerial applications (see Table 2). Coveralls, over long shirts and long pants was considered as an option to reduce exposure for these workers. However, even with the addition of coveralls the MOE is only 63.

Table 2. Summary Exposure/Risk Values for Captan for Short Term Exposure

Exposure Scenario (Scen. #)	Dermal Exposure[a] (mg/lb ai)	Inhalation Exposure[b] (µg/lb ai)	Application Rate[c] (lb ai/cycle)	Daily Amt.[d] Treated	Daily Dermal Dose[e] (mg/kg/day)	Daily Inhalation Exposure[f] (mg/kg/day)	Combined dermal and inhalation exposure (mg/kg/day)	SHORT TERM EXPOSURE MOEs
Mixer/Loader Exposure								
Wettable Powders (Aerial Application) - strawberries (I)	0.6 plus coveralls	4.7	3 lb ai/A, 7x/season	350 acres	0.14	0.014	0.16	63
Wettable Powders (Airblast Application) - apples, apricots, cherries, grapes, peach, nectarines, blueberries (II)	0.9	4.7	2-3.7 lb ai/A, 3x/season	40 acres	0.01 - 0.02	0.001 - 0.003	0.011 - 0.023	333 - 500
Wettable Powders (Groundboom Application) - strawberries (II)	0.9	4.7	3 lb ai/A, 7x/season	20 acres	0.01	0.001	0.011	> 1000
Wettable Powders (High Pressure Spray) - greenhouses	0.9	4.7	1 lb ai/100 gallons 26x/year	100 gallons	0.0002	0.00001	0.0002	> 1000
Wettable Powders (Groundboom Application) - golf course	0.9	4.7	4.4 lb ai/A, 10x/season	40 acres	0.034	0.003	0.037	270
Liquids/Flowable (Aerial Application-strawberries) (III)	0.2	0.4	3 lb ai/A, 7x/season	350 acres	0.05	0.007	0.06	167
Liquids/Flowables (Airblast Application) - apples, apricots, cherries, grapes, peach, nectarines, blueberries (IV)	0.2	0.4	2-3.7 lb ai/A, 3x/season	40 acres	0.003 - 0.006	0.0005 - 0.001	0.004 - 0.007	> 1000
Liquids/Flowables (Groundboom Application - strawberries	0.2	0.4	3 lb ai/A, 7x/season	20 acres	0.0026	0.00008	0.0027	> 1000
Applicator Exposure								

Aerial Application - strawberries (V)	0.004	0.2	3 lb ai/A, 7x/season	350 acres	0.001	0.004	0.005	> 1000
Airblast Application - apples, apricots, cherries, grapes, peach, nectarines, blueberries (VI)	5.3	4.2	2-3.7 lb ai/A, 3x/season	20 acres*	0.045 - 0.085	0.003 - 0.005	0.05 - 0.09	111 - 200
Groundboom Application - strawberries (VII)	0.02	1.3	3 lb ai/A, 7x/season	20 acres	0.0003	0.001	0.01	> 1000
Groundboom Application - Golf Course	0.02	1.3	4.4 lb ai/A, 10x/season	40 acres	0.001	0.004	0.005	> 1000
Paint Brush (VIII)	218	570 (median)	5 gallons (0.15 lb ai)	5 gallons	0.01	0.001	0.011	909
Paint-Airless Sprayer (IX)	28.5	700	3 lb ai/100 gallons	200 gal/day	0.04	0.07	0.11	91
Seed/Seed Piece Treatment - Potatoes (XI)	8 mg/day	0.7 mg/day	1.2 oz/cwt 15x/year	8 hrs/day	0.002	0.012	0.014	714
High Pressure Spray	0.7	0.09	1 lb ai/100 gal, 26x/season	100 gal/0.25 acre	0.0002	0.002	0.002	> 1000
Apple Dips (XII)	45 mg/day	1.5 mg/day	30x/year	PD 2/3	0.01	0.025	0.035	286
As a Preservative (XII)	14.3	–	7925 lb ai/yr	31.7 lb ai/day	0.1	–	0.1	100
Adhesive (XIII)	14.3	–	1,975 lb ai/yr	7.9 lb ai/day	0.024	–	0.024	417
Pet Powders (XVI)	200 mg/use	PD 2/3	once/week	PD 2/3	0.04	–	0.04	250
Mixer/Loader/Applicator								
Low Pressure Handwand (XVII)	103	39	0.8 oz/day (0.05 lb)	18x/yr	0.001	0.00003	0.001	> 1000
Backpack/Knapsack (XVIII)	1.3	30	1 lb ai/100 gal	0.25 acre	0.0003	0.0005	0.001	> 1000
Garden Hose End-Sprayer - Dichondra	25.2	0.01	1 lb ai/100 gal, 1 gal/10 sq. ft, 2x/yr	10,000 sq. ft	0.05	–	0.05	200
Hose End-Sprayer - (XIX)	6**	0.01	1 lb ai/100 gal, 1 gal/10 sq. ft	2 acres	.11	–	0.11	91

* Dermal unit exposures are reported as the best fit mean to simulate workers wearing long pants, long-sleeved shirts, and chemical resistant gloves, unless noted. The best fit mean is the composite total dermal exposure based on using the geometric mean for lognormal distributed data, arithmetic mean for

normal distributed data, and the median for all other distribution types. Protection factors were used to calculate dermal unit exposure values because insufficient data are available for PPE in these scenarios. Fifty percent of the total dermal exposure is assumed to be attributed to hand exposure. Fifty percent protection factor is applied to the hand exposure for chemical resistant gloves. Fifty percent protection factor is applied to total deposition for long pants and long-sleeved shirts. (** assumes a 90% protection factor for chemical resistant gloves)

- Inhalation exposure values are reported as geometric means (lognormal distributions), unless otherwise noted.

- Luis Report dated 8/26/91, Captan, Task Force Memorandum dated 5/11/94, PD 2/3 dated 6/85.

- Values represent the typical area or the typical volume of spray solution which is assumed to be used in a single day to complete treatments for each exposure scenario of concern.

- Daily Dermal Dose (mg/kg/day) = $\frac{\text{Exposure (mg/lb ai)} * \text{Appl. Rate (lb ai)} * \text{Amt.treated} * 1.3\% \text{ d.a.}}{60 \text{ kg}}$

- Daily Inhalation Exposure (mg/kg/day) = $\frac{\text{Exposure (mg/lb ai)} * \text{Appl. Rate (lb ai/cycle)} * \text{Amt. Treated}}{60 \text{ kg}}$

For mixer/loaders an 80% protection factor was included to account for respirators which are on current labelling for mixer/loaders.

Table 3. Summary Exposure/Risk Values for Captan Chronic Exposure

Exposure Scenario (Scen. #)	Dermal Exposure[a] (mg/lb ai)	Inhalation Exposure[b] (μg/lb ai)	Application Rate[c] (lb ai/cycle)	Daily Amt.[d] Treated	Daily Dermal Dose[e] (mg/kg/day)	Daily Inhalation Exposure[f] (mg/kg/day)	Combined dermal and inhalation LADD[g] (mg/kg/day)		RISK[h]	
							Private Applicator[k]	Commercial Applicator[l]	Private Application	Commercial Applicator
Mixer/Loader Exposure										
Wettable Powders (Aerial Application) - strawberries (1)	0.6 plus coveralls	4.7	3 lb ai/A, 7x/season	350 acres	0.14	0.014	N/A	0.015 (70 days total worked/yr)	N/A	5.3×10^{-3}
Wettable Powders (Airblast Application) - apples, apricots, cherries, grapes, peach, nectarines, blueberries (2a)	0.9	4.7	2-3.7 lb ai/A, 3x/season	40 acres	0.013-0.025	0.0011-0.002	0.00006-0.0001	N/A	$2.0\text{-}3.0 \times 10^{-7}$	N/A
Wettable Powders (Groundboom Application) - strawberries (2b)	0.9	4.7	3 lb ai/A, 7x/season	20 acres	0.01	0.0008	0.0001	N/A	3.0×10^{-7}	N/A
Wettable Powders (High Pressure Spray) - greenhouses (2c)	0.9	4.7	1 lb ai/100 gallons 1hr/day; 26x/year	100 gallons	.00017	0.000013	0.000007	N/A	negligible	N/A
Wettable Powders (Groundboom Application) - golf course (2d)	0.9	4.7	4.4 lb ai/A, 10x/year	40 acres	0.029	0.003	N/A	0.00044	N/A	1.5×10^{-6}
Liquids/Flowable (Aerial Application-strawberries) (3)	0.2	0.4	3 lb ai/A, 7x/season	350 acres	0.039	0.006	N/A	0.0043 (70 days total worked/yr)	N/A	1.5×10^{-3}
Liquids/Flowables (Airblast Application) - apples, apricots, cherries, grapes, peach, nectarines, blueberries (4a)	0.2	0.4	2-3.7 lb ai/A, 3x/season	40 acres	0.003-0.0055	0.0005-0.0008	0.000014-0.000026	N/A	$5.0\text{-}9.4 \times 10^{-8}$	
Liquids/Flowables (Groundboom Application - strawberries (4b)	0.2	0.4	3 lb ai/A, 7x/season	20 acres	0.002	0.00023	0.00007		2.5×10^{-7}	

Exposure Scenario (Scen. #)	Dermal Exposure[a] (mg/lb ai)	Inhalation Exposure[b] (μg/lb ai)	Application Rate[c] (lb ai/cycle)	Daily Amt.[d] Treated	Daily Dermal Dose[e] (mg/kg/day)	Daily Inhalation Exposure[f] (mg/kg/day)	Combined dermal and inhalation LADD[g] (mg/kg/day)		RISK[i]	
							Private Applicator[h]	Commercial Applicator[i]	Private Application	Commercial Applicator
Applicator Exposure										
Aerial Application - strawberries (5)	0.004	0.2	3 lb ai/A, 7x/season	350 acres	0.00078	0.003	N/A	0.00036 (70 days total worked/yr)	N/A	1.3×10^{-4}
Airblast Application - apples, apricots, cherries, grapes, peach, nectarines, blueberries (6)	5.3	4.2	2-3.7 lb ai/A, 3x/season	40 acres	0.078-0.146	0.0048-0.009	0.00034-0.00064	N/A	$1.2\text{-}2.3 \times 10^{-6}$	N/A
Groundboom Application - strawberries (7a)	0.02	1.3	3 lb ai/A, 7x/season	20 acres	0.00022	0.00011	0.0000031	N/A	1.1×10^{-6}	N/A
Groundboom Application - Golf Course (7b)	0.02	1.3	4.4 lb ai/A, 10x/season	40 acres	0.00065	0.0033	N/A	0.000054	N/A	2.0×10^{-7}
Paint Brush (8)	218	570 (median)	5 gallons (0.15 lb ai)	5 gallons	0.0061	0.0012	0.00001	0.001 (100x/yr)	4.0×10^{-6}	3.6×10^{-4}
Paint-Airless Sprayer (9)	28.5	700	3 lb ai/100 gallons	200 gal/day	0.032	0.06	0.00018	0.012 (100x/yr)	6.5×10^{-7}	4.5×10^{-5}
Seed/Seed Piece Treatment - Potatoes (11)	8 mg/day	0.7 mg/day	1.2 oz/cwt 15x/year	8 hrs/day	0.0015	0.01	0.00024	N/A	8.6×10^{-7}	N/A
High Pressure Spray- Greenhouse (12)	0.7	0.09	1 lb ai/100 gal, 26x/season	100 gal/0.25 acre	0.00013	0.000001	0.0000046	N/A	1.7×10^{-6}	N/A
Apple Dips (13)	45 mg/day	1.5 mg/day	30x/year	PD 2/3	0.0084	0.02	N/A	0.0012	N/A	4.3×10^{-4}
As a Preservative (10a)	14.3	--	7925 lb ai/yr	31.7 lb ai/ day	0.084	--	N/A	0.028 (250 days/yr)	N/A	1.0×10^{-4}
Adhesive (10b)	14.3	--	1,975 lb ai/yr	7.9 lb ai/ day	0.021	--	N/A	0.007 (250 days/yr)	N/A	2.5×10^{-5}

Exposure Scenario (Scen. #)	Dermal Exposure[a] (mg/lb ai)	Inhalation Exposure[b] (µg/lb ai)	Application Rate[c] (lb ai/cycle)	Daily Amt.[d] Treated	Daily Dermal Dose[e] (mg/kg/day)	Daily Inhalation Exposure[f] (mg/kg/day)	Combined dermal and inhalation LADD[g] (mg/kg/day)		RISK[h]	
							Private Applicator[h]	Commercial Applicator[i]	Private Applicator	Commercial Applicator
Pet Powders (14)	200 mg/use	PD 2/3[b]	once/week	PD 2/3	0.0005	–	0.0005	N/A	1.8 x [illegible]	N/A
Mixer/Loader/Applicator										
Low Pressure Handwand (15)	103	39	0.8 oz/day (0.05 lb)	18x/yr	0.00096	0.00003	0.000035	N/A	1.3×10^{-7}	N/A
Backpack/Knapsack (16)	1.3	30	1 lb ai/100 gal	0.25 acre	0.00024	0.00043	N/A	0.000024	N/A	8.6×10^{-9}
Garden Hose End-Sprayer - Dichondra (17)	25.2	0.01	1 lb ai/100 gal, 1 gal/10 sq. ft, 2x/yr	10,000 sq. ft	0.047	0.0014	0.00019	N/A	6.8×10^{-7}	N/A
Hose End-Sprayer (18)	16.8	0.01	1 lb ai/100 gal, 1 gal/10 sq. ft	2 acres	0.27	0.012	N/A	0.0039 (10x/yr)	N/A	1.4×10^{-5}

[a] Dermal unit exposures are reported as the best fit mean to simulate workers wearing long pants, long-sleeved shirts, and chemical resistant gloves, unless noted. The best fit mean is the composite total dermal exposure based on using the geometric mean for lognormal distributed data, arithmetic mean for normal distributed data, and the median for all other distribution types. Protection factors were used to calculate dermal unit exposure values because insufficient data are available for PPE in these scenarios. Fifty percent of the total dermal exposure is assumed to be attributed to hand exposure. Fifty percent protection factor is applied to the hand exposure for chemical resistant gloves. Fifty percent protection factor is applied to total deposition for long pants and long-sleeved shirts.

[b] Inhalation exposure values are reported as geometric means (lognormal distributions), unless otherwise noted.

[c] Luis Report dated 8/26/91, Captan, Task Force Memorandum dated 5/11/94, PD 2/3 dated 6/85.

[d] Values represent the typical area or the typical volume of spray solution which is assumed to be used in a single day to complete treatments for each exposure scenario of concern.

[e] Daily Dermal Dose = $\frac{\text{Exposure (mg/lb ai) x Appl. Rate (lb ai/cycle) x Amt.treated x 1.3\% (dermal absorption)}}{\text{70 kg}}$

[f] Daily Inhalation Exposure = $\frac{\text{Exposure (mg/lb ai) x Appl. Rate (lb ai/cycle) x Amt. Treated x 100\% absorption}}{\text{70 kg}}$

For mixer/loaders a 80% protection factor is included to account for respirators which are on current labelling for mixer/loaders.

- LADD (mg/kg/day) = Daily Dermal Dose (mg/kg/day) x Work Days Per Yr/365 Days x Work Yrs/70 Yrs [Work years = 35 (commercial handler) or 50 (private handlers)].
- Private applicator is defined as a intermittently exposed individual, usually a private grower.
- Commercial applicator is defined as those working as PCO's, aerial applicators, golf courses, and people working in industrial settings.
- Estimated Excess Carcinogenic Risk = Dermal LADD + Inhalation LADD (mg/kg/day) x Q_1 *

Table 4. Strawberries Use: Post-Application Exposure and Excess Carcinogenic Risk

Study	Application rate/ No. applications per season	DAT [1]	FDR µg/cm²	Transfer Factor cm²/hr	Daily Dose [2] mg/kg/day	AADE 80 days	AADE 120 days	LADE 80 days	LADE 120 days	Risk (80 days) x 10^{-6}	Risk (120 days) x 10^{-6}
Task Force (MRID # 40988601, 40966502)	3lb ai/8X	1	8.3	2333	0.029	0.064	0.0095	0.0032	0.0047	1.1	1.7
"	"	2	6.5	"	0.022	0.0048	0.0072	0.0024	0.0036	0.8	1.3
"	"	3	8.1	"	0.029	0.0064	0.0095	0.0032	0.0047	1.1	1.7
"	"	4	5.7	"	0.020	0.0044	0.0066	0.0022	0.0032	0.8	1.2
"	"	5	4.9	"	0.017	0.0037	0.0056	0.0019	0.0028	0.7	1.0
"	"	9	6.1	"	0.021	0.0046	0.0069	0.0023	0.0035	0.8	1.2
Youth in Agriculture Study #1 [3]	2lb ai/3X(pre) 8X/season	2	9.75	2758	0.039	0.0085	0.0128	0.0043	0.0064	1.5	2.3
Youth in Agriculture Study #3 [3]	2/lb ai/8X	4	5.1	3413	0.026	0.0056	0.0085	0.0028	0.0043	1.0	1.5
Youth in Agriculture Study #4 [3]	2-2.25lb ai/5X	3	2.74	5974	0.025	0.0055	0.0083	0.0027	0.0040	1.0	1.5
Youth in Agriculture Study #5 [3]	1-2lb ai/3X	48	1.29	4558	0.009	0.002	0.0030	0.0010	0.0015	0.4	0.5
Zweig et al. 1983 [4]	Not Reported	4	4.5	8500	0.057	0.010	0.0190	0.0062	0.0094	2.2	3.4

[1]: Days after treatment

[2] Daily dose based on dermal exposure only and taking into account a dermal absorption rate of 1.3%.

[3] and [4]: EPA funded studies (references 5 and 6 at end of this document under OREB Other References)

[5]: 12 hour REI

Table 5: Apples, Grapes and Peaches Uses: Post-Application Exposure and Excess Carcinogenic Risk

Crop-MRID	Application rate/ No. applications per season	Post-Application Scenario (days after treatment)	FDR $\mu g/cm^2$	Transfer Factor cm^2/hr	Daily Dose mg/kg/day	AADE mg/kg/day	LADE mg/kg/day	Risk x 10^{-6}
Apples-408239-02	4lb ai/acre/8x	60 days of harvesting (2)	17.4	3300	0.061	0.01	0.005	1.8
Grapes-409886-03, 409856-01	3lb ai/acre/6x	80 days of harvesting (30)	0.3	15,600	0.070	0.0153	0.0076	2.7
Grapes-409886-03, 430129-03	3lb ai/acre/6x	30 days of cane cutting and leaf pulling (14)	3.1	18,000	0.08	0.0065	0.0034	1.2
Peaches-409886-04, 409665-01	4lb ai/acre/8x	60 days of harvesting (14)	16.36	3300	0.08	0.013	0.007	2.4

REI = 12 hours

Handlers' Carcinogenic Risk

The upper bound (95%) excess carcinogenic risk may be estimated using the following equation:

Upper Bound estimated excess Carcinogenic Risk = LADD x Q_1*

where Q_1* = 3.6×10^{-3} $(mg/kg/day)^{-1}$ and

$$\text{LADD} = \text{daily DD} \times \frac{\text{days/yr}}{365 \text{ days}} \times \frac{35 \text{ or } 50 \text{ yrs (commercial or private user)}}{70 \text{ yrs}}$$

Handlers' estimated excess carcinogenic risks are shown in Table 3. Estimated excess carcinogenic risk for commercial handlers exposed on a long-term basis to captan for all of its uses are less than 1×10^{-4} (8.6×10^{-4} to 9.1×10^{-5}) and thus do not trigger a health concern. For private handlers, estimated excess carcinogenic risks are less than 1×10^{-6} (1.1×10^{-5} to 8.6×10^{-7}) for all individuals except the applicator applying captan by airblast to fruits/berries other than strawberries (cancer risk = $1.2\text{-}2.2 \times 10^{-6}$). The data were adjusted to reflect WPS.

Post Application Excess Carcinogenic Risk

Carcinogenic Risk Associated With Captan's Food Uses

Strawberries Use: The estimated excess cancer risk for postapplication strawberry exposure are shown in Table 4. Cancer risks are 1.7×10^{-5}, based on a 12 hour REI (task force studies) and 1.3×10^{-5} (task force studies) or 2.3×10^{-5} (EPA funded studies), based on a 2-day REI.

Apples, Grapes and Peaches Uses: The estimated excess cancer risk for post application exposure to apples, grapes and peaches are shown in Table 5. Cancer risks are less than 1×10^{-4} based on the proposed Restricted Entry Interval (REI) of 12 hours. The risk for the worker thinning plum trees (not in Table 5) may be comparable to that of the worker cutting grape canes, based on similar daily exposure (ADE) values.

Carcinogenic Risk Associated With Captan's Agricultural Uses: For the commercial worker involved with captan's agricultural non-food use tasks, cancer risk is $2.4 - 6.1 \times 10^{-5}$, based on the typical task of harvesting or bundling flowers, with a 12 hour REI and a 100-day harvesting period per year (8-hour work day).

Non-Agricultural Uses: Estimated excess carcinogenic risk associated with the non-agricultural uses of captan (i.e., formulation into paints, plastics, rubbers, adhesives and pet powders) are expected to be low, based on exposures considered to

be negligible [see Table 3].

No FDR data are available for the non-commercial uses of captan. Cancer risk associated with these uses are however expected to be significantly lower than that associated with the commercial uses, based on the lower exposure rates encountered in private settings.

RECOMMENDATIONS

A. Restricted Entry Intervals (REI)

Based on concerns for carcinogenicity and, adverse developmental effects HED recommends the following REIs:

- 12 hours for all in-scope WPS uses except the following,
- 14-days for peaches,
- 14-days for grapes (all tasks other than harvesting),
- 14-days for plum thinning and
- 30-days for grape harvesting.

B. PPE

Handler PPE consists of at a minimum long-sleeved shirt, long pants, chemical resistant gloves. Respirators are required for mixer/loaders using wettable powder formulations. Coveralls over long-sleeved shirt and long pants are required for mixer/loaders supporting aerial applications. Protective eyewear is triggered by the toxicity of the end-point product. For workers, early entry PPE shall include coveralls, chemical resistent gloves and protective eyewear.

C. Additional Data Requirements

1. Product Chemistry Data Requirements:

A Summary of the data gaps may be found in Appendix I attached to this document. To maintain continued registration of captan following issuance of the RED, the product chemistry data gaps must be fulfilled. These data are considered confirmatory.

2. Residue Chemistry Data Requirements:

Directions for Use (GL# 171-3): The following labels must be revised to include a maximum annual use rate and pre-harvest interval: 10182-165 and 10182-149. The labels must specify that the annual rate includes any post-harvest sprays. The directions for post-harvest dip for apples, cherries and pears must be modified on label 10182-165. The feeding restrictions for almond hulls must be removed from label 10182-165 because such a restriction is not practical.

Storage Stability [GL# 171-4(e)]: Additional animal storage stability data are required. Sufficient storage stability data are available to support the residue data for milk. Additional data are required to demonstrate the stability of THPI residues in animal tissues. These data are considered confirmatory since the milk data give a preliminary indication of the stability of THPI residues in animal commodities.

Magnitude of the Residue in plants [GL# 171-4(k)]: Data from a minimum of two additional field studies are required for reregistration of captan on blackberries, dewberries and raspberries. Additional field trials for strawberries grown in Florida are required because of an increased incidence of fruits with residues exceeding tolerance levels; a minimum of three trials must be conducted, reflecting maximum single application rate, maximum seasonal application rate and minimum pre-harvest interval. Current cultural practices, including drip irrigation must be employed. Additional data may be required reflecting eight applications per crop in Florida, where more than one crop per year may be grown. These data are considered confirmatory.

Based on the metabolism data in plants and animals for captan, the HED Metabolism Committee has determined that the tolerance expression for meat and milk should include both the parent, captan and the metabolite THPI. The tolerance expression for plants, based on captan *per se* only, should remain unchanged.

3. OREB Data Requirements

Foliar Dislodgeable Residue Data (Guideline 132-1a) and Dermal Exposure Data (Guideline 133-3) are required to support the uses on home turfgrass and dichondra. These studies must be conducted concurrently. In the interim, HED recommends that these uses be ineligible for reregistration.

D. Risk Concerns

Although, short term exposure for mixer/loaders supporting aerial applications, coveralls, over long shirts and long pants was considered as an option to reduce exposure, even with the addition of coveralls the short term MOE is only 63.

011423

REFERENCES BY MRID NUMBER(S)

A. Toxicological References

GL #	STUDY TYPE	MRID #
81-1	Acute oral toxicity/rats	00054789
81-2	Acute dermal toxicity/rabbits	40021401
81-3	Acute inhalation toxicity/rats	Access.# 258791
81-4	Primary eye irritation/rabbits	00128621
81-5	Primary dermal irritation/rabbits	40021401
81-6	Dermal sensitization/in guinea pigs	00054791
82-2	21-day dermal toxicity study/rabbits	40273201
82-2	90-day inhalation toxicity study/rats	41234402
83-1	2-yr feeding toxicity study/dogs	40893604
83/1-2	Chronic feeding/oncogenicity study/rats	00130316 00129163 00129164 Access.#s 250667, 250668
83-2	Oral oncogenicity study/rats	Access.# 260078
83-2	Oral oncogenicity study/mice	00068076
83-2	Oral oncogenicity study/mice	00126845
83-3	developmental toxicity study/rabbits	41826901
83-3	developmental toxicity study/hamsters	00086803
83-4	Multi-generation reproduction study/rats	00120315 00125293
84-2a	Mutagenicity (Ames Assay + E. coli)	00114210
84-2a	In vivo gene mutation (host mediated assays in mice and rats	00131715
84-2b	In vitro and in vivo Structural chromosome aberration	00131725 00131727
84-4	in vitro unscheduled DNA synthesis assay	00244432
85-1	General metabolism study	41505401 to 41505404
85-2	Dermal absorption study in rats	00117083 Access.# 249333

OTHER REFERENCES

1. Memo K. Baetcke: Toxicological Endpoint Selection Document; Captan; 02/24/94.

2. Memo P. Chin and C. Olinger: The metabolism Committee Meetings Held on 02/22/94 and 03/01/94: Captan Plant and Animal Metabolism.

3. Memo R. Engler: Peer Review of Captan, Caswell No. 159; 12/29/86.

4. Memo G. Ghali: RfD/Peer Review Report of Captan; 01/31/94.

5. Memo H. Lacayo: Captan, PD 2/3, Carcinogenicity Risk Assessment (08/14/84).

6. Memo E. Rinde: Second Peer Review of Captan, Addendum; 07/20/88.

7. PD 4: Federal Register vol. 54, No. 36, PPs. 8116-8149; 02/24/89.

B. Product Chemistry References

GL #	STUDY TYPE	MRID #
Makhteshim Chemical Works, Ltd. 92%T (EPA Reg. No. 11678-1)		
61-2	Starting Materials and Manufacturing Process	40121701 40231301
61-3	Discussion of Formation of Impurities	40121701
62-1	Preliminary Analysis	40021201
62-3	Analytical Methods to Verify Certified the Limits	40021201
63-5	Melting Point	40231201
63-7	Density, Bulk Density or Specific Gravity	40231201
63-8	Solubility	40231201
63-11	Octanol/Water Partition Coefficient	40021202
63-12	pH	40231201
63-13	Stability	40231201
Zeneca Inc. 92% T (EPA Reg. No. 10182-262) and 90%Ts (EPA Reg. Nos. 10182-197 & 10182-293)		
61-2	Starting Materials and Manufacturing Process	40021301
61-3	Discussion of Formation of Impurities	40021301
62-1	Preliminary Analysis	40021201
62-3	Analytical Methods to Verify the Certified Limits	40021201
63-4	Odor	40021202
63-5	Melting Point	40021202, 40231801
63-7	Density, Bulk Density or Specific Gravity	40021202 40231801
63-8	Solubility	40021202, 40231801
63-11	Octanol/Water Partition Coefficient	40021201
63-12	pH	40021202, 40231801
63-13	Stability	40021202, 40231801
Zeneca Inc. 88.92% FI (EPA Reg. No. 10182-198)		
61-1	Product Identity and Disclosure of Ingredients	40141501
61-2	Starting Materials and Manufacturing Process	40141501
61-3	Discussion of Formation of Impurities	40141501
62-2	Certification of Ingredient Limits	40141501
62-3	Analytical Methods to Verify the Certified Limits	40141502, 40141503

C. Residue Chemistry References

GL #	STUDY TYPE	MRID #
171-4 (a):	Plant Metabolism	00058941, 00083100, 00096978, 00098790, 00098831, 00128355, GS120-001, 40658005, 40658006, 41746001, 42109601
171-4 (b):	Animal Metabolism	00058940, 00096901, 00096908, 00098786, 00128355, GS120-003, GS120-004, 40658002, 40658003, 40658004, 42568801, 42756401, 43266701, 43266702
171-4 (c/d):	Residue Analytical Methods	00002927, 00002928, 00003025, 00025123, 00025125, 00025129, 00035246, 00035248, 00042645, 00042646, 00045174, 00045175, 00045176, 00045179, 00045182, 00045183, 00045184, 00045188, 00045189, 00053324, 00054015, 00054016, 00070201, 00071790, 00083393, 00085525, 00085526, 00090988, 00090989, 00096910, 00096982, 00097622, 00098720, 00098726, 00098731, 00098747, 00098751, 00098784, 00098789, 00098804, 00098810, 00098811, 00098817, 00098818, 00098894, 00117087, 00128355, GS120-008, GS120-011, 41393001, 41386501, 41406901
171-4 (e):	Storage Stability	40752301, 41039101, 41557601, 42803901

171-4 (k): Magnitude of the Residue in Plants

<u>Root and Tuber Vegetables Group</u>	
- Beet roots	40189806, 41149104, 41306101, 41306102, 41468401
- Carrots	40189806, 41149104, 41306101, 41306102, 41468401
- Potatoes	00098716, 00098894, 00054016, 40189806, 41149104, 41306101, 41306102, 41468401
- Rutabagas	40189806, 41149104, 41306101, 41306102, 41468401,
- Taro	40189806, 41149104, 41468401, 41306101, 41306102,
- Turnip roots	40189806, 41149104, 41306101, 41306102, 41468401

C. Residue Chemistry References (Continued)

GL #	STUDY TYPE	MRID #
171-4 (k): Magnitude of the Residue in Plants		
- Peas, dry		40189820, 41149101, 41306101 41306102, 41468401
- Peas, succulent		40189820, 41149101, 41306101 41306102, 41468401
- Soybeans, dry	00003025, 00071790, 00096982, 40189820 41149101, 41306101, 41306102, 41468401	
- Soybeans, succulent	00071790, 00096982, 00098709, 40189820 41149101, 41306101, 41306102, 41468401	
Fruiting Vegetables Group		
- Eggplants		00098709, 40189820, 41149101 41306101, 41306102, 41468401
- Peppers		40189820, 41149101, 41306101 41306102, 41468401
- Pimentos		40189820, 41149101, 41306101 41306102, 41468401
- Tomatoes	00070201, 00085526, 00098708, 40189820 40189823, 40189824, 41149101, 41306101 41306102, 41468401	
Cucurbit Vegetables Group		
- Cantaloupes		00098818, 41089820, 41149101 41306101, 41306102, 41468401
- Cucumbers		00098709, 41089820, 41149101 41306101, 41306102, 41468401
- Honeydew melons		00098818, 41089820, 41149101 41306101, 41306102, 41468401
- Muskmelons		00098818, 41089820, 41149101 41306101, 41306102, 41468401
- Pumpkins		41089820, 41149101, 41306101 41306102, 41468401
- Squash, summer		00098818, 41089820, 41149101 41306101, 41306102, 41468401
- Squash, winter		00098818, 41089820, 41149101 41306101, 41306102, 41468401
- Watermelons		00128355, 41089820, 41149101 41306101, 41306102, 41468401
Pome Fruits Group		
- Apples	00085526, 00098711, 00098722, 00098789 00106602, 00128355, 00159597, 40189803 40745403, 42252201, 42252202	
- Pears		00070201, 00085526, 00098722, 00106602, 00128355, 40189815

C. Residue Chemistry References (Continued)

GL #	STUDY TYPE	MRID #
171-4 (k): Magnitude of the Residue in Plants		
Leaves of Root and Tuber Vegetables Group		
- Beet greens		40189821, 41149102, 41306101 41306102, 41468401
- Turnip greens		40189821, 41149102, 41306101 41306102, 41468401
Bulb Vegetables Group		
- Garlic		40189806, 41149104, 41306101 41306102, 41468401
- Leeks		40189806, 41149104, 41306101 41306102, 41468401
- Onions, dry bulb		40189806, 41149104, 41306101 41306102, 41468401
- Onions, green		40189806, 41149104, 41306101 41306102, 41468401
- Shallots		40189806, 41149104, 41306101 41306102, 41468401
Leafy Vegetables Group		
- Celery		00070201, 00159599, 40189821 41149102, 41306101, 41306102, 41468401
- Lettuce		00070201, 00159605, 40189821, 41149102 41306101, 41306102, 41468401
- Spinach		00070201, 00159606, 40189821, 41149102 41149103, 41306101, 41306102, 41468401
Brassica Leafy Vegetables Group		
- Broccoli		40189821, 41149102, 41306101 41306102, 41468401
- Brussels sprouts		40189821, 41149102, 41306101 41306102, 41468401
- Cabbage		40189821, 41149102, 41306101 41306102, 41468401
- Cauliflower		40189821, 41149102, 41306101 41306102, 41468401
- Collards		40189821, 41149102, 41306101 41306102, 41468401
- Kale		40189821, 41149102, 41306101 41306102, 41468401
- Mustard greens		40189821, 41149102, 41306101 41306102, 41468401
Legume Vegetables Group		
- Beans, dry		00046914, 00070201, 00098710, 40189820 41149101, 41306101, 41306102, 41468401
- Beans, succulent		00046914, 00070201, 00098710, 40189820 41149101, 41306101, 41306102, 41468401

C. Residue Chemistry References (Continued)

GL #	STUDY TYPE	MRID #
171-4 (k):	Magnitude of the Residue in Plants	
Stone Fruits Group		
- Apricots		00128355, 40189805
- Cherries		00128355, 40189808
- Nectarines		00128355, 40189813
- Peaches	00128355, 40189814,	40745406, 40745407
- Plums (fresh prunes)		00128355, 40189816
Small Fruits and Berries Group		
- Blackberries		42712801
- Blueberries (huckleberries)	00046914,	00070201, 00090988
		00128355, 41039101
- Dewberries		42712801
- Grapes	00046914, 00070201,	00090988, 00098726,
	00128355, 00159601,	00162037, 40189811
	40189812,	40745405, 42254202
- Raspberries		00070201, 42712801
- Strawberries	00046914, 00070201,	00090988, 00117088,
	00128355, 00159607,	40189822, 40745408
Tree Nuts Group		
- Almonds	00070201, 00090988, 00098804,	00098811, 00128355
	00159596, 00162037,	40189802, 40745402
- Almond hulls	00070201, 00090988, 00098804,	00098811,
	00128355, 00159596,	00162037, 40189802
	40745402	
Cereal Grains Group		
- Corn, sweet	00003025, 00045176,	00070201, 00128355,
	GS120-039, 40189809,	41149103, 41306101
	41306102, 41468401	
Miscellaneous Commodities		
- Cottonseed	00002928, 00003025,	00070201, 00128355,
	GS120-039, 40189820,	41149101, 41306101,
	41306102, 41468401	
171-4(l):	Magnitude of the Residue in Processed Food/Feed	
- Apples	00098789, 00159597,	42296003
	40189804, 42563102	
- Grapes	00128355, 00159601,	00162037
	40189812, 42296004,	42563101
- Plums/Prunes		40189817

C. Residue Chemistry References (Continued)

GL #	STUDY TYPE	MRID #
171-4 (j):	Magnitude of the Residue in Meat, Milk, Poultry, and Eggs	
- Cattle, hogs		00025125, 00035246, 00035248, 00045178, 00096910, 00098751, 00098808, 00098810, 00104753, 40010501, 42296002
171-5:	Reduction of Residues	00159595, 00159596, 00159597 00159599, 00159601, 00159605 00159606, 00159607, 00162037
165-1:	Rotational Crops (Confined)	41404001, 42378401

D. OREB References

GL #	STUDY TYPE	MRID #
132-1a	Foliar Dislodgeable Residue Data	
Strawberries		40988601, 40966502
Apples		40823902
Grapes	40988603,	40985601, 43012903
Peaches		40988604, 40966501

Other OREB References

1. Letter from M.E. Rhodes, Captan Task Force Chairman, to Peg Perreault, EPA/SRRD dated May 11, 1994.

2. Brower et al., Pesticides in the Cultivation of Chrysanthemums in Greenhouses: Part I, and Pesticides in the Cultivation of Carnations in Greenhouses: Part II, American Industrial Hygiene Association Journal, September 1992.

3. California Department of Food and Agriculture, Worker Healt.. and Safety Branch, Human Exposure Assessment, Third Revision, January 5, 1990.

4. Letter from J. Evans, EPA/OREB to P. Perreault, EPA/SRRD dated March 14, 1994, Re: Revised Captan REI for Strawberries.

5. Popendorf et al, Youth in Agriculture, Pesticide Exposure to Strawberry Pickers, Office of Pesticide Programs, EPA, Washington, D.C., 1983.

6. Zweig et al., Simultaneous Dermal Exposure to Captan and Benomyl by Strawberry Harvesters, J. Agric. Food Chem., 1983.

7. Captan Special Review Position Document 2/3; June 1985.

APPENDIX I

Case No. 0120
Chemical No. 081301

Case Name: Captan
Registrant: Drexel Chemical Company
Product(s): 90% FI (EPA Reg. No. 19713-258)

Table 1. PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [a]	MRID Number
61-1	Product Identity and Disclosure of Ingredients	N	
61-2	Starting Materials and Manufacturing Process	N	
61-3	Discussion of Formation of Impurities	N	
62-1	Preliminary Analysis	N	
62-2	Certification of Ingredient Limits	N	
62-3	Analytical Methods to Verify the Certified Limits	N	
63-2	Color	N	
63-3	Physical State	N	
63-4	Odor	N	
63-5	Melting Point	N	
63-6	Boiling Point	N	
63-7	Density, Bulk Density or Specific Gravity	N	
63-8	Solubility	N	
63-9	Vapor Pressure	N	
63-10	Dissociation Constant	N	
63-11	Octanol/Water Partition Coefficient	N	
63-12	pH	N	
63-13	Stability	N[b]	42301401
63-14	Oxidizing/reducing action	N	
63-15	Flammability	N	
63-16	Explodability	N	
63-17	Storage stability	N	
63-18	Viscosity	N	
63-19	Miscibility	N	
63-20	Corrosion characteristics	N	

[a] Y = Yes; N = No; N/A = Not Applicable.
[b] These data do not satisfy the data requirements of 40 CFR §158.190 (Guideline Reference No. 63-13) concerning storage stability because data are required on stability to heat, metal/metal ions, and light. Data were presented only on stability at ambient conditions in an unspecified container. There was no appreciable decrease in captan concentration over 18 months.

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Case No. 0120
Chemical No. 081301

Case Name: Captan
Registrant: Gustafson, Inc.
Product(s): 90% T (EPA Reg. No. 7501-24)

Table 2. PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? *	MRID Number
61-1	Product Identity and Disclosure of Ingredients	N	
61-2	Starting Materials and Manufacturing Process	N	
61-3	Discussion of Formation of Impurities	N	
62-1	Preliminary Analysis	N	
62-2	Certification of Ingredient Limits	N	
62-3	Analytical Methods to Verify the Certified Limits	N	
63-2	Color	N	
63-3	Physical State	N	
63-4	Odor	N	
63-5	Melting Point	N	
63-6	Boiling Point	N	
63-7	Density, Bulk Density or Specific Gravity	N	
63-8	Solubility	N	
63-9	Vapor Pressure	N	
63-10	Dissociation Constant	N	
63-11	Octanol/Water Partition Coefficient	N	
63-12	pH	N	
63-13	Stability	N	
63-14	Oxidizing/reducing action	N	
63-15	Flammability	N	
63-16	Explodability	N	
63-17	Storage stability	N	
63-18	Viscosity	N	
63-19	Miscibility	N	
63-20	Corrosion characteristics	N	

* Y = Yes; N = No; N/A = Not Applicable.

Case No. 0120
Chemical No. 081301

Case Name: Captan
Registrant: Makhteshim Chemical Works, Ltd.
Product(s): 92% T (EPA Reg. No. 11678-1)

Table 3. PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [a]	MRID Number [b]
61-1	Product Identity and Disclosure of Ingredients	Y	CSF [c]
61-2	Starting Materials and Manufacturing Process	Y	40121701 *40231301*
61-3	Discussion of Formation of Impurities	Y	40121701
62-1	Preliminary Analysis	Y	**40821201**
62-2	Certification of Ingredient Limits	Y	CSF [c]
62-3	Analytical Methods to Verify the Certified Limits	Y	**40821201**
63-2	Color	Y	N/A
63-3	Physical State	Y	N/A
63-4	Odor	Y	N/A
63-5	Melting Point	Y	*40231201*
63-6	Boiling Point	N/A	
63-7	Density, Bulk Density or Gravity	Y	*40231201*
63-8	Solubility	Y	*40231201*
63-9	Vapor Pressure	Y	N/A
63-10	Dissociation Constant	N/A	
63-11	Octanol/Water Partition Coefficient	Y	**40821202**
63-12	pH	Y	*40231201*
63-13	Stability	Y	*40231201*
63-14	Oxidizing/reducing action	N	
63-15	Flammability	N/A	
63-16	Explodability	N	
63-17	Storage stability	N	
63-18	Viscosity	N/A	
63-19	Miscibility	N/A	
63-20	Corrosion characteristics	N	

[a] Y = Yes; N = No; N/A = Not Applicable.

[b] Bolded citations were reviewed under CBRS No. 2018, 2019, and 2020, dated 4/2/87, by J. Garbus; underlined citations were reviewed under CBRS No. 2120, dated 4/27/87, by J. Garbus; *italicized* citations were reviewed under CBRS No. 2472, dated 8/28/87, by R. Loranger; and remaining citations were reviewed as noted.

[c] Data were initially addressed under CBRS No. 2120, dated 4/27/87, by J. Garbus, but were re-evaluated when data required for other guidelines were submitted under CBRS No. 2472, dated 8/28/87, by R. Loranger.

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Case No. 0120
Chemical No. 081301

Case Name: Captan
Registrant: Zeneca, Inc.
Product(s): 92% T (EPA Reg. No. 10182-262) and
90% Ts (EPA Reg. Nos. 10182-197 and 10182-293)

Table 4. PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [a]	MRID Number [b]
61-1	Product Identity and Disclosure of Ingredients	Y	CSFs dated 9/15/92
61-2	Starting Materials and Manufacturing Process	Y	40021301
61-3	Discussion of Formation of Impurities	Y	40021301
62-1	Preliminary Analysis	Y	40021201
62-2	Certification of Ingredient Limits	Y	CSFs dated 9/15/92
62-3	Analytical Methods to Verify the Certified Limits	Y	40021201
63-2	Color	Y	N/A
63-3	Physical State	Y	N/A
63-4	Odor	Y	40021202
63-5	Melting Point	Y	40021202 40231801
63-6	Boiling Point	N/A	N/A
63-7	Density, Bulk Density or Specific Gravity	Y	40021202 40231801
63-8	Solubility	Y	40021202 40231801
63-9	Vapor Pressure	Y	N/A
63-10	Dissociation Constant	N/A	
63-11	Octanol/Water Partition Coefficient	Y	40021201
63-12	pH	Y	40021202 40231801
63-13	Stability	Y	40021202 40231801
63-14	Oxidizing/reducing action	N	
63-15	Flammability	N/A	
63-16	Explodability	N	
63-17	Storage stability	N	
63-18	Viscosity	N/A	
63-19	Miscibility	N/A	
63-20	Corrosion characteristics	N	

[a] Y = Yes; N = No; N/A = Not Applicable. CBRS has concluded (CBRS No. 10655, D183104, dated 2/22/93, by R. Perfetti) that the three Zeneca technical products are identical, and that data for any one of the three products can be shared by the other two products.

[b] **Bolded** citations were reviewed under CBRS No. 2018, 2019, and 2020, dated 4/2/87, by J. Garbus; underlined citations were reviewed under CBRS No. 2427, dated 8/28/87, by R. Loranger; and remaining citations were reviewed under CBRS No. 10655, D183104, dated 2/22/93, by R. Perfetti.

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Case No. 0120
Chemical No. 081301

Case Name: Captan
Registrant: Zeneca, Inc.
Product(s): 88.92% FI (EPA Reg. No. 10182-198)

Table 5. PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [a]	MRID Number [b]
61-1	Product Identity and Disclosure of Ingredients	N [c]	40141501
61-2	Starting Materials and Manufacturing Process	N [c]	40141501
61-3	Discussion of Formation of Impurities	Y	40141501
62-1	Preliminary Analysis	N/A [c]	
62-2	Certification of Ingredient Limits	N [c]	40141501
62-3	Analytical Methods to Verify the Certified Limits	Y	40141502 40141503
63-2	Color	N	
63-3	Physical State	N	
63-4	Odor	N	
63-5	Melting Point	N/A [c]	
63-6	Boiling Point	N/A [c]	
63-7	Density, Bulk Density or Specific Gravity	N	
63-8	Solubility	N/A [c]	
63-9	Vapor Pressure	N/A [c]	
63-10	Dissociation Constant	N/A [c]	
63-11	Octanol/Water Partition Coefficient	N/A [c]	
63-12	pH	N	
63-13	Stability	N/A [c]	
63-14	Oxidizing/reducing action	N	
63-15	Flammability	N	
63-16	Explodability	N	
63-17	Storage stability	N	
63-18	Viscosity	N	
63-19	Miscibility	N	
63-20	Corrosion characteristics	N	

[a] Y = Yes; N = No; N/A = Not Applicable. Although Zeneca claims that the 88.92% FI and 87% FI (EPA Reg. Nos. 10182-198 and 10182-298) are similar enough to share data, CSFs on file with the Agency indicate a slight difference in composition. CBRS has concluded (CBRS No. 9780, D177146, dated 6/26/92, by C. Olinger) that a justification is required for each data requirement for which the registrant intends to share FI data.

[b] All citations were reviewed in the Captan Reregistration Standard Update dated 12/31/91.

[c] These data do not satisfy the data requirements of 40 CFR §158.155 (Guideline Reference

No. 61-1) concerning product composition because the nominal concentration of the active ingredients (captan and related derivatives) must be revised to represent the level of the active ingredients in the final product based on the concentration of the active ingredients in the technical source product.

[d] These data do not satisfy the data requirements of 40 CFR §158.160-165 (Guideline Reference No. 61-2) concerning the starting materials and manufacturing process because a specification sheet for an inert ingredient must be submitted.

[e] These data requirements will be satisfied by the technical source product.

[f] These data do not satisfy the data requirements of 40 CFR §158.175 (Guideline Reference No. 62-2) concerning certified limits because an updated CSF on EPA Form 8570-4 (Rev. 12-90) is required reflecting transfer of ownership.

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Case No. 0120
Chemical No. 081301

Case Name: Captan
Registrant: Zeneca, Inc.
Product(s): 87% FI (EPA Reg. No. 10182-298)

Table 6. PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [a]	MRID Number
61-1	Product Identity and Disclosure of Ingredients	N	
61-2	Starting Materials and Manufacturing Process	N	
61-3	Discussion of Formation of Impurities	N	
62-1	Preliminary Analysis	N/A [b]	
62-2	Certification of Ingredient Limits	N	
62-3	Analytical Methods to Verify the Certified Limits	N	
63-2	Color	N	
63-3	Physical State	N	
63-4	Odor	N	
63-5	Melting Point	N/A [b]	
63-6	Boiling Point	N/A [b]	
63-7	Density, Bulk Density or Specific Gravity	N	
63-8	Solubility	N/A [b]	
63-9	Vapor Pressure	N/A [b]	
63-10	Dissociation Constant	N/A [b]	
63-11	Octanol/Water Partition Coefficient	N/A [b]	
63-12	pH	N	
63-13	Stability	N/A [b]	
63-14	Oxidizing/reducing action	N	
63-15	Flammability	N	
63-16	Explodability	N	
63-17	Storage stability	N	
63-18	Viscosity	N	
63-19	Miscibility	N	
63-20	Corrosion characteristics	N	

[a] Y = Yes; N = No; N/A = Not Applicable. Although Zeneca claims that the 88.92% FI and 87% FI (EPA Reg. Nos. 10182-198 and 10182-298) are similar enough to share data, CSFs on file with the Agency indicate a slight difference in composition. CBRS has concluded (CBRS No. 9780, D177146, dated 6/26/92, by C. Olinger) that a justification is required for each data requirement for which the registrant intends to share FI data.

[b] These data requirements will be satisfied by the technical source product.

APPENDIX II

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TOLERANCE REASSESSMENT SUMMARY

Chemistry Branch Reregistration Support recommends for tolerance revisions for captan on several commodities for reregistration (C. Olinger memo, 9/7/94). The following modifications have been recommended by CBRS:

- Based on the metabolism data in plants and animals for captan, the HED Metabolism Committee has determined that the tolerance expression for meat and milk should include both the parent, captan and the metabolite THPI. The tolerance expression for plants, based on captan per se only, should remain unchanged.

- The established tolerance levels for apples, pears, and blueberries are adequate and should remain.

- The established tolerances for almonds, almond hulls, apricots, cherries, grapes, nectarines, peaches, and plums can be lowered due to revised, more restrictive use patterns.

- The established tolerances for beet greens, beet roots, cantaloupes, cucumbers, eggplants, honeydew melons, kale, lettuce, muskmelons, onions, peas (dry), peas (succulent), peppers, pimentos, pumpkins, spinach, squash (summer), squash (winter), and watermelons should be lowered to 0.05 ppm. All uses except seed treatments on these crops have been canceled. The recommended 0.05 ppm level represents nondetectable residues of captan.

- The established 2 ppm tolerances for captan residues in/on broccoli, Brussels sprouts, cabbage, carrots, cauliflower, collards, corn (sweet, K+CWHR), cottonseed, mustard greens, rutabagas, soybeans (dry), soybeans (succulent), turnip tops, and turnip roots from seed treatment use should be lowered to 0.05 ppm to represent nondetectable captan residues.

- Tolerances are required to cover the seed treatment uses on the following crops for which there are currently no established tolerances: alfalfa, barley (grain, forage, and straw), clover, corn (field), cotton forage, flax (seed and straw), grasses (forage and hay), lespedeza, oats (grain, forage, and straw), okra, peanuts and peanut hay, radish roots, radish tops, rape seed, rape forage, rape greens, rye (grain, forage, and straw), safflower, sesame, sunflower (seed and forage), sorghum (grain, forage and fodder), sugar beet roots, sugar beet tops, Swiss chard, trefoil, and wheat (grain, forage, and straw).

- Tolerances are required for milk and the meat, meat-byproducts, and fat of goats, horses, and sheep. CBRS recommends the following tolerance levels for cattle, goats, sheep, horses and hogs: meat, 0.3 ppm; meat by-products, 0.40 ppm; fat,

0.25 ppm; and milk, 0.15 ppm.

- A tolerance reduction for raisins from 50 ppm to 20 ppm.
- A feed additive tolerance is required for raisin waste at 150 ppm. Because captan is classified as a carcinogen, tolerances on these two processed commodities (raisins and raisin waste) are unacceptable under the Delaney clause. OGC should be consulted on the eligibility of grapes for reregistration.

Tolerance Reassessment Summary for Captan

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances listed under 40 CFR §180.103 (a)			
Apples	25	25	
Apricots	50	10	
Avocados	25	Revoke	No registered uses exist
Beet, greens	100	0.05	Seed treatment only
Beet (roots)	2	0.05	Seed treatment only
Blackberries	25	Cannot Be Reassessed	Additional residue data are required/*Caneberries*
Blueberries (huckleberries)	25	25	
Broccoli	2	0.05	Seed treatment only
Brussels sprouts	2	0.05	Seed treatment only
Cabbage	2	0.05	Seed treatment only
Cantaloupes	25	0.05	Seed treatment only
Carrots	2	0.05	Seed treatment only
Cattle, fat Cattle meat Cattle, mbpy	0.05 0.05 0.05	0.25 0.3 0.4	Move to 40 CFR §180.103(b)
Cauliflower	2	0.05	Seed treatment only
Celery	50	Revoke	No registered uses exist
Cherries	100	50	
Collards	2	0.05	Seed treatment only
Corn, sweet (K+CWHR)	2	0.05	Seed treatment only
Cottonseed	2	0.05	Seed treatment only/*Cotton, seed*
Cucumbers	25	0.05	Seed treatment only
Dewberries	25	Cannot Be Reassessed	Additional residue data are required/*Caneberries*
Eggplants	25	0.05	Seed treatment only
Garlic	25	Revoke	No registered uses exist
Grapes	50	10	
Hogs, fat Hogs, meat Hogs, mbyp	0.05 0.05 0.05	0.25 0.3 0.4	Move to 40 CFR §180.103(b)
Honeydew melons	25	0.05	Seed treatment only
Kale	2	0.05	Seed treatment only
Leeks	50	Revoke	No registered uses exist

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances listed under 40 CFR §180.103 (a) -- (Continued).			
Lettuce	100	0.05	Seed treatment only
Mangoes	50	Revoke	No registered uses exist
Muskmelons	25	0.05	Seed treatment only
Mustard greens	2	0.05	Seed treatment only
Nectarines	50	25	
Onions, dry bulb	25	0.05	Seed treatment only
Onions, green	50	0.05	Seed treatment only
Peaches	50	15	
Pears	25	25	
Peas, dry	2	0.05	Seed treatment only
Peas, succulent	2	0.05	Seed treatment only
Plums (fresh prunes)	100	10	
Peppers Pimentos	25 25	0.05	Seed treatment only/*Peppers*
Pumpkins	25	0.05	Seed treatment only
Raspberries	25	Cannot Be Reassessed	Additional residue data are required/*Caneberries*
Rutabagas (roots)	2	0.05	Seed treatment only
Shallots	50	Revoke	No registered uses exist
Soybeans, dry	2	0.05	Seed treatment only
Soybeans, succulent	2	0.05	Seed treatment only
Spinach	100	0.05	Seed treatment only
Squash, summer	25	0.05	Seed treatment only
Squash, winter	25	0.05	Seed treatment only
Strawberries	25	Cannot Be Reassessed	Additional residue data are required
Taro (corm)	0.25	Revoke	No registered uses exist
Tomatoes	25	Revoke	No registered uses exist
Turnip, greens	2	0.05	Seed treatment only/*Turnip, tops*
Turnips, roots	2	0.05	Seed treatment only
Watermelons	25	0.05	Seed treatment only

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances listed under 40 CFR §180.103 (b)			
Almonds	2	0.25	Move to 40 CFR §180.103 (a)
Almond hulls	100	75	Move to 40 CFR §180.103 (a)
Beans, dry	25	0.05	Move to 40 CFR §180.103 (a)
Beans, succulent	25	0.05	Move to 40 CFR §180.103 (a)
Potatoes	25	0.05	Move to 40 CFR §180.103 (a)

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances required under 40 CFR §180.103 (a)			
Alfalfa forage	–	0.05	Seed treatment only
Alfalfa hay	–	0.05	Seed treatment only
Barley, grain	–	0.05	Seed treatment only
Barley, forage	–	0.05	Seed treatment only
Barley, straw	–	0.05	Seed treatment only
Clover forage	–	0.05	Seed treatment only
Clover hay	–	0.05	Seed treatment only
Corn, field, grain	–	0.05	Seed treatment only
Corn, pop, grain	–	0.05	Seed treatment only
Corn, forage	–	0.05	Seed treatment only
Corn, fodder	–	0.05	Seed treatment only
Cotton, forage	–	0.05	Seed treatment only
Flax, seed	–	0.05	Seed treatment only
Flax, straw	–	0.05	Seed treatment only
Grass, forage	–	0.05	Seed treatment only
Grass, hay	–	0.05	Seed treatment only
Lespedeza forage	–	0.05	Seed treatment only
Lespedeza hay	–	0.05	Seed treatment only
Oats, grain	–	0.05	Seed treatment only
Oats, forage	–	0.05	Seed treatment only
Oats, straw	–	0.05	Seed treatment only
Okra	–	0.05	Seed treatment only
Peanuts	–	0.05	Seed treatment only
Peanut hay	–	0.05	Seed treatment only
Radish, roots	–	0.05	Seed treatment only
Radish, tops	–	0.05	Seed treatment only
Rape, seed	–	0.05	Seed treatment only
Rape, forage	–	0.05	Seed treatment only
Rape, greens	–	0.05	Seed treatment only
Rye, grain	–	0.05	Seed treatment only
Rye, forage	–	0.05	Seed treatment only

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances required under 40 CFR §180.103 (a) -- (Continued).			
Rye, straw	--	0.05	Seed treatment only
Safflower seed	--	0.05	Seed treatment only
Sesame seed	--	0.05	Seed treatment only
Sorghum, grain	--	0.05	Seed treatment only
Sorghum, fodder	--	0.05	Seed treatment only
Sorghum, forage	--	0.05	Seed treatment only
Sunflower, seeds	--	0.05	Seed treatment only
Sunflower, forage	--	0.05	Seed treatment only
Sugar beets, roots	--	0.05	Seed treatment only
Sugar beets, tops	--	0.05	Seed treatment only
Swiss chard	--	0.05	Seed treatment only
Trefoil forage	--	0.05	Seed treatment only
Trefoil hay	--	0.05	Seed treatment only
Wheat, grain	--	0.05	Seed treatmentonly
Wheat, forage	--	0.05	Seed treatment only
Wheat, straw	--	0.05	Seed treatment only

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Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances required under 40 CFR §180.103 (b) [Redefined]			
Cattle, fat	0.05	0.25	
Cattle, mbyp	0.05	0.4	
Cattle, meat	0.05	0.3	
Goats, fat	--	0.25	
Goats, mbyp	--	0.4	
Goats, meat	--	0.3	
Hogs, fat	0.05	0.25	
Hogs, mbyp	0.05	0.4	
Hogs, meat	0.05	0.3	
Horses, fat	--	0.25	
Horses, mbyp	--	0.4	
Horses, meat	--	0.3	
Milk	--	0.15	
Sheep, fat	--	0.25	
Sheep, mbyp	--	0.4	
Sheep, meat	--	0.3	
Food Additive Tolerances Listed Under 40 CFR §185.500			
Washed raisins	50	20	*Raisins*
Feed Additive Tolerances Needed (40 CFR §186.500)			
Raisin waste	--	150	

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ATTACHMENT I

2. Exposure Assessment

a. Acute Dietary Endpoint (One Day) for Dietary Risk Evaluation System (DRES)

The endpoint for acute dietary risk assessment is the NOEL (10 mg/kg/day) from the rabbit developmental toxicity study (Guideline requirement 83-3). In this study, 20 rabbits per dose group of the New Zealand White strain received either 10, 30, or 100 mg captan/kg/day by oral gavage from gestation days 7 through 19. The maternal NOEL/LEL were considered to be 10 and 30 mg/kg/day based upon reduced body weight gain, decreased food consumption and anorexia in the dams. The developmental LEL was considered to be 10 and 30 mg/kg/day based upon increased post-implantation loss, reduced mean fetal weight, and increased manus score (altered growth) in fetuses at 100 mg/kg/day; increased skeletal defects in fetuses at 30 and 100 mg/kg/day (MRID No. 418269-01).

b. Short Term Occupational or Residential Exposure (1 to 7 Days)

A risk assessment for short term occupational or residential exposure is not required because the 21-day dermal toxicity study has a NOEL of 110 mg/kg/day, which exceeds the cutoff of 100 mg/kg/day established by the Less-Than-Lifetime Exposure Endpoint Selection Committee. The Committee established that when the NOEL for systemic toxicity from the 21-day dermal toxicity study or the NOEL from appropriate oral studies is equal or greater than 100 mg/kg/day, no short or intermediate term occupational exposure assessments will be required (memo of Reto Engler to HED staff dated March 16, 1994). See Section b. Subchronic Toxicity for details.

c. Intermediate Term Occupational or Residential Exposure (1 Week to Several Months)

A risk assessment for intermediate term occupational or residential exposure is not required because the 21-day dermal toxicity study has a NOEL of 110 mg/kg/day as mentioned above, which exceeds the cutoff of 100 mg/kg/day.

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

011423

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

Subject: Toxicology Review for the Reregistration Eligibility Document on Captan

Tox.Chem No.: 159
MRID No.: N/A
DP Barcode: D193525; D191888
Submission No.: S445164; S441627

To: Flora Chow/John C. Redden
Chemical Coordination Branch
Health Effects Division (H7509C)

From: Paul Chin, Ph.D. Paul Chin 3/30/94
Toxicology Branch I
Health Effects Division (H7509C)

Thru: Joycelyn E. Stewart, Ph.D. 3/30/94
Head, Section 2
Toxicology Branch I
Health Effects Division (H7509C)

Karl Baetcke, Ph.D., Chief 4/13/94
Toxicology Branch I
Health Effects Division (H7509C)

Chemical: Captan; N-trichloromethylthio-4-cyclohexene-1,2-dicarboximide

Case/chemical number: 819260/081301

Trade Names: Merpan®, Orthocide®, Vancide 89®, and Agrox®.

Considerations: Captan is a fungicide used on apples, stone fruits, almonds, grapes, small fruits, berries, ornamentals, and vegetable. The major livestock feed items are raisin waste, grape pomace, apple pomace, and almond hulls.

Tolerances for captan are listed in 40 CFR, Part 180.103.

In June 1985, the Agency issued a Position Document (PD 2/3) which indicated concerns for captan which included

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1. Toxicology Assessment

The toxicological data base is adequate and will support reregistration.

a. Acute Toxicity

Acute toxicity values and categories for captan are summarized in the following table.

ACUTE TOXICITY VALUES - CAPTAN TECHNICAL

TEST	RESULT	TOXICITY CATEGORY
81-1: Oral LD50; Rat; MRID Nos. 001148 & 00054789; Technical captan	LD50 = 9 g/kg (M)	IV
81-2: Dermal LD50; Rabbit; MRID Nos. 400214-01; Technical captan (86.94%)	LD50 > 2 g/kg	III
81-3: Inhalation LC50; Rat; MRID No. 258791; Captan (87% a.i.)	LC50 = 0.72 mg/L (M) LC50 = 0.87 mg/L (F)	III
81-4: Primary Eye Irritation; Rabbit; MRID No. 00128621; Captan 90% concentrate (85.1% a.i.)	Unwashed eyes PIS = 70/110 at 7 days, PIS = 16/110 at 21 days (irreversible corneal opacities). Washed eyes PIS = 0/110 at 7 days	I
81-5: Primary Dermal Irritation; Rabbit; MRID No.400214-01; Captan (86.94% a.i.)	Not an irritant at 3 days	IV
81-6: Dermal Sensitization; Guinea pig; MRID No. 00054791; Technical Captan	Moderate skin sensitizer	N/A

The acute oral LD_{50} of captan in rats is 9 g/kg (Toxicity Category IV). The acute dermal LD_{50} in rabbits is > 2 g/kg

systemic toxicity was 60 mg/kg/day and the LEL was 300 mg/kg/day based on emesis and soft/mucoid stools. This study satisfies the toxicological data requirement for a chronic feeding study [83-1] in non-rodent.

e. Carcinogenicity

Rats were tested in the following two carcinogenicity studies: In a chronic/carcinogenicity feeding study in Charles River CD strain rats (70/sex/group), rats were fed diets containing 0, 500, 2000 and 5000 ppm captan (0, 25, 100 and 250 mg/kg/day) for 2 years [MRID No. 00130316, 00129163, and 00129164; Accession No. 250667 and 250668]. The NOEL for systemic effects was 25 mg/kg/day. The LEL of 100 mg/kg/day was based on hepatocellular hypertrophy (males); increased relative organ weight for kidneys (males and females); increased relative organ weight for heart, brain, liver and thyroid/parathyroid (males); and decreased body weight for males (12%) and females (19%) when compared to controls. The Cancer Peer Review document dated 12/29/86 indicated that the MTD was apparently exceeded at 100 mg/kg/day based on decreased body weight. There was a dose-related trend for combined adenoma and carcinomas of the kidney in male rats. The percent incidence of combined adenoma and carcinomas of the kidney was 1, 1, 4, and 6% for 0, 25, 100 and 250 mg/kg/day groups, respectively. There was no increased incidence of renal cortical/tubular cell neoplasias in females.

In another carcinogenicity feeding study in Wistar rats, rats (50/sex/group) were fed diets containing 0, 125, 500 or 2000 ppm captan (0, 6.25, 24 and 98 mg/kg/day) for 30 months [Accession No. 260078]. The NOEL/LEL for systemic toxicity were equal to or greater than 2000 ppm (HDT). There was no increase in the incidence of renal cortical/tubular cell neoplasms. There was a slight but statistically significant increase in uterine sarcomas (4/50 vs 0/48 in controls) in the high dose group. [The MTD was apparently approached at the high dose (10% body weight decrease).]

The above studies, when combined, satisfy the toxicological data requirement [83-5 or 83-1a and 83-2a] for a chronic/carcinogenicity feeding study in rats.

Mice were tested in the following 2 carcinogenicity studies:

In a carcinogenicity study conducted in (ICR derived) CD-1 Charles River mice (80/sex/group), mice were fed diets containing 0, 2,000, 6,000 and 10,000 ppm of captan for 4 weeks initially and captan concentrations were increased to 0, 6000, 10,000, and 16,000 ppm (900, 1,500, and 2,400 mg/kg/day for the females and at 900, 1,000, and 2,400 mg/kg/day for the males) for the remainder of the study [Accession No. 00068076]. The NOEL for

fetal weights ($p < 0.05$), and increased manus score (altered growth) ($p < 0.01$) at 100 mg/kg/day. This study satisfies the toxicological data requirement for a developmental toxicity (83-3) in rabbits.

A developmental toxicity study was conducted with Golden Syrian hamsters (30/group) (MRID No. 00086803). Hamsters were treated by intubation on days 5 through 10 of gestation with 0, 50, 200 and 400 mg/kg/day of captan. The maternal NOEL/LEL were considered to be 50 and 200 mg/kg/day based upon reduced body weight gain and increased mortality. The developmental NOEL/LEL were considered to be 200 and 400 mg/kg/day based upon increased incidence of delayed ossification, decreased weight and increased resorption. This study satisfies the toxicological data requirement for a developmental toxicity (83-3) in a second species.

g. Reproductive Toxicity

One- and three-reproduction studies were conducted in COBS CD rats (MRID Nos. 00120315 & 00125293). In the one-generation study, captan was administered in the diet at dose levels of 6, 12.5 and 25 mg/kg/day to male and female rats. For this study, 15 males were mated with 30 females. No compound related effects were seen. This study by itself does not satisfy Subdivision F guidelines because it is only a one-generation reproduction study.

In the three-generation study, dose levels tested were 25, 100, 250 and 500 mg/kg/day. For this study, 15 males were mated with 30 females. Maternal toxicity NOEL/LEL were considered to be 12.5 and 25 mg/kg/day based on decreased body weight gain and food consumption. Reproductive toxicity NOEL/LEL were considered to be 12.5 and 25 mg/kg/day based on decreased pup litter weights. Pup survival was reduced at 250 mg/kg/day or higher.

These two studies, when considered together, satisfy the toxicological data requirement for a reproductive toxicity study (83-4) in rats.

h. Mutagenicity

Acceptable studies for mutagenicity fulfill all three categories for mutagenicity testing (under old guidelines) and there are no data gaps. Captan can produce mutagenic events in bacteria, eukaryotic microorganisms, and mammalian cells in culture.

The following is a summary of the mutagenic potential of captan.

a) Gene mutation - Captan (50% technical) was not mutagenic in vivo in host-mediated assays in mice or rats with the target bacterial cultures of S.

The identities of urinary and fecal metabolites of captan are described in details below. This study satisfies the toxicological data requirement for a metabolism study (85-1) in rats. 011423

The following is a summary of metabolism studies of captan in rats cited in the Position Document 2/3 (June 1985). According to the Agency PD 2/3, the initial step in the metabolism of captan appears to be hydrolysis of captan into two different parts, via cleavage of the N-S bond, to form THPI (tetrahydrophthalimide) and a derivative of the trichloromethylthio side chain. A major site of the hydrolytic cleavage of captan is the gastrointestinal tract, although the process also occurs in blood. For each of the two different metabolites formed by the hydrolysis of captan, analysis of 0-48 hour rat urine has indicated the presence of a separate metabolic pathway.

For the pathway involving the trichloromethylthio side chain group, a total of 4 urinary metabolites were found. The metabolites identified were thiophosgene, thiazolidine-2-thione-4-carboxylic acid, and dithiobis (methanesulfonic acid) and its disulfide monoxide derivative (Position Document 2/3, June 1985).

For the THPI pathway, a total of 7 urinary metabolites were found (MRID Nos. 415054-01 to 415054-04). The primary metabolite was THPI which was formed from the cleavage of the trichloromethylthio moiety. THPI represented 5.7 to 15.4% of the urinary radioactivity. Six other metabolites identified were 3-OH THPI, 5-OH THPI, THPI-epoxide, THPI-diol, cyclohexene acid amide, and 3-OH-cyclohexene acid amide.

Five metabolites and a unidentified compound were found in the feces. The unidentified compound is suggested to be the parent compound; however data were inadequate to show that it was an unmetabolized captan. The primary metabolite was THPI which represented 30 to 39% of the fecal radioactivity. Five other metabolites identified were 3-OH THPI, 5-OH THPI, THPI-diol, cyclohexene acid amide, and 3-OH-cyclohexene acid amide.

j. Reference Dose (RfD)

The HED RfD Committee on September 23, 1993 concluded that an RfD should be established based upon a NOEL of 12.5 mg/kg/day in one- and three-generations reproductive toxicity studies (MRID Nos. 120315 and 125293). The LEL was 250 mg/kg/day for decreased pup body weight. An Uncertainty Factor (UF) of 100 was used to account for the inter-species extrapolation and intra-species variability. On this basis the RfD was calculated to be 0.13 mg/kg/day.

2. Exposure Assessment

a. Acute Dietary Endpoint (One Day) for Dietary Risk Evaluation System (DRES)

The endpoint for acute dietary risk assessment is the NOEL (10 mg/kg/day) from the rabbit developmental toxicity study (Guideline requirement 83-3). In this study, 20 rabbits per dose group of the New Zealand White strain received either 10, 30, or 100 mg captan/kg/day by oral gavage from gestation days 7 through 19. The maternal NOEL/LEL were considered to be 10 and 30 mg/kg/day based upon reduced body weight gain, decreased food consumption and anorexia in the dams. The developmental LEL was considered to be 10 and 30 mg/kg/day based upon increased post-implantation loss, reduced mean fetal weight, and increased manus score (altered growth) in fetuses at 100 mg/kg/day; increased skeletal defects in fetuses at 30 and 100 mg/kg/day (MRID No. 418269-01).

b. Short Term Occupational or Residential Exposure (1 to 7 Days)

A risk assessment for short term occupational or residential exposure is not required because the 21-day dermal toxicity study has a NOEL of 110 mg/kg/day, which exceeds the cutoff of 100 mg/kg/day established by the Less-Than-Lifetime Exposure Endpoint Selection Committee. The Committee established that when the NOEL for systemic toxicity from the 21-day dermal toxicity study or the NOEL from appropriate oral studies is equal or greater than 100 mg/kg/day, no short or intermediate term occupational exposure assessments will be required (memo of Reto Engler to HED staff dated March 16, 1994). See Section b. Subchronic Toxicity for details.

c. Intermediate Term Occupational or Residential Exposure (1 Week to Several Months)

A risk assessment for intermediate term occupational or residential exposure is not required because the 21-day dermal toxicity study has a NOEL of 110 mg/kg/day as mentioned above, which exceeds the cutoff of 100 mg/kg/day.

ATTACHMENT II

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

011423

JUN 6 1994

MEMORANDUM

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

SUBJECT: OCCUPATIONAL AND RESIDENTIAL EXPOSURE ASSESSMENT AND RECOMMENDATIONS FOR THE REREGISTRATION ELIGIBILITY DOCUMENT FOR CAPTAN

FROM: Jeff Evans, Biologist
Reregistration Section
Occupational and Residential Exposure Branch
Health Effects Division (7509C)

TO: John Redden, Chemical Coordinator
Chemical Coordination Branch
Health Effects Division (H7509C)

THRU: Alan P. Nielsen, Section Head
Reregistration Section

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

Please find the OREB review of ....

DP Barcode: D197999

Pesticide Chemical Codes:

EPA Reg. No.: N/A

EPA MRID No.:408239-02; 409665-01; 409856-01; 409886-01 - 04, 430129-01 - 03.

Review Time: 20 days

PHED: YES

This memorandum presents the OREB science chapter review for the Captan Reregistration Eligibility Document (RED). Occupational and residential exposure data requirements to support the reregistration of captan are discussed in this chapter. Precautionary label language recommendations regarding personal protective equipment are also addressed.

Captan is a non-systemic fungicide used as a protectant against fungal diseases on a wide variety of plant materials and is used as a fungicide/preservative in commercial products. On August 18, 1980, the Agency initiated a Special Review of captan based on its classification as a B_2, probable human carcinogen. The current carcinogenic potency of captan is $Q_1^* = 3.6 \times 10^{-3}$ $(mg/kg/day)^{-1}$). As a result of the special review, it was determined that the non-food uses would be retained while some food uses would be canceled. A Task Force, representing the then major manufacturers of captan, was formed to provide the necessary toxicology, residue, and worker exposure data required to support the remaining uses. The Task Force currently consists of Zeneca Inc. (formerly ICI Americas Inc.) and Makhteshim-Agan (America), Inc. The Task Force intends to support the reregistration of captan for the following uses:

Terrestrial Food Uses:

Seed Treatment for crops such as alfalfa, cereal grains, cotton, soybeans, corn, potatoes, and vegetables.

Spray Applications to almonds, apples, apricots, blueberries, cherries, grapes, pears, plums, strawberries, caneberries (IR-4), nectarines, and peaches.

Terrestrial Non-Food Uses:

Spray Applications to azaleas, begonias, camellias, carnations, chrysanthemums, conifers, dichondra, gladiolus, grasses (lawns and lawn seedbeds), ornamental flowering plants, roses.

Soil and greenhouse bench treatments.

Non-Agricultural Uses:

In-plant additives for paints, plastics, rubber, adhesives, cosmetics.

Use in pet powders.

Occupational and Residential Exposure

Postapplication/reentry data and mixer/loader/applicator data are required when both toxicity and exposure criteria are met. Captan meets the Agency's toxicity criteria because it is a quantifiable carcinogen. Captan also meets the agency's exposure criteria as a result of the activities associated with its application and as a result of direct contact with treated surfaces following the applications. Because exposure to carcinogens is a chronic concern, typical application rates

rather than maximum application rates will be used whenever possible. Many typical rates were provided by the Task Force in a memorandum submitted to the Agency on May 11, 1994. OREB recommends that the Agency's Biological and Economic Analysis Division (BEAD) review the memorandum for concurrence.

Mixer/Loader/Applicator Exposure (Handlers):

Mixer/loader/applicator exposure was evaluated during the Special Review. Where new surrogate data are available, those data will be used to re-evaluate mixer/loader/applicator exposure. Otherwise, exposure and risk calculations will only reflect the revised cancer potency of captan which increased from 2.3×10^{-3} to 3.6×10^{-3}.

Terrestrial Food Uses:

Seed Treatments for crops such as alfalfa, cereal grains, cotton, soybeans, corn, potatoes, and vegetables.

There are three occupational exposure scenarios associated with the seed treatment use: 1) exposure while operating commercial or smaller on-farm, bulk, seed treatment equipment; 2) exposure while adding captan to seed during planting activities; 3) exposure to the treated seed at planting time.

In the Position Document PD 2/3, the Agency evaluated handler exposure for the soybean seed treatment (at the time of planting) and the potato seed piece treatment. Both uses were considered "worst case" with risk estimates ranging from 10^{-7} to 10^{-6}. These estimates were calculated using a captan potato seed piece study (Stevens and Davis, 1980), surrogate assumptions from the Lindane PD 2/3, as well as use assumptions provided by E. N. Pelleter, 1982 of EPA. During the PD 2/3, the Agency assumed that exposure to treated seed while planting (scenario 3) is negligible.

OREB has not reevaluated this exposure assessment because new surrogate data, representing these uses, have not been generated. Furthermore, OREB believes the personal protective equipment (PPE) required by the Agency for captan will adequately protect handlers for this use. The risk value has been recalculated because the Q_1^* for captan has increased from 2.3×10^{-3} to 3.6×10^{-3}. The risk calculations are presented in Table 7, Summary Exposure/Risk Values for Captan, which is provided as an attachment.

Spray Applications to almonds, apples, apricots, blueberries, cherries, grapes, pears, plums, strawberries, caneberries (IR-4), nectarines, peaches.

Exposure estimates for these applications include the use of aerial, airblast, and groundboom equipment. There has been a considerable amount of surrogate data generated for these uses since the PD 2/3. These data are compiled in the Agency's Pesticide Handlers Exposure Database (PHED). The PHED data were used to reevaluate handler exposure. Mixer/loader exposure estimates are calculated separately from the applicator estimates and address wettable powder and liquid/flowable formulations. The surrogate data were adjusted to reflect the current PPE as required by the WPS and previous Agency requirements. Exposure scenarios for home gardeners are discussed under the ornamental uses.

The risk for mixer/loaders and applicators involved in the airblast, groundboom, and aerial application activities ranges from less than 10^{-4} to 10^{-7}. The highest risk was estimated for mixer/loaders using wettabel powders to support aerial applications to strawberries 9.1×10^{-5}. The frequency of applications was estimated to be 7 times per season. The use of flowable concentrates for this scenario would result less exposure. Refer to Table 7, Summary Exposure/Risk Values for Captan for the assumptions used in the assessment, which is provided as an attachment.

Dip applications to apples and cherries

OREB has not reevaluated this exposure assessment because new surrogate data, representing this use, have not been generated. Furthermore, OREB believes the personal protective equipment (PPE) required by the Agency for captan will adequately protect handlers for this use. The risk value has been recalculated because the Q_1^* for captan has increased from 2.3×10^{-3} to 3.6×10^{-3}. The risk calculations are presented in Table 7, Summary Exposure/Risk Values for Captan, which is provided as an attachment.

<u>Terrestrial Non-Food Uses</u>:

Spray Applications to azaleas, begonias, camellias, carnations, chrysanthemums, conifers, dichondra, gladiolus, grasses (lawns and lawn seedbeds), ornamental flowering plants, roses.

Field-Grown Ornamentals.

OREB believes groundboom applications to field grown ornamentals such as azaleas and carnations would result in less exposure than strawberry exposure scenario presented discussed above. This is based on the likelihood of smaller acerages being treated in one day.

Greenhouse-Grown Ornamentals.

For applications to greenhouse grown ornamentals such as carnations and chrysanthemums, two appropriate application scenarios were available in the database. These are application with a high pressure portable handwand on wheels, and the backpack/knapsack sprayer. In the PD 2/3 it was assumed mixer/loaders spent 0.25 hr per day 26 days per year and applicators spent 0.5 hr per day 26 days per year handling captan.

Typical use directions for ornamentals include directions apply to the point of drip. Dosages are expressed as amount of active ingredient (ai) per 100 gallons of water. Thus, there is no way to determine a rate per area treated. In a greenhouse study conducted in the Netherlands (Brower et. al.)[2], it was reported that typical high pressure sprays require 300 to 350 liters (approximately 75 gallons) of water per 1,000 sq. meters (approximately 0.25 acre) and applicators require approximately 50 minutes to spray 1,000 sq. meters. Therefore, for the high pressure exposure scenario, OREB will assume one hour per day for mixing/loading and applying the pesticide 26 times per year. Although it is unlikely that a backpack sprayer could deliver 100 gallons per hour, OREB will assume one pound ai handled per day, 26 days per year. For both scenarios, the risk is estimated to be less than 2×10^{-7}.

Homegardens including Fruit and Nut Crops.

Exposure scenarios for home gardeners include use of the garden hose-end sprayers and low pressure handwands. For these scenarios, the mixer/loader and applicator exposure calculations for mixing/loading and application are combined. For the homeowner uses, the Agency will assume that PPE is not routinely worn. In the PD 2/3, it was assumed that homeowners use 0.8 oz/5 gallons per day, 4 days per year. In California, it was assumed that captan could be used 18 times per year[3]. Therefore, OREB will assume the higher frequency. In addition, for lifetime exposure, OREB will assume 50 years of use. The risk for hose-end and low pressure applications is estimated to be 6.0×10^{-7} and 1.0×10^{-6} respectively.

Soil and greenhouse bench treatments.

These treatments are similar to the foliar treatments using hose-end applicators. The only exception being that the application is directed to the soil around the plants rather than the foliage. Thus this exposure assessment was not conducted.

Dip treatments.

Although there are no specific data addressing this exposure scenario it is expected to be similar to that of mixing and loading. Since the use rate (2 lb ai/100 gallons) is much lower than expected to be encountered by mixer/loaders in the agricultural setting, this exposure scenario was not addressed.

Lawns.

For this scenario, the mixer/loader/applicator exposure assessment addresses the use of captan on dichondra. Dichondra was chosen because its application rate is a order of magnitude higher than the turfgrass application rate. For the homeowner, OREB assumed that a dichondra lawn of 10,000 square feet would be sprayed 2 times a year, over a 50 year lifetime. It was also assumed that the homeowner would not wear PPE. For the commercial applicator, OREB assumed 2 acres would be treated per day, 10 times a year. The respective commercial and homeowner risks are 1.4×10^{-5} and 6.0×10^{-7}.

Golf Courses.

For applications to golf courses, OREB assumed the use of groundboom equipment, PPE normally worn by handlers under the WPS, and a typical golf course of 40 acres. The golf course would be treated 10 time a year. For this scenario applicator risk was estimated to be 1.0×10^{-7}. The combined risk for mixer/loader/applicators using the wettable powder formulation was estimated to be 2.3×10^{-7}. OREB recommends that the PPE normally required by the Worker Protection Standard (WPS) be recommended for this out-of-scope use.

Non-Agricultural Uses:

In-plant additives for paints, plastics, rubber, adhesives, cosmetics.

The use of captan in the above industrial settings was addressed using the Chemical Manufacturers Association (CMA) Database. For the industrial scenarios, chronic exposure is of concern because of the number of potential days of exposure per year (250 days). The formulation of captan in paints and adhesives were selected as typical scenarios for the industrial uses.

For preservation in linseed oil exterior paints, captan is added at a rate of 12 pounds ai per 100 gallons of paint, with a total of 36 pounds ai added per day. For preservation of wallpaper paste against the growth of mold, 7.9 pounds ai are used per day. The respective risk for workers adding captan to industrial products is 1×10^{-4} to 1.35×10^{-5}. This assessment does not consider the use of closed-application systems or the

use of aprons and chemical resistant gloves currently stated on the labels. Thus, this assessment is assumed to be conservative.

Commercial painter and homeowner applicator exposures, with respect to application of paints containing captan, were also estimated. This is because of label claims suggesting that molds are controlled after the paint is applied. The commercial and homeowner exposure assessments were conducted using PHED. The risks ranged from 4.5×10^{-5} to 3.6×10^{-6} for commercial applicators (100 days exposure) and 4.0 to 6.0×10^{-7} for homeowners. Homeowners were assumed to use the paints one day a year, for 50 years. There are no data or pesticidal claims for the use of captan in adhesives other than as a in storage preservative. Thus, an exposure assessment for the use of wall paper paste containing captan was not conducted.

Use in pet powders.

OREB has not reevaluated this exposure assessment because new surrogate data, representing this use, have not been generated. The revised risk calculation is estimated to be 1.35×10^{-5}.

Postapplication/Reentry Exposure (Workers):

Terrestrial Food Uses:

Seed Treatment for crops such as alfalfa, cereal grains, cotton, soybeans, corn, potatoes, and vegetables.

The potential for postapplication exposure following the seed treatment uses is negligible based on the unlikelihood of any contact with the treated seed after it has been planted.

Spray Applications to almonds, apples, apricots, blueberries, cherries, grapes, pears, plums, strawberries, caneberries (IR-4), nectarines, and peaches.

The issue of postapplication/reentry exposure was partially addressed in the Special Review and Registration Standard. Data available at that time consisted of several strawberry studies measuring worker exposure following applications of captan. Because field measurements were limited to 3 to 4 days postapplication, an interim reentry interval of 4 days was established until additional data were submitted and reviewed by the Agency. The 4 day reentry interval was subsequently converted to a 4 day restricted entry interval (REI) by the Worker Protection Standard (WPS). This REI consists of a 48 hour "no entry period" based on captan's primary eye irritation potential. In Supplement Three-A of the WPS, PR Notice 93-7, the following REI was proposed:

After application, routine hand labor will be prohibited in the treated area for 48 hours (this is based on captan being in Toxicity Category I for primary eye irritation);

After application is complete and the 48-hour, WPS, REI has expired, routine hand labor will be permitted during the remainder of the 4-day REI, if workers receive early-entry PPE and all other early-entry protection required by the WPS.

In the 1986 Captan Registration Standard, the risk for strawberry postapplication workers was estimated to range from 10^{-4} to 10^{-6}. Since then, the Task Force has submitted data addressing postapplication exposure following applications of captan to apples, peaches, grapes, strawberries, and tomatoes. With the exception of the tomato data, the new data were used 1) to revise the existing 4 day REI, 2) to calculate restricted entry intervals (REI) for all the agricultural crops, and 3) to use as surrogate data for field and greenhouse grown flowers. Because tomatoes are not being supported at this time, those data are not part of this exposure assessment.

Recently, the Task Force requested EPA reassess the 4 day REI for strawberries. In order to reassess the strawberry REI, OREB reviewed two studies submitted by the Task Force, and five studies conducted under the auspices of EPA. The two Task Force studies MRID 409886-01 and 409665-02, consist of captan foliar/soil dissipation data and concurrent dermal/inhalation exposure data respectively. The five EPA funded studies were chosen because they also consist of captan postharvest worker exposure data and foliar dissipation data following captan applications. In addition, all studies, including the Task Force's, were conducted in the vicinity of Salinas, California.

OREB has concluded that the studies submitted by the Task Force are acceptable for the purposes of calculating an REI. However, OREB offers the following suggestions and criticisms:

The investigators should provide a discussion of worker productivity (ie. number of crates per time period).

The investigators should provide a discussion regarding the poor field spike recoveries. The studies are acceptable based on the strength of the laboratory recovery data, the fact that captan is not volatile (< 10^{-6} mm Hg at 25 C), and the similarity of the Task Force's results as compared to the EPA funded studies.

These comments also apply to the remaining reentry studies submitted by the Task Force.

Table 1 presents selected results from the Task Force and EPA funded studies. These results include foliar dislodgeable residue (FDR) data, transfer factors (cm^2/hr), days after treatment (DAT) and average daily exposures (mg/kg/day). To calculate the average daily exposure, OREB assumed a dermal absorption rate of 1.3%/hour, and 70 kg body weight. OREB also assumed that harvesters do not wear gloves.

TABLE 1

Study	Application rate/applications	DAT	FDR $\mu g/cm^2$	Transfer Factor cm^2/hr	Daily Exposure mg/kg/da
Task Force	3lb ai/8X	1	8.3	2333	0.029
"	"	2	6.5	"	0.022
"	"	3	8.1	"	0.029
"	"	4	5.7	"	0.02
"	"	5	4.9	"	0.017
"	"	9	6.1	"	0.021
Youth in Agriculture Study #1[5]	2lb ai/3X(pre) 8X/season	2	9.75	2758	0.039
Youth in Agriculture Study #3[5]	2/lb ai/8X	4	5.1	3413	0.026
Youth in Agriculture Study #4[5]	2-2.25lb ai/5X	3	2.74	5974	0.025
Youth in Agriculture Study #5[5]	1-2lb ai/3X	48	1.29	4558	0.009
Zweig et al. 1983[6]	Not Reported	4	4.5	8500	0.057

Table 2 presents average annual daily exposures (AADE), lifetime average daily exposure (LADE), and Risk for harvesters. For these calculations, OREB assumed 80 and 120 days for the AADE, 35/70 years for the LADE, and the Q 3.6×10^{-3} for calculating risk. OREB has assumed 120 days per year exposure in California and 80 days per year for the rest of the country.

TABLE 2

Study DAT	AADE 80 days	AADE 120 days	LADE 80 days	LADE 120 days	Risk 80 days $\times 10^{-5}$	Risk 120 days $\times 10^{-5}$
Task Force 1 - day	0.0064	0.0095	0.0032	0.0047	1.14	1.7
2 - days	0.0048	0.0072	0.0024	0.0036	0.8	1.3
3 - days	0.0064	0.0095	0.0032	0.0047	1.14	1.7
4 - days	0.0044	0.0066	0.0022	0.0032	0.78	1.2
5 - days	0.0037	0.0056	0.0019	0.0028	0.67	1.0
9 - days	0.0046	0.0069	0.0023	0.0035	0.8	1.2
Youth in Agriculture Study #1[3]	0.0085	0.0128	0.0043	0.0064	1.5	2.3
Youth in Agriculture Study #3[3]	0.0056	0.0085	0.0028	0.0043	1.0	1.5
Youth in Agriculture Study #4[3]	0.0055	0.0083	0.0027	0.004	1.0	1.5
Youth in Agriculture Study #5[3]	0.002	0.003	0.001	0.0015	0.4	0.5
Zweig et al.[6] 1983	0.01	0.019	0.0062	0.0094	2.2	3.4

The Task Force contends that their data, generated using maximum application rates (3 lb ai/acre/8 applications/year), results in an over-estimation of typical harvester exposure. According to Task Force representatives, four (4) applications per year at the 2 lb ai per acre rate are typical.

OREB believes that the Task Force's data do not over-estimate exposure, as they suggest, but, represent levels of captan residues likely to be encountered by strawberry harvesters. This is based on:

1) The similarity of the results shown in studies using the maximum rate (3 lb ai/acre, 8 times/year-Task Force), and the EPA studies using the typical rates.

2) Cultural practices suggesting captan is typically applied close to harvest. According to the Task Force representatives, strawberries are picked every 2-3 days. For example, pick on Monday, apply captan Monday afternoon, Pick on Wednesday.

3) Extensive use of captan in Florida where the rate of dissipation may be as slow as in California (typically considered worst case). The assumption is based on the increased use of drip irrigation by Florida growers, thereby resulting in slower dissipation rates than would be expected on farms that previously used overhead irrigation.

Assuming that a lifetime cancer risk of $< 10^{-4}$ is acceptable, and that there are no other toxicological end-points of concern, OREB recommended a 24 hour REI for harvesting strawberries treated with captan[4].

Inhalation exposure is considered insignificant as compared to dermal exposure, even with a dermal absorption factor of 1.3% per hour. Lifetime risk for inhalation exposure, using the highest level measured, and working 120 days per year, is 4.9×10^{-6}. OREB did not consider inhalation exposure for the remainder of the assessment.

OREB is concerned about the potential for eye injuries in crops requiring close contact, at face levels, during harvesting and/or postapplication activities. Because captan is in toxicity category I for primary eye irritation, OREB recommends retaining, at a minimum, the 48 hour REI imposed by the WPS for crops other than strawberries. The following tables (3 and 4) address the average daily exposures (ADE), average annual daily exposure (AADE) and lifetime average daily exposures (LADE) based on the crop specific data submitted by the Task Force:

TABLE 3

Crop-MRID	Application rate/applications	DAT	FDR $\mu g/cm^2$	Transfer Factor cm^2/hr	Daily Exposure mg/kg/da
Apples-4008239-02	4lb ai/acre, 8x	2	12.4	3300	0.061
Grapes-409886-03 409856-01	3lb ai/acre, 6x	30	0.3	15,600	0.07
Grapes-409886-03 430129-03	3lb ai/acre, 6x	7	6.6	18,000	0.176
Peach-409886-04 409665-01	4lb ai/acre, 8x	2	28.7	3300	0.137

TABLE 4

Crop and Postapplication Scenario Days after treatment (DAT)	AADE mg/kg/day	LADE mg/kg/day	Risk $\times 10^{-5}$
Apples - 60 days of harvesting (2)	0.01	0.005	1.8
Grapes - 80 days of harvesting (30)	0.0153	0.0076	2.7
Grapes - 30 days of cane cutting and leaf pulling (7)	0.0145	0.0072	2.6
Grapes - 110 days of combined tasks (under a theoretical 2 day REI, ADE = 0.53 mg/kg/day)	0.16	0.08	28.75
Peach - 60 days of harvesting (2)	0.023	0.0113	4.1

OREB has noted a high transfer factor for a captan use that was reported in the California EPA document "Gauging Pesticides Exposure of Handlers (Mixer/Loaders/Applicators) and Harvesters in California", Krieger et al., July 15, 1991. In that

document, a transfer factor of 390,000 cm^2/hr was reported for thinning plums after the application of captan. The basis for the high transfer coefficient is due to the low FDRs in relation the average daily exposure. Because the ADE for plum thinners was similar the ADE for grape cane cutters (also exposed to higher captan FDRs), OREB recommends an REI of 7 days for plum/prune thinning.

Terrestrial Non-Food Uses:

Spray Applications to azaleas, begonias, camellias, carnations, chrysanthemums, conifers, dichondra, gladiolus, grasses (lawns and lawn seedbeds), ornamental flowering plants, roses.

To calculate risk for workers harvesting and bundling flowers FDR data from the Task Force's Strawberry FDR study (MRID 409886-01), and transfer coefficients developed in the Netherlands (Brower et al.)[2]. The strawberry data were chosen due to the similarity of the application rate. The transfer coefficients suggested by Brower et al. are 4,000 cm^2 and 10,000 cm^2 for chrysanthemums and carnations respectively. Under the current REI of 48 hours (based on primary eye irritation) the risk for workers harvesting for 100 days per year (8 hour days) is $2.4 - 6.1 \times 10^{-3}$.

There are no appropriate data available to address reentry to home lawns following applications of captan. Therefore, OREB recommends that the home turfgrass and dichondra uses be ineligible for reregistration until data are submitted, reviewed and the safety of this use verified. OREB recommends requiring the following data to support this use; Foliar Dislodgeable Residue data (Guideline 132-1a) and Dermal Exposure Data (Guideline 133-3). These studies must be conducted concurrently.

For workers using the plant dips (ie azalea cuttings), exposure is expected to be mitigated by the use of chemical resistant gloves required by the Special Review and stated on current labelling.

Non-Agricultural Uses:

In-plant additives for paints, plastics, rubber, adhesives, cosmetics.

Use in pet powders.

Post application exposure regarding the above uses was addressed in the PD 2/3. In that document exposure was considered negligible. Because there are no new data regarding

these uses, an exposure assessment was not conducted. It should be noted that exposure, for people wearing cosmetics treated with captan, is addressed by the Food and Drug Administration.

Restricted Entry Interval (REI):

Table 5 presents the REI's recommended for the continued use of captan:

TABLE 5

CROP	TASK	REI
Almonds	All	48 hours
Apples	All	48 hours
Apricots	All	48 hours
Blueberries	All	48 hours
Cherries	All	48 hours
Grapes	Harvesting	30 days
Grapes	All Other Tasks Including Leaf Thinning, Cane Cutting	7 days
Pears	All	48 hours
Plums	Thinning	7 Days
Plums	Harvesting	48 hours
Strawberries	All	24 hours
Caneberries (IR-4)	All	48 hours
Nectarines	All	48 hours
Peaches	All	48 hours
Greenhouse Grown Ornamentals	All	48 hours
Field Grown Ornamentals	All	48 hours

Personal Protective Equipment (PPE) Requirements:

OREB recommends the PPE for captan be constant with the WPS (PR Notice 93-7) for chemicals in toxicity category III for acute

dermal toxicity, and toxicity category I for primary eye irritation. Additional use specific PPE required by past regulatory actions such as the Special Review should also be retained.

IV. REFERENCES:

1. Letter from M.E. Rhodes, Captan Task Force Chairman, to Peg Perreault, EPA/SRRD dated May 11, 1994.

2. Brower et al., Pesticides in the Cultivation of Chrysanthemums in Greenhouses: Part I, and Pesticides in the Cultivation of Carnations in Greenhouses: Part II, American Industrial Hygiene Association Journal, September 1992.

3. California Department of Food and Agriculture, Worker Health and Safety Branch, Human Exposure Assessment, Third Revision, January 5, 1990.

4. Letter from J. Evans, EPA/OREB to P. Perreault, EPA/SRRD dated March 14, 1994, Re: Revised Captan REI for Strawberries.

5. Popendorf et al, Youth in Agriculture, Pesticide Exposure to Strawberry Pickers, Office of Pesticide Programs, EPA, Washington, D.C., 1983.

6. Zweig et al., Simultaneous Dermal Exposure to Captan and Benomyl by Strawberry Harvesters, J. Agric. Food Chem., 1983.

7. Krieger et al., Gauging Pesticide Exposure of Handlers (Mixer/Loader/Applicator) and Harvesters in California, July 15, 1991.

cc: J. Evans, OREB
J. Andersen, BEAD
Correspondence File
Chemical File (081301)

ATTACHMENT

Table 6. Summary Exposure/Risk Values for Captan

Exposure Scenario (Scen. #)	Dermal Exposure[a] (mg/lb ai)	Inhalation Exposure[b] (µg/lb ai)	Application Rate[c] (lb ai/cycle)	Daily Amt.[d] Treated	Daily Dermal Dose[e] (mg/kg/day)	Daily Inhalation Exposure[f] (mg/kg/day)	Combined dermal and inhalation LADD[g] (mg/kg/day)		RISK[h]	
							Private Applicator[i]	Commercial Applicator[j]	Private Application	Commercial Applicator
Mixer/Loader Exposure										
Wettable Powders (Aerial Application) - strawberries (I)	1.3	4.7	3 lb ai/A, 7x/season	350 acres	0.25	0.014	N/A	0.025 (70 days total worked/yr)	N/A	9.1×10^{-5}
Wettable Powders (Airblast Application) - apples, apricots, cherries, grapes, peach, nectarines, blueberries (II)	1.3	4.7	2-3.7 lb ai/A, 3x/season	40 acres	0.019-0.036	0.0011-0.002	0.00008-0.00016	N/A	$2.0\text{-}5.0 \times 10^{-7}$	N/A
Wettable Powders (Groundboom Application) - strawberries (II)	1.3	4.7	3 lb ai/A, 7x/season	20 acres	0.014	0.0008	0.00014	N/A	5.0×10^{-7}	N/A
Wettable Powders (High Pressure Spray) - greenhouses	1.3	4.7	1 lb ai/100 gallons 26x/year	100 gallons	0.00024	0.000013	0.000009	N/A	3.2×10^{-6}	N/A
Wettable Powders (Groundboom Application) - golf course	1.3	4.7	4.4 lb ai/A, 10x/season	40 acres	0.042	0.003	N/A	0.00062	N/A	2.2×10^{-4}
Liquids/Flowable (Aerial Application-strawberries) (III)	0.2	0.4	3 lb ai/A, 7x/season	350 acres	0.039	0.006	N/A	0.0043 (70 days total worked/yr)	N/A	1.5×10
Liquids/Flowables (Airblast Application) - apples, apricots, cherries, grapes, peach, nectarines, blueberries (IV)	0.2	0.4	2-3.7 lb ai/A, 3x/season	40 acres	0.003-0.0055	0.0005-0.0008	0.000014-0.000026	N/A	5.0-9.4[k]	
Liquids/Flowables (Groundboom Application - strawberries	0.2	0.4	3 lb ai/A, 7x/season	20 acres	0.002	0.00023	0.00007		7.2×10^{-6}	
Applicator Exposure										
Aerial Application - strawberries (V)	0.004	0.2	3 lb ai/A, 7x/season	350 acres	0.00078	0.003	N/A	0.00036 (70 days total worked/yr)	N/A	1.3×10^{-6}
Airblast Application - apples, apricots, cherries, grapes, peach, nectarines, blueberries (VI)	5.3	4.2	2-3.7 lb ai/A, 3x/season	40 acres	0.078-0.146	0.0048-0.009	0.00034-0.00064	N/A	$1.2\text{-}2.2 \times 10^{-4}$	N/A
Groundboom Application - strawberries (VII)	0.02	1.3	3 lb ai/A, 7x/season	20 acres	0.00022	0.00011	0.0000031	N/A	1.3×10^{-6}	N/A

Groundboom Application - Golf Course	0.02	1.3	4.4 lb ai/A, 10x/season	40 acres	0.00065	0.0033	N/A	0.000054	N/A	1.0×10^{-1}
Paint Brush (VIII)	218	570 (median)	5 gallons (0.15 lb ai)	5 gallons	0.0061	0.0012	0.00001	0.001 (100x/yr)	4.0×10^{-7}	3.6×10^{-4}
Paint-Airless Sprayer (IX)	28.5	700	3 lb ai/100 gallons	200 gal/day	0.032	0.06	0.00018	0.012 (100x/yr)	6.0×10^{-7}	4.5×10^{-3}
Seed/Seed Piece Treatment - Potatoes (XI)	8 mg/day	0.7 mg/day	1.2 oz/cwt 15x/year	8 hrs/day	0.0015	0.01	0.00024	N/A	8.0×10^{-7}	N/A
High Pressure Spray	0.7	0.09	1 lb ai/100 gal, 26x/season	100 gal/0.25 acre	0.00013	0.000001	0.0000046	N/A	1.0×10^{-7}	N/A
Apple Dips (XII)	45 mg/day	1.5 mg/day	30x/year	PD 2/3	0.0084	0.02	N/A	0.0017	N/A	4.2×10^{-4}
As a Preservative (XII)	14.3	–	7925 lb ai/yr	31.7 lb ai/ day	0.084	–	N/A	0.028 (250 days/yr)	N/A	1.0×10^{-4}
Adhesive (XIII)	14.3	–	1,975 lb ai/yr	7.9 lb ai/ day	0.021	–	N/A	0.007 (250 days/yr)	N/A	2.6×10^{-5}
Pet Powders (XVI)	200 mg/use	PD 2/3	once/week	PD 2/3	0.037	–	0.0038	N/A	1.35×10^{-5}	N/A
Mixer/Loader/Applicator										
Low Pressure Handwand (XVII)	103	39	0.8 oz/day (0.05 lb)	18x/yr	0.00096	0.00003	0.000035	N/A	1.0×10^{-7}	N/A
Backpack/Knapsack (XVIII)	1.3	30	1 lb ai/100 gal	0.25 acre	0.00024	0.00043	N/A	0.000024	N/A	8.6×10^{-8}
Garden Hose End-Sprayer - Dichondra	25.2	0.01	1 lb ai/100 gal, 1 gal/10 sq. ft, 2x/yr	10,000 sq. ft	0.047	0.0014	0.00019	N/A	6.0×10^{-7}	N/A
Hose End-Sprayer - (XIX)	16.8	0.01	1 lb ai/100 gal, 1 gal/10 sq. ft	2 acres	0.27	0.012	N/A	0.0039 (10x/yr)	N/A	1.4×10^{-5}

- Dermal unit exposures are reported as the best fit mean to simulate workers wearing long pants, long-sleeved shirts, and chemical resistant gloves, unless noted. The best fit mean is the composite total dermal exposure based on using the geometric mean for lognormal distributed data, arithmetic mean for normal distributed data, and the median for all other distribution types. Protection factors were used to calculate dermal unit exposure values because insufficient data are available for PPE in these scenarios. Fifty percent of the total dermal exposure is assumed to be attributed to hand exposure. Fifty percent protection factor is applied to the hand exposure for chemical resistant gloves. Fifty percent protection factor is applied to total deposition for long pants and long-sleeved shirts.

- Inhalation exposure values are reported as geometric means (lognormal distributions), unless otherwise noted.

- Luis Report dated 8/26/91, Captan, Task Force Memorandum dated 5/11/94, PD 2/3 dated 6/85.

- Values represent the typical area or the typical volume of spray solution which is assumed to be used in a single day to complete treatments for each exposure scenario of concern.

[e] Daily Dermal Dose (mg/kg/day) = $\frac{\text{Exposure (mg/lb ai) * Appl. Rate (lb ai/cycle) * Amt.treated * 1.3\% (dermal penetration)}}{\text{70 kg}}$

[f] Daily Inhalation Exposure (mg/kg/day) = $\frac{\text{Exposure (mg/lb ai) * Appl. Rate (lb ai/cycle) * Amt. Treated}}{\text{70 kg}}$

For mixer/loaders an 80% protection factor was included to account for respirators which are on current labelling for mixer/loaders.

[g] LADD (mg/kg/day) = Daily Dermal Dose (mg/kg/day) * (Work Days Per Yr/365 Days Per Year) * (35 Yrs/70 Yrs) (for homeowners 50 Yrs/70 Yrs)

[h] Private applicator is defined as a short term exposed individual, usually a private grower.

[i] Commercial applicator is defined as those working as PCO's, aerial applicators, golf courses, and people working in industrial settings.

[j] Risk = Dermal LADD (mg/kg/day) * Q_1 *

Table 7. Exposure Scenario Descriptions for Captan

Exposure Scenario	Data Source	Clothing Scenario[a]	Equipment	Standard Assumptions[b] (8-hr work day)	Comments[c]
Mixer/Loader Exposure					
Wettable Powders for Aerial Application	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Open Mixing	350 acres (fixed wing)	Acceptable dermal grades; Inhalation all grades; Dermal = 2 to 12; Inhalation = 35 replicates
Wettable Powders for Ground Application	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Open Mixing	40 acres airblast	Acceptable dermal grades; Inhalation all grades; Dermal = 2 to 12; Inhalation = 25 replicates
Liquids/Flowables for Aerial Application	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Open Mixing	350 acres (fixed wing)	Acceptable grades; Dermal = [illegible] replicates; Inhalation = 40 replicates
Liquids/Flowables for Ground Application	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Open Mixing	4 acres airblast	Acceptable grades; Dermal = 14+ replicates; Inhalation = 40 replicates
Applicator Exposure					
Aerial Application	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Fixed wing, all cab types	350 acres	All grades; Dermal = 4 to 41 replicates; Inhalation = 25 replicates
Airblast Application	PHED	Total deposition	Open cab	40 acres	Acceptable grades; Dermal = 12+ replicates; Inhalation = 24 replicates
Groundboom Application	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Open cab	20 acres	Grades A, B, C; Dermal = 6+ replicates; Inhalation = 56 replicates
Paintbrush	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Brush	5 gallons	Dermal grades B, C; Inhalation grade C; Dermal = 15 replicates; Inhalation = 15 replicates
Paint-Airless Sprayer	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	High Pressure Airless Siphon Sprayer	25 gallons/hr x 8 hours/day	Acceptable dermal grades; Inhalation grade C; Dermal = 15 replicates; Inhalation = 15 replicates
High Pressure Sprayer	PHED	Long Pants, Long-Sleeved Shirt, Gloves	High Pressure Portable Hand Wand on Wheels	100 gallons/hr/0.25 acre	Acceptable grades B and C; Dermal = 9 replicates; Inhalation = 9 replicates
Mixer/Loader/Applicator					
Low Pressure Handwand	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	2 to 3 gallon low pressure single wand	see text	All grades; Dermal = 25 to 95 replicates Inhalation = 95 replicates
Backpack/Knapsack	PHED	Long Pants, Long-Sleeved Shirt, Gloves	2 gallon knapsack	see text	Acceptable grades (except for hand exposure); Dermal = 9 replicates; Inhalation = 9 replicates
Garden Hose End-Sprayer	PHED	Total deposition	Garden hose	see text	All grades; Dermal = 8 replicates Inhalation = 8 replicates

[a] Clothing scenario represents actual monitored exposure data. The dermal exposure values on Table 1 have been adjusted using protection factors to simulate us work clothing and chemical resistant gloves.

[b] Standard Assumptions based on an 8-hour work day (unless noted in text) as estimated by ORED. BEAD data were not available.

[c] If dermal and inhalation grades are not listed separately, then the listed grades pertain to both dermal and inhalation. "Acceptable grades," as defined by O SOP for meeting Subdivision U Guidelines, are grades A and B for dermal and inhalation, and grade C for hand rinse method.

011423

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

JAN 6 1995

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: ACUTE OCCUPATIONAL AND RESIDENTIAL EXPOSURE ASSESSMENT FOR THE CAPTAN REREGISTRATION ELIGIBILITY DOCUMENT

FROM: Jeff Evans, Biologist
Reregistration Section
Occupational and Residential Exposure Branch
Health Effects Division (7509C)

TO: John Redden, Chemical Coordinator
Reregistration Section
Chemical Coordination Branch
Health Effects Division (7509C)

THRU: Alan P. Nielsen, Section Head
Reregistration Section (7509C)

Larry C. Dorsey, Chief
Occupational and Residential Exposure Branch
Health Effects Division (7509C)

Please find the OREB review of ....

DP Barcode: D197999

Pesticide Chemical Code: 081301

EPA Reg. No.: N/A

EPA MRID No.: 408239-02, 409665-01, 409856-01, 409886-01 - 04, 430129-01 - 03

Review Time: 5 days

PHED: yes

CCB has requested OREB conduct an acute occupational and residential exposure assessment based on the revised less-than-lifetime document dated 10/14/94. In that document, an acute toxicity endpoint of 10 mg/kg/day was established from a rabbit developmental study (MRID 418269-01). The previous captan occupational and residential exposure assessment dated June 6, 1994, addressed chronic exposure based on captan's carcinogenic potential.

In this assessment, the same exposure scenarios as well as the same dermal absorption rate (1.3%/hr) used in the June 6, 1994 memorandum, were used to calculate margins of exposure (MOE) for the acute effect discussed above. In most cases, MOEs are greater than the regulatory standard of 100 by using the PPE recommended in that assessment. For mixer/loaders supporting aerial applications, coveralls, over long shirts and long pants, may be an option. However, even with the addition of coveralls the MOE is only 63.

For reentry scenarios, OREB recommends increasing two restricted entry intervals (REIs) based on the developmental effect. The REI will have to be increased from 7 days to 14 days for grapes, and from 48 hours to 14 days for peaches. The remaining REIs may be reduced to the 12 hour minimum REI. This recommendation is based on the limited number of eye incidences noted in the California Pesticide Illness Surveillance Program database.

A new Summary Exposure table presenting MOEs for mixer/loaders, applicators, and mixer/loader/applicators is provided as an attachment. In this attachment, new data, added to the Pesticide Handlers Exposure Database (PHED) were used to estimate mixer/loader exposure while using wettable powder formulations. The additional data are presented in Table 2, Exposure Scenario Descriptions for Captan.

For some handler exposure scenarios, changes in assumptions were made. A maximum of 20 acres per day rather than 40 acres per day was assumed to be the maximum acreage per day for airblast applicators. The previous 40 acres per day assumption seems unlikely. However, 40 acres for mixer/loaders supporting airblast applications was retained based on the possibility of a single mixer/loader assisting two airblast applicators. For mixer/loader/applicators using hose-end sprayers a 90% protection factor was used instead of the standard 50%. This is based on the fact that data for this scenario indicates high hand exposure.

cc: J. Evans, OREB
D. Edwards, CCB (7509C)
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Chemical File (081301)

Table 1. Summary Exposure/Risk Values for Captan

Exposure Scenario (Scen. #)	Dermal Exposure[a] (mg/lb ai)	Inhalation Exposure[b] (µg/lb ai)	Application Rate[c] (lb ai/cycle)	Daily Amt.[d] Treated	Daily Dermal Dose[e] (mg/kg/day)	Daily Inhalation Exposure[f] (mg/kg/day)	Combined dermal and inhalation exposure (mg/kg/day)	SHORT TERM EXPOSURE MOEs
Mixer/Loader Exposure								
Wettable Powders (Aerial Application) - strawberries (I)	0.6 plus coveralls (0.9 w/o coveralls)	4.7	3 lb ai/A, 7x/season	350 acres	0.14	0.016	0.16	63 (50 w/o coveralls)
Wettable Powders (Airblast Application) - apples, apricots, cherries, grapes, peach, nectarines, blueberries (II)	0.6 plus coveralls (0.9 w/o coveralls)	4.7	2-3.7 lb ai/A, 3x/season	40 acres	0.01 - 0.02	0.001 - 0.003	0.011 - 0.023	435 - 909 (333 - 500 w/o coveralls)
Wettable Powders (Groundboom Application) - strawberries (II)	0.6 plus coveralls (0.9 w/o coveralls)	4.7	3 lb ai/A, 7x/season	20 acres	0.0088	0.001	0.011	> 1000 (796 w/o coveralls)
Wettable Powders (High Pressure Spray) - greenhouses	0.6 plus coveralls	4.7	1 lb ai/100 gallons 26x/year	100 gallons	0.0001	0.00001	0.0001	> 00
Wettable Powders (Groundboom Application) - golf course	0.6 plus coveralls	4.7	4.4 lb ai/A, 10x/season	40 acres	0.02	0.003	0.023	435
Liquids/Flowable (Aerial Application-strawberries) (III)	0.2	0.4	3 lb ai/A, 7x/season	350 acres	0.05	0.007	0.06	167
Liquids/Flowables (Airblast Application) - apples, apricots, cherries, grapes, peach, nectarines, blueberries (IV)	0.2	0.4	2-3.7 lb ai/A, 3x/season	40 acres	0.003 - 0.006	0.0005 - 0.001	0.004 - 0.007	> 1000
Liquids/Flowables (Groundboom Application - strawberries	0.2	0.4	3 lb ai/A, 7x/season	20 acres	0.005	0.0004	0.005	> 1000
Applicator Exposure								
Aerial Application - strawberries (V)	0.004	0.2	3 lb ai/A, 7x/season	350 acres	0.001	0.004	0.005	> 1000

Airblast Application - apples, apricots, cherries, grapes, peach, nectarines, blueberries (VI)	5.3	4.2	2-3.7 lb ai/A, 3x/season	20 acres*	0.045 - 0.085	0.003 - 0.005	0.05 - 0.09	111 - 200
Groundboom Application - strawberries (VII)	0.02	1.3	3 lb ai/A, 7x/season	20 acres	0.0003	0.001	0.001	> 1000
Groundboom Application - Golf Course	0.02	1.3	4.4 lb ai/A, 10x/season	40 acres	0.001	0.004	0.005	> 1000
Paint Brush (VIII)	218	570 (median)	5 gallons (0.15 lb ai)	5 gallons	0.01	0.001	0.011	909
Paint-Airless Sprayer (IX)	28.5	700	3 lb ai/100 gallons	200 gal/day	0.04	0.07	0.11	91
Seed/Seed Piece Treatment - Potatoes (X)	8 mg/day	0.7 mg/day	1.2 oz/cwt 15x/year	8 hrs/day	0.002	0.012	0.014	714
High Pressure Spray	0.7	0.09	1 lb ai/100 gal, 26x/season	100 gal/0.25 acre	0.0002	0.0[illegible]	0.002	> 1000
Apple Dips (XII)	45 mg/day	1.5 mg/day	30x/year	PD 2/3	0.01	0.025	0.035	286
As a Preservative (XII)	14.3	--	7925 lb ai/yr	31.7 lb ai/day	0.1	--	0.1	100
Adhesive (XIII)	14.3	--	1,975 lb ai/yr	7.9 lb ai/day	0.024	--	0.024	417
Pet Powders (XVI)	200 mg/use	PD 2/3	once/week	PD 2/3	0.04	--	0.04	250
Mixer/Loader/Applicator								
Low Pressure Handwand (XVII)	103	39	0.8 oz/day (0.05 lb)	18x/yr	0.001	0.00003	0.001	> 1000
Backpack/Knapsack (XVIII)	1.3	30	1 lb ai/100 gal	0.25 acre	0.0003	0.0005	0.001	> 1000
Garden Hose End-Sprayer - Dichondra	25.2	0.01	1 lb ai/100 gal, 1 gal/10 sq. ft 2x/yr	10,000 sq. ft	0.05	--	0.05	200
Hose End-Sprayer - (XIX)	6**	0.01	1 lb ai/100 gal, 1 gal/10 sq. ft	2 acres	.11	--	0.11	91

a Dermal unit exposures are reported as the best fit mean to simulate workers wearing long pants, long-sleeved shirts, and chemical resistant gloves, unless noted. The best fit mean is the composite total dermal exposure based on using the geometric mean for lognormal distributed data, arithmetic mean for normal distributed data, and the median for all other distribution types. Protection factors were used to calculate dermal unit exposure values because insufficient data are available for PPE in these scenarios. Fifty percent of the total dermal exposure is assumed to be attributed to hand exposure. Fifty percent protection factor is applied to the hand exposure for chemical resistant gloves.

percent protection factor is applied to total deposition for long pants and long-sleeved shirts. (** assumes a 90% protection factor for chemical resistant gloves)

b Inhalation exposure values are reported as geometric means (lognormal distributions), unless otherwise noted.

c Luis Report dated 8/26/91, Captan, Task Force Memorandum dated 5/11/94, PD 2/3 dated 6/85.

d Values represent the typical area or the typical volume of spray solution which is assumed to be used in a single day to complete treatments for each exposure scenario of concern.

e Daily Dermal Dose (mg/kg/day) = $\frac{\text{Exposure (mg/lb ai) * Appl. Rate (lb ai) * Amt.treated * 1.3\% d.a.}}{\text{60 kg}}$

f Daily Inhalation Exposure (mg/kg/day) = $\frac{\text{Exposure (mg/lb ai) * Appl. Rate (lb ai/cycle) * Amt. Treated}}{\text{60 kg}}$

For mixer/loaders an 80% protection factor was included to account for respirators which are on current labelling for mixer/loaders.

Table 2. Exposure Scenario Descriptions for Captan

Exposure Scenario	Data Source	Clothing Scenario[a]	Equipment	Standard Assumptions[b] (8-hr work day)	Comments[c]
Mixer/Loader Exposure					
Wettable Powders for Aerial Application	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Open Mixing	350 acres (fixed wing)	Acceptable dermal grades; Inhalation all grades; Dermal = 2 to 33; Inhalation = 35 replicates
Wettable Powders for Ground Application	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Open Mixing	40 acres airblast	Acceptable dermal grades; Inhalation all grades; Dermal = 2 to 33; Inhalation = 35 replicates
Liquids/Flowables for Aerial Application	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Open Mixing	350 acres (fixed wing)	Acceptable grades; Dermal = 14+ replicates; Inhalation = 40 replicates
Liquids/Flowables for Ground Application	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Open Mixing	4 acres airblast	Acceptable grades; Dermal = 14+ replicates; Inhalation = 40 replicates
Applicator Exposure					
Aerial Application	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Fixed wing, all cab types	350 acres	All grades; Dermal = 4 to 41 replicates; Inhalation = 25 replicates
Airblast Application	PHED	Total deposition	Open cab	40 acres	Acceptable grades; Dermal = 12+ replicates; Inhalation = 24 replicates
Groundboom Application	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Open cab	20 acres	Grades A, B, C; Dermal = 6+ replicates; Inhalation = 56 replicates

Paintbrush	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	Brush	5 gallons	Dermal grades B, C; Inhalation grade C; Dermal = 15 replicates; Inhalation = 15 replicates
Paint-Airless Sprayer	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	High Pressure Airless Siphon Sprayer	25 gallons/hr x 8 hours/day	Acceptable dermal grades; Inhalation grade C; Dermal = 15 replicates; Inhalation = 15 replicates
High Pressure Sprayer	PHED	Long Pants, Long-Sleeved Shirt, Gloves	High Pressure Portable Hand Wand on Wheels	100 gallons/hr /0.25 acre	Acceptable grades B and C; Dermal = 9 replicates; Inhalation = 9 replicates
Mixer/Loader/Applicator					
Low Pressure Handwand	PHED	Long Pants, Long-Sleeved Shirt, No Gloves	2 to 3 gallon low pressure single wand	see text	All grades; Dermal = 25 to 95 replicates; Inhalation = 95 replicates
Backpack/Knapsack	PHED	Long Pants, Long-Sleeved Shirt, Gloves	2 gallon knapsack	see text	Acceptable grades (except for hand exposure); Dermal = 9 replicates; Inhalation = 9 replicates
Garden Hose End-Sprayer	PHED	Total deposition	Garden hose	see text	All grades; Dermal = 8 replicates Inhalation = 8 replicates

Clothing scenario represents actual monitored exposure data. The dermal exposure values on Table I have been adjusted using protection factors to simulate normal work clothing and chemical resistant gloves.

Standard Assumptions based on an 8-hour work day (unless noted in text) as estimated by OREB. BEAD data were not available.

If dermal and inhalation grades are not listed separately, then the listed grades pertain to both dermal and inhalation. "Acceptable grades," as defined by OREB SOP for meeting Subdivision U Guidelines, are grades A and B for dermal and inhalation, and grade C for hand rinse method.

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ATTACHMENT III

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

SEP 7 1994

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Captan [illegible] Case No. 120. Product and Residue Chemistry Chapters for the Captan Reregistration Eligibility Decision (RED). Chemical No. 81059; DP Barcode D191890

FROM: Christine L. Olinger, Chemist
Reregistration Section I
Chemistry Branch II - Reregistration Support
Health Effects Division (7509C)

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

TO: Esther Saito, Chief
Reregistration Branch
Special Review and Reregistration Division (7508W)

and

Flora Chow/John Redden
Chemical Coordination Branch
Health Effects Division (7509C)

Attached are the Product and Residue Chemistry Chapters to the Captan RED. The chapters were assembled by Dynamac Corporation under supervision of CBRS, HED. The data assessment has undergone secondary review in the branch and has been revised to reflect branch policies.

Product Chemistry

All pertinent data requirements concerning the captan TGAI are satisfied for Makhteshim Agan and Zeneca (Captan Task Force) technical products; however, manufacturing-use product (MP) data remain outstanding for these technical products and for the Zeneca Formulation Intermediates (FIs) as noted in the data summary tables beginning on page 7 of the Product Chemistry Chapter.

Residue Chemistry

The existing data base for captan is substantially complete. Plant metabolism data provide adequate identification/characterization of the terminal residues. Sufficient crop field trial data are available to reassess all tolerances for raw and processed plant commodities with the exception of caneberries (blackberries, dewberries, and raspberries) and strawberries. Additional ruminant and poultry metabolism studies remain outstanding. Based on existing, acceptable data and preliminary data from the livestock metabolism studies in progress, CBRS provisionally believes the terminal residues in livestock are adequately identified/characterized. CBRS has reassessed the tolerances for livestock commodities and recommend for tolerance increases and new animal commodity tolerances. Additional animal storage stability data are required to validate the livestock feeding studies.

Dietary Exposure/Risk Assessment

Anticipated residues will be provided to DRES for all commodities and should be used when calculating the dietary risk assessment associated with the RED.

Although the database for captan is substantially complete, additional data are needed to eliminate the uncertainties associated with the exposure/risk assessment as outlined below.

- Sufficient data are available to demonstrate stability of captan residues of concern in milk. It is unlikely that the outstanding storage stability data for animal tissues will significantly alter the exposure/risk assessment.

- The anticipated residue values are the best estimates CBRS can provide using the residue data available at the time of the RED. These values have an inherent uncertainty associated with variations in analytical methods, geographical representation of field trials, seasonal variation of residue levels, etc.

- Field trial data are outstanding for strawberries. In response to recent over-tolerance concerns, CBRS has extensively examined monitoring data and all existing field trial data and required that additional trials be conducted reflecting labeling changes and cultural practices in FL. These data are necessary to assure that any labeling changes and FL cultural practices do not result in over-tolerance residues of captan on strawberries. Based on existing field trial data, it is unlikely that the tolerance for strawberries will require modification.

- Field trial data are outstanding for caneberries; the existing data are sufficient to estimate that the tolerances for these commodities are not likely to require modification.

Attachments 1 and 2

cc: (with attachments): CLOlinger (CBRS), Circulate, Reg Std File, SF, Dynamac
cc: (without attachments): RF

7509C:CBRS:CLOlinger:clo:CM#2:Rm 816G:305-5406:09/07/94
RDI: PADeschamp: 09/08/94 MMetzger: 09/12/94 EZager: 09/15/94

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DYNAMAC
CORPORATION
Environmental Services

Final Report

CAPTAN
Shaughnessy No. 081301; Case No. 0120 (CBRS No. 11955; DP Barcode D191890)

TASK 2A
Reregistration Eligibility Document: Product Chemistry Considerations

January 6, 1994

Contract No. 68-D2-0053

Submitted to:
U.S. Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
The Dynamac Building
2275 Research Boulevard
Rockville, MD 20850-3268

CAPTAN

REREGISTRATION ELIGIBILITY DOCUMENT:

PRODUCT CHEMISTRY CONSIDERATIONS

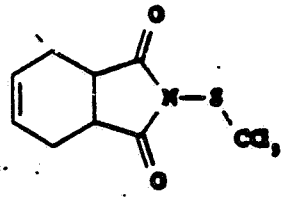
(Shaughnessy No. 081301; Case No. 0120)

(CBRS No. 11955; DP Barcode D191890)

TASK 2A

DESCRIPTION OF CHEMICAL

Captan (N-trichloromethylthio-4-cyclohexene-1,2-dicarboximide) is a broad-spectrum fungicide classified as a dicarboximide or chlorinated organosulfur compound, which is widely used as a seed treatment and has foliar uses on several fruits and almonds.



Empirical Formula:	$C_9H_8Cl_3NO_2S$
Molecular Weight:	300.61
CAS Registry No.:	133-06-2
Shaughnessy No.:	081301

IDENTIFICATION OF ACTIVE INGREDIENT

Technical captan is a white to buff powder with a melting point of 158-164 C and a vapor pressure of less than 10^{-6} mm Hg at 25 C. Captan is practically insoluble in water, and is soluble in acetone, ethanol, kerosene, xylene, chloroform, and benzene.

MANUFACTURING-USE PRODUCTS

A search of the Reference Files System (REFS) conducted 11/30/93 identified eight captan manufacturing-use products (MPs) registered under Shaughnessy No. 081301 which are listed in Table 1. Only these MPs are subject to a reregistration eligibility decision.

Table 1. Captan Manufacturing-Use Products

Formulation	EPA Reg. No.	Registrant	Transferred from	
			EPA Reg. No.	Date
90% FI [a]	19713-258	Drexel Chemical Company	--	--
90% T	7501-24	Gustafson, Inc.	--	--
92% T [b]	11678-1	Makhteshim Chemical Works Ltd.	--	--
92% T	10182-262	Zeneca, Inc. [c]	32691-1	12/22/87
90% T	10182-197		476-2099	12/22/87
90% T	10182-293		239-1246	5/25/89
88.92% FI	10182-198		476-2100	12/22/87
87% FI	10182-296		239-2351	5/25/89

[a] Identified as a technical product in the Captan Update dated 12/31/91.
[b] Identified as a 90% formulation in the Captan Update dated 12/31/91.
[c] Formerly ICI Americas, Inc.

REGULATORY BACKGROUND

The regulatory background for captan products in terms of comprehensive product chemistry reviews is presented below.

Products	September 1985 Reregistration Standard		December 1991 Update	
	Data required	Data submitted in response	Data required	Data submitted in response
90% FI (19713-258)	not registered at this time	n/a [a]	61-1, -2, -3 62-1, -2, -3 63-2 through -20	none
90% T (7501-24)	61-2, -3 62-1, -2, -3 63-2, -3, -4, -5, -7, -8, -11, -12, -13	none	61-1, -2, -3 62-1, -2, -3 63-2 through -20	none
92% T (11678-1)	61-2, -3 62-1, -2, -3	61-1, -2, -3 62-1, -2, -3 63-5, -7, -8, -11, -12, -13	63-14, -16, -17, -20	none

Products	September 1985 Rereg. Standard		December 1991 Update	
	Data required	Data submitted in response	Data required	Data submitted in response
92% T (10182-262)	61-2, -3 62-1, -2, -3 63-4, -5, -7, -11, -12, -13	none	61-1, -2, -3 62-1, -2, -3 63-2 through -20	61-1 62-2
90% T (10182-197)	61-2, -3 62-1, -2, -3 63-4, -5, -7, -11, -12, -13	61-2, -3 62-1, -3 63-4, -5, -7, -8 -11, -12, -13	61-1 62-2 63-14, -16, -17, -20	61-1 62-2
90% T (10182-293)	61-2, -3 62-1, -2, -3 63-4, -5, -7, -8, -11, -12, -13	61-1, -2, -3 62-1, -2, -3 63-5, -7, -8 -11, -12, -13	62-2 63-14, -16, -17, -20	61-1 62-2
88.92% FI (10182-198)	61-2, -3 62-1, -2, -3	61-1, -2, -3 62-1, -2, -3	61-1, -2 62-2 63-2 through -7, -12, -14 through -20	none
87% FI (10182-298)	61-2, -3 62-1, -2, -3	none	61-1, -2, -3 62-2, -3 63-2 through -7, -12, -14 through -20	none

* n/a = not applicable.

CBRS has concluded (CBRS No. 10655, D183104, dated 2/22/93, by R. Perfetti) that the three Zeneca technical products are identical, and that data for any one of the three products can be shared by the other two products. Although Zeneca claims that the captan formulation intermediates are similar enough to share data, CSFs on file with the Agency indicate a slight difference in composition. CBRS has concluded (CBRS No. 9780, D177146, dated 6/26/92, by C. Olinger) that a justification is required for each data requirement for which the registrant intends to share FI data.

The current status of the product chemistry data requirements for captan products is presented in the attached data summary tables. Refer to these tables for a listing of the outstanding product chemistry data requirements.

CONCLUSIONS

All pertinent data requirements concerning the captan TGAI are satisfied for the Makhteshim and Zeneca technical products; however MP data remain outstanding for these technical products and for the Zeneca FIs. All product chemistry data are required for the Drexel and Gustafson captan products. Provided that the registrants submit the data required in the attached data summary tables for the captan products and either certify that the suppliers of beginning materials and the manufacturing processes for the captan technical products and MPs have not changed since the last comprehensive product chemistry review or submit complete updated product chemistry data packages, CBRS has no objections to the reregistration of captan with respect to product chemistry data requirements.

AGENCY MEMORANDA CITED IN THIS DOCUMENT

CBRS No(s).:	2018, 2019, and 2020
DP Barcode(s):	none
Subject:	EPA Nos. 239-1246 (Chevron), 476-2099 (Stauffer), 11678-1 (Makhteshim/Agan): Captan Technical: Product Chemistry Data in Response to Registration Standard.
From:	J. Garbus
To:	R. Mountfort and E. Wilson
Dated:	4/2/87
MRID(s):	40021201, 40021202, and 40021301

CBRS No(s).:	2120
DP Barcode(s):	none
Subject:	EPA No. (11678-1): Captan Technical: Additional Product Chemistry Data for Makhteshim Material in Response to Registration Standard.
From:	J. Garbus
To:	R. Mountfort and E. Wilson
Dated:	4/27/87
MRID(s):	40121701

CBRS No(s).:	2427
DP Barcode(s):	none
Subject:	EPA Reg No. 239-1246. Additional Product Chemistry Data for Chevron Captan Technical in Response to Registration Standard.
From:	R. Loranger
To:	R. Mountfort and E. Wilson
Dated:	8/28/87
MRID(s):	40231801

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CBRS No(s).: 2472
DP Barcode(s): none
Subject: EPA Reg No. 11678-1. Additional Product Chemistry Data for Makhteshim Captan Technical in Response to Registration Standard.
From: R. Loranger
To: R. Mountfort and E. Wilson
Dated: 8/28/87
MRID(s): 40231201 and 40231301

CBRS No(s).: 9780
DP Barcode(s): D177146
Subject: Reregistration of Captan: Captan Task Force Response to the Reregistration Standard Update.
From: C. Olinger
To: C. Peterson
Dated: 6/26/92
MRID(s): none

CBRS No(s).: 10655
DP Barcode(s): 183104
Subject: Response to the Captan Reregistration Standard: Product Chemistry.
From: R. Perfetti
To: L. Rossi and E. Saito
Dated: 2/22/93
MRID(s): none

PRODUCT CHEMISTRY CITATIONS

Bibliographic citations include only MRIDs containing data which fulfill data requirements. One additional MRID which has not yet been reviewed, but which may contain data pertinent to the reregistration of the Drexel captan product, is included in bold type at the end of this section.

References (cited):

40021201 Chevron Chemical Co. (1986) Analysis and Certification of Product Ingredients: Project I.D. 8615386. Unpublished compilation. 73 p.

40021202 Chevron Chemical Co. (1986) Physical and Chemical Characteristics: Project I.D. 8615387. Unpublished compilation. 57 p.

40021301 Chevron Chemical Co. (1986) Product Identity and Composition: Laboratory Project ID. 8615385. Unpublished compilation. 127 p.

40121701 Makhteshim Chemical Works Ltd. (1987) Product Chemistry: Translation from French to English Merpan Captan Technical: MCW 10002. Unpublished study. 15 p.

40141501 Wegner, M. (1987) Beginning Materials, Manufacturing Process, Formation of Impurities and Certification of Ingredient Limits: Captan 90 Dust Base: Project No. RRC 87-34. Unpublished compilation prepared by Stauffer Chemical Co. 14 p.

40141502 Bussey, R. (1987) Preliminary Analysis of Product Samples Captan 90 DB: Project No. 87-02. Unpublished compilation prepared by Stauffer Chemical Co. 20 p.

40141503 Riggs, R. (1987) Analytical Methods to Verify Certified Limits: Captan 90 Dust Base: Project No. PRS-RLR-870326. Unpublished compilation prepared by Association of Official Analytical Chemists in cooperation with Chevron Chemical Co. 15 p.

40231201 Makhteshim Chemical Works Ltd. (1987) Additional Product Chemistry Data: Merpan Captan Technical: Makhteshim-Agan Project ID: MCW 10001. Unpublished study. 10 p.

40231301 Makhteshim Chemical Works Ltd. (1987) Additional Product Chemistry Data: Merpan Captan Technical: Makhteshim-Agan Project ID: MCW 10001. Unpublished study. 16 p.

40231801 Thornberry, N. (1987) Physical and Chemical Characteristics: Captan Technical: Laboratory Project ID: 8709737. Unpublished study prepared by Chevron Chemical Co. 4 p.

42301401 Haefele, L. (1992) Storage Stability Study: Drexel Captan 90% Technical. Unpublished study prepared by Drexel Chemical Co. 6 p.

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DYNAMAC CORPORATION
Environmental Services

Final Report

CAPTAN
Shaughnessy No. 081301; Case No. 0120 (CBRS No. 11955; DP Barcode D191890)

TASK 2A
Reregistration Eligibility Document: Product Chemistry Considerations

January 6, 1994

Contract No. 68-D2-0053

Submitted to:
U.S. Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
The Dynamac Building
2275 Research Boulevard
Rockville, MD 20850-3268

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CAPTAN

REREGISTRATION ELIGIBILITY DOCUMENT:

PRODUCT CHEMISTRY CONSIDERATIONS

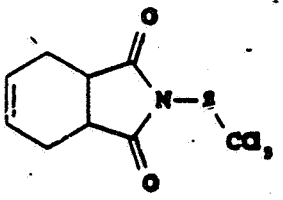
(Shaughnessy No. 081301; Case No. 0120)

(CBRS No. 11955; DP Barcode D191890)

TASK 2A

DESCRIPTION OF CHEMICAL

Captan (N-trichloromethylthio-4-cyclohexene-1,2-dicarboximide) is a broad-spectrum fungicide classified as a dicarboximide or chlorinated organosulfur compound, which is widely used as a seed treatment and has foliar uses on several fruits and almonds.



Empirical Formula:	$C_9H_8Cl_3NO_2S$
Molecular Weight:	300.61
CAS Registry No.:	133-06-2
Shaughnessy No.:	081301

IDENTIFICATION OF ACTIVE INGREDIENT

Technical captan is a white to buff powder with a melting point of 158-164°C and a vapor pressure of less than 10^{-4} mm Hg at 25°C. Captan is practically insoluble in water, and is soluble in acetone, ethanol, kerosene, xylene, chloroform, and benzene.

MANUFACTURING-USE PRODUCTS

A search of the Reference Files System (REFS) conducted 11/30/93 identified eight captan manufacturing-use products (MPs) registered under Shaughnessy No. 081301 which are listed in Table 1. Only these MPs are subject to a reregistration eligibility decision.

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			EPA Reg. No.	Date
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92% T [b]	11678-1	Makhteshim Chemical Works Ltd.	--	--
92% T	10182-262	Zeneca, Inc. [c]	32691-1	12/22/87
90% T	10182-197		476-2099	12/22/87
90% T	10182-293		239-1246	5/25/89
88.92% FI	10182-196		476-2100	12/22/87
87% FI	10182-298		239-2351	5/25/89

[a] Identified as a technical product in the Captan Update dated 12/31/91.
[b] Identified as a 90% formulation in the Captan Update dated 12/31/91.
[c] Formerly ICI Americas, Inc.

REGULATORY BACKGROUND

The regulatory background for captan products in terms of comprehensive product chemistry reviews is presented below.

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	Data required	Data submitted in response	Data required	Data submitted in response
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90% T (7501-24)	61-2, -3 62-1, -2, -3 63-2, -3, -4, -5, -7, -8, -11, -12, -13	none	61-1, -2, -3 62-1, -2, -3 63-2 through -20	none
92% T (11678-1)	61-2, -3 62-1, -2, -3	61-1, -2, -3 62-1, -2, -3 63-5, -7, -8, -11, -12, -13	63-14, -16, -17, -20	none

Products	September 1985 Reregistration Standard		December 1991 Update	
	Data required	Data submitted in response	Data required	Data submitted in response
92% T (10182-262)	61-2, -3 62-1, -2, -3 63-4, -5, -7, -11, -12, -13	none	61-1, -2, -3 62-1, -2, -3 63-2 through -20	61-1 62-2
90% T (10182-197)	61-2, -3 62-1, -2, -3 63-4, -5, -7, -11, -12, -13	61-2, -3 62-1, -3 63-4, -5, -7, -8 -11, -12, -13	61-1 62-2 63-14, -16, -17, -20	61-1 62-2
90% T (10182-295)	61-2, -3 62-1, -2, -3 63-4, -5, -7, -8, -11, -12, -13	61-1, -2, -3 62-1, -2, -3 63-5, -7, -8 -11, -12, -13	62-2 63-14, -16, -17, -20	61-1 62-2
88.92% FI (10182-196)	61-2, -3 62-1, -2, -3	61-1, -2, -3 62-1, -2, -3	61-1, -2 62-2 63-2 through -7, -12, -14 through -20	none
87% FI (10182-296)	61-2, -3 62-1, -2, -3	none	61-1, -2, -3 62-2, -3 63-2 through -7, -12, -14 through -20	none

* n/a = not applicable.

CBRS has concluded (CBRS No. 10655, D183104, dated 2/22/93, by R. Perfetti) that the three Zeneca technical products are identical, and that data for any one of the three products can be shared by the other two products. Although Zeneca claims that the captan formulation intermediates are similar enough to share data, CSFs on file with the Agency indicate a slight difference in composition. CBRS has concluded (CBRS No. 9780, D 7146, dated 6/26/92, by C. Olinger) that a justification is required for each data requirement for which the registrant intends to share FI data.

The current status of the product chemistry data requirements for captan products is presented in the attached data summary tables. Refer to these tables for a listing of the outstanding product chemistry data requirements.

CONCLUSIONS

All pertinent data requirements concerning the captan TGAI are satisfied for the Makhteshim and Zeneca technical products; however MP data remain outstanding for these technical products and for the Zeneca FIs. All product chemistry data are required for the Drexel and Gustafson captan products. Provided that the registrants submit the data required in the attached data summary tables for the captan products and either certify that the suppliers of beginning materials and the manufacturing processes for the captan technical products and MPs have not changed since the last comprehensive product chemistry review or submit complete updated product chemistry data packages, CBRS has no objections to the reregistration of captan with respect to product chemistry data requirements.

AGENCY MEMORANDA CITED IN THIS DOCUMENT

CBRS No(s).:	2018, 2019, and 2020
DP Barcode(s):	none
Subject:	EPA Nos. 239-1246 (Chevron), 476-2099 (Stauffer), 11678-1 (Makhteshim/Agan): Captan Technical: Product Chemistry Data in Response to Registration Standard.
From:	J. Garbus
To:	R. Mountfort and E. Wilson
Dated:	4/2/87
MRID(s):	40021201, 40021202, and 40021301

CBRS No(s).:	2120
DP Barcode(s):	none
Subject:	EPA No. (11678-1): Captan Technical: Additional Product Chemistry Data for Makhteshim Material in Response to Registration Standard.
From:	J. Garbus
To:	R. Mountfort and E. Wilson
Dated:	4/27/87
MRID(s):	40121701

CBRS No(s).:	2427
DP Barcode(s):	none
Subject:	EPA Reg No. 239-1246. Additional Product Chemistry Data for Chevron Captan Technical in Response to Registration Standard.
From:	R. Loranger
To:	R. Mountfort and E. Wilson
Dated:	8/28/87
MRID(s):	40231801

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CBRS No(s).: 2472
DP Barcode(s): none
Subject: EPA Reg No. 11678-1. Additional Product Chemistry Data for Makhteshim Captan Technical in Response to Registration Standard.
From: R. Loranger
To: R. Mountfort and E. Wilson
Dated: 8/28/87
MRID(s): 40231201 and 40231301

CBRS No(s).: 9780
DP Barcode(s): D177146
Subject: Reregistration of Captan: Captan Task Force Response to the Reregistration Standard Update.
From: C. Olinger
To: C Peterson
Dated: 6/26/92
MRID(s): none

CBRS No(s).: 10655
DP Barcode(s): 183104
Subject: Response to the Captan Reregistration Standard: Product Chemistry.
From: R. Perfetti
To: L. Rossi and E. Saito
Dated: 2/22/93
MRID(s): none

PRODUCT CHEMISTRY CITATIONS

Bibliographic citations include only MRIDs containing data which fulfill data requirements. One additional MRID which has not yet been reviewed, but which may contain data pertinent to the reregistration of the Drexel captan product, is included in bold type at the end of this section.

References (cited):

40021201 Chevron Chemical Co. (1986) Analysis and Certification of Product Ingredients: Project I.D. 8615386. Unpublished compilation. 73 p.

40021202 Chevron Chemical Co. (1986) Physical and Chemical Characteristics: Project I.D. 8615387. Unpublished compilation. 57 p.

40021301 Chevron Chemical Co. (1986) Product Identity and Composition: Laboratory Project ID. 8615385. Unpublished compilation. 127 p.

40121701 Makhteshim Chemical Works Ltd. (1987) Product Chemistry: Translation from French to English Merpan Captan Technical: MCW 10002. Unpublished study. 15 p.

40141501 Wegner, M. (1987) Beginning Materials, Manufacturing Process, Formation of Impurities and Certification of Ingredient Limits: Captan 90 Dust Base: Project No. RRC 87-34. Unpublished compilation prepared by Stauffer Chemical Co. 14 p.

40141502 Bussey, R. (1987) Preliminary Analysis of Product Samples Captan 90 DB: Project No. 87-02. Unpublished compilation prepared by Stauffer Chemical Co. 20 p.

40141503 Riggs, R. (1987) Analytical Methods to Verify Certified Limits: Captan 90 Dust Base: Project No. PRS-RLR-870326. Unpublished compilation prepared by Association of Official Analytical Chemists in cooperation with Chevron Chemical Co. 15 p.

40231201 Makhteshim Chemical Works Ltd. (1987) Additional Product Chemistry Data: Merpan Captan Technical: Makhteshim-Agan Project ID: MCW 10001. Unpublished study. 10 p.

40231301 Makhteshim Chemical Works Ltd. (1987) Additional Product Chemistry Data: Merpan Captan Technical: Makhteshim-Agan Project ID: MCW 10001. Unpublished study. 16 p.

40231801 Thornberry, N. (1987) Physical and Chemical Characteristics: Captan Technical: Laboratory Project ID: 8709737. Unpublished study prepared by Chevron Chemical Co. 4 p.

42301401 Haefele, L. (1992) Storage Stability Study: Drexel Captan 90% Technical. Unpublished study prepared by Drexel Chemical Co. 6 p.

Case No. 0120
Chemical No. 081301

Case Name: Captan
Registrant: Drexel Chemical Company
Product(s): 90% FI (EPA Reg. No. 19713-258)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [a]	MRID Number
61-1	Product Identity and Disclosure of Ingredients	N	
61-2	Starting Materials and Manufacturing Process	N	
61-3	Discussion of Formation of Impurities	N	
62-1	Preliminary Analysis	N	
62-2	Certification of Ingredient Limits	N	
62-3	Analytical Methods to Verify the Certified Limits	N	
63-2	Color	N	
63-3	Physical State	N	
63-4	Odor	N	
63-5	Melting Point	N	
63-6	Boiling Point	N	
63-7	Density, Bulk Density or Specific Gravity	N	
63-8	Solubility	N	
63-9	Vapor Pressure	N	
63-10	Dissociation Constant	N	
63-11	Octanol/Water Partition Coefficient	N	
63-12	pH	N	
63-13	Stability	N[b]	42981401
63-14	Oxidizing/reducing action	N	
63-15	Flammability	N	
63-16	Explodability	N	
63-17	Storage stability	N	
63-18	Viscosity	N	
63-19	Miscibility	N	
63-20	Corrosion characteristics	N	

[a] Y = Yes; N = No; N/A = Not Applicable.
[b] These data do not satisfy the data requirements of 40 CFR §158.190 (Guideline Reference No. 63-13) concerning storage stability because data are required on stability to heat, metal/metal ions, and light. Data were presented only on stability at ambient conditions in an unspecified container. There was no appreciable decrease in captan concentration over 18 months.

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Case No. 0120
Chemical No. 081301

Case Name: Captan
Registrant: Gustafson, Inc.
Product(s): 90% T (EPA Reg. No. 7501-24)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? *	MRID Number
61-1	Product Identity and Disclosure of Ingredients	N	
61-2	Starting Materials and Manufacturing Process	N	
61-3	Discussion of Formation of Impurities	N	
62-1	Preliminary Analysis	N	
62-2	Certification of Ingredient Limits	N	
62-3	Analytical Methods to Verify the Certified Limits	N	
63-2	Color	N	
63-3	Physical State	N	
63-4	Odor	N	
63-5	Melting Point	N	
63-6	Boiling Point	N	
63-7	Density, Bulk Density or Specific Gravity	N	
63-8	Solubility	N	
63-9	Vapor Pressure	N	
63-10	Dissociation Constant	N	
63-11	Octanol/Water Partition Coefficient	N	
63-12	pH	N	
63-13	Stability	N	
63-14	Oxidizing/reducing action	N	
63-15	Flammability	N	
63-16	Explodability	N	
63-17	Storage stability	N	
63-18	Viscosity	N	
63-19	Miscibility	N	
63-20	Corrosion characteristics	N	

* Y = Yes; N = No; N/A = Not Applicable.

011423

Case No. 0120
Chemical No. 081301

Case Name: Captan
Registrant: Makhteshim Chemical Works, Ltd.
Product(s): 92% T (EPA Reg. No. 11678-1)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [a]	MRID Number [b]
61-1	Product Identity and Disclosure of Ingredients	Y	CBI [c]
61-2	Starting Materials and Manufacturing Process	Y	40121701 40831501
61-3	Discussion of Formation of Impurities	Y	40121701
62-1	Preliminary Analysis	Y	40831501
62-2	Certification of Ingredient Limits	Y	CBI [c]
62-3	Analytical Methods to Verify the Certified Limits	Y	40831501
63-2	Color	Y	N/A
63-3	Physical State	Y	N/A
63-4	Odor	Y	N/A
63-5	Melting Point	Y	40831501
63-6	Boiling Point	N/A	
63-7	Density, Bulk Density or Specific Gravity	Y	40831501
63-8	Solubility	Y	40831201
63-9	Vapor Pressure	Y	N/A
63-10	Dissociation Constant	N/A	
63-11	Octanol/Water Partition Coefficient	Y	40831501
63-12	pH	Y	40831201,
63-13	Stability	Y	40831501
63-14	Oxidizing/reducing action	N	
63-15	Flammability	N/A	
63-16	Explodability	N	
63-17	Storage stability	N/A	
63-18	Viscosity	N/A	
63-19	Miscibility	N/A	
63-20	Corrosion characteristics	N	

[a] Y = Yes; N = No; N/A = Not Applicable.

[b] Bolded citations were reviewed under CBRS No. 2018, 2019, and 2020, dated 4/2/87, by J. Garbus; underlined citations were reviewed under CBRS No. 2120, dated 4/27/87, by J. Garbus; *italicized* citations were reviewed under CBRS No. 2472, dated 8/28/87, by R. Loranger; and remaining citations were reviewed as noted.

* Data were initially addressed under CBRS No. 2120, dated 4/27/87, by J. Garbus, but were re-evaluated when data required for other guidelines were submitted under CBRS No. 2472, dated 8/28/87, by R. Loranger.

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Case No. 0120
Chemical No. 081301

Case Name: Captan
Registrant: Zeneca, Inc.
Product(s): 92% T (EPA Reg. No. 10182-262) and
90% Ts (EPA Reg. Nos. 10182-197 and 10182-293)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [1]
61-1	Product Identity and Disclosure of Ingredients	Y	CSFs dated 9/15/92
61-2	Starting Materials and Manufacturing Process	Y	[illegible]
61-3	Discussion of Formation of Impurities	Y	40021301
62-1	Preliminary Analysis	Y	[illegible]
62-2	Certification of Ingredient Limits	Y	CSFs dated 9/15/92
62-3	Analytical Methods to Verify the Certified Limits	Y	[illegible]
63-2	Color	Y	N/A
63-3	Physical State	Y	[illegible]
63-4	Odor	Y	40021302
63-5	Melting Point	Y	[illegible]
63-6	Boiling Point	N/A	N/A
63-7	Density, Bulk Density or Specific Gravity	Y	[illegible]
63-8	Solubility	Y	40021302, 40231801
63-9	Vapor Pressure	Y	[illegible]
63-10	Dissociation Constant	N/A	
63-11	Octanol/Water Partition Coefficient	Y	[illegible]
63-12	pH	Y	40021302, 40231801
63-13	Stability	Y	[illegible]
63-14	Oxidizing/reducing action	N	
63-15	Flammability	N/A	
63-16	Explodability	N	
63-17	Storage stability	N	
63-18	Viscosity	N/A	
63-19	[illegible]	N/A	
63-20	Corrosion characteristics	N	

[1] Y = Yes; N = No; N/A = Not Applicable. CBRS has concluded (CBRS No. 10655, D183104, dated 2/22/93, by R. Perfetti) that the three Zeneca technical products are identical, and that data for any one of the three products can be shared by the other two products.

• **Bolded** citations were reviewed under CBRS No. 2018, 2019, and 2020, dated 4/2/87, by J. Garbus; underlined citations were reviewed under CBRS No. 2427, dated 8/28/87, by R. Loranger; and remaining citations were reviewed under CBRS No. 10655, D183104, dated 2/22/93, by R. Perfetti.

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Case No. 0120
Chemical No. 081301

Case Name: Captan
Registrant: Zeneca, Inc.
Product(s): 88.92% FI (EPA Reg. No. 10182-198)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [a]	MRID Number [b]
61-1	Product Identity and Disclosure of Ingredients	N [a]	40141501
61-2	Starting Materials and Manufacturing Process	N [a]	40141501
61-3	Discussion of Formation of Impurities	Y	40141501
62-1	Preliminary Analysis	N/A [a]	
62-2	Certification of Ingredient Limits	N [a]	40141501
62-3	Analytical Methods to Verify the Certified Limits	Y	40141502, 40141503
63-2	Color	N	
63-3	Physical State	N	
63-4	Odor	N	
63-5	Melting Point	N/A [a]	
63-6	Boiling Point	N/A [a]	
63-7	Density, Bulk Density or Specific Gravity	N	
63-8	Solubility	N/A [a]	
63-9	Vapor Pressure	N/A [a]	
63-10	Dissociation Constant	N/A [a]	
63-11	Octanol/Water Partition Coefficient	N	
63-12	pH	N/A [a]	
63-13	Stability	N	
63-14	Oxidizing/reducing action	N/A [a]	
63-15	Flammability	N	
63-16	Explodability	N	
63-17	Storage stability	N	
63-18	Viscosity	N/A [a]	
63-19	Miscibility	N	
63-20	Corrosion characteristics	N	

[a] Y = Yes; N = No; N/A = Not Applicable. Although Zeneca claims that the 88.92% FI and 87% FI (EPA Reg. Nos. 10182-198 and 10182-298) are similar enough to share data, CSFs on file with the Agency indicate a slight difference in composition. CBRS has concluded (CBRS No. 9780, D177146, dated 6/26/92, by C. Olinger) that a justification is required for each data requirement for which the registrant intends to share FI data.

[b] All citations were reviewed in the Captan Reregistration Standard Update dated 12/31/91.

[e] These data do not satisfy the data requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) concerning product composition because the nominal concentration of the active ingredients (captan and related derivatives) must be revised to represent the level of the active ingredients in the final product based on the concentration of the active ingredients in the technical source product.

[d] These data do not satisfy the data requirements of 40 CFR §158.160-165 (Guideline Reference No. 61-2) concerning the starting materials and manufacturing process because a specification sheet for an inert ingredient must be submitted.

[c] These data requirements will be satisfied by the technical source product.

[f] These data do not satisfy the data requirements of 40 CFR §158.175 (Guideline Reference No. 62-2) concerning certified limits because an updated CSF on EPA Form 8570-4 (Rev. 12-90) is required reflecting transfer of ownership.

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Case No. 0120
Chemical No. 081301

Case Name: Captan
Registrant: Zeneca, Inc.
Product(s): 37% FI (EPA Reg. No. 10182-298)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [a]	MRID Number
61-1	Product Identity and Disclosure of Ingredients	N	
61-2	Starting Materials and Manufacturing Process	[illegible]	
61-3	Discussion of Formation of Impurities	N	
62-1	Preliminary Analysis	[illegible]	
62-2	Certification of Ingredient Limits	N	
62-3	Analytical Methods to Verify the Certified Limits	[illegible]	
63-2	Color	N	
63-3	Physical State	[illegible]	
63-4	Odor	N	
63-5	Melting Point	[illegible]	
63-6	Boiling Point	N/A [b]	
63-7	Bulk Density or Specific Gravity	[illegible]	
63-8	Solubility	N/A [b]	
63-9	Vapor Pressure	[illegible]	
63-10	Dissociation Constant	N/A [b]	
63-11	Octanol/Water Partition Coefficient	[illegible]	
63-12	pH	N	
63-13	Stability	[illegible]	
63-14	Oxidizing/reducing action	N	
63-15	Flammability	[illegible]	
63-16	Explodability	N	
63-17	Storage stability	[illegible]	
63-18	Viscosity	N	
63-19	Miscibility	[illegible]	
63-20	Corrosion characteristics	N	

[a] Y = Yes; N = No; N/A = Not Applicable. Although Zeneca claims that the 88.92% FI and 87% FI (EPA Reg. Nos. 10182-198 and 10182-298) are similar enough to share data, CSFs on file with the Agency indicate a slight difference in composition. CBRS has concluded (CBRS No. 9780, D177146, dated 6/26/92, by C. Olinger) that a justification is required for each data requirement for which the registrant intends to share FI data.

[b] These data requirements will be satisfied by the technical source product.

011423

DYNAMAC CORPORATION
Environmental Services

Final Report

CAPTAN
Shaughnessy No. 081301
Case No. 0120
(CBRS No. 11955, DP Barcode D191890)

TASK 2B
Reregistration Eligibility Document: Residue Chemistry Considerations

April 11, 1994

Contract No. 68-D2-0063

Submitted to:
U.S. Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
The Dynamac Building
2275 Research Boulevard
Rockville, MD 20850-3268

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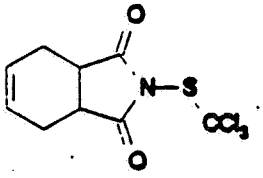
CAPTAN



REREGISTRATION ELIGIBILITY DOCUMENT

RESIDUE CHEMISTRY CONSIDERATIONS

(Shaughnessy No. 081301; Case 0120)

(DP Barcode D191890; CBRS Nos. 11955)

Task 2B

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CAPTAN

REREGISTRATION ELIGIBILITY DOCUMENT

RESIDUE CHEMISTRY CONSIDERATIONS

(Shaughnessy No. 081301; Case 0120)

(DP Barcode D191890; CBRS Nos. 11955)

Task 2B

INTRODUCTION

Captan (N-trichloromethylthio-4-cyclohexene-1,2-dicarboximide) is a fungicide registered for foliar applications to almonds, apples, apricots, blueberries, caneberries, cherries, grapes, nectarines, peaches, plums, and strawberries; post-harvest fruit dip on apples, cherries, and pears; and seed treatment of numerous food and feed crops. These are the only use patterns to be supported by the Captan Task Force comprised of Mahleteshim-Agan and Zeneca, Inc., formerly ICI Americas, Inc., (letter from Zeneca dated 2/3/94) and are detailed in Table A. Formulations registered for field application are the 50 and 80% wettable powder (WP), the 75% water-dispersible granules (WDG), and the 4 lb/gal flowable concentrate (FlC). Several dusts (D) and WPs and a 4 lb/gal FlC are registered for seed treatments *[Source: REFS search dated 5/04/94; active end-use product labels.]*

Tolerances for residues in/on numerous plant and animal commodities are currently expressed in terms of captan *per se* (a complete list of commodities with tolerances is provided in Table C).

REGULATORY BACKGROUND

A Special Review Data Call-In Notice (DCI) was issued 4/29/85 for captan requiring a number of studies to be used by the Agency in refining dietary exposure assessments.

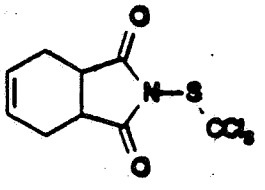
Captan was the subject of a Reregistration Standard and Guidance Document issued 3/86. The Guidance Document specified numerous residue chemistry data gaps. The Captan Reregistration Standard Update dated 12/31/91 summarizes data submitted in response to the DCI and Guidance Document and specified remaining data gaps and needed label amendments. The information contained in this document outlines the Residue Chemistry Science Assessments with respect to the reregistration of captan.

Issues

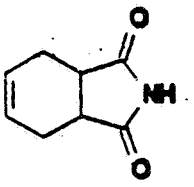
The Position Document 1 (PD1) published in 1980 (45 FR 54938) outlined the oncogenic, teratogenic, and reproductive effects of captan. The PD2/3 (1985) summarized the potential risks and benefits of captan use. The PD2/3 recommended the cancellation of all foliar and postharvest food/feed uses of captan and retention of seed treatment uses. However, additional data were required to support established tolerances and to determine the actual food residues. In addition the PD2/3 stated that uses would be retained where submitted data demonstrate that actual residues are lower than the established tolerance or in cases where modified use patterns would reduce dietary risk.

The Agency's Special Review and Risk/Benefit Analysis concluded that retention of all food uses of captan would result in unreasonable adverse effects on humans or the environment. Consequently, the Agency announced (PD4; FR Notice of 2/24/89, Vol. 54, No. 36, p. 8116) a notice of intent to cancel the registrations of all products containing captan as the active ingredient with the following exceptions: (i) all non-food uses; (ii) seed treatments; and (iii) the following food uses: almonds, apples, apricots, cherries, grapes, pears, plums, strawberries, nectarines, pears (postharvest), and peaches, plus several uses not canceled, but subject to suspension. Those use sites subject to suspension were blackberries, blueberries, celery (plant-bed), dewberries, eggplant (plant bed), lettuce, mangoes, green onions, peppers and pimentos (plant bed), raspberries, spinach (plant bed), taro, and tomatoes (plant bed). These uses were suspended due to insufficient residue data reflecting these use patterns. The use on blueberries is being supported by the Captan Task Force. The use on caneberries (blackberries, dewberries, and raspberries) is being retained with supporting data provided by IR-4. Foliar uses on lettuce, mangoes, and green onions and plant-bed use registrations listed in the PD4 as subject to suspension are not being supported by the Captan Task Force.

The HED Metabolism Committee (C. Olinger and P. Chin, 4/1/94) has ruled that the tolerance expression for animal commodities is to be revised to include the metabolite 1,2,3,6-tetrahydrophthalimide (THPI) as well as captan. Captan *per se* is to remain the only residue regulated by tolerances in raw and processed plant commodities. The structures of captan and THPI may be found below.



Captan



THPI

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SUMMARY OF SCIENCE FINDINGS

The summaries of residue chemistry guidelines and topics listed below are based on the present regulatory status where the only registered food/feed uses of captan are those to be retained by the Captan Task Force. CBRS reserves the right to require additional studies for each applicable guideline and topic if additional registrations on food/feed crops are sought. A complete summary of residue chemistry data requirements for the reregistration of captan, in accordance with Subdivision O of the Pesticide Assessment Guidelines, appears in Table B.

GLN 171-3: Directions for Use: There are 36 end-use products (EP) of captan currently registered by Zeneca for food/feed crops *[Source: REFS search conducted 3/04/94]*. Only WP, FIC, and WDG formulations are registered for foliar applications. Dusts, in addition to the aforementioned formulation classes, are registered for seed treatment. A comprehensive summary of registered food/feed use patterns based on these product labels is presented in Table A (EPA Reg. Nos. 10182-145, -146, -147, -148, -149, -161, -164, -165, -166, -176, -190, -200, -290, -291, -292, -296, -297, -302, -303, -304, -311, -312, -316, -318, -319, -320, -321, -333, -364; uses permitted under CA930007 for foliar application to pears and SC920001 for chemigation of strawberries were also used). Zeneca has requested voluntary cancellation of 10182-153, -313 and -314 in a letter dated 10/25/93 and products 10182-289, -295, -305, and -315 in a letter dated 2/24/94. These products were still considered active in a REFS search conducted 5/04/94.

The conclusions regarding the reregistration eligibility of captan on the crops listed in Table B are based on the use patterns registered by members of the Captan Task Force for which residue data are available reflecting these use patterns. Modifications are still required for some Zeneca labels including maximum seasonal use rates, pre-harvest intervals, and other use restrictions. When end-use product DCIs are developed (e.g., at issuance of the RED), RD should require that all end-use product labels (e.g., MAI labels, SLNs, and products subject to the generic data exemption) be amended such that they are consistent with the basic producer labels.

GLN 171-4 (a): Plant Metabolism: The qualitative nature of the residue in plants is adequately understood based on acceptable lettuce and tomato metabolism studies. These studies indicated that captan is cleaved at the N-S bond to form THPI, which is further metabolized. The metabolite of the cleaved side chain is carbon dioxide (CO_2), which may be reincorporated into plant constituents. Captan is the major residue in tomato fruits and lettuce comprising 55-81% of the total radioactive residue (TRR). Minor residues include THPI, (4-9% of the TRR), captan epoxide, (0.4%), and THPI epoxide (0.9%). Bis(trichloromethyl)disulfide, *trans*-3-hydroxy-1,2,6-trihydrophthalimide (3-OH-THPI), and

trans-5-hydroxy-1,2,6-trihydrophthalimide (5-OH-THPI) may be present at very low levels. The residue of concern in raw and processed plant commodities is captan *per se*.

GLN 171-4 (b): Animal Metabolism: For purposes of risk assessment, the qualitative nature of the residue in animals is adequately understood, based on acceptable poultry and ruminant metabolism studies with cyclohexyl ring-labeled (CHR) [^{14}C]captan. No captan was detected in tissues, milk, or eggs. The major residues in goat muscle, liver, kidney and milk are 3-OH-THPI and 5-OH-THPI; in addition THPI was a major residue in goat fat. THPI was the major residue in hen matrices. Captan metabolism in livestock proceeds through rapid cleavage of the trichloromethyl moiety, followed by oxidation and hydroxylation of the cyclohexyl ring. Additional data on trichloromethyl-labeled (TCM) [^{14}C]captan are forthcoming. *[Zeneca, Inc. has committed to submitting these data by May, 1994.]* Preliminary data submitted from the TCM-labeled goat study indicate that 43% of the ^{14}C-residues were trapped as CO_2 and an additional estimated 18% may be [^{14}C]methane formed from CO_2. The TCM-labeled data are required for confirmatory purposes. Sufficient data are available to assess the dietary risk from animal commodities bearing captan residues. The residues of concern in animals are captan and THPI.

GLN 171-4 (c/d): Residue Analytical Methods - Plants and Animals: Adequate methodology is available for enforcement of tolerances residues of captan *per se* in/on plant commodities. A GC/electron capture detection (EC) method included in PAM, Vol. II as Method I is the preferred enforcement method. Other methods in PAM Vol. II that use colorimetry to analyze surface residues from plant tissues are not acceptable. Data submitted to support crop tolerances and in response to the DCI (residue reduction) were collected using the following GC methods: Chevron Methods No. RM-1K-1 and RM-1K-2 for captan and THPI, Stauffer Method No. RRC-76-30R for captan and RRC-78-20 for THPI, and Zeneca (formerly ICI) Method No. WRC 89-51 for captan and THPI.

Zeneca Method No. 166 for quantifying THPI in meat and milk has been validated for use in tolerance enforcement. This method has also been used for data collection and is adequate for that purpose.

Captan is completely recovered (>80%) using PAM Vol. I Multiresidue Protocol E, Section 211.1 for oily matrices and partially recovered (50-85%) using Protocol E Section 212.1 for non-oily matrices. Captan is completely recovered using Multiresidue Protocol D (Luke Method; 232.4). THPI is completely recovered through Protocol D, but not through Protocol E (PESTDATA, PAM, Vol. I, Appendix, 8/93).

GLN 171-4 (e): Storage Stability: Storage stability studies have been conducted with crop matrices. The stability of captan is somewhat dependent on the extent of sample preparation. Captan *per se* is stable for periods of 3-14 months in whole almonds, apples, apple juice, apple sauce, grape dry pomace, raisins, spinach, strawberries, sugar beet tops, tomato dry pomace, and tomato sauce, and for 3 months in cherries and wheat forage. Captan *per se* was not stable in almonds, corn grain, or spinach that had been ground prior to fortification

or in beet tops, whole corn grain, cucumbers, lettuce, potatoes, soybean seed and forage, or tomatoes. As captan degrades to THPI, which exhibits greater stability, the total captan plus THPI residues can show the overall stability of total residues. Captan plus THPI residues were stable for 9-15 months on whole almonds, apples, apple juice, applesauce, beet tops, cherries, cucumbers, grape dry pomace, raisins, soybean forage, chopped spinach, strawberries, sugar beet tops, tomato dry pomace, tomato sauce, and wheat forage. Combined residues were stable for 3-6 months in lettuce, potatoes, and soybean grain, and for 1-2 months in ground almonds, ground corn grain, and finely chopped spinach. The data are adequate to support the residue data submitted to support foliar applications and seed treatments. Additional storage stability data may be required to support any new magnitude of residue data submitted in the future.

Sufficient storage stability data are available to support the residue data for milk. Additional data are required to demonstrate the stability of THPI residues in animal tissues. CBRS considers these data confirmatory since the milk data give a preliminary indication of the stability of THPI residues in animal commodities.

GLN 171-4 (k): Magnitude of the Residue in Plants: All data requirements for magnitude of the residue in plants have been evaluated. Requirements for confirmatory field trials on caneberries and on strawberries in FL remain outstanding. Otherwise, all data are adequate to reassess captan tolerances in light of canceled and revised uses. Field data on fruit and nut orchard crops and grapes are available reflecting multiple foliar applications of WP, FlC, or WDG formulations with appropriate PHIs and geographic representation. Data on postharvest fruit dip are available for apples, cherries, and pears. Data from seed treatments using WP/FlC and D formulations on representative crop seed and potato seed pieces indicate that these uses will not result in detectable residues of captan in/on edible commodities.

Additional field trials for strawberries grown in FL are required due to an increase of incidences of fruit with over-tolerance residues. A minimum of three field trials must be conducted on strawberries in FL. The maximum single application rate and maximum seasonal rate to be proposed by the registrant must be used on strawberries grown using drip irrigation as typically employed in FL. Berries must be harvested the day of the final application, unless the registrant intends to propose a different pre-harvest interval for FL.

GLN 171-4 (l): Magnitude of the Residue in Processed Food/Feed: All data requirements for magnitude of the residue in processed food/feed have been evaluated and deemed adequate to determine the extent to which residues concentrate in food/feed items upon processing of the raw agricultural commodity. Captan residues tend to concentrate in raisins and raisin waste. Residues tend to reduce or convert to THPI in all other processed commodities. A feed additive tolerance for raisin waste must be proposed.

GLN 171-4 (l): Magnitude of the Residue in Meat, Milk, Poultry, and Eggs: Cattle feeding studies have been evaluated and found adequate to satisfy ruminant feeding study data requirements. Using Table II (June, 1994), the maximum theoretical dietary burden for

dairy cattle is 41 ppm and beef cattle is 83 ppm, based on residue contributions from wet apple pomace (40% dry matter), raisin waste, and almond hulls. The feeding study data represent daily dietary levels of 10, 30, and 100 ppm and are adequate for assessing the established tolerances and establishing a new tolerance for milk.

A poultry feeding study is not required. Using the revised Table II to the Subdivision O Residue Chemistry Guidelines, the only poultry feed items which remain are those grown from captan treated seed. Since residues of captan and THPI are not detectable in the poultry feed items, poultry feeding studies and tolerances will not be required.

GLN 171-5 Reduction of Residue: Data pertaining to reduction of captan residues on plant commodities were submitted in response to the Special Review of captan. Studies conducted on apples, cantaloupe, cucumbers, grapefruit, lemons, lettuce, oranges, squash, strawberries, and spinach indicate that residues are substantially reduced by washing and are almost non-detectable after peeling. Cooking studies on celery, cucumbers, squash, and spinach indicate that residues of captan are almost non-detectable after cooking, with a corresponding increase in the THPI residues.

GLNs 165-1 and 165-2: Confined/Field Rotational Crops: Confined rotational crop studies were reviewed previously by EFGWB and judged unacceptable due to low field application rates. However, since the EFGWB review, captan use patterns have become more restrictive, such that the only uses pertinent to rotational crops are seed treatments. There are no captan uses on annual crops. The studies have been reconsidered under the current use patterns, and it has been concluded that no detectable residues of captan or THPI are likely in rotated crops and that no field rotational crop data or tolerances for rotated crops are required.

Table A. Use patterns subject to reregistration for: Case 0120, Captan.

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Alfalfa, Clover							
Seed treatment Slurry	4 oz/cwt	WP, FlC	NA[a]	NA	NA	None	
Seed treatment Dust	6 oz/cwt	D					
Seed treatment Planter box	0.25 oz/cwt	D					
Almonds							
Foliar Ground and aerial equipment	4.5 lb/A	WP, FlC, WDG	22.5 lb/A	NS[b]	30	96	
Apples							
Foliar Ground and aerial equipment	4 lb/A	WP, FlC, WDG	32 lb/A	5	14	96	Eastern U.S.
			32 lb/A	NS	14	96	Western U.S. exc. CA
			15 lb/A	NS	21	96	CA
	4.5 lb/A		32 lb/A	7	0	96	AR, LA, MO, TX, and states east of the Mississippi River only
Postharvest fruit dip	1.25 lb/ 100 gal	WP, FlC, WDG	NA	NA	NA	NA	
Apricots							
Foliar Ground and aerial equipment	2.5 lb/A	WP, FlC, WDG	12.5 lb/A	NS	7	96	

(continued; footnotes follow.)

Table A. Use patterns subject to reregistration for: Case 0120, Captan. (*Continued*).

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Barley							
Seed treatment Dust or slurry	1.5 oz/cwt	D, WP, FlC	NA	NA	NA	None	
Seed treatment Planter box	0.8 oz/cwt	D					
Beans							
Seed treatment Slurry	1.3 oz/cwt	WP, FlC	NA	NA	NA	None	
Seed treatment Dust	1.9 oz/cwt	D					
Seed treatment Planter box	0.5 oz/cwt	D					
Beets (table)							
Seed treatment Slurry	6 oz/cwt	WP, FlC, EC	NA	NA	NA	None	
Seed treatment Dust	9 oz/cwt	D					
Blueberries							
Foliar Ground and aerial equipment	2.5 lb/A	WP, FlC, WDG	35 lb/A	7	(0)	96	Eastern U.S.; Western U.S. exc CA
			12.5 lb/A	7	4		CA

(*continued; footnotes follow.*)

Table A. Use patterns subject to reregistration for: Case 0120, Captan. *(Continued).*

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Bluegrass							
Seed treatment Slurry	4.1 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	6 oz/cwt	D					
Broccoli, Brussels sprouts, cabbage, cauliflower							
Seed treatment Dust or slurry	1.1 oz/cwt	D, WP, FIC	NA	NA	NA	None	
Seed treatment Planter box	0.25 oz/cwt	D					
Carrots							
Seed treatment Slurry	4.4 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	6 oz/cwt	D					
Seed treatment Planter box	0.5 oz/cwt	D					
Cantaloupe, cucumber							
Seed treatment Slurry	1.6 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	2.25 oz/cwt	D					
Seed treatment Planter box	0.5 oz/cwt	D					

(continued; footnotes follow.)

Table A. Use patterns subject to reregistration for: Case 0120, Captan. *(Continued).*

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Cherries							
Foliar Ground and aerial equipment	2 lb/A	WP, FlC, WDG	14 lb/A	3	(0)	96	Eastern U.S.
				NS	(0)	96	Western U.S. exc. CA
				NS	7	96	CA
Postharvest fruit dip	1.25 lb/ 100 gal	WP, FlC, WDG	NA	NA	NA	NA	
Corn (field)							
Seed treatment Dust or slurry	1.1 oz/cwt	D, WP, FlC	NA	NA	NA	None	
Corn (sweet)							
Seed treatment Dust or slurry	2 oz/cwt	D, WP, FlC	NA	NA	NA	None	
Corn (unspecified)							
Seed treatment Planter box	1 oz/cwt	D	NA	NA	NA	None	
Cotton, acid delinted							
Seed treatment Slurry	1.4 oz/cwt	EC	NA	NA	NA	None	
Seed treatment Slurry	2.5 oz/cwt	FlC, WP					
Seed treatment Dust	1.5 oz/cwt	D					

(continued; footnotes follow.)

Table A. Use patterns subject to reregistration for: Case 0120, Captan. (*Continued*).

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Cotton, machine delinted							
Seed treatment Dust or slurry	2.25 oz/cwt	D, WP, FIC	NA	NA	NA	None	
Cotton, fuzzy							
Seed treatment Slurry or dust	2.25 oz/cwt	D, WP	NA	NA	NA	None None	
Seed treatment Slurry	3.5 oz/cwt	FIC, WP					
Cotton, reginned							
Seed treatment Slurry	3.5 oz/cwt	FIC	NA	NA	NA	None	
Cotton (unspecified)							
Seed treatment Planter box	1 oz/cwt	D	NA	NA	NA	None	
Cowpeas							
Seed treatment Slurry	1.5 oz/cwt	WP, FIC		NA	NA	None	
Seed treatment Dust	2.25 oz/cwt	D					
Eggplant							
Seed treatment Slurry	2.7 oz/cwt	WP	NA	NA	NA	None	
Seed treatment Dust	4.5 oz/cwt	D					

(continued; footnotes follow.)

Table A. Use patterns subject to reregistration for: Case 0120, Captan. *(Continued).*

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Flax							
Seed treatment Slurry	2 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	2.6 oz/cwt	D					
Seed treatment Planter box	0.25 oz/cwt	D					
Grapes							
Foliar Ground and aerial equipment	2 lb/A	WP, FIC, WDG	12 lb/A	10	14	96	U.S. exc. CA
				NS	45	96	CA
Grasses							
Seed treatment Slurry	4.1 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	9 oz/cwt	D					
Mustard, rape							
Seed treatment Slurry	0.8 oz/cwt	WP, FIC	NA	NA	NA	None	
Nectarines							
Foliar Ground and aerial equipment	4 lb/A	WP, FIC, WDG	24 lb/A	3	0	96	U.S. exc. CA
			20 lb/A		7		CA

(continued; footnotes follow.)

Table A. Use patterns subject to reregistration for: Case 0120, Captan. (*Continued*).

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Oats							
Seed treatment Dust or slurry	2 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Planter box	0.8 oz/cwt	D					
Okra							
Seed treatment Planter box	0.5 oz/cwt	D	NA	NA	NA	None	
Onion							
Pelleting	0.8 lb/lb seed	D, FIC	NA	NA	NA	None	
Seeder box treatment	0.75 lb/3 lb seed	D, WP, FIC					
Peaches							
Foliar Ground and aerial equipment	4 lb/A	WP, FIC, WDG	32 lb/A	3	(0)	96	U.S. exc. CA
			20 lb/A		7		CA
Peanuts							
Seed treatment Dust or slurry	3 oz/cwt	D, FIC, WP	NA	NA	NA	None	

(continued; footnotes follow.)

Table A. Use patterns subject to reregistration for: Case 0120, Captan. *(Continued).*

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Pears							
Foliar Ground and aerial equipment	3 lb/A	WP	NS	NS	14	24	CA only under EPA SLN No. CA 930007
Postharvest fruit dip	1.25 lb/ 100 gal	WP, FIC, WDG	NA	NA	NA	NA	
Peas							
Seed treatment Slurry	1.3 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	1.9 oz/cwt	D					
Seed treatment Planter box	0.5 oz/cwt	D					
Peppers							
Seed treatment Slurry	1.5 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	2.25 oz/cwt	D					
Plums/Fresh prunes							
Foliar Ground and aerial equipment	3 lb/A	WP, FIC, WDG	27 lb/A	7	(0)	96	Eastern U.S.
			27 lb/A	NS	(0)	96	Western U.S. exc. CA
			15 lb/A	NS	7	96	CA

(continued; footnotes follow.)

Table A. Use patterns subject to reregistration for: Case 0120, Ciptin. *(Continued).*

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Potatoes							
Seed piece treatment Dust	1.2 oz/cwt	D	NA	NA	NA	None	
Radish							
Seed treatment Dust or slurry	1.1 oz/cwt	D, WP, FIC	NA	NA	NA	None	
Seed treatment Planter box	0.25 oz/cwt	D					
Rutabaga							
Seed treatment Slurry	2.3 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	3.4 oz/cwt	D					
Rye							
Seed treatment Dust or slurry	1.5 oz/cwt	D, WP, FIC	NA	NA	NA	None	
Seed treatment Planter box	0.25 oz/cwt	D					
Safflower							
Seed treatment Planter box	0.25 oz/cwt	D	NA	NA	NA	None	
Sesame							
Seed treatment Slurry	0.8 oz/cwt	WP, FIC	NA	NA	NA	None	

(continued; footnotes follow.)

Table A. Use patterns subject to reregistration for: Case 0120, Captan. *(Continued).*

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Sorghum - milo							
Seed treatment Slurry	3 oz/cwt	WP, FIC	NA	NA	NA	None	
Sorghum - hulled							
Seed treatment Dust or slurry	3 oz/cwt	D, WP, FIC	NA	NA	NA	None	
Soybeans							
Seed treatment Slurry	1.3 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	1.9 oz/cwt	D					
Seed treatment Planter box	1.75 oz/cwt	D					
Spinach							
Seed treatment Slurry	3.3 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	4.5 oz/cwt	D					
Seed treatment Planter box	0.5 oz/cwt	D					

(continued; footnotes follow.)

Table A. Use patterns subject to reregistration for: Case 0120, Captan. *(Continued).*

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Squash, pumpkins, watermelon							
Seed treatment Slurry	1 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	1.5 oz/cwt	D					
Seed treatment Planter box	0.5 oz/cwt	D					
Strawberries							
Foliar Ground and aerial equipment	3 lb/A	WP, FIC, WDG	24 lb/A	7	(0)	96	U.S. exc. CA Chemigation permitted in SC under EPA SLN NO. SC920001
	2.5 lb/A		16 [illegible]	10	2		CA
Sugar beets, Eastern U.S.							
Seed treatment Slurry	6 oz/cwt	WP, FIC	[illegible]	NA	NA	None	Eastern U.S.
Sugar beets, Western U.S.							
Seed treatment Slurry	3 oz/cwt	WP, FIC	NA	NA	NA	None	Western U.S.

(continued; footnotes follow.)

Table A. Use patterns subject to reregistration for: Case 0120, Captan. *(Continued).*

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Sugar beets, unspecified							
Seed treatment Slurry	6 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	9 oz/cwt	D					
Seed treatment Planter box	2 oz/cwt	D					
Sunflower							
Seed treatment Slurry	2 oz/cwt	FIC	NA	NA	NA	None	
Seed treatment Planter box	0.5 oz/cwt	D					
Swiss chard							
Seed treatment Slurry	6 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	9 oz/cwt	D					
Turnips							
Seed treatment Slurry	1.5 oz/cwt	WP, FIC	NA	NA	NA	None	
Seed treatment Dust	2.25 oz/cwt	D, WP, FIC					

(continued; footnotes follow.)

Table A. Use patterns subject to reregistration for: Case 0120, Captan. (*Continued*).

SITE Application Type Application Timing Application Equipment	Maximum Application Rate (ai)	Form	Maximum Seasonal Rate (ai)	Minimum Retreatment Interval (days)	PHI (days)	Restricted Entry Interval (hours)	Use Limitations
Wheat							
Seed treatment Slurry	1 oz/cwt	WP		NA	NA	None	
Seed treatment Dust or slurry	2 oz/cwt	FIC					
Seed treatment Planter box	0.8 oz/cwt	D					

NA = Not applicable.
NS = Minimum interval between treatments not specified.

Table B *(continued)*.

GLN: Data Requirements	Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References[1]
171-4 (e): Storage Stability	N/A	Yes[9]	40752301[11] 41039101[12] 41557601[13] 42803901[14]
171-4 (k): Magnitude of the Residue in Plants			
Root and Tuber Vegetables Group			
- Beet roots	2 [§180.103 (a)]	No	40189806[15] 41149104[16] 41306101[17] 41306102[17] 41468401[18]
- Carrots	2 [§180.103 (a)]	No	40189806[15] 41149104[16] 41306101[17] 41306102[17] 41468401[18]
- Potatoes	25 [§180.103 (b)]	No	00098716 00098894 00054016 40189806[15] 41149104[16] 41306101[17] 41306102[17] 41468401[18]
- Rutabagas	2 [§180.103 (a)]	No	40189806[15] 41149104[16] 41306101[17] 41306102[17] 41468401[18]
- Taro	2 [§180.103 (a)]	No[19]	40189806[15] 41149104[16] 41468401[17] 41306101[17] 41306102[18]
- Turnip roots	2 [§180.103 (a)]	No	40189806[15] 41149104[16] 41306101[17] 41306102[17] 41468401[18]
Leaves of Root and Tuber Vegetables Group			
- Beet greens	100 [§180.103 (a)]	No	40189821[15] 41149102[16] 41306101[17] 41306102[17] 41468401[18]
- Turnip greens	2 [§180.103 (a)]	No	40189821[15] 41149102[16] 41306101[17] 41306102[17] 41468401[18]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References[1]
Bulb Vegetables Group			
- Garlic	2 [§180.103 (a)]	No	40189806[15] 41149104[16] 41306101[17] 41306102[17] 41468401[18]
- Leeks	2 [§180.103 (a)]	No	40189806[15] 41149104[16] 41306101[17] 41306102[17] 41468401[18]
- Onions, dry bulb	25 [§180.103 (a)]	No	40189806[15] 41149104[16] 41306101[17] 41306102[17] 41468401[18]
- Onions, green	50 [§180.103 (a)]	No	40189806[15] 41149104[16] 41306101[17] 41306102[17] 41468401[18]
- Shallots	50 [§180.103 (a)]	No	40189806[15] 41149104[16] 41306101[17] 41306102[17] 41468401[18]
Leafy Vegetables Group			
- Celery	50 [§180.103 (a)]	No	00070201 00159599[20] 40189821[15] 41149102[16] 41306101[17] 41306102[17] 41468401[18]
- Lettuce	100 [§180.103 (a)]	No	00070201 00159605[20] 40189821[15] 41149102[16] 41306101[17] 41306102[17] 41468401[18]
- Spinach	100 [§180.103 (a)]	No	00070201 00159606[20] 40189821[15] 41149102[16] 41149103[16] 41306101[17] 41306102[17] 41468401[18]
Brassica Leafy Vegetables Group			
- Broccoli	2 [§180.103 (a)]	No	40189821[15] 41149102[16] 41306101[17] 41306102[17] 41468401[18]
- Brussels sprouts	2 [§180.103 (a)]	No	40189821[15] 41149102[16] 41306101[17] 41306102[17] 41468401[18]
- Cabbage	2 [§180.103 (a)]	No	40189821[15] 41149102[16] 41306101[17] 41306102[17] 41468401[18]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References[1]
- Cauliflower	2 [§180.103 (a)]	No	40189821[15] 41149102[16] 41306101[17] 41306102[17] 41468401[18]
- Collards	2 [§180.103 (a)]	No	40189821[15] 41149102[16] 41306101[17] 41306102[17] 41468401[18]
- Kale	2 [§180.103 (a)]	No	40189821[15] 41149102[16] 41306101[17] 41306102[17] 41468401[18]
- Mustard greens	2 [§180.103 (a)]	No	40189821[15] 41149102[16] 41306101[17] 41306102[17] 41468401[18]
Legume Vegetables Group			
- Beans, dry	25 [§180.103 (b)]	No	00046914 00070201 00096710 40189820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Beans, succulent	25 [§180.103 (b)]	No	00046914 00070201 00096710 40189820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Peas, dry	2 [§180.103 (a)]	No	40189820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Peas, succulent	2 [§180.103 (a)]	No	40189820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Soybeans, dry	2 [§180.103 (a)]	No	00003025 00071790 00096982 40189820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Soybeans, succulent	2 [§180.103 (a)]	No	00071790 00096982 00096709 40189820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References[1]
Fruiting Vegetables Group			
- Eggplants	25 [§180.103 (a)]	No	00098709 40189820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Peppers	25 [§180.103 (a)]	No	40189820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Pimentos	25 [§180.103 (a)]	No	40189820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Tomatoes	25 [§1• .103 (a)]	No	00070201 00085526 00098708 40189820[15] 40189823[15] 40189824[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
Cucurbit Vegetables Group			
- Cantaloupes	25 [§180.103 (a)]	No	00098818 41089820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Cucumbers	25 [§180.103 (a)]	No	00098709 41089820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Honeydew melons	25 [§180.103 (a)]	No	00098818 41089820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Muskmelons	25 [§180.103 (a)]	No	00098818 41089820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Pumpkins	25 [§180.103 (a)]	No	41089820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Squash, summer	25 [§180.103 (a)]	No	00098818 41089820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
- Squash, winter	25 [§180.103 (a)]	No	00098818 41089820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References[1]
- Watermelons	25 [§180.103 (a)]	No	00128355 41089820[13] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
Pome Fruits Group			
- Apples	25 [§180.103 (a)]	No	00085526 00096711 00098722 00098789 00106602 00128355 00159597[20] 40189803[15] 40745403[21] 42252201[19] 42252202[19]
- Pears	25 [§180.103 (a)]	No	00070201 00085526 00098722 00106602 00128355 40189815[15]
Stone Fruits Group			
- Apricots	50 [§180.103 (a)]	No	00128355 40189805[15]
- Cherries	100 [§180.103 (a)]	No	00128355 40189808[15]
- Nectarines	50 [§180.103 (a)]	No	00128355 40189813[15]
- Peaches	50 [§180.103 (a)]	No	00128355 40189814[15] 40745406[21] 40745407[21]
- Plums (fresh prunus)	100 [§180.103 (a)]	No	00128355 40189816[15]
Small Fruits and Berries Group			
- Blackberries	25 [§180.103 (a)]	Yes[22]	42712801[20]
- Blueberries (huckleberries)	25 [§180.103 (a)]	No	00046914 00070201 00090988 00128355 41039101[12]
- Dewberries	25 [§180.103 (a)]	Yes[22]	42712801[20]
- Grapes	50 [§180.103 (a)]	No	00046914 00070201 00090988 00098726 00128355 00159601[20] 00162037[20] 40189811[15] 40189812[15] 40745405[21] 42254202[19]
- Raspberries	25 [§180.103 (a)]	Yes[22]	00070201 42712801[20]
- Strawberries	25 [§180.103 (a)]	Yes[20]	00046914 00070201 00090988 00117088 00128355 00159607[20] 40189822[15] 40745408[21]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References[1]
Tree Nuts Group			
- Almonds	2 [§180.103 (b)]	No	00070201 00090988 00098804 00098811 00128355 00159596[20] 00162037[24] 40189802[15] 40745402[21]
- Almond hulls	100 [§180.103 (b)]	No	00070201 00090988 00098804 00098811 00128355 00159596[20] 00162037[24] 40189802[15] 40745402[21]
Cereal Grains Group			
- Corn, sweet	2 [§180.103 (a)]	No	00003025 00045176 00070201 00128355 GS120-039 40189809[15] 41149103[16] 41306101[17] 41306102[17] 41468401[18]
Miscellaneous Commodities			
- Cottonseed	2 [§180.103 (a)]	No	00002928 00003025 00070201 00128355 GS120-039 40189820[15] 41149101[16] 41306101[17] 41306102[17] 41468401[18]
171-4(l): Magnitude of the Residue in Processed Food/Feed			
- Apples		No	00098789 00159597[20] 42296003[10] 40189804[15] 42563102[10]
- Grapes	50 (Raisins) [§185.500]	No[26]	00128355 00159601[20] 00162037[24] 40189812[15] 42296004[10] 42563101[10]
- Plums/Prunes		No	40189817[15]
171-4 (j): Magnitude of the Residue in Meat, Milk, Poultry, and Eggs			
- Cattle, hogs	0.05 (fat, meat, and mbyp) [§180.103 (a)]	No[27]	00025125 00035246 00035248 00045178 00096910 00098751 00098808 00098810 00104753 40010501[15] 42296002[10]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References[1]
171-5: Reduction of Residues		No	00159595[20] 00159596[20] 00159597[20] 00159599[20] 00159601[20] 00159605[20] 00159606[20] 00159607[20] 00162037[20]
165-1: Rotational Crops (Confined)		No	41404001[28] 42378401[28]
165-2: Rotational Crops (Field)		No	

[1] These references were reviewed in the Residue Chemistry Science Chapter of the Reregistration Standard dated 3/6/86. Otherwise, references were reviewed as noted.

[2] The following labels must be revised to include a maximum annual use rate and pre-harvest interval: 10182-165 and -149. The label must specify that the annual use rate includes any post-harvest sprays. The directions for post-harvest dip for apples, cherries, and pears must be modified on label 10182-165. The feeding restriction for almond hulls must be removed from 10182-165 because CBRS does not consider such a restriction to be practical.

[3] CBRS Nos. 6525/6526, 10/2/90, R. Perfetti.

[4] CBRS No. 7583, DP Barcode D160608, 9/11/91, R. Perfetti.

[5] CBRS No. 9135, DP Barcode D172317, 4/15/92, P. Deschamp.

[6] Additional data are required pertaining to the metabolism of trichloromethyl-labeled [^{14}C]captan in ruminants and poultry. These studies are currently in progress and are considered confirmatory.

[7] CBRS No. 11262, DP Barcode D187280, 2/12/93, C. Olinger.

[8] CBRS No. 11936, DP Barcode D191630, 2/17/94, C. Olinger.

[9] Zeneca (formerly ICI) method No. 166 for quantifying THPI meat and milk is adequate for use in enforcement (CBRS No. 9877, DP Barcode D178079 6/22/92, C. Olinger).

[10] Additional animal storage stability data are required (CBRS Nos. 9902, 10668, and 11105, DP Barcode Nos. 178351 and 183051, 5/20/94, C. Olinger). Sufficient storage stability data are available to support the residue data for milk. Additional data are required to demonstrate the stability of THPI residues in animal tissues. CBRS considers these data confirmatory since the milk data give a preliminary indication of the stability of THPI residues in animal commodities.

[11] CBRS No. 4204, 12/19/89, L. Propst.

[12] CBRS No. 5148, 5/31/89, L. Cheng.

[13] CBRS No. 6995, DP Barcode D155338, 6/26/91, C. Olinger.

(continued; footnotes follow)

[14] CBRS No. 12183, DP Barcode D192936, 5/10/94, C. Olinger.

[15] CBRS No. 2317, 4/22/88, N. Gray.

[16] CBRS No. 5589, 10/6/89, C. Olinger.

[17] CBRS No. 6142, 1/29/90, C. Olinger.

[18] CBRS No. 6691, 7/30/90, C. Olinger.

[19] CBRS No. 6055, 12/18/89, J. Smith.

[20] CBRS No. 953, 7/21/86, L. Bradley.

[21] CBRS No. 4203, 12/19/89, L. Propst.

[22] CBRS No. 11071, DP Barcode No. D186008, 4/25/94, C. Olinger. Data from a minimum of two additional field trials are required for reregistration of captan on raspberries, dewberries, and blackberries (C. Olinger, CBRS No. 13214, DP Barcode D199377, 3/29/94).

[23] Data are available to support the 24(c) label (D. Davis, CBTS Nos. 11712/11716, DP Barcodes D190127 and D190128, 5/6/93; CBTS Nos. 11890/11891, DP Barcodes D191396 and D191398, 6/1/93); and CBTS Nos. 12097/12098, DP Barcodes D192518 and D192519, 6/29/93).

[24] CBRS No. 1334, 9/16/86, L. Bradley.

[25] Data are required reflecting maximum single application rate, maximum seasonal application rate, and minimum pre-harvest interval on strawberries grown in FL. Current cultural practices, including drip irrigation, must be employed. A minimum of three trials must be conducted (CBRS No. 13650, DP Barcode D202998, 5/20/94, C. Olinger). Additional data may be required reflecting eight applications per crop in FL, where more than one crop per year may be grown (CBRS No. 10477, DP Barcode D182080, 9/16/92, C. Olinger).

[26] Captan residues concentrate in raisins and raisin waste. Based on average concentration factors from all processing studies submitted to the Agency with captan treated grapes, the registrant should propose food/feed additive tolerances of 20 ppm for raisins and 150 ppm for raisin waste.

[27] Tolerance increases for animal products should be proposed for cattle, goats, sheep, horses and hogs: meat, 0.30 ppm; meat by-products, 0.40 ppm; and fat, 0.25 ppm. A tolerance for milk must be proposed at 0.15 ppm. The tolerance for animal commodities should be expressed as captan and tetrahydrophthalimide, measured as tetrahydrophthalimide.

[28] CBRS No. 13457, DP Barcode D201033, 7/?/94, S. Funk.

TOLERANCE REASSESSMENT SUMMARY

Tolerances Currently Listed Under 40 CFR §180.103(a):

Tolerances for plant and animal commodities currently listed in 40 CFR §180.103(a) are for residues of captan *per se*. This tolerance definition is to be retained for plant commodities; a separate tolerance definition is appropriate for livestock commodities. The tolerance expression for residues in livestock commodities should be "the combined residues of captan and its metabolite THPI...". CBRS recommends that tolerances for livestock commodities be removed from 40 CFR §180.103(a) and placed in a new 40 CFR §180.103(b) under the revised tolerance expression.

Tolerances Currently Listed Under 40 CFR §180.103(b):

Tolerances listed in 40 CFR §180.103(b) are for residues of captan *per se* and are established on an interim basis. CBRS recommends that tolerances listed in 40 CFR §180.103(b) for almonds, almond hulls, beans dry, beans succulent, and potatoes be moved to 40 CFR §180.103(a) at their respective reassessed tolerance levels.

Tolerances Listed Under 40 CFR §185.500:

The food additive tolerance listed in 40 CFR §185.500 for washed raisins is for residues of captan *per se*. This tolerance can be lowered from 50 ppm to 20 ppm and the commodity definition should be changed from washed raisins to raisins.

Tolerances Listed Under 40 CFR §186.500:

The feed additive tolerance of 100 ppm for de-treated corn seed listed in 40 CFR §186.500 has been revoked (58 FR 41430, 8/4/93). A feed additive tolerance of 150 ppm is required for residues of captan in raisin waste.

Refer to Table C for modifications in commodity definitions and recommended tolerance revisions and Table D for recommendations for harmonizing U.S. tolerances with Codex MRLs.

Adequate data are available to assess the established tolerances for almonds, apples, apricots, beans (dry and succulent), beet greens, beet roots, blueberries, broccoli, Brussels sprouts, cabbage, cantaloupes, carrots, cauliflower, cherries, collards, corn (sweet, K+CWHR), cottonseed, cucumbers, eggplants, grapes, honeydew melons, kale, lettuce, muskmelons, mustard greens, nectarines, onions, peaches, pears, peas dry, peas succulent, plums (fresh prunes), peppers, pimentos, pumpkins, rutabagas (roots), soybeans (dry), soybeans (succulent), spinach, squash (summer), squash (winter), turnip tops, turnip roots, and watermelons.

- The established tolerance levels for apples, pears, and blueberries are adequate and should remain.

- The established tolerances for almonds, almond hulls, apricots, cherries, grapes, nectarines, peaches, and plums can be lowered due to revised, more restrictive use patterns.

- The established tolerances for beet greens, beet roots, cantaloupes, cucumbers, eggplants, honeydew melons, kale, lettuce, muskmelons, onions, peas (dry), peas (succulent), peppers, pimentos, pumpkins, spinach, squash (summer), squash (winter), and watermelons should be lowered to 0.05 ppm. All uses except seed treatments on these crops have been canceled. The recommended 0.05 ppm level represents nondetectable residues of captan.

- The established 2 ppm tolerances for captan residues in/on broccoli, Brussels sprouts, cabbage, carrots, cauliflower, collards, corn (sweet, K+CWHR), cottonseed, mustard greens, rutabagas, soybeans (dry), soybeans (succulent), turnip tops, and turnip roots from seed treatment use should be lowered to 0.05 ppm to represent nondetectable captan residues.

Tolerances are required to cover the seed treatment uses on the following crops for which there are currently no established tolerances: alfalfa, barley (grain, forage, and straw), clover, corn (field), cotton forage, flax (seed and straw), grasses (forage and hay), lespedeza, oats (grain, forage, and straw), okra, peanuts and peanut hay, radish roots, radish tops, rape seed, rape forage, rape greens, rye (grain, forage, and straw), safflower, sesame, sunflower (seed and forage), sorghum (grain, forage and fodder), sugar beet roots, sugar beet tops, Swiss chard, trefoil, and wheat (grain, forage, and straw).

Adequate data are available to assess the established tolerances for captan residues in meat, fat, and meat byproducts of cattle and hogs. The expression of these tolerances should be changed to "the combined residues of captan and its metabolite THPI..." These tolerances should be deleted from 40 CFR §180.103(a) and placed in a separate section, 40 CFR §180.103(b). Tolerances should be added to this section for milk and the meat, fat, and meat byproducts of goats, horses, and sheep. CBRS recommends the following tolerance levels for cattle, goats, sheep, horses and hogs: meat, 0.3 ppm; meat by-products, 0.40 ppm; fat, 0.25 ppm; and milk, 0.15 ppm.

Tolerances are not required for eggs and the meat, fat, and meat byproducts of poultry.

Additional data are required to support tolerances for caneberries (blackberries, dewberries, and raspberries) and strawberries.

The established tolerances for residues of captan in/on avocados, celery, garlic, leeks, mangoes, shallots, taro, and tomatoes should be revoked as there are no registered uses of captan on these crops.

Table C. Tolerance Reassessment Summary for Captan

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comment/Correct Commodity Definition
Tolerances listed under 40 CFR §180.103 (a)			
Apples	25	25	
Apricots	50	10	
Avocados	25	Revoke	No registered uses exist
Beet, greens	100	0.05	Seed treatment only
Beet (roots)	2	0.05	Seed treatment only
Blackberries	25	Cannot Be Reassessed	Additional residue data are required/*Caneberries*
Blueberries (huckleberries)	25	25	
Broccoli	2	0.05	Seed treatment only
Brussels sprouts	2	0.05	Seed treatment only
Cabbage	2	0.05	Seed treatment only
Cantaloupes	25	0.05	Seed treatment only
Carrots	2	0.05	Seed treatment only
Cattle, fat Cattle meat Cattle, mbpy	0.05 0.05 0.05	0.25 0.3 0.4	Move to 40 CFR §180.103(b)
Cauliflower	2	0.05	Seed treatment only
Celery	50	Revoke	No registered uses exist
Cherries	100	50	
Collards	2	0.05	Seed treatment only
Corn, sweet (K+CWHR)	2	0.05	Seed treatment only
Cottonseed	2	0.05	Seed treatment only/*Cotton, seed*
Cucumbers	25	0.05	Seed treatment only
Dewberries	25	Cannot Be Reassessed	Additional residue data are required/*Caneberries*
Eggplants	25	0.05	Seed treatment only
Garlic	25	Revoke	No registered uses exist
Grapes	50	10	
Hogs, fat Hogs, meat Hogs, mbyp	0.05 0.05 0.05	0.25 0.3 0.4	Move to 40 CFR §180.103(b)
Honeydew melons	25	0.05	Seed treatment only
Kale	2	0.05	Seed treatment only
Leeks	50	Revoke	No registered uses exist

(continued)

Table C (*continued*).

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	*Comment/Correct Commodity Definition*
Tolerances listed under 40 CFR §180.183 (a) -- (Continued).			
Lettuce	100	0.05	Seed treatment only
Mangoes	50	Revoke	No registered uses exist
Muskmelons	25	0.05	Seed treatment only
Mustard greens	2	0.05	Seed treatment only
Nectarines	50	25	
Onions, dry bulb	25	0.05	Seed treatment only
Onions, green	50	0.05	Seed treatment only
Peaches	50	15	
Pears	25	25	
Peas, dry	2	0.05	Seed treatment only
Peas, succulent	2	0.05	Seed treatment only
Plums (fresh prunes)	100	10	
Peppers Pimentos	25 25	0.05	Seed treatment only/*Peppers*
Pumpkin	25	0.05	Seed treatment only
Raspberries	25	Cannot Be Reassessed	Additional residue data are required/*Caneberries*
Rutabagas (roots)	2	0.05	Seed treatment only
Shallots	50	Revoke	No registered uses exist
Soybeans, dry	2	0.05	Seed treatment only
Soybeans, succulent	2	0.05	Seed treatment only
Spinach	100	0.05	Seed treatment only
Squash, summer	25	0.05	Seed treatment only
Squash, winter	25	0.05	Seed treatment only
Strawberries	25	Cannot Be Reassessed	Additional residue data are required
Taro (corm)	0.25	Revoke	No registered uses exist
Tomatoes	25	Revoke	No registered uses exist
Turnip, greens	2	0.05	Seed treatment only/*Turnip, tops*
Turnips, roots	2	0.05	Seed treatment only
Watermelons	25	0.05	Seed treatment only

(continued)

Table C (*continued*).

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	*Comment/Correct Commodity Definition*
Tolerances listed under 40 CFR §180.183 (b)			
Almonds	2	0.25	Move to 40 CFR §180.103 (a)
Almond hulls	100	75	Move to 40 CFR §180.103 (a)
Beans, dry	25	0.05	Move to 40 CFR §180.103 (a)
Beans, succulent	25	0.05	Move to 40 CFR §180.103 (a)
Potatoes	25	0.05	Move to 40 CFR §180.103 (a)

(continued)

Table C (*continued*).

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	*Comment/Correct Commodity Definition*
Tolerances required under 40 CFR §180.183 (a)			
Alfalfa forage	--	0.05	Seed treatment only
Alfalfa hay	--	0.05	Seed treatment only
Barley, grain	--	0.05	Seed treatment only
Barley, forage	--	0.05	Seed treatment only
Barley, straw	--	0.05	Seed treatment only
Clover forage	--	0.05	Seed treatment only
Clover hay	--	0.05	Seed treatment only
Corn, field, grain	--	0.05	Seed treatment only
Corn, pop, grain	--	0.05	Seed treatment only
Corn, forage	--	0.05	Seed treatment only
Corn, fodder	--	0.05	Seed treatment only
Cotton, forage	--	0.05	Seed treatment only
Flax, seed	--	0.05	Seed treatment only
Flax, straw	--	0.05	Seed treatment only
Grass, forage	--	0.05	Seed treatment only
Grass, hay	--	0.05	Seed treatment only
Lespedeza forage	--	0.05	Seed treatment only
Lespedeza hay	--	0.05	Seed treatment only
Oats, grain	--	0.05	Seed treatment only
Oats, forage	--	0.05	Seed treatment only
Oats, straw	--	0.05	Seed treatment only
Okra	--	0.05	Seed treatment only
Peanuts	--	0.05	Seed treatment only
Peanut hay	--	0.05	Seed treatment only
Radish, roots	--	0.05	Seed treatment only
Radish, tops	--	0.05	Seed treatment only
Rape, seed	--	0.05	Seed treatment only
Rape, forage	--	0.05	Seed treatment only
Rape, greens	--	0.05	Seed treatment only
Rye, grain	--	0.05	Seed treatment only
Rye, forage	--	0.05	Seed treatment only

(continued)

Table C (*continued*).

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	*Comment/Correct Commodity Definition*
Tolerances required under 40 CFR §180.103 (a) – (Continued).			
Rye, straw	–	0.05	Seed treatment only
Safflower seed	–	0.05	Seed treatment only
Sesame seed	–	0.05	Seed treatment only
Sorghum, grain	–	0.05	Seed treatment only
Sorghum, fodder	–	0.05	Seed treatment only
Sorghum, forage	–	0.05	Seed treatment only
Sunflower, seeds	–	0.05	Seed treatment only
Sunflower, forage	–	0.05	Seed treatment only
Sugar beets, roots	–	0.05	Seed treatment only
Sugar beets, tops	–	0.05	Seed treatment only
Swiss chard	–	0.05	Seed treatment only
Trefoil forage	–	0.05	Seed treatment only
Trefoil hay	–	0.05	Seed treatment only
Wheat, grain	–	0.05	Seed treatmentonly
Wheat, forage	–	0.05	Seed treatment only
Wheat, straw	–	0.05	Seed treatment only

(continued)

Table C (*continued*).

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances required under 40 CFR §180.163 (b) [Redefined]			
Cattle, fat	0.05	0.25	
Cattle, mbyp	0.05	0.4	
Cattle, meat	0.05	0.3	
Goats, fat	–	0.25	
Goats, mbyp	–	0.4	
Goats, meat	–	0.3	
Hogs, fat	0.05	0.25	
Hogs, mbyp	0.05	0.4	
Hogs, meat	0.05	0.3	
Horses, fat	–	0.25	
Horses, mbyp	–	0.4	
Horses, meat	–	0.3	
Milk	–	0.15	
Sheep, fat	–	0.25	
Sheep, mbyp	–	0.4	
Sheep, meat	–	0.3	
Feed Additive Tolerances Listed Under 40 CFR §185.500			
Washed raisins	50	20	*Raisins*
Feed Additive Tolerances Needed (40 CFR §186.500)			
Raisin waste	–	150	

CODEX HARMONIZATION

01:423

Several maximum residue limits (MRLs) for captan have been established by Codex in various commodities. The captan residues regulated by Codex and the U.S. are equivalent. The Codex MRLs defined in terms of captan per se and corresponding U.S. tolerances are listed in Table D.

Table D. Codex MRLs and applicable U.S. tolerances. Recommendations for compatibility are based on conclusions following reassessments of U.S. tolerances (see Table C).

Commodity	MRL (mg/kg)[1]	U.S. Tolerance (ppm)	Recommendation
Apple	25	25	
Blueberries	20	25	
Citrus fruits	15[2]	N/A	
Dried grapes	5[2]	50 (washed raisins)	
Peach	15	50	Decrease U.S. tolerance
Pear	25	25	
Strawberry	20	25	
Tomato	15	25	U.S. tolerance to be revoked; no registered use

[1]All captan MRLs are final (CXL).
[2]JMPR 1990 had proposed to withdraw the CXL in view of no expected uses.

The following conclusions can be made regarding efforts to harmonize the U.S. tolerances with the Codex MRLs:

- Compatibility between U.S. tolerances and Codex MRLs exists for apples and pears.
- The level of the U.S. tolerances should be decreased to achieve compatibility with the Codex MRLs for peaches (from 25 ppm to 15 ppm). The available residue data support the decreased tolerance levels.
- The recommended U.S. tolerance of 20 ppm for raisins is based on registered use patterns in the U.S. and cannot be lowered to 5 ppm to achieve compatibility with the Codex MRL of 5 ppm for dried grapes.

- The U.S. tolerance of 25 ppm for strawberries is based on registered use patterns in the U.S. and cannot be lowered to 20 ppm to achieve compatibility with the Codex MRL of 20 ppm.

- The U.S. tolerance of 25 ppm for blueberries is based on registered use patterns in the U.S. and cannot be lowered to 20 ppm to achieve compatibility with the Codex MRL of 20 ppm.

- No questions of compatibility exist with respect to commodities where: (i) no Codex MRLs have been established but U.S. tolerances exist; or (ii) Codex MRLs have been established but U.S. tolerances do not exist.

DIETARY EXPOSURE REASSESSMENT

The plant metabolism data for captan are adequate. Sufficient residue data are available to reassess all tolerances for plant commodities with the exception of the caneberries (blackberries, dewberries, and raspberries) and strawberries. The existing data are sufficient to estimate that the tolerances for these commodities are not likely to require modification.

A requirement for additional studies on captan metabolism in ruminants and poultry are outstanding. However, these data are expected to be confirmatory. The existing data provide a preliminary indication that the nature of the residue in livestock is understood. Cattle feeding studies are adequate and support the established tolerances for fat, meat, and meat byproducts of cattle and hogs. Supporting storage stability data are required; it is unlikely that these data will affect the tolerance reassessment. Tolerances are not required for poultry commodities.

CBRS has revised the anticipated residue calculations for captan and THPI in light of canceled uses, recently submitted residue data, and the most recent FDA monitoring data. The risk assessment will involve captan only for raw plant and processed plant commodities and captan and THPI for meat and milk. Captan and THPI residues in livestock feed items will be considered when estimating the livestock dietary burden.

The anticipated residue values are the best estimates CBRS can provide using the residue data available at the time of the RED. These values have an inherent uncertainty associated with the variations in analytical methods, geographical representation of field trials, seasonal variation of residue levels, and other factors.

AGENCY MEMORANDA CITED IN THIS DOCUMENT

CBRS No.: 953
Subject: Captan Residue Reduction Data Submitted in Response to 04/29/85 DCI Letter. Accession No. 262770. RCB No. 953
From: L.M. Bradley
To: C. Langley, A. Rispin, E. Wilson, and B. Briscoe
Dated: 7/21/86
MRID(s): 00159595-00159608

CBRS No.: 1334
Subject: Captan. Addendum to Residue Reduction Data Submitted in Response to 04/29/85 DCI Letter. Accession No. 263843. RCB No. 1334.
From: L.M. Bradley
To: C. Monroe, A. Rispin, E. Wilson, and B. Briscoe
Dated: 9/19/86
MRID(s): 00162037

CBRS No.: 2317
Subject: Captan - Addendum to Registration Standard. RCB No. 2317. MRID Nos. 401898-02 through - 24 and 400105-01.
From: N.S. Gray
To: J. Dizikes and E. Wilson
Dated: 4/22/88
MRID(s): 40010501 and 40189802-40189824

CBRS No.: 4203
Subject: Residue Data Reflecting Aerial Versus Ground Spray Applications of Captan on Foliar Crops
From: L.S. Propst
To: E.M. Wilson
Dated: 12/19/89
MRID(s): 40475401-40745409

CBRS No.: 4204
Subject: Captan - Storage Stability Studies for the Captan Registration Standard
From: L.S. Propst
To: E.M. Wilson
Dated: 12/19/89
MRID(s): 40752301

CBRS No.: 5148
Subject: 239-1246. Captan on Blueberries. MRID # 410391-01. DEB # 5148.
From: L. Cheng
To: R. Mountfort
Dated: 5/31/89
MRID(s): 41039101

CBRS No.: 5589
Subject: Residue Data Review for Corn, Soybean, Beet, and Spinach Seed Treatments with Captan. DEB No. 5589. EPA No. 239-1246. MRID Nos. 411491-01 through -04
From: C.L. Olinger
To: E. Wilson
Dated: 10/6/89
MRID(s): 41149101-41149104

011423

CBRS No.. 6142
Subject: Residue Data Review for Soybean and Wheat Seed Treatments with Captan. Record No. 256461; ID No. 10182-293; DEB No. 6142; MRID Nos. 413061-01 and -02
From: C.L. Olinger
To: J. Miller
Dated: 1/29/90
MRID(s): 41306101 and 41306102

CBRS No.: 6691
Subject: Addendum to Residue Data for Captan Seed Treatments; EPA Reg. No. 10182-293; MRID No. 41468401; DEB No. 6691
From: C.L. Olinger
To: J. Miller
Dated: 7/30/90
MRID(s): 41468401

CBRS Nos.: 6525 and 6526
Subject: Chevron Chemical Co.: Response to the Captan Reregistration Standard: Residue Chemistry Requirements (No MRID #'s 406580-02, -03, -04, -05, and -06, and 413930-01, 414069-01, 413865-01, DEB #'s 6525 and 6526.)
From: R.B. Perfetti
To: R. Engler and L. Rossi
Dated: 10/2/90
MRID(s): 40658002-40658006, 41386501, 41393001, and 41406901

CBRS No: 6995
DP Barcode: D155338
Subject: Captan - Storage Stability Studies for the Captan Registration Standard and Follow-Up to Seed Treatment Residue Data; MRID No. 411576-01; Branch No. 6995; DP Barcode No. 155338
From: C.L. Olinger
To: C. Peterson
Dated: 6/26/91
MRID(s): 41157601

CBRS No.: 7583
DP Barcode: D160608
Subject: Captan - Registrant's Response to Residue Chemistry Data Requirements
From: R. Perfetti
To: R. Engler and L. Rossi
Dated: 6/26/91
MRID(s): 41746001

CBRS No. 9135
DP Barcode: D172317
Subject: Reregistration of Captan. Case No. 120. Qualitative Nature of the Residue in Plants
From: P. Donelson
To: L. Rossi/C. Peterson
Dated: 4/15/92
MRID(s): 42109601

011423

CBRS No. 9902, 10668, and 11105
DP Barcode: D178351 and D183051
Subject: Reregistration of Captan: Magnitude of Residue in Meat, Milk, Poultry, and Eggs; Magnitude of Residue in Apples, Grapes, and their Processed Products
From: C. Olinger
To: L. Rossi
Dated: 5/20/94
MRID(s): 42252201, 42252202, 42296001, 42296002, 42296003, 42296004, 42563101 and 42563102

CBRS No. 9877
DP Barcode: D178079
Subject: Reregistration of Captan: Method Validation Request
From: C. Olinger
To: D. Marlow
Dated: 6/22/92
MRID(s): None

CBRS No. 10477
DP Barcode: D182080
Subject: Reregistration of Captan: Use on Strawberries
From: C. Olinger
To: L. Rossi
Dated: 9/16/92
MRID(s): None

CBRS No. 11071
DP Barcode: D186008
Subject: Reregistration of Captan: Use on Peaches and Nectarines
From: C. Olinger
To: L. Rossi
Dated: 4/25/94
MRID(s): None

CBRS No. 11262
DP Barcode: D187280
Subject: Reregistration of Captan: Animal Metabolism Study Interim Report
From: C. Olinger
To: L. Rossi
Dated: 2/12/93
MRID(s): 42568801

CBTS No. 11712/11716
DP Barcode: D190127/D190128
Subject: WA920011, WA920012, Section 24(c) Captan on Raspberries and Blackberries
From: D. Davis
To: D. Kenney/Joanne Miller
Dated: 5/6/93
MRID(s): 42712801

CBTS No. 11890/11891
DP Barcode: D191396/D191398
Subject: WA920011, WA920012, Section 24(c) Captan on Raspberries and Blackberries
From: D. Davis
To: D. Kenney/Joanne Miller
Dated: 6/1/93

MRID(s): 42712801

CBTS No. 12097/12098
DP Barcode: D192518/D192519
Subject: WA920011, WA920012, Section 24(c) Captan on Raspberries and Blackberries
From: D. Davis
To: D. Kenney/Joanne Miller
Dated: 6/29/93
MRID(s): 42712801

CBRS No. 11936
DP Barcode: D191630
Subject: Reregistration of Captan: Metabolism in Laying Hens
From: C. Olinger
To: L. Rossi
Dated: 2/17/93
MRID(s): 42756401

CBRS No. 13214
DP Barcode: D199377
Subject: Reregistration of Captan: Raspberry Magnitude of Residue Data
From: C. Olinger
To: L. Rossi
Dated: 3/29/94
MRID(s): 43086601

CBRS No. 12183
DP Barcode: D192936
Subject: Reregistration of Captan: Storage Stability Issues
From: C. Olinger
To: L. Rossi
Dated: 5/10/94
MRID(s): 42803901

CBRS No. 13650
DP Barcode: D202998
Subject: Use of Captan on Strawberries
From: C. Olinger
To: J. Miller
Dated: 5/20/94
MRID(s): None

CBRS No. None
DP Barcode: None
Subject: The Metabolism Committee Meetings Held on February 22 and March 1, 1994: Captan Plant and Animal Metabolism
From: C. Olinger
To: The Metabolism Committee: Health Effects Division
Dated: 4/1/94
MRID(s): None

MASTER RECORD IDENTIFICATION NUMBERS

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MEMORANDUM

Subject: Captan (List A, Case No. 0120, Chemical No. 081301). Anticipated Residues for Dietary Exposure. MRID Nos. None. DP Barcode D207075 and D207149. CBRS Nos. 14284 and 14301.

From: Stephen Funk, Ph.D., Chemist
Special Review Section I
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Health Effects Division (7509C)

Through: Andrew Rathman, Section Head
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Special Review and Reregistration Division (7508W)

and

Karen Whitby\Nguyan Thoa
Chemical Coordination Branch
Health Effects Division (7509C)

As part of the Reregistration Eligibility Decision process, the anticipated residues of captan (N-trichloromethylthio-4-cyclohexene-1,2-dicarboximide) in/on plant raw agricultural commodities and of captain plus THPI (1,2,3,6-tetrahydrophthalimide) in animal commodities must be determined in order to perform dietary risk assessment. Table 1 lists the anticipated residues of captan in all DRES food items resulting from raw agricultural commodities with label uses for captan. Commodities with canceled registrations have not been included.

The table also lists the anticipated residues of captan plus the metabolite THPI (chronic noncancer and acute only) in meat, milk, fat, and meat byproducts resulting from the use of captan on ruminant feed items. The derivation of the residue values is discussed in detail by commodity. US FDA monitoring data (1990 - 1993) and USDA PDP survey data (1992 - 1993 partial), field trial data, and/or reassessed tolerances are used in arriving at the values. Quantitative usage (per cent crop treated) information is taken from a 03/31/94 Memorandum of Kathleen Vinlove, BEAD.

Acute anticipated residues are based on the reassessed tolerance (Reregistration Eligibility Decision, Chemistry Chapter) or the maximum residue found in field trials. Where survey data indicate that the tolerance may be routinely exceeded, the maximum survey result is used, i.e., strawberries.

Chronic anticipated residue values are generally based on survey data. The average value of all domestic and foreign FDA surveillance monitoring and all PDP (where available) monitoring samples is used for the chronic cancer anticipated residue value. The 95th percentile confidence interval for an individual value, assuming a log normal distribution and using the same data as for the chronic cancer values, is used for the chronic noncancer anticipated residue value. The average of appropriate field trial data is used for deriving the chronic anticipated residue value where monitoring data are unavailable, e.g., almonds and seed treatments.

Captan only is considered in arriving at the anticipated residues in food and processed foods. Captan only is considered in arriving at the anticipated residues for chronic cancer effects in meat and milk. Captan plus the metabolite THPI is considered in determining animal diets and in arriving at the anticipated residues for chronic noncancer exposure and acute exposure in meat and milk.

Appendix I, prepared by Dynamac Corporation under supervision of CBRS, summarizes all relevant field trial data for captan. Appendix II summarizes the survey data and the statistical calculations.

The HED R_fD Committee established a R_fD of 0.13 mg/kg/day based on the NOEL from reproductive toxicity studies. Captan is regarded as a Group B2 probable human carcinogen, with a Q_1^* of 3.6×10^{-3} $(mg/kg/day)^{-1}$. The endpoint for acute dietary risk assessment is the NOEL (10 mg/kg/day) from the rabbit developmental toxicity study.

Table 1: Anticipated Residues of Captan in Plant Commodities and of Captan Plus TPHI in Animal Commodities for Dietary Risk Assessment

Food Item	Food Code	Residue Data Source		% Crop Treated[1]	Noncancer Chronic Anticipated Residue (ppm)	Cancer Chronic Anticipated Residue (ppm)	Acute Anticipated Residue (ppm)
		Chronic	Acute				
Alfalfa Sprouts	15021AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Almonds	03001AA	Field Trial	Field Trial	10	0.07	0.07	0.10
Apples	04001AA	Survey	Field Trial	55	0.41	0.060	25
Apples-dried	04001DA	Survey[2]	Field Trial[2]	55	3.3	0.50	200
Apples-juice	04001JA	Survey/ Processing	Field Trial/ Processing	55	0.13	0.019	8
Apricots	05001AA	Survey	Field Trial	5	0.54	0.23	7
Apricots-dried	05001DA	Survey[3]	Field Trial[3]	5	3.3	1.4	42
Barley	24001AA	Field Trial	Tolerance	5	0.01	0.01	0.05
Beans-dry-Great Northern	15001AA	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans-dry-Kidney	15001AB	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans-dry-Lima	15001AC	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans-dry-Navy	15001AD	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans-dry other	15001AE	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans-dry-Pinto	15001AF	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans, Mung, sprouts	15013AA	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans-dry-Broadbeans (mature seed)	15022AA	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans-dry-Pigeon Beans	15023AA	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans, unspecified	15027AA	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans, dry-Hyacinth (mature seed)	15030AA	Field Trial	Tolerance	90	0.01	0.01	0.05
Peas, Black-eyed	15031AA	Field Trial	Tolerance	90	0.01	0.01	0.05

Table 1: Anticipated Residues of Captan in Plant Commodities and of Captan Plus TPHI in Animal Commodities for Dietary Risk Assessment

Food Item	Food Code	Residue Data Source		% Crop Treated[1]	Noncancer Chronic Anticipated Residue (ppm)	Cancer Chronic Anticipated Residue (ppm)	Acute Anticipated Residue (ppm)
		Chronic	Acute				
Beans-dry-Garbanzo (Chick Pea)	15032AA	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans, Lima, succulent	15002AA	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans-dry-Lima	15001AC	Field Trial	Tolerance	90	0.01	0.01	0.05
Beans, Snap (succulent-green)	15003AA	Field Trial	Tolerance	90	0.01	0.01	0.05
Beets, garden, tops (greens)	13001AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Beets, roots	14001AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Blackberries	01002AA	Survey	Field Trial	17	0.44	0.24	28
Blueberries	01009AA	Survey	Field Trial	50	0.17	0.11	36
Broccoli	13005AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Brussels Sprouts	13006AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Cabbage-Green and Red	13007AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Cabbage, Chinese/Celery including Bok Choy	13010AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Cantaloupes-pulp	10002AB	Field Trial	Tolerance	5	0.01	0.01	0.05
Carrots	14003AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Cattle, fat	53001FA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.01	0.001	0.25
Cattle, MBPY	53001BA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.02	0.001	0.40

Table 1: Anticipated Residues of Captan in Plant Commodities and of Captan Plus TPHI in Animal Commodities for Dietary Risk Assessment

Food Item	Food Code	Residue Data Source		% Crop Treated[1]	Noncancer Chronic Anticipated Residue (ppm)	Cancer Chronic Anticipated Residue (ppm)	Acute Anticipated Residue (ppm)
		Chronic	Acute				
Cattle, meat	53001MA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.02	0.001	0.30
Cauliflower	13008AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Cherries	05002AA	Survey	Field Trial	45	0.070	0.056	36
Cherries-dried	05002DA	Survey[4]	Field Trial[4]	45	0.28	0.22	144
Cherries-juice	05002JA	Survey[5]	Field Trial[5]	45	0.11	0.084	54
Collards	13009AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Corn, pop	15004AA	Field Trial	Tolerance	6	0.01	0.01	0.05
Corn, sweet	15005AA	Field Trial	Tolerance	6	0.01	0.01	0.05
Corn, Grain-oil	270020A	Field Trial	Tolerance	100	0.01	0.01	0.05
Corn, Grain-Endosperm	24002EA	Field Trial	Tolerance	100	0.01	0.01	0.05
Corn, Grain-Bran	24002HA	Field Trial	Tolerance	100	0.01	0.01	0.05
Corn Sugar	24002SA	Field Trial	Tolerance	100	0.01	0.01	0.05
Cotton, Seed, oil	270030A	Field Trial	Tolerance	60	0.01	0.01	0.05
Cotton, Seed, meal	27003WA	Field Trial	Tolerance	60	0.01	0.01	0.05
Cucumbers	10010AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Dewberries	01004AA	Survey	Field Trial	100 (U)	3	0.55	28
Eggplant	11001AA	Field Trial	Tolerance	6	0.01	0.01	0.05
Flax Seed	27004AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Goats, fat	53002FA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.01	0.001	0.25
Goats, MBYP	53002BA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.02	0.001	0.40

Table 1: Anticipated Residues of Captan in Plant Commodities and of Captan Plus TPHI in Animal Commodities for Dietary Risk Assessment

Food Item	Food Code	Residue Data Source		% Crop Treated[1]	Noncancer Chronic Anticipated Residue (ppm)	Cancer Chronic Anticipated Residue (ppm)	Acute Anticipated Residue (ppm)
		Chronic	Acute				
Goats, meat (boneless, lean)	53002HA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.02	0.001	0.30
Grapes-fresh	01014AA	Survey	Field Trial	35	1.5	0.24	23
Grapes-raisins	01014DA	Survey/ Processing	Field Trial/ Processing	35	3.0	0.48	46
Grapes-juice	01014JA	Survey/ Processing	Field Trial/ Processing	35	1.5	0.24	23
Hogs, MBYP	53006BA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.02	0.001	0.40
Hogs, fat	53006FA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.01	0.001	0.25
Hogs, meat	53006MA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.02	0.001	0.30
Honeydew Melons	10005AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Horses, fat	53003AA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.01	0.001	0.25
Horses, MBYP	53003AA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.02	0.001	0.40
Horses, meat	53003AA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.02	0.001	0.30

Table 1: Anticipated Residues of Captan in Plant Commodities and of Captan Plus TPHI in Animal Commodities for Dietary Risk Assessment

Food Item	Food Code	Residue Data Source		% Crop Treated[1]	Noncancer Chronic Anticipated Residue (ppm)	Cancer Chronic Anticipated Residue (ppm)	Acute Anticipated Residue (ppm)
		Chronic	Acute				
Kale	13011AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Lettuce	13020AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Milk	50000--	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.01	0.001	0.15
Muskmelons	16003AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Mustard Greens	13021AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Nectarines	05003AA	Survey	Field Trial	100 (U)	0.016	0.016	10
Oats	24003AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Okra	15015AA	Field Trial	Tolerance	[illegible] (U)	0.01	0.01	0.05
Onions, green	16004AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Onions (Dry Bulb)	14011AA	Field Trial	Tolerance	[illegible] (U)	0.01	0.01	0.05
Onions (Dehydrated or Dried)	14011DA	Field Trial	Tolerance	[illegible] (U)	0.01	0.01	0.05
Peaches	05004AA	Survey	Field Trial	65	0.53	0.15	14
Peaches-dried	05004DA	Survey[6]	Field Trial[6]	65	3.8	1.1	98
Peanuts	15006AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Peanuts, Oil	270070A	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Pears	04003AA	Survey	Field Trial	15	0.11	0.062	15
Pears-dried	04003DA	Survey[7]	Field Trial[7]	15	0.49	0.28	66
Peas, dried type (mature seeds)	15007AA	Field Trial	Tolerance	[illegible] (U)	0.01	0.01	0.05
Peas, succulent (green, immature)	15009AA	Field Trial	Tolerance	[illegible] (U)	0.01	0.01	0.05
Peppers, bell (sweet, garden)	11003AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05

Table 1: Anticipated Residues of Captan in Plant Commodities and of Captan Plus TPHI in Animal Commodities for Dietary Risk Assessment

Food Item	Food Code	Residue Data Source		% Crop Treated[1]	Noncancer Chronic Anticipated Residue (ppm)	Cancer Chronic Anticipated Residue (ppm)	Acute Anticipated Residue (ppm)
		Chronic	Acute				
Pimentos	11004AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Plums (including fresh prunes)	05005AA	Survey	Field Trial	15	0.063	0.044	8
Prunes-dried	05005DA	Survey/ Processing	Field Trial/ Processing	15	0.020	0.010	2
Plums, Prune-juice	05005JA	Survey[a]	Field Trial[a]	15	0.10	0.062	12
Potatoes-whole	14013AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Potatoes-dry	14013DA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Pumpkins	10011AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Radishes	14014AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Rape, seed	27017AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Raspberries	01006AA	Survey	Field Trial	50	3.0	0.55	28
Rutabages	14015AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Rye	24005AA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Rye-germ	24005GA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Rye, flour	24005WA	Field Trial	Tolerance	[illegible]	0.01	0.01	0.05
Safflower	27008AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Safflower-oil	27008OA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Sesame	15026AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Sesame-oil	27009OA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Sheep, MBYP	53005BA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.02	0.001	0.3
Sheep, fat	53005FA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.01	0.001	0.25

Table 1: Anticipated Residues of Captan in Plant Commodities and of Captan Plus TPHI in Animal Commodities for Dietary Risk Assessment

Food Item	Food Code	Residue Data Source		% Crop Treated[1]	Noncancer Chronic Anticipated Residue (ppm)	Cancer Chronic Anticipated Residue (ppm)	Acute Anticipated Residue (ppm)
		Chronic	Acute				
Sheep, meat	53005MA	Field Trial/ Survey Animal Diet/Feeding Study	Tolerance	N/A	0.02	0.001	0.30
Sorghum, grain (Milo)	24006AA	Field Trial	Tolerance	100	0.01	0.01	0.05
Soybeans	28023AA	Field Trial	Tolerance	5	0.01	0.01	0.05
Soybeans-oil	270100A	Field Trial	Tolerance	5	0.01	0.01	0.05
Soybean flour	28023WA	Field Trial	Tolerance	5	0.01	0.01	0.05
Soybeans-mature, seeds dry	28023AB	Field Trial	Tolerance	5	0.01	0.01	0.05
Soybeans, sprouted seeds	15029AA	Field Trial	Tolerance	5	0.01	0.01	0.05
Spinach	13024AA	Field Trial	Tolerance	5	0.01	0.01	0.05
Squash, summer	10013AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Squash, winter	10014AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Strawberries	01016AA	Survey	Survey	95	1.5	0.70	75
Sugar Beet, sugar	25002SA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Sunflower Seeds	15018AA	Field Trial	Tolerance	5	0.01	0.01	0.05
Sunflower-Oil	270110A	Field Trial	Tolerance	5	0.01	0.01	0.05
Swiss Chard	13025AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Turnips, roots	14019AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Turnips, greens	13026AA	Field Trial	Tolerance	100 (U)	0.01	0.01	0.05
Watermelons	10008AA	Field Trial	Tolerance	5	0.01	0.01	0.05
Wheat	24007AA	Field Trial	Tolerance	5	0.01	0.01	0.05
Wheat, germ	24007GA	Field Trial	Tolerance	5	0.01	0.01	0.05
Wheat, bran	24007HA	Field Trial	Tolerance	5	0.01	0.01	0.05
Wheat, flour	24007WA	Field Trial	Tolerance	5	0.01	0.01	0.05

Table 1: Anticipated Residues of Captan in Plant Commodities and of Captan Plus THPI in Animal Commodities for Dietary Risk Assessment

Food Item	Food Code	Residue Data Source		% Crop Treated[1]	Noncancer Chronic Anticipated Residue (ppm)	Cancer Chronic Anticipated Residue (ppm)	Acute Anticipated Residue (ppm)
		Chronic	Acute				

[1] Per cent crop treated should be used in the DRES analysis of chronic anticipated residues only where the entry is reduced. U = unknown.
[2] Apple rac values multiplied by the DRES concentration factor (8).
[3] Apricot rac values multiplied by the DRES concentration factor (6).
[4] Cherry rac values multiplied by the DRES concentration factor (4).
[5] Cherry rac values multiplied by the DRES concentration factor (1.5).
[6] Peach rac values multiplied by the DRES concentration factor (7).
[7] Pear rac values multiplied by the DRES concentration factor (4.4).
[8] Plum rac values multiplied by the DRES concentration factor (1.40).

Almonds

There are no US FDA survey data (1990 - 1993), and only limited field trial data. Three CA trials (MRID 40189802) were conducted at the maximum application rate and minimum PHI (5 X 4.5 lbs. a.i./acre/application, 30 day PHI). See Tables I-1, I-2, I-3, I-4, and I-5. Captan residues on nutmeat were 0.10, <0.05, and <0.05 ppm, average 0.067 ppm. Using residue decline data from two Redley, CA studies at 2.22X with data at five intervals from day 0 to day 14, residues at 30 days are estimated to be 0.02 - 0.04 ppm.

For the same trials, captan residues on hulls (animal feed item) were 31, 13, and 47 ppm, average 30.4 ppm. The THPI residues were 0.13, 0.32, and 1.69 ppm, average 0.72 ppm. Additional data on hulls harvested 102 - 130 days after the last of 5 foliar applications at 4.5 lbs. a.i./A showed captan residues ranging from 16 to 50 ppm, average 34 ppm (n = 3), and THPI residues ranging from 0.23 - 0.54 ppm, average 0.35 ppm.

The anticipated residue for chronic dietary exposure considerations is 0.07 ppm captan. The anticipated residue for acute dietary exposure is 0.10 ppm captan. The reassessed tolerance for residues of captan in/on almonds is 0.25 ppm.

For purposes of estimating the dietary burden of ruminants, the combined residue of captan and THPI in/on almond hulls is 35 ppm.

Apples

Field trial data are available that reflect the label maximum use rate conditions for foliar application (3 lbs. a.i/A/application,

32 lbs. a.i./A/season, 14 day PHI, Eastern US; 3 lbs. a.i./A/application, 32 lbs. a.i./A/season (15 in CA), 14 day PHI (21 in CA), Western US; 4 lbs. a.i./A/application, 32 lbs. a.i./A/season, 0 day PHI, AR, LA, MO, and TX). Limited data (n = 6) exist for use of captan as a postharvest dip. See Tables I-6, I-7, I-8, I-9, and I-10. The average residue from relevant trials is 4.12 ± 3.19 ppm (n = 23, including the 6 dip treatments). The average residue from dip treatments (n = 4) is 4.18 ± 2.10 ppm, and the average residue from combined foliar and dip treatment (n = 2) is 6.58 ppm. The maximum residue encountered from foliar treatment is 15.8 ppm captan (9 X 3.0 lbs. a.i./A, 0 day PHI; Sodus, NY), and the maximum captan residue encountered from dip treatment is 9.0 (WV).

Both FDA and USDA PDP survey data exist for apples and are summarized as follows:

Year	Total No. of Samples[1]	No. Positive	% Positive	Range of Positives (ppm)	Mean of Positives (ppm)	Mean of All Samples[2] (ppm).	95th % Normal Distribution[3] (ppm)	95th % Log Normal Distribution[3] (ppm)
FDA 1990	524	39	7.44	0.005 - 1.76	0.262	0.023	0.214	0.070
1991	379	78	20.6	0.005 - 2.27	0.256	0.055	0.413	0.191
1992	525	92	17.5	0.005 - 6.44	0.294	0.054	0.569	0.161
1993	359	89	24.8	0.005 - 8.59	0.335	0.086	0.920	0.232
Total	1787	298	16.7	0.005 - 8.59	0.292	0.051	0.558	0.144
PDP 1992	1053	86	8.17	0.01 - 19	0.333	0.073	1.04	0.095
Grand Total	2840	384	13.5	0.005 - 19	0.301	[illegible]	0.770	[illegible]

[1] Includes domestic and import.
[2] The domestic nondetects (ND) were corrected for per cent crop treated. The total number of US FDA monitoring domestic nondetects multiplied by the per cent crop treated (55%) were assigned a value of 0.005 ppm, 50% of the nominal limit of detection for FDA samples. The remainder of US FDA nondetects and all USDA PDP nondetects were assigned a value of 0.0001 ppm (nominal 0) or 0.05 ppm, respectively. The limit of quantitation for PDP samples was variable; 0.05 ppm is 50% of the highest limit of quantitation.
[3] The 95th percentile of an individual value, not the 95th percentile of the mean.

The anticipated residue for noncancer chronic dietary exposure considerations is 0.41 ppm captan, and for cancer chronic dietary exposure, the value is 0.060 ppm. The anticipated residue for acute dietary exposure is 25 ppm captan, the sum of the maximum foliar and maximum dip residues. The reassessed tolerance for residues of captan in/on apples is 25 ppm.

Processing studies are summarized in Tables I-11, I-12, I-13, I-14, and I-15. Considering all studies in which quantifiable captan residues were found on the rac (apples), the following

concentration/reduction factors are reported:

Commodity	Number of Studies	Concentration/Reduction Factor		
		Average	Standard Deviation	Range
Apple Juice	18	0.31	0.27	<0.01 - 1.0
Wet Pomace	18	1.02/4.38[1] /1.22[2]	1.13/4.09[1] /0.88[2]	0.1 - 3.9/ 1.0 - 13[1] 0.5 - 3.2[2]
Dry Pomace	18	1.26	1.31	0.06 - 3.5
Apple Sauce[3]	20	0.315	0.34	0.02 - 1.0

[1] Second entry is for THPI, a metabolite, n = 16. Factor based on THPI concentration in the processed commodity versus the THPI concentration in the rac (apple).
[2] Total concentration/reduction of captan plus THPI in the processed commodity versus the rac (apple).
[3] Including baby food apple sauce.

A factor of 0.31X will be applied to apple data to arrive at anticipated residues in apple juice, 0.13 ppm and 0.019 ppm for noncancer and cancer chronic exposures, respectively, and 8 ppm for acute exposure. For wet apple pomace, an animal feed, captan does not concentrate. However, THPI concentrates by a factor of 4X. The average concentration factor for the combined residue of captan plus THPI is 1.22, and this factor will be used in calculating the average dietary burden for animals.

Apricots

Limited field trial data that reflect the label maximum use rate conditions (multiple applications of 2.5 lbs. a.i./acre, 12.5 lbs. a.i./acre/season, 7 day PHI) are available. See Tables I-16 and I-17. The average residue from pertinent field trials (n = 3) was 4.8 $\pm$ 0.90 ppm captan. The maximum residue encountered was 6.6 ppm captan.

FDA survey data exist for apricots and are summarized as follows:

011423

Year	Total No. of Samples[1]	No. Positives	% Positives	Range of Positives (ppm)	Mean of Positives (ppm)	Mean of All Samples[2] (ppm)	95th % Normal Distribution[3] (ppm)	95th % Log Normal Distribution[3] (ppm)
1990	76	7	9.21	0.3 - 3.52	0.904	0.086	0.788	0.106
1991	74	7	9.46	0.005 - 3.61	0.694	0.068	0.767	0.071
1992	64	16	25.0	0.2 - 5.40	1.68	0.423	2.23	1.78
1993	32	18	56.2	0.005 - 2.22	1.00	0.564	1.79	19.0
Total	246	48	19.5	0.005 - 5.40	1.17	[illegible]	1.43	[illegible]

[1] Includes domestic and import.
[2] The domestic nondetects (ND) were corrected for per cent crop treated. The total number of domestic nondetects multiplied by the per cent crop treated (5%) were assigned a value of 0.005 ppm, or 50% of the nominal limit of detection. The remainder of domestic nondetects were assigned a value of 0.0001 ppm (nominal 0). All import nondects were assigned a value of 0.005 ppm.
[3] The 95th percentile of an individual value, not the 95th percentile of the mean.

The anticipated residue for noncancer chronic dietary exposure considerations is 0.54 ppm captan; for cancer chronic dietary exposure, 0.23 ppm. The anticipated residue for acute dietary exposure is 7 ppm captan. The reassessed tolerance for residues of captan in/on apricots is 10 ppm.

Blackberries

Field trial data are not available for blackberries, and raspberry field trial data (Table I-41) will be translated to cover blackberries. The average field trial residue was 15.4 ± 8.99 ppm, and the maximum residue was 27.8 ppm. See raspberry for use information.

FDA survey data exist for blackberries and are summarized as follows:

Year	Total No. of Samples[1]	No. Positives	% Positives	Range of Positives (ppm)	Mean of Positives (ppm)	Mean of All Samples[2] (ppm)	95th % Normal Distribution[3] (ppm)	95th % Log Normal Distribution[3] (ppm)
1990	70	15	21.4	0.020 - 9.18	1.524	0.329	2.36	0.736
1991	43	2	4.6	0.05, 0.52	0.285	0.017	0.147	0.053
1992	68	19	30.6	0.040 - 4.00	0.959	0.271	1.46	0.795
1993	63	11	17.5	0.030 - 10.4	1.461	0.259	2.46	0.297
Total	244	47	19.3	0.020 - 10.4	1.228	[illegible]	1.923	[illegible]

[1] Includes domestic and import.
[2] The domestic nondetects (ND) were corrected for per cent crop treated. The total number of US FDA domestic monitoring nondetects multiplied by the per cent crop treated (17%) were assigned a value of 0.005 ppm, or 50% of the nominal limit of detection. The remainder were assigned a value of 0.0001 ppm (nominal 0).
[3] The 95th percentile of an individual value, not the 95th percentile of the mean.

The 95th percentile log normal distribution value for the sum of years 1990 - 1993 will be used as a basis for the chronic exposure anticipated residue. The anticipated residue for noncancer chronic dietary exposure considerations is 0.44 ppm captan and for cancer chronic dietary exposure, 0.24 ppm. The anticipated residue on blackberries for acute dietary exposure is 28 ppm captan, based on the maximum residue encountered in raspberry field trials. Inadequate data are available to reassess the tolerance; the current tolerance is 25 ppm.

Blueberries

Field trial data that reflect the label maximum use rate conditions (multiple applications of 2.5 lbs. a.i./acre, 35 lbs. a.i./acre/season (12.5 lbs. a.i./acre/season, CA), 0 day PHI (4 days CA)) are available. See Table I-18. The average residue from pertinent field trials (n = 7) was 8.1 ± 5.2 ppm captan. The maximum residue encountered from 2.5 lbs. a.i./A applications was 18.3 ppm captan (14 X 2.5 lbs. a.i.WP/A, 0 day PHI; WA). This trial was the only one conducted at 2.5 lbs. a.i./A in which a total of 35 lbs. a.i./A was applied. Linear extrapolation of all multiple application field trials (n = 7) conducted at 2.5 lbs. a.i./A/application to a seasonal rate of 35 lbs. a.i./acre yielded an average 17 ppm captan residue.

Linear Extrapolation of 2.5 lbs. a.i./A/application Data to 35 lbs. a.i./A/season, PHI 0 Day

Total Application (lbs. a.i./A/season)	Formulation	Captan (ppm)	Extrapolated Captan (ppm)
7.5	50WP	1.72	8.0
15	50WP	7.8[1]	18
25	50WP	8.4	12
10	50WP	4.0	14
20	50WP	8.2	14
35	50WP	18.3	18
8[2]	FIC	8.25	[illegible]
AVERAGE		9.09	17 ± 9.0

[1] 1 day PHI, average of two determinations (4.8 and 10.8 ppm).
[2] 2 lbs. a.i./A/application.

FDA survey data exist for blueberries and are summarized as follows:

Year	Total No. of Samples[1]	No. Positives	% Positives	Range of Positives (ppm)	Mean of Positives (ppm)	Mean of All Samples[2] (ppm)	95th % Normal Distribution[3] (ppm)	95th % Log Normal Distribution[3] (ppm)
1990	99	13	13.1	0.005 - 0.53	0.192	0.029	0.177	0.101
1991	109	20	18.3	0.005 - 4.62	0.393	0.076	0.823	0.114
1992	106	19	17.9	0.09 - 12.7	1.27	0.231	2.351	0.347
1993	73	14	19.2	0.005 - 1.7	0.351	0.071	0.462	0.185
Total	387	66	17.1	.005 - 12.7	0.597	0.108	1.30	0.168

[1] Includes domestic and import.
[2] The domestic nondetects (ND) were corrected for per cent crop treated. The total number of domestic nondetects multiplied by the per cent crop treated (50%) were assigned a value of 0.005 ppm, or 50% of the nominal limit of detection. The remainder of domestic nondetects were assigned a value of 0.0001 ppm (nominal 0). All import nondetects were assigned a value of 0.005 ppm.
[3] The 95th percentile of an individual value, not the 95th percentile of the mean.

The anticipated residue for noncancer chronic dietary exposure considerations is 0.17 ppm captan. The anticipated residue for cancer chronic dietary exposure considerations is 0.11 ppm captan. The anticipated residue for acute dietary exposure is 36 ppm captan. The reassessed tolerance for residues of captan in/on blueberries is 25 ppm.

Cherries

There are two types of registered uses for captan on cherries. The WP, DF, and FlC formulations may be used for foliar treatment at a maximum rate of 2 lbs. a.i./A, 14 lbs. a.i./A/season, 0 day PHI (7 days CA). The retreatment interval is 7 days or not stated. The same formulations may also be used as a postharvest dip at 1.25 lbs. a.i./100 gal. water. Field trial data that reflect the label maximum foliar use rate conditions are available. See Tables I-19 and I-20. The average captan residue from pertinent field trials (n = 9) was 14.0 ± 5.1 ppm, and the maximum residue was 21.3 ppm (MI; 6 X 2 lbs. a.i./A, 50 WP, 0 day PHI). The nine trials included 4 trials (WA, MI, NY) with the maximum seasonal rate. The maximum residue from these trials was 20.8 ppm and the average was 13.5 ± 3.6 ppm.

Data are available for 3 dip treatment trials and for 3 foliar plus dip treatment trials, using the 50 WP formulation (Table I-20). The average captan residue for dip treatment was 10.1 ± 4.1 ppm, and the maximum captan residue was 14.6 ppm. The foliar (7

X 2 lbs. a.i./A) plus dip treatment results were variable within a given trial. The average captan residue was 17.8 ± 6.0 ppm, and the maximum residue, using average values from each of the three trials, was 24.2 ppm. The maximum single sample residue, however, was 35.4 ppm (Wenatchee, WA).

FDA survey data exist for cherries and are summarized as follows:

Year	Total No. of Samples[1]	No. Positives	% Positives	Range of Positives (ppm)	Mean of Positives (ppm)	Mean of All Samples[2] (ppm)	95th % Normal Distribution[3] (ppm)	95th % Log Normal Distribution[3] (ppm)
1990	139	8	5.8	0.005 - 1.68	0.438	0.028	0.317	0.057
1991	234	19	8.1	0.01 - 5.44	0.511	0.044	0.655	0.060
1992	136	9	6.6	0.013 - 4.62	1.141	0.078	0.996	0.059
1993	106	12	11.3	0.094 - 4.7	0.777	0.091	0.888	0.157
Total	615	48	7.4	0.005 - 5.44	0.683	0.056	0.731	0.070

[1] Includes domestic and import.
[2] The domestic nondetects (ND) were corrected for per cent crop treated. The total number of domestic nondetects multiplied by the per cent crop treated (45%) were assigned a value of 0.005 ppm, or 50% of the nominal limit of detection. The remainder of domestic nondetects were assigned a value of 0.0001 ppm (nominal 0). All import nondetects were assigned a value of 0.005 ppm.
[3] The 95th percentile of an individual value, not the 95th percentile of the mean.

The anticipated residue for noncancer chronic dietary exposure considerations is 0.070 ppm captan. The anticipated residue for cancer chronic dietary exposure considerations is 0.056 ppm captan. The anticipated residue for acute dietary exposure is 36 ppm captan. The reassessed tolerance for residues of captan in/on cherries is 50 ppm.

Grapes

Limited field trial data are available that reflect the label maximum use rate conditions (2 lbs. a.i./acre/application, 12 lbs. a.i./acre/year, and 14 day PHI (45 days CA)). See Tables I-21, I-22, I-23, and I-24. The average residue from the pertinent field trials (n = 11, including 8 trials with 0 day PHI) is 5.27 ± 4.88 ppm. The maximum residue encountered at the 2 lbs. a.i./acre application rate was 22.4 ppm captan (6 applications, 0 day PHI, CA).

Both FDA and USDA PDP survey data exist for grapes and are summarized as follows:

Year	Total No. of Samples[1]	No. Positives	% Positives	Range of Positives (ppm)	Mean of Positives (ppm)	Mean of All Samples[2] (ppm)	95th % Normal Distribution[3] (ppm)	95th % Log Normal Distribution[3] (ppm)
1990	411	64	15.6	0.02 - 8.0	0.883	0.140	1.15	0.286
1991	373	95	25.5	0.005 - 19.	1.81	0.464	3.07	1.40
1992	323	79	24.4	0.005 - 8.6	0.914	0.226	1.46	0.752
1993	156	70	44.9	0.005 - 5.5	1.07	0.481	2.11	4.83
Total	1263	308	24.4	0.005 - 19	1.22	0.300	2.06	0.926
1992 PDP	988	328	33.2	0.005 - 3.4	0.382	0.160	2.70	0.258
Grand Total	2251	636	28.2	0.005 - 19	0.788	[illegible]	2.38	[illegible]

[1] Includes domestic and import.
[2] The US FDA domestic nondetects (ND) were corrected for per cent crop treated. The total number of US FDA domestic nondetects multiplied by the per cent crop treated (35%) were assigned a value of 0.005 ppm, 50% of the nominal limit of detection for FDA samples. The remainder of the US FDA nondetects were assigned a value of 0.0001 ppm (nominal 0). The USDA (PDP) nondetects were assigned a value of 0.05 ppm. The limit of quantitation varied for PDP samples and was dependent upon the participating laboratory. Fifty per cent of the highest limit of quantitation (0.1 ppm) was utilized.
[3] The 95th percentile of an individual value, not the 95th percentile of the mean.

The anticipated residue for noncancer chronic dietary exposure considerations is 1.5 ppm captan. The anticipated residue for cancer chronic dietary exposure considerations is 0.24 ppm captan. The anticipated residue for acute dietary exposure is 23 ppm captan. The reassessed tolerance for residues of captan in/on grapes is 10 ppm.

Processing studies are summarized in Tables I-25, I-26, I-27, I-28, and I-29. Considering all studies in which quantifiable captan residues were found on the rac (grapes), the following concentration/reduction factors are reported:

Commodity	Number of Studies	Concentration/Reduction Factor		
		Average	Standard Deviation	Range
Grape Juice	17	0.81	0.74	<0.01 - 3.1
Raisin	15	1.77	1.08	0.5 - 4.8
Wet Pomace	19	0.75/ 2.90/ 0.79[1]	0.49/ 4.7/ 0.40[1]	<0.1 - 1.6/ 0.6 - 15.8/ 0.3 - 1.4[1]
Dry Pomace	16	0.73/ 12/ 1.1[1]	0.63/ 17/ 0.48[1]	<0.1 - 2.2/ 1.0 - 44/ 1.0 - 2.3[1]

Raisin Waste	11	12.2/ 9.2/ 11	15.4/ 9.8/ 9.1	1.4 - 52.3/ 1.0 - 23/ 1.4 - 27

[1] Second entry is the concentration factor for THPI. Third entry is the combined concentration factor for THPI and captan.

Within experimental error, concentration/reduction of captan in grape juice does not occur. A factor of 2X will be applied to grape data to arrive at anticipated residues in/on raisins, 3.0 ppm and 0.48 ppm for noncancer and cancer chronic exposures, respectively, and 46 ppm for acute exposure. The combined residue of captan and THPI does not concentrate in the animal feed items wet pomace and dry pomace, but the combined residue does concentrate in raisin waste. A factor of 11X will be applied to grape data to arrive at the residue concentration in raisin waste.

Cattle, Goat, Sheep, Horse, and Hog Meat, Meat-Byproducts, Fat, and Milk

A theoretical maximum exposure diet for beef and dairy cattle was previously calculated (C. Olinger, CBRS Nos. 9902, 10668, and 11105; DP Barcodes D178351 and D183051). Based on a diet of wet apple pomace, raisin waste, and almond hulls, the dietary burden of dairy cattle was estimated as 84 ppm captan and THPI; and the dietary burden of beef cattle was estimated as 41 ppm. Using results of a ruminant feeding study (0, 10, 30, 100 ppm levels), the following tolerances were recommended for ruminant commodities: meat, 0.30 ppm; meat by-products, 0.40 ppm; fat, 0.25 ppm; milk, 0.15 ppm. These values will be used for acute exposure anticipated residues.

For purposes of dietary risk assessment for chronic effects, the dietary burden has been recalculated to reflect an average exposure. The previous calculation used reassessed tolerances and concentration factors to arrive at the maximum possible concentration of captan plus THPI on animal feed items. While this calculation is necessary to determine appropriate animal commodity tolerances which are, in turn, appropriate for acute dietary risk assessment, it greatly exaggerates the average exposure.

Commodity	Captan + THPI (ppm)	% in Diet		% Dry Matter	Average Dietary Burden, ppm	
		Dairy	Beef		Dairy	Beef
Almond Hulls	3.5[1]	15	25	90	0.58	0.97
Apple Pomace, wet	0.65[2]	20	30[6]	40	0.32	0.49
Grape Pomace, wet	1.7[3]	-	20	15	-	2.3
Raisin Waste	18.7[4]	10	25	79	2.4	5.9
RAC's from seed treatment (grass, corn, cottonseed, small grain etc.)	0.1[5]	55	-	20[7]	0.28	-
TOTAL		100	100		3.6	9.7

[1] Average field trial almond hull residue X % crop treated, 35 ppm X 10%.
[2] 95th percentile grape survey concentration for captan (0.41) plus 10% for THPI (0.05) X average concentration factor for captan plus THPI, 0.5 ppm X 1.3.
[3] 95th percentile grape survey concentration for captan (1.5) plus 10% for THPI (0.15) X average concentration factor for captan plus THPI, 1.7 ppm X 1.
[4] 95th percentile grape survey concentration for captan (1.5) plus 10% for THPI (0.15) X average concentration factor for captan plus THPI, 1.7 ppm X 11.
[5] Limit of detection for THPI plus limit of detection for captan, 0.05 ppm + 0.05 ppm.
[6] Maximum is 40%.
[7] Maximizes residue. 20% is the percent dry matter for potato culls. Other rac's typically have higher percents dry matter.

Using the results of the 10 ppm cow feeding study (MRID 42296002) with no downward extrapolation, the following concentrations of THPI are anticipated in the animal commodities: fat, 0.01 ppm (ND); meat by-products, 0.02 ppm; meat, 0.02 ppm; milk, 0.01 ppm (ND). These values will be used for chronic noncancer dietary exposure.

The animal metabolism studies have shown that captan is not found in the radiolabeled residue of tissues or milk. Therefore, for purposes of chronic cancer dietary exposure, the limit of detection value for captan in meat and milk shall be used as the appropriate exposure concentration. This value is 0.001 ppm, based on radiolabeled residue analysis from the metabolism study.

The Captan Task Force (ICI Americas, Inc.; Makhteshim-Agan) has submitted a milk survey study (MRID 42458801; M. Clifford, DP Barcode D201720, CBRS No. 13503). A total of 224 samples of milk were collected from 01/91 to 12/91 at grocery and convenience stores throughout the US and were analyzed for captan, THPI,

trans-3-hydroxy THPI, and trans-5-hydroxy THPI. The level of quantitation for each analyte was shown to be 0.005 ppm. No quantifiable analyte (<0.005 ppm) was found in any of the samples. The THPI and captan were each 0.0025 ppm, or 50% of the LOQ. The ruminant metabolism studies predict no detectable residues of captan. The absence of THPI may be related to the method in which the study was conducted. The study did not target those regions and time periods where and when feed items with high captan residues, e.g., apple pomace and raisin waste, would be present. Therefore, the milk residue results will not be utilized for either chronic or acute dietary burden considerations. The survey results (0.005 ppm) do support the 0.01 ppm residue value for milk for chronic exposure considerations.

US FDA milk monitoring data (165 samples, plain milk, 1990 -1993) showed no captan or THPI residues.

Nectarines

Field trial data that reflect the label maximum use rate conditions (multiple applications of 4 lbs. a.i./acre, 24 lbs. a.i./A/season, 0 day PHI (7 days CA)) are not available. Data are available for exaggerated rates (1 or 9 applications at 6 lbs. a.i./acre, 0 day PHI). See Tables I-30, I-I-31, and I-32. The average residue from pertinent field trials (n = 2) was 6.7 ppm. The maximum residue encountered from all field trials (n = 11) was 10 ppm captan (9 X 6 lbs. a.i./A, 0 day PHI).

FDA survey data exist for nectarines and are summarized as follows:

Year	Total No. of Samples[1]	No. Positives	% Positives	Range of Positives (ppm)	Mean of Positives (ppm)	Mean of All Samples[2] (ppm)	95th % Normal Distribution[3] (ppm)	95th % Log Normal Distribution[3] (ppm)
1990	114	3	2.6	0.005 - 0.30	0.10	0.008	0.053	0.010
1991	95	4	4.2	0.005 - 0.58	0.30	0.017	0.138	0.020
1992	87	2	2.3	0.18, 0.92	0.55	0.018	0.181	0.017
1993	21	1	4.8	0.91	0.91	0.048	0.389	0.045
Total	317	10	3.2	0.005 - 0.92	0.35	0.016	0.155	0.016

[1] Includes domestic and import.
[2] The domestic nondetects (ND) were corrected for per cent crop treated. The total number of domestic nondetects multiplied by the per cent crop treated (100%) were assigned a value of 0.005 ppm, or 50% of the nominal limit of detection. The remainder of domestic nondetects were assigned a value of 0.0001 ppm (nominal 0). All import nondetects were assigned a value of 0.005 ppm.
[3] The 95th percentile of an individual value, not the 95th percentile of the mean.

The anticipated residue for noncancer chronic dietary exposure considerations is 0.016 ppm captan. The anticipated residue for cancer chronic dietary exposure considerations is 0.016 ppm captan. The anticipated residue for acute dietary exposure is 10 ppm captan. The reassessed tolerance for residues of captan in/on nectarines is 25 ppm.

Peaches

Field trial data are available that reflect the label maximum use rate conditions (8 applications of 4 lbs. a.i./acre, 0 day PHI). See Tables I-33, I-34, and I-35. The average residue from field trials is 6.53 ± 2.92, n = 6. The maximum residue encountered from these trials was 11.6 ppm captan.

Both FDA and USDA PDP survey data exist for peaches and are summarized as follows:

Year	Total No. of Samples[1]	No. Positives	% Positives	Range of Positives (ppm)	Mean of Positives (ppm)	Mean of All Samples[2] (ppm)	95th % Normal Distribution[3] (ppm)	95th % Log Normal Distribution[3] (ppm)
FDA 1990	264	23	8.7	0.005 - 6.52	1.046	0.099	0.99	0.114
1991	245	50	20	0.005 - 5.14	0.994	0.206	1.26	0.472
1992	203	27	13	0.005 - 8.43	1.02	0.139	1.27	0.213
1993	181	46	25	0.005 - 11.6	1.56	0.400	3.16	0.811
Total	893	146	16	0.005 - 11.6	1.18	0.197	1.74	0.301
PDP 1992	644	78	12	0.005 - 1.40	0.229	0.072	0.295	0.128
Grand Total	1537	224	15	0.005 - 11.6	0.851	0.164	1.34	0.428

[1] Includes domestic and import.
[2] The domestic nondetects (ND) were corrected for per cent crop treated. The total number of US FDA monitoring domestic nondetects multiplied by the per cent crop treated (65%) were assigned a value of 0.005 ppm, 50% of the nominal limit of detection for FDA samples. The remainder of US FDA nondetects and all USDA (PDP) nondetects were assigned a value of 0.0001 ppm (nominal 0) or 0.05 ppm, respectively. The limit of quantitation varied for PDP samples was variable; 0.05 ppm is 50% of the highest limit of quantitation.
[3] The 95th percentile of an individual value, not the 95th percentile of the mean.

The anticipated residue for noncancer chronic dietary exposure considerations is 0.53 ppm captan. The anticipated residue for cancer chronic dietary exposure considerations is 0.15 ppm captan. The anticipated residue for acute dietary exposure is 14 ppm captan. The reassessed tolerance for residues of captan in/on peaches is 15 ppm.

Pears

There are two uses for captan on pears. It is used in CA as a foliar spray, 3 lbs. a.i./acre/application with a 14 day PHI. There is no specified maximum seasonal application rate. The second use is as a postharvest dip, 1.25 lbs. a.i./100 gallons of water. There are adequate field trial data for both the foliar use (with the maximum or greater than maximum label rate and minimum PHI) and the postharvest dip. See Tables I-36 and I-37. The average captan residue from foliar application is 0.966 ± 0.741 ppm, n = 7. The average captan residue from dip application is 7.54, n = 2. Foliar plus dip applications (n = 2) did not yield higher residues than dip only. The greatest captan residue determined resulted from a dip application, 11.4 ppm (Wenatchee, WA). The greatest residue from a foliar application was 2.64 ppm (NY, 3.5 lbs. a.i./A, 14 day PHI).

There are substantial FDA monitoring data for pears, summarized as follows:

Year	Total No. of Samples[1]	No. Positives	% Positives	Range of Positives (ppm)	Mean of Positives (ppm)	Mean of All Samples[2] (ppm)	95th % Normal Distribution[3] (ppm)	95th % Log Normal Distribution[3] (ppm)
1990	306	28	9.2	0.005 - 3.57	0.376	0.037	0.403	0.085
1991	288	27	9.4	0.005 - 3.4	1.038	0.101	0.8	0.136
1992	179	11	6.1	0.005 - 1.66	0.739	0.049	0.406	0.082
1993	112	17	15	0.005 - 1.6	0.286	0.047	0.35	0.114
Total	885	83	9.4	0.005 - 3.57	0.621	0.062	0.58	0.108

[1] Includes domestic and import.
[2] The domestic nondetects (ND) were corrected for per cent crop treated. The total number of US FDA domestic monitoring nondetects multiplied by the per cent crop treated (15%) were assigned a value of 0.005 ppm, or 50% of the nominal limit of detection. The remainder were assigned a value of 0.0001 ppm (nominal 0).
[3] The 95th percentile of an individual value, not the 95th percentile of the mean.

The anticipated residue for noncancer chronic dietary exposure considerations is 0.11 ppm captan. The anticipated residue for cancer chronic dietary exposure considerations is 0.062 ppm captan. The anticipated residue for acute dietary exposure is 15 ppm captan, the sum of the highest residues from foliar and dip treatments. The reassessed tolerance for residues of captan in/on pears is 25 ppm.

Plums

The specific use pattern varies somewhat by region, but the maximum use rate is 3 lbs. a.i./A/application and 26 lbs. a.i./acre/season (15 lbs. in CA), with a 0 day PHI (7 days in

CA). Field trial data reflecting the maximum application rate and minimum PHI are available. See Tables I-38 and I-39. Four trials were conducted at 9 X 3 lbs. a.i./acre with a 0 day PHI. The average captan residue (n = 4) was 3.22 ± 3.61 ppm, and the maximum captan residue was 7.9 ppm.

FDA survey data exist for plums and are summarized as follows:

Year	Total No. of Samples[1]	No. Positives	% Positives	Range of Positives (ppm)	Mean of Positives (ppm)	Mean of All Samples[2] (ppm)	95th % Normal Distribution[3] (ppm)	95th % Log Normal Distribution[3] (ppm)
1990	137	13	9.5	0.04 - 3.6	1.05	0.103	0.876	0.136
1991	167	9	5.4	0.005 - 1.6	0.527	0.032	0.333	0.059
1992	98	0	0	-	-	0.003	0.007	0.024
1993	45	0	0	-	-	0.005	0.006	0.016
Total	447	22	4.9	0.005 - 3.6	0.838	0.044	0.514	0.082

[1] Includes domestic and import.
[2] The domestic nondetects (ND) were corrected for per cent crop treated. The total number of domestic nondetects multiplied by the per cent crop treated (15%) were assigned a value of 0.005 ppm, or 50% of the nominal limit of detection. The remainder of domestic nondetects were assigned a value of 0.0001 ppm (nominal 0). All import nondetects were assigned a value of 0.005 ppm.
[3] The 95th percentile of an individual value, not the 95th percentile of the mean.

The anticipated residue for noncancer chronic dietary exposure considerations is 0.063 ppm captan. The anticipated residue for cancer chronic dietary exposure considerations is 0.044 ppm captan. The anticipated residue for acute dietary exposure is 8 ppm captan. The reassessed tolerance for residues of captan in/on plums is 10 ppm.

One test was conducted for the processing of plums into prunes. See Table I-40. That single result indicates that captan residue is reduced in prunes by a factor of 0.2. The metabolite THPI is concentrated in prunes by a factor of 104. The anticipated captan residue in prunes for noncancer chronic dietary exposure considerations is 0.02 ppm (0.2 X 0.07 ppm), and for cancer chronic dietary exposure, 0.010 ppm (0.2 X 0.044 ppm). The anticipated captan residue for acute dietary exposure considerations is 2 ppm (0.2 X 8 ppm).

Raspberry

Field trial data that reflect the label maximum use rate conditions (multiple applications with 10 lbs. a.i./acre/season maximum rate, 3 day PHI, WA only) are available. See Table I-41. The average residue from 4 pertinent trials was 15.4 ± 8.99

ppm, and the residue range was 6.45 ppm (Aurora, OR; 10 X 3 lbs. a.i./acre, 50 WP, 3 day PHI) - 27.8 ppm (Vancouver, WA; 7 X 2.5 lbs. a.i./acre, 50 WP, 3 day PHI).

FDA survey data exist for raspberries and are summarized as follows:

Year	Total No. of Samples[1]	No. Positives	% Positives	Range of Positives (ppm)	Mean of Positives (ppm)	Mean of All Samples[2] (ppm)	95th % Normal Distribution[3] (ppm)	95th % Log Normal Distribution[3] (ppm)
1990	143	41	28.7	0.050 - 5.80	1.15	0.332	1.776	1.421
1991	169	57	33.7	0.005 - 12.8	2.12	0.717	3.542	3.349
1992	88	32	36.4	0.005 - 6.40	1.42	0.520	2.529	2.785
1993	117	50	42.7	0.005 - 5.72	1.32	0.567	2.388	4.472
Total	517	180	34.8	0.005 - 12.8	1.55	[illegible]	2.701	[illegible]

[1] Includes domestic and import.
[2] The domestic nondetects (ND) were corrected for per cent crop treated. The total number of domestic nondetects multiplied by the per cent crop treated (50%) were assigned a value of 0.005 ppm, or 50% of the nominal limit of detection. The remainder of domestic nondetects were assigned a value of 0.0001 ppm (nominal 0). All import nondetects were assigned a value of 0.005 ppm.
[3] The 95th percentile of an individual value, not the 95th percentile of the mean.

The 95th percentile log normal distribution value for the sum of years 1990 - 1993 will be used as a basis for the chronic exposure anticipated residue. The anticipated residue for noncancer chronic dietary exposure considerations is 3.0 ppm captan. The anticipated residue for cancer chronic dietary exposure considerations is 0.54 ppm captan. The anticipated residue for acute dietary exposure is 28 ppm captan, based on the maximum residue encountered in field trials. Inadequate data are available to reassess the tolerance; the current tolerance is 25 ppm. These values will also be used for dewberries.

Seed Treatments

The following uses involve seed treatment only: alfalfa, barley, beans (dry and succulent), peas (dry and succulent), beets, broccoli, brussels sprouts, cabbage, cantaloupes, cauliflower, carrots, clover, collards, corn, cottonseed, cucumbers, eggplant, flax seed, grasses, honeydew melons, kale, lespedeza, lettuce, muskmelons, mustard greens, oats, okra, onions, peanuts, peppers, pimentos, potatoes, pumpkins, radishes, rape, rutabagas, rye, safflower, sesame, sorghum, soybeans, spinach, squash, sugar beets, sunflower seeds, swiss chard, trefoil, turnips, watermelons, and wheat. Treatment rates range from 0.02 lb. a.i./100 lbs. seed (cabbage, broccoli, etc.) to 0.6 lbs. a.i./100 lbs. seed (beets, swiss chard), with use on onions at 80 lbs.

a.i./100 lbs. seed (pelleting). See Table A of the RED Chemistry Chapter.

Seed treatment field trials (beets, corn, oats, potatoes, rice, soybeans, spinach, and wheat; Tables I-46 to I-63) have shown nonquantifiable residues (<0.05 ppm captan; <0.05 ppm THPI) in/on the rac's. Additionally, pods and beans grown from soybean seed treated with radiolabeled captan (1.7 - 1X) contained total radiolabeled residues of 0.005 ppm maximum (Registration Standard). The plant metabolism studies have shown that captan is not readily translocated. USDA survey data (1990 - 1993) for numerous seed treatment crops yield a 95th percentile confidence limit of 0.005 - 0.01 ppm (see table). A value of 0.01 ppm, or 20% of the limit of quantitation (0.05 ppm) for captan on treated seed, should be used for residues of captan in/on rac's grown from treated seeds for chronic exposure.

The tolerances for seed treatment uses, 0.05 ppm, should be used for acute dietary exposure considerations.

Summary of FDA Monitoring Data (1990 - 1993) for Selected Crops with Captan Seed Treatment Uses.

Commodity	FDA Designation	Number of Samples	Number of Positives	Average[1,2] (ppm)	95th Percentile Log Normal Distribution[1]
corn grain	02A/01	98	0	0.005	-
wheat	02A/09	350	0	0.005	-
soybean	02A/10	77	0	0.005	-
cantaloupe	22A/01	1063	4	0.006	0.007
honeydew	22A/03	456	0	0.005	-
watermelon	22A/04	632	2	0.005	0.006
string beans	24A/14	799	3	0.012	0.009
green (garden) peas	24A/51	1118	15	0.008	0.010
corn	24A/60	496	1	0.005	0.006
squash	24F/06	1650	4	0.006	0.007
peppers	24F/03;07;08	3530	18	0.006	0.008
cucumber	24F/20	890	8	0.007	0.009
tomato	24F/50	1639	7	0.006	0.007
asparagus[3]	24T/02	719	0	0.005	-
broccoli	24T/05	822	1	0.005	0.006

Summary of FDA Monitoring Data (1990 - 1993) for Selected Crops with Captan Seed Treatment Uses.

Commodity	FDA Designation	Number of Samples	Number of Positives	Average[1,2] (ppm)	95th Percentile Log Normal Distribution[1]
cabbage	24T/08	723	4	0.006	0.007
cauliflower	24T/10	433	0	0.005	-
celery[3]	24T/11	449	4	0.009	0.009
lettuce (leaf)	24T/19;32	1593	0	0.005	-
spinach	24T/25	480	0	0.005	-
lettuce (head)	24T/31	700	3	0.29	0.013
green onions	25J/04	433	1	0.005	0.007
potato	25J/06	1183	0	0.005	-
carrot	25J/01	561	1	0.005	0.006
onion (bulb)	25J/25	302	5	0.32	0.022[4]

[1] Assumed 100% crop treated.
[2] Nominal limit of quantitation is 0.01 ppm captan.
[3] No tolerance.
[4] One positive sample had an extreme captan concentration, 89 ppm.

Strawberry

Field trial data that reflect the label maximum use rate conditions (multiple applications of 3 lbs. a.i./acre (2.5 lbs. a.i./acre, CA), no seasonal rate limitation, 0 day PHI (2 days CA)) are available. See Tables I-42, I-43, I-44, and I-45. The average residue from 17 pertinent trials was 7.86 $\pm$ 5.85, and the residue range was 1.79 ppm (Dover, Fl; 6 X 3 lbs. a.i./acre, 50 WP, 0 day PHI) - 27 ppm (Ontario, Canada; 5 X 3 lbs. a.i./acre, 50 WP, 0 day PHI).

Monitoring data from the Florida Department of Agriculture and Consumer Services reveal a tolerance violation rate for residues of captan in/on strawberries for 1992 - 1993 of about 5%, with a maximum residue of 37.5 ppm. Data for 1993 -1994 show a maximum captan residue of 74.1 ppm (C. Olinger, CBRS No. 13490, DP Barcode D201403, 04/13/94).

FDA survey data exist for strawberries and are summarized as follows:

Year	Total No. of Samples[1]	No. Positives	% Positives	Range of Positives (ppm)	Mean of Positives (ppm)	Mean of All Samples[2] (ppm)	95th % Normal Distribution[3] (ppm)	95th % Log Normal Distribution[3] (ppm)
1990	418	108	25.8	0.005 - 28.4	2.31	0.756	4.48	1.47
1991	404	90	22.3	0.005 - 70.2	2.74	0.615	6.79	0.788
1992	350	83	23.7	0.005 - 19.1	3.14	0.747	4.51	1.28
1993	234	69	29.5	0.005 - 12.0	2.06	0.609	3.54	1.34
Total	1406	350	24.9	0.005 - 70.2	2.75	0.689	5.16	[illegible]

[1] Includes domestic and import.
[2] The domestic nondetects (ND) were corrected for per cent crop treated. The total number of domestic nondetects multiplied by the per cent crop treated (95%) were assigned a value of 0.005 ppm, or 50% of the nominal limit of detection. The remainder of domestic nondetects were assigned a value of 0.0001 ppm (nominal 0). All import nondetects were assigned a value of 0.005 ppm.
[3] The 95th percentile of an individual value, not the 95th percentile of the mean.

The anticipated residue for chronic dietary exposure considerations is 1.5 ppm captan. The anticipated residue for acute dietary exposure is 75 ppm captan and is based on the maximum survey (monitoring) result rather than the normal maximum field trial residue (27 ppm). Survey data were used for the acute value because of a pattern of significant tolerance violations in Florida. Inadequate data are available to reassess the tolerance; the current tolerance is 25 ppm.

Attachments: *Appendix I: Captan Field Trial and Processing Data. Appendix II: Captan Survey (FDA and PDP) Data.*

cc with Attachments: S. Funk, Registration Standard File, Dynamec Corp.
cc without Attachments: circ., SF, RF, Deborah Hartman- PSPS (7501C).

RDI:A. Rathman:09/22/94:M. Metzger:09/22/94:E. Zager:09/22/94:
H7509C:CBRS:S.Funk:305-5430:CM#2:RM803-A:SF(0894.6):09/20/94.

APPENDIX I

CAPTAN FIELD TRIAL AND PROCESSING DATA

All uses of captan (excluding seed treatments) have been canceled for alfalfa, barley, beets, broccoli, Brussels sprouts, cabbage, cantaloupe, carrots, cauliflower, clover, collards, corn, clover, cotton, cucumber, eggplant, flax, garlic, grasses, honeydew melons, kale, leeks, lentils, lespedeza, lettuce, muskmelons, mustard greens, oats, okra, onions, peanuts, peas, peppers, pimentos, potatoes, pumpkins, radishes, rape, rutabagas, rye, safflower, sesame, shallots, sorghum, soybeans, spinach, squash (summer and winter), sugar beets, sunflowers, Swiss chard, taro, tomatoes, trefoil, turnips, and watermelons. Residue data reflecting seed treatment of beets, field corn, sweet corn, potatoes (seed piece), rice, soybeans, spinach, and wheat are available and are used in anticipated residue calculations for all crops with seed treatments.

All uses of captan on avocados, celery, crabapples, cranberries, grapefruit, lemons, limes, mangoes, oranges, pineapples, quinces, rhubarb, and tangerines have been canceled. These crops are not included in the captan anticipated residue calculations.

ANALYTICAL METHODS

Residue data were generated using Chevron Method Nos. RM-1K-2 and RM-1F, Stauffer Chemical Company Method Nos. RRC-76-30R and RRC-78-20, and an ICI method described in Report No. WRC 89-51.

Chevron Method No. RM-1K-2 determines residues of both captan and THPI and is a modification of Chevron Method No. RM-1K-1. Residues are extracted with ethyl acetate. For oily crops, the residues are evaporated to dryness, and dissolved in acetonitrile:hexane. Residues in either oily or non-oily crops are cleaned-up by gel permeation chromatography. Elution through a Nuchar/silica gel column further cleans up the residues and separates captan residues from THPI. Captan residues are further cleaned up on a Florisil column. Residues are determined on a GC equipped with a flame photometric detector in the sulfur mode (to detect captan) or a nitrogen phosphorous flame ionization detector (to determine THPI). Modifications to Method RM-1K-1 consists of an alternative clean-up procedure for THPI and revised GC parameters for captan and THPI.

Chevron Chemical Company Method Nos. RM-1F and RM-1F-1 determine residues of captan only. Residues are extracted with hexane and acetonitrile:hexane, cleaned-up using a Florisil column, and determined by GC equipped with an

electron capture detector.

Stauffer Chemical Company Method No. RRC-76-30R determines captan residues only. Residues are extracted with toluene. Oily crops such as almonds and soybeans require an additional acetonitrile:hexane partition cleanup. Residues are determined by GC using electron capture or flame photometric detection.

Stauffer Chemical Company Method No. RRC-78-20 determines THPI only. Residues are extracted with ethyl acetate, cleaned-up by column chromatography, and are determined by GC using a nitrogen-phosphorus specific detector.

The ICI method described in Report No. WRC 89-51 determines both captan and THPI residues and is a modification of Chevron Method RM-1K-2. Residues are extracted with ethyl acetate, washed with aqueous phosphoric acid, eluted through a charcoal/silica gel column, and detected by GC using an electrolytic conductivity detection. The limits of detection are 0.5 ppm for captan and 0.1 ppm for THPI.

The limit of detection, except as noted, for all commodities is 0.05 ppm.

Almonds

Use
The 50 and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to almonds at up to 4.5 lb ai/A/application starting at the popcorn bloom stage using either ground or aerial equipment. The labels specify a 96 hour reentry interval, a maximum seasonal rate of 22.5 lb ai/A/season, and a 30-day PHI. Minimum retreatment intervals are not specified.

MRID 00128335 (1973-1978)
Six tests were conducted between 1975 and 1978 in CA. In five tests, a single foliar application of captan (50% WP) was applied to almonds at 2.6-10 lb ai/A. In another test, captan (50% WP) was applied twice to almonds at 4 lb ai/A/application. Samples were stored frozen for up to 16 months prior to analysis. Residue data were generated using Method Nos. RRC 76-30R, RRC 78-20, and RM-1K-2. Recoveries of both analytes were adequate from both nutmeats and hulls. Residue data are presented in Table I-1.

Table I-1. Residue of captan and THPI in/on almond nutmeats and hulls.

Location Commodity	Application Rate [a] (lb ai/A)	Number of Applications	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Bellico, CA Nutmeats	4.0	1	50 WP	166	<0.05	NR= not reported	<0.05
Hulls	4.0	1	50 WP	166	0.1	NR	0.1
Nutmeats	2.6	1	50 WP	164	<0.05	NR	<0.05
Hulls	2.6	1	50 WP	164	<0.05	NR	<0.05
Reedley, CA Nutmeats	4.0	1	50 WP	0	<0.05	NR	<0.05
Hulls	4.0	1	50 WP	0	92.7	NR	92.7
Nutmeat	10.0	1	50 WP	0	4.50	NR	4.50
				1	0.70	NR	0.70
				3	0.60	NR	0.60
				7	0.30	NR	0.30
				14	0.40	NR	0.40
Hulls	10.0	1	50W	0	25.2	NR	25.2
				1	25.2	NR	25.2
				3	31.0	NR	31.0
				7	23.4	NR	23.4
				14	27.1	NR	27.1
Nutmeats	10.0	1	50 WP	0	0.30	<0.05	0.35
				1	0.05	<0.05	0.10
				3	0.17	<0.05	0.22
				7	0.21	<0.05	0.26
				14	0.07	<0.05	0.12
Hulls	10.0	1	50 WP	0	47.5	<0.05	47.55
				1	30.0	<0.05	30.05
				3	24.3	<0.05	24.35
				7	52.6	<0.05	52.65
				14	36.2	<0.05	36.25
CA Nutm	4.0	2 [b]	50 WP	195	<0.03	<0.03	<0.06
					<0.03	<0.03	<0.06
Hulls	4.0	2 [b]	50 WP	195	<0.03	<0.03	<0.06
					<0.03	<0.03	<0.06

[a] Single application rate.
[b] Retreatment interval was not reported.

MRID 00159596 (1985)
One test was conducted in 1984 in CA. Multiple foliar applications of captan (50% WP) were made to almonds at 5 lb ai/A/application. Residue samples were stored frozen for 3 months prior to analysis using Method No. RM-1K-2. Recoveries of both analytes from

each matrix were adequate. Data on control samples were not presented. Residue data on nutmeats and hulls are presented in Table I-2.

Table I-2. Residue of captan and THPI in/on almond nutmeats and hulls.

Location Commodity	Application Rate [a] (lb ai/A)	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Fresno, CA Nutmeats	5.0	4	50 WP	128	0.04	<0.01	<0.05
					0.03	<0.01	<0.04
Hulls	5.0	4	50W	128	6.4	0.05	6.45
					4.3	0.08	4.38

[a] Single application rate.
[b] Applications were made at 7- to 36-day intervals.

MRID 00162037 (5/29/86)

One test was conducted in 1985 in CA. Multiple foliar applications of captan (50% WP) were made to almonds at 5 lb ai/A/application using aerial equipment. Nutmeat, hull, and shell residue samples were stored frozen for 9 months prior to analysis using Method No. RM-1K-2. Recoveries of both analytes from each matrix were adequate. Residues of both analytes were nondetectable (<0.01 ppm) in/on control samples. Residue data on nutmeats and hulls are presented in Table I-3. Residue data for shells are not presented as almond shells are not a food or feed item.

Table I-3. Residue of captan and THPI in/on almond nutmeats and hulls.

Location Commodity	Application Rate [a] (lb ai/A)	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Kerman, CA Nutmeats	5.0	4	50 WP	152	<0.01	<0.01	<0.02
					<0.01	<0.01	<0.02
Hulls	5.0	4	50 WP	152	0.29	<0.01	0.30
					0.19	<0.01	0.20

[a] Single application rate.
[b] Applications were made at 8- to 35-day intervals.

MRID 40189801 (3/3/87)

This submission summarizes residue data from numerous 1986 field studies, including data for almonds. These almond studies were submitted in full as MRID 40189802 and are discussed below in detail.

MRID 40189802 (3/3/87)

Six tests were conducted in 1986 in CA. Multiple foliar applications of captan (50% WP) were made to almonds at 4.5 lb ai/A/application, for seasonal application rates of 18 or 22.5 lb ai/A/season. Almonds, hulls, and shells were stored frozen for up to 6 months prior to

analysis using Method No. RM-1K-2. The detection limit was 0.05 ppm for each compound. Recoveries of both analytes from each matrix were adequate. Nutmeat control samples bore apparent residues of <0.05-0.06 ppm captan and <0.05 ppm THPI. Residues in hull control samples were nondetectable (<0.05 ppm) for each compound. Residue data for nutmeats and hulls are presented in Table I-4.

Table I-4. Residues of captan and THPI in/on almond nutmeats and hulls[d].

Location Commodity	Application Rate [a], (lb ai/A)	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Chico, CA Nutmeats	4.5	5	50 WP	30	[illegible]	<0.05	0.14
					[illegible]	<0.05	0.15
Hulls	4.5	5	50 WP	30	13.20	0.05	13.25
					48.00	0.21	48.21
Terra Bella, CA Nutmeats	4.5	5	50 WP	30	[illegible]	<0.05	<0.1
					[illegible]	<0.05	<0.1
Hulls	4.5	5	50 WP	30	12.5, 11.7 [c]	0.36, 0.40 [c]	12.86, 12.1
					13.00	0.25	13.25
Reedley, CA Nutmeats	4.5	5	50 WP	30	[illegible]	0.15	0.20
					[illegible] [c]	0.11, 0.13 [c]	0.16, 0.18
Hulls	4.5	5	50 WP	30	39.60	2.07	41.67
					53.60	1.31	54.91
McFarland, CA Nutmeats	4.5	4	50 WP	102	<0.05	<0.05	<0.1
					<0.05	<0.05	<0.1
Hulls	4.5	4	50 WP	102	24.80	0.30	25.10
					15.60	0.54	16.14
Porterville, CA Nutmeats	4.5	4	50 WP	124	<0.05	<0.05	<0.1
					<0.05	<0.05	<0.1
Hulls	4.5	4	50 WP	124	20.20	0.28	20.48
					16.00	0.35	16.35
Chico, CA Nutmeats	4.5	4	50 WP	130	0.20	0.09	0.29
					<0.05	<0.05	<0.10
Hulls	4.5	4	50 WP	130	40.4, 50.0 [c]	0.33, 0.42 [c]	40.73, 50.42
					27.20	0.23	27.43

[a] Single application rate.
[b] Applications were made at 5- to 101-day intervals.
[c] Duplicate analysis of a single sample.
[d] Redlined data were used to calculate an average.

011423

MRID 40745402 (1988)

Three tests were conducted in 1987 in CA. Multiple foliar applications of captan (50% WP) were made to almonds at 4.5 lb ai/A/application, for a total of four applications (18 lb ai/A/season). Almonds, hulls, and shells were stored for up to 3 months prior to analysis using Method No. RM-1K-2. Recovery of both analytes from each matrix was adequate. Hull control samples bore apparent residues of 0.11 ppm captan and 0.07 ppm THPI. Residues in control nutmeats were nondetectable (<0.05 ppm) for each compound. Residue data on nutmeats and hulls are presented in Table I-5.

Table I-5. Residues of captan and THPI in/on almond nutmeats and hulls.

Location Commodity	Application Rate [a] (lb ai/A)	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Hughson, CA Nutmeats	4.5	4	50 WP	142	<0.05	<0.05	<0.10
					<0.05	<0.05	<0.10
					<0.05	<0.05	<0.10
					<0.05	<0.05	<0.10
					<0.05	<0.05	<0.10
					<0.05	<0.05	<0.10
					<0.05	<0.05	<0.10
					<0.05	<0.05	<0.10
					<0.05	<0.05	<0.10
Hulls	4.5	4	50W	142	3.80	0.08	3.88
					3.62	0.11	3.73
					4.48	0.17	4.65
					6.76	0.15	6.91
					4.48	0.13	4.61
					5.32	0.17	5.49
					6.96	0.28	7.24
					7.72	0.21	7.93
					6.80, 6.60 [c]	0.22, 0.19 [c]	7.02, 6.79

[a] Single application rate.
[b] Applications were made at 7- to 36-day intervals.
[c] Duplicate analysis of a single sample.

Other MRIDs

Three additional MRIDs (00070201, 00098804 and 00098811) were cited by the Residue Chemistry Chapter of the 1985 Captan Registration Standard as containing residue data for almonds. These data will not be used for anticipated residue calculations because either supporting information was insufficient or the data were generated using a colorimetric method.

Apples

Use

U.S. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for a postharvest spray or dip application to apples at 1.25 lb ai/100 gal water.

Eastern U.S. The 50 and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for foliar application to apples at 3 lb ai/A/application using ground or aerial equipment. The labels specify a minimum treatment interval of 10 days, a maximum seasonal application rate of 32 lbs ai/A, and a 14-day PHI.

Western U.S., except CA. The 50 and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for foliar application to apples at 3 lb ai/A/application using ground or aerial equipment. The labels specify a maximum of 32 lbs ai/A and a 14-day PHI (WP only). No minimum treatment interval is specified.

California. The 50 and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for foliar application to apples at 3 lb ai/A/application using ground or aerial equipment. The labels imply a maximum of 15 lb ai/A and specify a 21-day PHI. No minimum treatment interval is specified.

AR, LA, MO, TX, and states east of the Mississippi River. The 50 and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for foliar application to apples at 4 lb ai/A/application with a 0-day PHI. A maximum of 32 lb ai/A per crop cycle is implied and a minimum treatment interval of 7 days is specified.

MRID 00128355 (1973-1980)

Twenty-eight tests were conducted between 1973-1980 in numerous locations. Multiple foliar applications of the 50% WP, 32% WP, and 16% WP were made to apples. Samples were stored frozen for up to 25 months prior to analysis using Method Nos. RM-1K-2, RM-1F, RRC-76-30R, and RRC-78-20. Adequate concurrent recoveries were obtained for captan and THPI. Residues of captan and THPI were nondetectable (<0.05 ppm) in/on all controls except in 11 samples bearing captan residues at 0.05-0.40 ppm. Results are presented in Table I-6.

011423

Table I-6. Residues of captan and THPI in/on apples[a].

Location	Application Rate (lb ai/A)[a]	Number of Applications[b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Sturgeon Bay, WI	0.5	9	50 WP	8	0.30	NR = not reported	0.30
					0.62	NR	0.62
	0.38	9	50 WP	8	0.29	NR	0.29
					0.44	NR	0.44
Hampton Falls, NH	0.75 + 1.12	5 + 3	50 WP + 32 WP	4	3.00	NR	3.00
Nottingham, NH	3.0 + 2.0 + 3.0	2 + 8 + 2	50 WP + 32 WP + 32 WP	8	6.60	NR	6.60
Radbury, NH	3.0	12	50 WP	26	1.75	NR	1.75
					1.76	NR	1.76
Montgomery Co., NC	3.5	10	50 WP	14	0.74	NR	0.74
Urbana, IL	1.5	17	50 WP	0	0.50	NR	0.50
					0.66	NR	0.66
Mt. Carmel, CT	2.0	10	16:12 WP	7	2.95	NR	2.95
Kentville, NS (Canada)	2.25	8	50:10 WP	8	0.27	NR	0.27
					0.06	NR	0.06
Charlestown, WV	2.0	1	50 WP	0	0.92	NR	0.92
				1	0.78	NR	0.78
				3	0.54	NR	0.54
				7	0.26	NR	0.26
				14	0.08	NR	0.08
Kearneysville, WV	3.0	9	50 WP	2	1.60	NR	1.60
		8	50 WP	24	0.24	NR	0.24
Biglerville, PA	2.0	10	50 WP	0	3.2	NR	3.2
					2.3	NR	2.3
					2.8	NR	2.8
					2.8	NR	2.8
				20	0.74	NR	0.74
					0.96	NR	0.96
					0.96	NR	0.96
					0.74	NR	0.74
				43	0.16	NR	0.16
					0.15	NR	0.15
					0.26	NR	0.26
					0.48	NR	0.48
	3.0	1	50 WP	0	1.60	NR	1.60
				1	1.10	NR	1.10
				3	0.63	NR	0.63
				7	0.40	NR	0.40
				14	0.06	NR	0.06
Orange Dove, CA	1.0	2	50 WP	1	2.2	NR	2.2
					1.5	NR	1.5

Table I-6. (*continued*).

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
				3	1.5	NR	1.5
					1.5	NR	1.5
				7	1.3	NR	1.3
					1.3	NR	1.3
				10	1.3	NR	1.3
					1.0	NR	1.0
				13	0.67	NR	0.67
					0.75	NR	0.75
Reedley, CA	4.0	1	50 WP	0	13.8	NR	13.8
					12.3	NR	12.3
Sodus, NY	2.0	12	50 WP	28	0.73	NR	0.73
	1.0	12	50 WP	28	0.33	NR	0.33
Sodus, NY	3.0	9	50 WP	0	[illegible]	<0.05	15.9
				3	5.0	0.05	5.05
				14	3.8	0.07	3.87
Geneva, NY	1.5	10	50 WP	27	0.18	NR	0.18
Fabius, NY	1.0	15	50 WP	21	0.20	NR	0.20
					0.09	NR	0.09
Mt. Holly, NJ	2.49	13	50 WP	0	[illegible]	NR	7.74
					[illegible]	NR	5.49
					[illegible]	NR	3.46
					[illegible]	NR	5.62
				1	[illegible]	NR	6.12
					[illegible]	NR	4.79
					[illegible]	NR	3.33
					[illegible]	NR	5.04
				7	4.50	NR	4.50
					6.04	NR	6.04
					3.74	NR	3.74
					2.92	NR	2.92
				14	5.20	NR	5.20
					6.70	NR	6.70
					2.67	NR	2.67
					2.37	NR	2.37
				21	6.16	NR	6.16
					3.60	NR	3.60
					3.62	NR	3.62
				28	3.28	NR	3.28
					3.18	NR	3.18
					2.77	NR	2.77
					3.31	NR	3.31
	2.16-3.16 [c] (30.0)	13	50 WP	0	[illegible]	NR	2.40
					[illegible]	NR	2.22
				1	[illegible]	NR	3.67

Table I-6. (*continued*).

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
					2.65	NR	2.65
				7	2.03	NR	2.03
					1.85	NR	1.85
				14	1.91	NR	1.91
					2.00	NR	2.00
				21	1.82	NR	1.82
					1.85	NR	1.85
				28	1.68	NR	1.68
					1.43	NR	1.43
Phelps, NY	4.0	14	50 WP	1	4.03	0.13	4.16
					3.61	0.10	3.71
					4.79	0.17	4.96
					5.06	0.15	5.21
				16	5.72	0.12	5.84
					3.23	0.06	3.29
				31	1.76	0.06	1.82
					2.35	0.08	2.43
		13	50 WP	16	3.54	0.08	3.62
					2.96	0.07	3.03
		12	50 WP	31	1.03	0.07	1.10
					0.83	0.05	0.88
New Franklin, MO	4.5	9	50 WP	1	6.62	0.05	6.67
	0.9	9	50 WP	1	1.16	0.01	1.17
	1.8	9	50 WP	1	1.32	0.02	1.34
	2.7	9	50 WP	1	2.16	0.03	2.19
	3.6	9	50 WP	1	3.29	0.03	3.32

[a] Rate reported is single application rate.
[b] Retreatment intervals were 1-35 days.
[c] Total seasonal application rate listed parenthetically.
[d] Redlined data used to calculate an average.

MRID 40189801 (3/3/87)
This submission summarizes residue data from numerous 1986 field studies, including data for apples. These apple studies were submitted in full as MRID 40189803 and 40189804 and are discussed below in detail.

MRID 40189803 (3/3/87)
Twelve tests were conducted in 1986 in WA, CA, NC, VA, MI, and NY. Eight foliar applications and/or one post harvest dip application of captan (50% WP) were made. Samples were stored frozen for up to 5 months prior to analysis using Method No. RM-1K-2. Adequate concurrent recoveries were obtained. Residues of captan and THPI were nondetectable (<0.05 ppm) in/on controls. Results are presented in Table I-7.

Table I-7. Residues of captan and THPI in/on apples[d].

Location	Application		Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
	Method	Rate [a]				Captan	THPI	Total
Wenatchee, WA	Foliar	4.0	8	50 WP	0	[illegible] [c]	[illegible]	[illegible]
						[illegible]	[illegible]	[illegible]
						1.23	0.37	1.57
						5.20	0.76	5.96
					7	5.20	0.21	5.41
						3.50	0.20	3.70
					14	2.20	0.19	2.39
						3.30	0.28	3.58
		12.0	8	50 WP	0	[illegible]	[illegible]	[illegible]
						[illegible]	[illegible]	[illegible]
	Dip	1.25	1	50 WP	0	4.00	0.08	4.08
						4.00	0.09	4.09
	Foliar +Dip	4.0 + 1.25	8 + 1	50 WP	0	7.70	0.35	8.05
						7.00	0.28	7.28
	Foliar	4.0	8	50 WP	0	1.20	0.37	1.57
						5.20	0.76	5.96
Porterville, CA	Foliar	4.0	8	50 WP	0	3.80	0.08	3.88
						4.90	0.13	5.03
Raleigh, NC	Foliar	4.0	8	50 WP	0	0.31	0.06	0.37
						1.50	0.05	1.55
Winchester, VA	Foliar	4.0	8	50 WP	0	1.40	0.07	1.47
						0.41	<0.05	0.46
Watervliet, MI	Foliar	4.0	8	50 WP	0	3.40	<0.05	3.45
						3.90	<0.05	3.95
					7	1.70	<0.05	1.75
						1.30	<0.05	1.35
					14	2.20	<0.05	2.25
						0.64	<0.05	0.69
Phelps, NY	Foliar	4.0	8	50 WP	0	4.70	0.10	4.80
						2.80	0.09	2.89
					7	2.80	0.12	2.92
						2.50	0.12	2.62
					14	2.80	0.23	3.03
						2.10	0.10	2.20
	Dip	1.25	1	50 WP	0	2.50	0.07	2.57
						3.30	0.10	3.40
	Foliar + Dip	4.0 + 1.25	8 + 1	50 WP	0	5.70	0.16	5.86
						5.90	0.10	6.00

[a] Rates reported are single application rates and are expressed in lb ai/A for foliar applications and lb ai/100 gal for dip applications.
[b] Retreatment intervals were 4-47 days.
[c] Redlined data are duplicated in MRID 40189804, apple processing study.
[d] Bolded data were used to calculate an average.

MRID 40745403 (5/16/88)
One test was conducted in 1987 in WA. Six foliar applications of captan (50% WP) were made. Samples were stored frozen for 2 months prior to analysis using Method No. RM-1K-2. Adequate concurrent recoveries were obtained for both captan and THPI. Residues of captan and THPI were nondetectable (<0.05 ppm) in/on all controls. Results are presented in Table I-8.

Table I-8. Residues of captan and THPI in/on apples[d].

Location	Application Rate [a] (lb ai/A)	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Ephrata, WA	4.0	6	50 WP	0	[illegible] [c]	<0.05, <0.05 [c]	0.91, 0.91
					[illegible]	<0.05	0.79
					[illegible]	<0.05	0.47
					[illegible]	<0.05	2.23
					[illegible]	<0.05	2.89
					[illegible]	<0.05	1.95

[a] Rate reported is single application rate.
[b] Retreatment intervals were 6-19 days.
[c] Duplicate analyses of a single sample.
[d] Redlined data were used to calculate an average.

MRID 42254201 (12/19/90)
Twenty tests were conducted in 1989 in NY, MI, WV, CA, and WA. Four to seven foliar applications of captan (50% WP) were made. Samples were stored frozen for up to 5 months prior to analysis using Method No. RM-1K-2. Adequate concurrent recoveries were obtained. Residues of captan and THPI in/on controls were nondetectable (<0.05 ppm). Results are presented in Table I-9.

Table I-9. Residues of captan and THPI in/on apples.

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Sodus, NY	4	4	50 WP	121	<0.05	<0.05	<0.10
		5	50 WP	114	<0.05	<0.05	<0.10
		6	50 WP	105	<0.05	<0.05	<0.10
		7	50 WP	92	0.07, 0.08 [c]	<0.05, <0.05 [c]	0.12, 0.13
Benton Harbor, MI	4	4	50 WP	131	<0.05	<0.05	<0.10
		5	50 WP	125	<0.05	<0.05	<0.10
		6	50 WP	116	<0.05	<0.05	<0.10
		7	50 WP	102	<0.05, <0.05 [c]	<0.05, <0.05 [c]	<0.10, <0.10
Romney, WV	4	4	50 WP	171	<0.05	<0.05	<0.10
		5	50 WP	151	<0.05	<0.05	<0.10
		6	50 WP	139	<0.05	<0.05	<0.10
		7	50 WP	125	<0.05, <0.05 [c]	<0.05, <0.05 [c]	<0.10, <0.10
Placerville, CA	4	4	50 WP	138	0.13	<0.05	0.18
		5	50 WP	136	0.15	<0.05	0.20
		6	50 WP	125	0.12	<0.05	0.17
		7	50 WP	116	0.44	<0.05	0.49
Vancouver, WA	4	4	50 WP	141	<0.05	<0.05	<0.10
		5	50 WP	134	0.13	<0.05	0.18
		6	50 WP	125	0.10	<0.05	0.15
		7	50 WP	117	0.59	<0.05	0.64

[a] Rate reported is single application rate.
[b] Retreatment intervals were 2-20 days
[c] Duplicate analyses of the same sample.

MRID 42254203 (10/30/91)

Two dip application tests were conducted in 1990 on apples grown in MI and WV. Apples received postharvest dip applications of captan (50% WP) at 1.25 lb ai/100 gal for 10 seconds (MI apples) or 3 minutes (WV apples). Two samples were stored frozen immediately after dipping, and two samples were held in cold storage at 3 C for 30 days after dipping and subsequently chilled to -20 C. Samples were in frozen storage for up to 6 months prior to analysis using Method No. RM-1K-2. Adequate concurrent recoveries were obtained for both captan and THPI. Residues of captan and THPI were nondetectable (<0.05 ppm) in/on controls. Results are presented in Table I-10.

Table I-10. Residues of captan and THPI in/on apples[d].

Location	Application Rate (lb ai/100 gal)[a]	Number of Applications	Formulation	Residues Found (ppm)		
				Captan	THPI	Total
Benton Harbor, MI	1.25	1	50 WP	[illegible]	<0.05	2.25
				[illegible][b]	0.12[b]	3.02
Romney, WV	1.25	1	50 WP	[illegible]	0.06,	6.66
				[illegible][b], [illegible][b,c]	0.07[b], 0.10[b,c]	6.67, 9.10

[a] Rate reported is single application rate.
[b] These samples were in cold storage at 3 C for 30 days after dipping and subsequently frozen at -20 C. All other samples were frozen immediately after treatment.
[c] Duplicate analyses of a single sample.
[d] Redlined data were used to calculate an average.

Apple Processing Studies

MRID 00098789 (1976)

In 1976, two tests were conducted in NJ and VA. Apples were treated with 11 or 13 foliar applications of captan (50% WP) at 2.5 lb ai/A/application at 7- to 42-day intervals for total seasonal application rates of 27.5 and 32.5 lb ai/A with 0-day PHIs. Samples were stored frozen for up to 3 months prior to extraction and analysis using Method No. RM-1F-1. Some sample extracts were stored in unspecified conditions for >40 days. Affected samples are noted in the table below. Adequate recoveries were obtained from fortified control samples. Residues of captan were nondetectable (<0.01-0.04 ppm) in/on controls. The registrant reported residues corrected for controls and recoveries. Residues did not concentrate in juice, wet pomace, or dry pomace. These data are presented in Table I-11.

Table I-11. Residues of captan in/on apple processed commodities.

Location Commodity	Application Rate (lb ai/A)[a]	Captan Residues (ppm)[b]	Concentration Factor
Mt. Holly, NJ Whole Apple	27.5	4.8, 5.4 (5.1)	–
Juice	27.5	1.6, 1.4 (1.5)	0.3
Wet Pomace	27.5	3.6, 4.5 (4.1)	0.8
Dry Pomace	27.5	0.35, 0.43 (0.39)[c]	0.08
Winchester, VA Whole Apple	32.5	3.2, 3.5 (3.4)[c]	–
Juice	32.5	0.71, 1.3 (1.0)[c]	0.3
Wet Pomace	32.5	0.95, 1.2 (1.1)[c]	0.3
Dry Pomace	32.5	0.06, 0.34 (0.20)	0.06

[a] Total seasonal application rate.
[b] The registrant reported residues corrected for controls and recoveries. Average residues listed parenthetically.
[c] These sample extracts were held for 45-49 days in unspecified storage conditions prior to analysis.

MRID 00159597 (1985)
In 1985, apples grown in MI were treated with nine foliar applications of captan (50% WP) at 1.0 lb ai/A/application at 7- to 39-day intervals for a total seasonal application rate of 9 lb ai/A with a 0-day PHI. Samples were stored frozen for up to 4 months prior to analysis using Method No. RM-1K-2. Adequate recoveries were obtained from fortified control samples. Residues of captan and THPI were nondetectable (<0.01 ppm) in/on controls. Results are presented in Table I-12. Residues of captan and the combined residues of captan and THPI did not concentrate in processed commodities. Residues of THPI *per se* concentrated in juice (1.6x) and wet (13x) and dry (23x) pomace.

Table I-12. Residues of captan and THPI in/on apple processed commodities.

Location Commodity	Application Rate[a] (lb ai/A)	Residues Found (ppm)			Concentration Factors[c]		
		Captan	THPI	Total	Captan	THPI	Total
East Lansing, MI Whole Apples	9	2.0, 3.3 (2.7)	0.10, 0.09 (0.1)	2.1, 3.4 (2.8)[b]	–	–	–
Wet Pomace	9	1.6	1.3	2.9	0.6	13.0	1.0
Dry Pomace	9	0.76	2.3	3.1	0.3	23.0	1.1
Juice		1.4	0.16	1.6	0.5	1.6	–

[a] Total seasonal application rate
[b] Average residues listed parenthetically.
[c] Concentration factor calculated by the reviewer relative to the average residues in whole apples.

MRID 40189804 (3/3/87)
In 1986, two tests were conducted in WA. Apples were treated with eight foliar applications of captan (50% WP) at 4.0 or 12.0 lb ai/A/application at 14- to 42-day intervals for total seasonal application rates of 32 and 96 lb ai/A/season with 0-day PHIs. Samples were stored frozen for up to 3 months prior to analysis using Method No. RM-1K-2. Adequate concurrent recoveries were obtained. Residues of captan and THPI were nondetectable (<0.05) in/on control samples. These data are presented in Table I-13. Residues of captan concentrated by an average of 1.5x in dry pomace; residues of THPI concentrated by an average of 8.5x in wet pomace and 78x in dry pomace; and the combined residues concentrated by averages of 1.1x and 5.3x in wet and dry pomace, respectively.

Table I-13. Residues of captan and THPI in/on apple processed commodities.

Location Commodity	Application Rate[a] (lb ai/A)	Residues Found (ppm)[b]			Concentration Factors[c]		
		Captan	THPI	Total	Captan	THPI	Total
Wenatchee, WA Whole-Apples	4.0	5.50, 5.10 (5.30)	0.23, 0.21 (0.22)	5.73, 5.31 (5.52)	–	–	–
	12.0	9.10, 5.50 (7.30)	0.40, 0.43 (0.42)	9.50, 5.93 (7.72)	–	–	–
Juice	4.0	<0.05	0.10	0.15	<0.01	0.5	–
	12.0	<0.05	2.20	2.25	<0.01	5.2	–
Wet Pomace	4.0	2.10	1.90	4.00	0.4	8.6	0.72
	12.0	7.80	3.50	11.3	1.1	8.3	1.5
Dry Pomace	4.0	10.0	12.0	22.0	1.9	55	4.0
	12.0	7.90	42.0	49.9	1.1	100	6.5

[a] Total seasonal application rate.
[b] Averages listed parenthetically.
[c] Concentration factor relative to the average residue in whole apples.

MRID 42296003 (3/26/91)

In 1991, eight tests were conducted in CA and NY. Apples were treated with four to seven foliar applications of captan (50% WP) at 4 lb ai/A/application at 2- to 20-day intervals for total seasonal application rates of 16-28 lb ai/A with PHIs of 113-143 days. Samples were stored frozen for up to 5 months prior to extraction and analysis using Method No. RM-1K-2. Adequate concurrent recoveries were obtained. Residues of captan and THPI were nondetectable (<0.05 ppm) in/on control samples. These data are presented in Table I-14. Residues of captan and THPI did not concentrate in apple juice. Residues concentrated in wet pomace by averages of 3x (captan), 1.2x (THPI), and 2.7x (combined); and residues concentrated in dry pomace by averages of 2.5x (captan), 11.3x (THPI), and 4x (combined).

Table I-14. Residues of captan and THPI in/on apple processed commodities.

Location Commodity	Application Rate[a] (lb ai/A)	Residues Found (ppm)[b]			Concentration Factors[c]		
		Captan	THPI	Total	Captan	THPI	Total
Placerville, CA Whole Apples	16	0.14, 0.09 (0.12)	<0.05, <0.05 (<0.05)	0.19, 0.14 (0.17)	–	–	–
	20	0.15, 0.29 (0.22)	<0.05, <0.05 (<0.05)	0.20, 0.34 (0.27)	–	–	–
	24	0.30, 0.22 (0.26)	<0.05, <0.05 (<0.05)	0.35, 0.27 (0.31)	–	–	–
	28	0.59, 0.16 (0.38)	<0.05, <0.05 (<0.05)	0.64, 0.21 (0.43)	–	–	–

Table I-14. (*continued*).

Location / Commodity	Application Rate [a] (lb ai/A)	Residues Found (ppm) [b]			Concentration Factors [c]		
		Captan	THPI	Total	Captan	THPI	Total
Juice	16	<0.05	<0.05	<0.10	<0.4	–	–
	20	<0.05	<0.05	<0.10	<0.2	–	–
	24	0.09	<0.05	0.11	0.3	–	–
	28	0.16	<0.05	0.21	0.4	–	–
Wet Pomace	16	0.47	0.05	0.52	3.9	1.0	3.2
	20	0.68	0.06	0.74	3.1	1.2	2.7
	24	0.74	0.07	0.81	2.8	1.4	2.6
	28	0.86	0.06	0.92	2.3	1.2	2.2
Dry Pomace	16	0.42	0.39	0.81	3.5	7.8	4.9
	20	0.55	0.58	1.13	2.5	11.6	4.2
	24	0.55	0.64	1.19	2.1	12.8	3.8
	28	0.72	0.64	1.36	1.9	12.8	3.2
Alton, NY Whole Apples	16	<0.05, <0.05	<0.05, <0.05	<0.1, <0.1	–	–	–
	20	<0.05, <0.05	<0.05, <0.05	<0.1, <0.1	–	–	–
	24	<0.05, <0.05	<0.05, <0.05	<0.1, <0.1	–	–	–
	28	<0.05, <0.05	<0.05, <0.05	<0.1, <0.1	–	–	–
Juice	16	<0.05	<0.05	<0.1	–	–	–
	20	<0.05	<0.05	<0.1	–	–	–
	24	<0.05	<0.05	<0.1	–	–	–
	28	<0.05	<0.05	<0.1	–	–	–
Wet Pomace	16	<0.05	<0.05	<0.1	–	–	–
	20	<0.05	<0.05	<0.1	–	–	–
	24	<0.05	<0.05	<0.1	–	–	–
	28	<0.05	<0.05	<0.1	–	–	–
Dry Pomace	16	<0.05	<0.05	<0.1	–	–	–
	20	<0.05	<0.05	<0.1	–	–	–
	24	<0.05	<0.05	<0.1	–	–	–
	28	0.06	<0.05	0.11	–	–	–

[a] Total seasonal application rate.
[b] Average residues listed parenthetically.
[c] Concentration factor relative to the average residue in whole apples were calculated for the CA test; concentration factors were not calculated for the NY test as residues were nondetectable.

011423

MRID 42305401

This study is a duplicate of the study described in MRID 42296003, which is discussed above.

MRID 42296003 (3/26/91)

In 1990, ten tests were conducted in MI and WV. Apples were treated with 10 foliar applications of captan (50% WP) at 3 lb ai/A/application at 7- to 14-day intervals for a total seasonal application rate of 30 lb ai/A with 14-97 day PHIs. Samples were stored frozen for up to 15 months prior to extraction and analysis using Method No. WRC 89-51. Adequate concurrent recoveries were obtained. Residues of captan and THPI were nondetectable (<0.05 ppm) in/on control samples. The residue data are presented in Table I-15. Residues of captan *per se* did not concentrate in any processed apple commodities. Residues of THPI concentrated (averages) in unclarified juice (2x), canned unclarified juice (1.5x), jelly (2.6x), wet pomace (4x), and dry pomace (13.4x).

Table I-15. Residues of captan and THPI in/on apple processed commodities.

Location / Commodity	PHI (days)	Residues Found (ppm) [a]			Concentration Factors [b]		
		Captan	THPI	Total	Captan	THPI	Total
Benton Harbor, MI Apples (Field)	97	0.05, 0.07, 0.07 (0.06)	<0.05, <0.05, <0.05 (<0.05)	0.10, 0.12, 0.12 (0.11)	–	–	–
	83	0.28, 0.08, 0.10 (0.15)	<0.05, <0.05, <0.05 (<0.05)	0.33, 0.13, 0.15 (0.20)	–	–	–
	69	0.33, 0.32, 0.42 (0.36)	<0.05, <0.05, <0.05 (<0.05)	0.38, 0.37, 0.47 (0.41)	–	–	–
	55	0.27, 0.68, 0.25 (0.40)	<0.05, <0.05, <0.05 (<0.05)	0.32, 0.73, 0.30 (0.45)	–	–	–
	41	0.42, 0.47, 0.80 (0.56)	<0.05, <0.05, <0.05 (<0.05)	0.47, 0.52, 0.85 (0.61)	–	–	–
Unwashed Apples (Processor)	97	0.06, <0.05 (0.06)	<0.05, <0.05 (<0.05)	0.11, 0.10 (0.11)	–	–	–
	83	0.10, 0.10, (0.10)	<0.05, <0.05 (<0.05)	0.15, 0.15 (0.15)	–	–	–
	69	0.14, 0.23 (0.19)	<0.05, <0.05 (<0.05)	0.19, 0.28 (0.24)	–	–	–
	55	0.58, 0.14 (0.36)	<0.05, <0.05 (<0.05)	0.63, 0.19 (0.41)	–	–	–
	41	0.36, 0.52 (0.44)	<0.05, <0.05 (<0.05)	0.41, 0.57 (0.49)	–	–	–
Washed Apples	97	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.8	1.0	0.9
	83	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.5	1.0	0.7
	69	0.08, 0.11 (0.10)	<0.05, <0.05 (<0.05)	0.13, 0.16 (0.15)	0.5	1.0	0.6
	55	0.29, 0.29 (0.29)	<0.05, <0.05 (<0.05)	0.34, 0.34 (0.34)	0.8	1.0	0.8
	41	0.20, 0.14 (0.17)	<0.05, <0.05 (<0.05)	0.25, 0.19 (0.22)	0.4	1.0	0.5

Table I-15. (*continued*).

Location / Commodity	PHI (days)	Residues Found (ppm) [a]			Concentration Factors [b]		
		Captan	THPI	Total	Captan	THPI	Total
Peeled, Cored, Sliced Apples	97	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.8	1.0	0.9
	83	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.5	1.0	0.7
	69	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.3	1.0	0.4
	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.1	1.0	0.2
	41	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.1	1.0	0.2
Applesauce	97	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.8	1.0	0.9
	83	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.5	1.0	0.7
	69	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.3	1.0	0.4
	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.1	1.0	0.2
	41	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.1	1.0	0.2
Baby-food Applesauce	97	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.8	1.0	0.9
	83	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.5	1.0	0.7
	69	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.3	1.0	0.4
	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.1	1.0	0.2
	41	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.1	1.0	0.2
Canned, Apple Slices	97	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.8	1.0	0.9
	83	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.5	1.0	0.7
	69	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.3	1.0	0.4
	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.1	1.0	0.2
	41	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.1	1.0	0.2
Unclarified Juice	97	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.8	1.0	0.9
	83	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.5	1.0	0.7
	69	0.13, 0.12 (0.13)	0.05, 0.05 (0.05)	0.18, 0.17 (0.18)	0.7	1.0	0.8
	55	0.18, 0.19 (0.19)	0.08, 0.07 (0.08)	0.26, 0.26 (0.27)	0.5	1.6	0.7
	41	0.29, 0.28 (0.29)	0.10, 0.10 (0.10)	0.39, 0.38 (0.39)	0.7	2.0	0.8

Table I-15. (*continued*).

Location / Commodity	PHI (days)	Residues Found (ppm) [a]			Concentration Factors [b]		
		Captan	THPI	Total	Captan	THPI	Total
Canned, Unclarified Juice	97	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.8	1.0	0.9
	83	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.5	1.0	0.7
	69	<0.05, <0.05 (<0.05)	0.11, 0.11 (0.11)	0.16, 0.16 (0.16)	0.3	2.2	0.7
	55	<0.05, <0.05 (<0.05)	0.18, 0.17 (0.18)	0.23, 0.23, (0.23)	0.1	3.6	0.6
	41	<0.05, <0.05 (<0.05)	0.27, 0.27 (0.27)	0.32, 0.32 (0.32)	0.1	5.4	0.7
Canned, Clarified Juice	97	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.8	1.0	0.9
	83	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.5	1.0	0.7
	69	<0.05, <0.05 (<0.05)	0.08, 0.07 (0.08)	0.13, 0.12 (0.13)	0.3	1.6	0.5
	55	<0.05, <0.05 (<0.05)	0.11, 0.12 (0.12)	0.16, 0.17 (0.17)	0.1	2.4	0.4
	41	<0.05, <0.05 (<0.05)	0.17, 0.19 (0.18)	0.22, 0.24 (0.23)	0.1	3.6	0.5
Apple Jelly	97	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.8	1.0	0.9
	83	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.5	1.0	0.7
	69	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.3	1.0	0.4
	55	<0.05, <0.05 (<0.05)	0.08, 0.07 (0.08)	0.13, 0.12 (0.13)	0.1	1.6	0.3
	41	<0.05, <0.05 (<0.05)	0.10, 0.11 (0.11)	0.15, 0.16 (0.16)	0.1	2.0	0.3
Wet Pomace	97	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (0.10)	0.8	1.0	0.9
	83	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (0.10)	0.5	1.0	0.7
	69	0.05, 0.07 (0.06)	0.09, 0.08 (0.09)	0.14, 0.15 (0.15)	0.3	1.8	0.6
	55	<0.05, <0.05 (<0.05)	0.14, 0.15 (0.15)	0.19, 0.20 (0.20)	0.1	3.0	0.5
	41	0.08, <0.05 (0.07)	0.20, 0.21 (0.21)	0.28, 0.26 (0.28)	0.2	4.0	0.6
Dry Pomace	97	<0.05, 0.05 (0.05)	0.08, 0.07 (0.08)	0.13, 0.12 (0.13)	0.8	1.6	1.2
	83	<0.05, <0.05 (<0.05)	0.10, 0.09 (0.10)	0.15, 0.14 (0.15)	0.5	2.0	1.0
	69	0.09, 0.12 (0.11)	0.33, 0.33 (0.33)	0.42, 0.45 (0.44)	0.6	6.6	1.8
	55	0.13, 0.13 (0.13)	0.67, 0.51 (0.59)	0.80, 0.64 (0.72)	0.4	11.8	1.8
	41	0.10, 0.16 (0.13)	0.83, 0.86 (0.84)	0.93, 1.02 (0.97)	0.3	16.8	2.0

Table I-15. (*continued*).

Location / Commodity	PHI (days)	Residues Found (ppm) [a]			Concentration Factors [b]		
		Captan	THPI	Total	Captan	THPI	Total
Romney, WV Apples (Field)	55	<0.05, <0.05, 0.07 (0.06)	<0.05, <0.05, <0.05 (<0.05)	<0.10, <0.10, 0.12 (0.11)	–	–	–
	42	0.11, 0.11, 0.05 (0.09)	<0.05, <0.05, <0.05 (<0.05)	0.16, 0.16, 0.10 (0.14)	–	–	–
	28	0.72, 0.15, 0.48 (0.45)	<0.05, <0.05, <0.05 (<0.05)	0.77, 0.20, 0.53 (0.50)	–	–	–
	21	0.85, 0.52, 1.24 (0.87)	<0.05, <0.05, <0.05 (<0.05)	0.90, 0.57, 1.29 (0.921)	–	–	–
	14	1.20, 1.56, 1.63 (1.46)	<0.05, <0.05, <0.05 (<0.05)	1.25, 1.61, 1.68 (1.51)	–	–	–
Unwashed Apples (Processor)	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	–	–	–
	42	0.22, 0.21 (0.22)	<0.05, <0.05 (<0.05)	0.27, 0.26 (0.27)	–	–	–
	28	0.67, 1.10 (0.89)	0.05, <0.05 (0.05)	0.72, 1.15 (0.94)	–	–	–
	21	1.51, 1.96 (1.74)	0.05, 0.06 (0.06)	1.56, 2.02 (1.80)	–	–	–
	14	2.42, 1.98 (2.20)	0.08, 0.08 (0.08)	2.50, 2.06 (2.28)	–	–	–
Washed Apples	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	1.0	1.0	1.0
	42	0.08, 0.15 (0.12)	<0.05, <0.05 (<0.05)	0.13, 0.20 (0.17)	0.6	1.0	0.6
	28	0.58, 0.51 (0.55)	<0.05, <0.05 (<0.05)	0.63, 0.56 (0.60)	0.6	1.0	0.6
	21	0.76, 0.85 (0.81)	<0.05, <0.05 (<0.05)	0.81, 0.90 (0.86)	0.5	0.8	0.5
	14	1.14, 1.80 (1.47)	0.07, 0.06 (0.07)	1.21, 1.86 (1.54)	0.7	0.9	0.7
Peeled, Cored, Sliced Apples	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	1.0	1.0	1.0
	42	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.2	1.0	0.4
	28	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.1	1.0	0.1
	21	0.13, <0.05 (0.09)	<0.05, <0.05 (<0.05)	0.18, <0.10 (0.14)	0.1	0.8	0.1
	14	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.02	0.6	0.04
Applesauce	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	1.0	1.0	1.0
	42	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.2	1.0	0.4
	28	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.1	1.0	0.1
	21	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.03	0.8	0.1
	14	<0.05, <0.05 (<0.05)	0.07, 0.07 (0.07)	0.12, 0.12 (<0.12)	0.02	0.9	0.1

Table I-15. (*continued*).

Location / Commodity	PHI (days)	Residues Found (ppm) [a]			Concentration Factors [b]		
		Captan	THPI	Total	Captan	THPI	Total
Baby-food Applesauce	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	1.0	1.0	1.0
	42	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.2	1.0	0.4
	28	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.1	1.0	0.1
	21	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.03	0.8	0.1
	14	<0.05, <0.05 (<0.05)	0.07, 0.06 (0.07)	0.12, 0.11 (0.12)	0.02	0.9	0.04
Canned, Apple Slices	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	1.0	1.0	1.0
	42	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.2	1.0	0.1
	28	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.1	1.0	0.4
	21	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.03	0.8	0.7
	14	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	0.02	0.6	1.1
Unclarified Juice	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	1.0	1.0	1.0
	42	0.06, 0.05 (0.06)	0.08, 0.10 (0.09)	0.14, 0.15 (0.15)	0.3	1.8	0.6
	28	0.27, 0.29 (0.28)	0.11, 0.11 (0.11)	0.38, 0.40 (0.39)	0.3	2.0	0.4
	21	1.08, 1.05 (1.07)	0.27, 0.27 (0.27)	1.35, 1.32 (1.34)	0.6	4.5	0.7
	14	2.16, 2.46 (2.31)	0.20, 0.32 (0.26)	2.36, 2.78 (2.57)	1.1	3.3	1.1
Canned, Unclarified Juice	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	1.0	1.0	1.0
	42	<0.05, <0.05 (<0.05)	0.13, 0.12 (0.13)	0.18, 0.17 (0.18)	0.2	2.6	0.7
	28	<0.05, <0.05 (<0.05)	0.41, 0.30 (0.36)	0.49, 0.35 (0.41)	0.1	7.2	0.4
	21	<0.05, <0.05 (<0.05)	0.99, 0.96 (0.98)	1.04, 1.01 (1.03)	0.03	16.3	0.6
	14	<0.05, <0.05 (<0.05)	1.40, 1.72 (1.56)	1.45, 1.77 (1.61)	0.02	19.5	0.7
Canned, Clarified Juice	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	1.0	1.0	1.0
	42	<0.05, <0.05 (<0.05)	0.08, 0.06 (0.07)	0.13, 0.11 (0.12)	0.2	1.4	0.4
	28	<0.05, <0.05 (<0.05)	0.39, 0.36 (0.38)	0.44, 0.41 (0.43)	0.1	7.6	0.5
	21	<0.05, <0.05 (<0.05)	0.93, 1.09 (1.01)	0.98, 1.14 (1.06)	0.03	16.8	0.6
	14	<0.05, <0.05 (<0.05)	1.26, 1.24 (1.25)	1.31, 1.29 (1.30)	0.02	15.6	0.6

Table I-15. (*continued*).

Location / Commodity	PHI (days)	Residues Found (ppm) [a]			Concentration Factors [b]		
		Captan	THPI	Total	Captan	THPI	Total
Apple Jelly	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	1.0	1.0	1.0
	42	<0.05, <0.05 (<0.05)	0.05, 0.05 (0.05)	0.10, 0.10 (0.10)	0.2	1.0	0.4
	28	<0.05, <0.05 (<0.05)	0.14, 0.15 (0.15)	0.19, 0.20 (0.20)	0.1	3.0	0.2
	21	<0.05, <0.05 (<0.05)	0.44, 0.39 (0.42)	0.49, 00.43 (0.47)	0.03	7.0	0.3
	14	<0.05, <0.05 (<0.05)	0.62, 0.53 (0.58)	0.67, 0.58 (0.63)	0.02	7.3	0.3
Wet Pomace	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	1.0	1.0	1.0
	42	0.06, 0.05 (0.06)	0.11, 0.09 (0.10)	0.17, 0.14 (0.16)	0.3	2.0	0.6
	28	0.23, 0.19 (0.21)	0.24, 0.29 (0.27)	0.47, 0.48 (0.48)	0.2	5.4	0.5
	21	0.86, 0.68 (0.77)	0.54, 0.65 (0.60)	1.40, 1.33 (1.37)	0.4	10.0	0.8
	14	0.68, 0.76 (0.72)	0.90, 0.80 (0.85)	1.58, 1.56 (1.57)	0.3	10.6	0.7
Dry Pomace	55	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (<0.10)	1.0	1.0	1.0
	42	0.12, 0.12 (0.12)	0.37, 0.30 (0.34)	0.49, 0.42 (0.46)	0.5	6.8	1.7
	28	0.42, 0.39 (0.41)	1.04, 0.95 (1.00)	1.46, 1.34 (1.41)	0.5	20.0	1.5
	21	1.58, 1.16 (1.37)	2.26, 1.90 (2.08)	3.74, 3.06 (3.45)	0.8	34.7	1.9
	14	1.92, 2.08 (2.00)	2.40, 2.76 (2.58)	4.32, 4.84 (4.58)	0.9	32.3	2.0

[a] Residue average listed parenthetically.
[b] Concentration factor relative to the average residue in unwashed apples from the processor for each test.

Other MRIDs

Seven additional MRIDs were cited by the Residue Chemistry Chapter of the 1985 Captan Registration Standard as containing residue data for apples; these are MRIDs 00046914, 00070201, 00085526, 00098711, 00098722, 0098726, and 00106602. These data will not be used for anticipated residue calculations because either supporting information was insufficient or the data were generated using a colorimetric method.

Apricots

Use

The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to apricots at up to 2.5 lb ai/A/application. A maximum seasonal application rate of 12.5 lb ai/A is implied, but a minimum retreatment interval is not specified. The labels specify a PHI of 7 days. Applications may be made using either ground or aerial equipment.

MRID 00128355 (1973-1980)

Three tests were conducted in 1975 through 1980 in CA. One foliar application of captan (50% WP and/or 4 lb/gal FlC) was made. Samples were stored for up to 15 months prior to analysis using Method Nos. RRC-76-30R, RRC-78-20, and RM-1K-1. Method recoveries were adequate. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-16.

Table I-16. Residues of captan and THPI in/on apricots.

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Reedley, CA	3+3	1+1	50 WP+FlC	5	1.33	not reported	1.33
	6	1	50 WP	0	13.4	<0.05	13.45
					6.6	<0.05	6.65
				1	4.0	<0.05	4.05
					9.3	<0.05	9.35
				3	6.0	<0.05	6.05
					13.6	<0.05	13.65
				7	8.3	0.24	8.54
					3.6	<0.05	3.65
				14	4.3	0.35	4.65
					2.0	<0.05	2.05
	3	1	50 WP	0	2.0	<0.05	2.05
				1	2.7	<0.05	2.75
				3	3.3	<0.05	3.35
				7	2.0	<0.05	2.05
				14	1.7	<0.05	1.75

[a] Rate reported is single application rate.
[b] Retreatment intervals were 10-103 days.

MRID 40189801 (3/3/87)

This submission summarizes residue data from numerous 1986 field studies, including data for apricots. These apricot studies were submitted in full as MRID 40189805 and are discussed below in detail.

MRID 40189805 (3/3/87)
Three tests were conducted in 1986 in CA. Five foliar applications of captan (50% WP) were made. Residue samples were stored frozen for up to 7 months prior to analysis using Method No. RM-1K-2. Method recoveries were adequate. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-17.

Table I-17. Residues of captan and THPI in/on apricots[d].

Location	Application Rate (lb ai/A)[a]	Number of Applications[b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Hughson, CA	2.5	5	50 WP	0	[illegible]	0.18	4.62
					[illegible]	0.21	4.73
Porterville, CA	2.5	5	50 WP	0	[illegible]	0.10, 0.09[c]	6.70, 4.57
					[illegible]	0.08, 0.20[c]	0.43, 5.48
Reedley, CA	2.5	5	50 WP	0	[illegible]	0.08	5.08
					[illegible]	0.12	6.87

[a] Rate reported is single application rate.
[b] Retreatment intervals were 9-37 days.
[c] Duplicate analysis of same sample.
[d] Redlined data were used to calculate an average.

Blueberries

Use
Eastern U.S. The 50 and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for foliar application to blueberries at 2.5 lb ai/A using ground or aerial equipment. A maximum of 35 lb ai/A per crop cycle and a 0-day PHI are implied. A 7-day retreatment interval is specified.

Western U.S., except CA. The 50 and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for foliar application to blueberries at 1.2 lb ai/A using aerial or ground equipment. A maximum of 35 lb ai/A per crop cycle and a 0-day PHI are implied. A 7-day retreatment interval is specified.

California. The 50 and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for foliar application to blueberries at 1-2.5 lb ai/A using aerial or ground equipment. A maximum of 12.5 lb ai/A per crop cycle is impled. A 4-day PHI and a 7-day retreatment interval are specified.

MRID 41039101 (2/6/89)
Ten trials were conducted in 1987 in MI, NJ, ME, and WA. Three to 14 foliar applications of captan (50% WP or 4 lb/gal FlC) were made. Samples were stored frozen for up to 9

months prior to analysis using Method No. RM-1K-2. Adequate concurrent recoveries were obtained. Residues of captan and THPI in/on control samples were nondetectable (<0.05 ppm). Results are presented in Table I-18.

Table I-18. Residues of captan and THPI in/on blueberries[a].

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Grand Junction, MI	2.0	4	4 FIC	0	[illegible]	0.120	8.37
				3	5.5	0.079	5.58
				5	6.52	0.063	6.58
				7	2.64	0.068	2.71
				10	1.75	<0.05	1.80
	4.0	4	4 FIC	0	22.6	0.318	22.9
				3	16.1	0.234	16.3
				5	10.8	0.150	11.0
				7	8.5	0.164	8.66
				10	7.16	0.058	7.22
	2.5	3	50 WP	0	[illegible]	<0.05	1.77
				3	1.96	<0.05	2.01
				5	0.495	<0.05	0.545
				7	3.32	<0.05	3.37
					0.310	<0.05	0.360
				8	2.79	<0.05	2.84
				10	0.504	<0.05	0.554
		4	50 WP	0	[illegible]	0.069	4.07
				3	5.40	0.08	5.48
				5	2.44	<0.05	2.49
				7	1.98	<0.05	2.03
				10	1.27	<0.05	1.32
		8	50 WP	0	[illegible]	0.106	8.31
				3	6.90	0.094	6.99
				5	6.80	0.10	6.90
				7	6.08	0.05	6.13
				10	3.64	<0.05	3.69
Mays Landing, NJ	2.5	6	50 WP	1	[illegible]	<0.05	4.85
					[illegible]	0.090	10.9
				3	14.6	0.141	14.7
					4.3	<0.05	4.35
				5	7.12	0.059	7.18
					3.46	<0.05	3.51
				7	7.12	0.205	7.33
					1.24	<0.05	1.29
Orono, ME	2.5	4	50 WP	21	0.664	<0.05	0.714
		10	50 WP	0	[illegible]	0.151	8.35

Table I-18: (*continued*). 55

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Puyallup, WA	2.5	3	50 WP	64	0.666	<0.05	0.716
		4	50 WP	7	3.36	<0.05	3.41
		14	50 WP	0	[illegible]	0.167	18.5

[a] Rate reported is single application rate.
[b] Retreatment intervals were 5-29 days.
[c] Redlined data used to calculate an average.

Other MRIDs

Four additional MRIDs were cited by the Residue Chemistry Chapter of the 1985 Captan Registration Standard as containing residue data for blueberries; these are MRIDs 00046914, 00070201, 00090988, and 00142163. These data will not be used for anticipated residue calculations because these submissions contain insufficient supporting information.

Cherries

Use

U.S. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for a postharvest spray or dip application to cherries at 1.25 lb ai/100 gal water.

Eastern U.S. The 50% and 80% WP and 75% DF formulations are registered for multiple foliar applications to cherries at up to 2 lb ai/A/application with a minimum interval of 7 days between applications. Captan may be applied through harvest (0-day PHI). The labels specify a maximum seasonal application rate of 14 lb ai/A/season. Applications may be made using either ground or aerial equipment.

Western U.S., excluding CA. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to cherries at up to 2 lb ai/A/application. The labels specify a maximum seasonal application rate of 14 lb ai/A/season. The labels imply a 0-day PHI, but do not state a minimum retreatment interval. Applications may be made using either ground or aerial equipment.

California. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to cherries at up to 2 lb ai/A/application with a maximum seasonal application rate of 14 lb ai/A/season and a 7-day PHI. The labels do not state a minimum retreatment interval. Applications may be made using either ground or aerial equipment.

MRID 00128355 (1973-1980)

Seventeen tests were conducted between 1973 and 1980 in CA, IL, MI, MT, and NY. Multiple foliar applications of captan (50% and 80% WP) were made to cherries at 1-12.7 lb ai/A/application. Residue samples were stored frozen for up to 15 months prior to extraction

for analysis using Method Nos. RM-1K-2, RRC-76-30R, and RRC-78-20. Recoveries reported for the method were adequate. Residues of captan were 0.10-0.19 ppm in/on three control samples from Hart, MI and Sodus, NY, and were <0.05 ppm in/on the other control samples. Results are presented in Table I-19.

Table I-19. Residues of captan and THPI in/on cherries[c].

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Traverse City, MI	3	5	50 WP	0	0.55	NR=not reported	0.55
					2.60	NR	2.60
Hart, MI	2	6	50 WP	0	[illegible]	NR	13.03
				1	20.00	NR	20.00
				3	14.98	NR	14.98
				7	5.86	NR	5.86
				12	4.32	NR	4.32
Hart, MI	2	6	50 WP	0	[illegible]	NR	21.28
				1	10.97	NR	10.97
				3	18.70	NR	18.70
				7	20.00	NR	20.00
				14	8.18	NR	8.18
Hart, MI	1.5	6	50 WP	0	[illegible]	NR	12.25
				1	14.25	NR	14.25
				3	8.28	NR	8.28
				7	5.47	NR	5.47
				12	1.93	NR	1.93
Hart, MI	1.5	6	50 WP	0	[illegible]	NR	20.00
				1	16.26	NR	16.26
				3	9.70	NR	9.70
				7	15.48	NR	15.48
				14	12.29	NR	12.29
Lodi, CA	5	2	50 WP	1	7.90	NR	7.90
Sodus, NY	3	7	50 WP	10	8.20	NR	8.20
					7.40	NR	7.40
	2	7	50 WP	8	0.92	NR	0.92
Urbana, IL	2	7	50 WP	1	4.34	NR	4.34
Sodus, NY	1	5	80WP	0	17.10	1.60	18.70
				1	5.30	0.55	5.85
				3	11.20	1.00	12.20
				7	8.30	1.50	9.80

Table I-19. (continued)

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Sodus, NY	1	5	80WP	0	16.10	1.80	17.90
				1	15.00	3.00	18.00
				3	9.90	1.90	11.80
				7	7.40	2.20	9.60
				10	7.10	1.60	8.70
				14	2.00	0.36	2.36
Finley Point, MT	2	6	50 WP	1	2.39	NR	2.39
				2	1.61	NR	1.61
				3	2.36	NR	2.36
				7	2.22	NR	2.22
				14	1.44	NR	1.44
Polson, MT	2	6	50 WP	0	[illegible]	NR	5.48
				1	3.43	NR	3.43
				3	4.68	NR	4.68
		8	50 WP	1	2.31	NR	2.31
				8	2.78	NR	2.78
Fresno, CA	12.7	4	50 WP	1	7.89	0.26	8.15
				6	4.93	0.49	5.42
				7	3.28	0.37	3.65
Phelps, NY	4	8	50 WP	1	3.71	0.52	4.23
					7.16	0.49	7.65
				7	7.06	0.30	7.36
					4.57	0.35	4.92
	3.5	7	50 WP	1	16.80	0.83	17.63
					12.20	0.51	12.71
				7	6.83	0.21	7.04
					11.20	0.32	11.52

[a] Rate reported is single application rate.
[b] Captan was applied at 2- to 48-day intervals, with the majority of intervals between 7 to 14 days.
[c] Redlined data used to calculate an average.

MRID 40189801 (3/3/87)
This submission summarizes residue data from numerous 1986 field studies, including data for cherries. These cherry studies were submitted in full as MRID 40189808 and are discussed below in detail.

MRID 40189808 (3/27/87)
Eight tests were conducted in 1986 in MI, NY, and WA. Multiple foliar applications of captan (50% WP) were made to cherries at 2 lb ai/A/application for a total of 14 lb ai/A/season. Treated and untreated samples from three of the tests also received a postharvest dip treatment of captan at 1.25 lb ai/100 gal. Cherries were stored frozen for up to 7 months prior to analysis. Residue data were generated using Method No. RM-1K-2.

Recoveries of both analytes were adequate. Four of six control samples bore apparent captan residues of 0.16-5.28 ppm; residues of THPI were nondetectable (<0.05 ppm) in all control samples. Results are presented in Table I-20.

Table I-20. Residues of captan and THPI in/on cherries[d].

Location	Application		Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
	Method	Rate [a]				Captan	THPI	Total
Wenatchee, WA	Foliar	2	7	50 WP	0	[redacted] [c]	0.2, 0.24 [c]	15.8, 19.24
						[redacted] [c]	0.22, 0.26	18.02, 21.06
	Dip	1.25	1	50 WP	0	3.80	0.09	3.89
						14.30	0.30	14.6
	Foliar + Dip	2 + 1.25	7+1	50 WP	0	35.40	0.45	35.85
						13.00	0.20	13.20
	Dip	1.25	1	50 WP	10	7.30	0.15	7.45
						5.80	0.17	5.97
	Foliar + Dip	2 + 1.25	7+1	50 WP	10	24.80	0.44	25.24
						9.20	0.35	9.55
Wenatchee, WA	Foliar	2	7	50 WP	0	[redacted] [c]	0.12, 0.17	10.12, 17.57
						[redacted] [c]	0.13, 0.13	14.53, 14.13
	Dip	1.25	1	50 WP	0	15.00	0.23	15.23
						14.20	0.24	14.44
	Foliar + Dip	2 + 1.25	7+1	50 WP	0	2.10	0.15	2.35
						22.6	0.34	22.94
Watervliet, MI	Foliar	2	7	50 WP	0	[redacted] [c]	0.19, 0.19	10.09, 9.49
						[redacted]	0.18	10.78
Sodus, NY	Foliar	2	7	50 WP	0	[redacted] [c]	0.17, 0.17	12.07, 11.17
						[redacted]	0.15	10.55

[a] Rates reported are single application rates and are expressed in lb ai/A for foliar applications and lb ai/100 gal for dip applications.
[b] Foliar applications were made at 5- to 29-day intervals.
[c] Duplicate analysis of a single sample.
[d] Redlined data used to calculate an average for the use type (foliar; dip; dip plus foliar) indicated.

Other MRIDs

Five additional MRIDs (00044660, 00044661, 00070201, 00090988, and 00098707) were cited by the Residue Chemistry Chapter of the 1985 Captan Registration Standard as containing residue data for cherries. These data will not be used for anticipated residue calculations because either supporting information was insufficient or the data were generated using a colorimetric method.

Grapes

Use

U.S., excluding CA. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to grapes at up to 2 lb ai/A/application with a minimum interval of 10 days between applications. The labels imply a maximum seasonal application rate of 12 lb ai/A/season and specify a 14-day PHI. Applications may be made using either ground or aerial equipment.

California. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to grapes at up to 2 lb ai/A/application. A maximum seasonal application rate of 12 lb ai/A/season is implied, but a minimum retreatment interval is not specified. The labels specify a PHI of 45 days. Applications may be made using either ground or aerial equipment.

MRID 00128355 (1973-1980)

Eleven tests were conducted between 1973 and 1980 in CA, FL, MD, and NY. Multiple foliar applications of captan (50% and 80% WP and 10% D) were made to grapes at 1-10 lb ai/A/application. Total seasonal application rates ranged from 1 to 20 lb ai/A/season. Residue samples were stored frozen for up to 14 months prior to extraction for analysis. Residue data were generated using Method Nos. RM-6E-1, RM-1F, RM-1K-2, RRC-76-30R, and RRC-78-20. Method recoveries were adequate. Residues of captan were nondetectable (<0.05 ppm) in/on control samples, except for two samples from CA that the registrant stated were contaminated. Results are presented in Table I-21. This MRID also includes four tests from CA, in which the only captan formulation used was the 10% D; these data were not reported here as no dust formulations are being supported for applications to grapes.

Table I-21. Residues of captan and THPI in/on grapes[a].

Location	Application Rate (lb ai/A)[a]	No. of Applications[b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Hancock, MD	1.0	9	50 WP	0	2.60	NR=not reported	2.60
Reedley, CA	1.0	2	50 WP	0	10.60	NR	10.60
	1.0	1	50 WP	0	11.10	NR	11.10
	10.0	1	50 WP	0	30.10	<0.05	30.15
				1	28.90	<0.05	28.95
				3	20.10	<0.05	20.15
				7	16.50	<0.05	16.55
Orange Cove, CA	3.0	3	50 WP	1	10.00	NR	10.00
				3	10.00	NR	10.00
				7	6.90	NR	6.90
				10	6.40	NR	6.40
				13	5.50	NR	5.50

Table I-21: (*continued*).

Location	Application Rate (lb ai/A) [a]	No. of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Leesburg, FL	2.0	6	50 WP	7	0.24	NR	0.24
					1.58	NR	1.58
				14	[illegible]	NR	0.22
					[illegible]	NR	0.53
Yountville, CA	2 + 4	2 + 3	50 WP + 10% D	63	4.12	0.18	4.30
					5.54	0.18	5.72
	4 + 4	2 + 3	50 WP + 10%D	63	2.34	0.20	2.54
					2.42	0.17	2.59
Fredonia, NY	2.0	3	50 WP	13	0.77	0.05	0.82
					1.11	0.14	1.25
		4	50 WP	9	[illegible]	0.10	1.29
					[illegible]	0.14	2.46
Hammondsport, NY	2.0	7	80WP	33	[illegible]	0.21	9.61
					[illegible]	0.19	9.32

[a] Rate reported is single application rate.
[b] Captan was applied at 5- to 49-day intervals, with the majority of intervals between 7 to 14 days.
[c] Redlined data were used to calculate an average.

MRID 40189801 (3/3/87)
This submission summarizes residue data from numerous 1986 field studies, including data for grapes. These grape studies were submitted in full as MRID 40189811 and are discussed below in detail.

MRID 40189811 (3/3/87)
Seven tests were conducted in 1986 in CA, MI, NY, and WA. Multiple foliar applications of captan (50% WP) were made to grapes at 2 lb ai/A/application for a total of six applications (12 lb ai/A/season). Residue samples were stored frozen for up to 4 months prior to extraction for analysis. Residue data were generated using Method No. RM-1K-2 with minor modifications. Method recoveries were adequate. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-22.

Table I-22. Residues of captan and THPI in/on grapes[a].

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Poplar, CA	2	6	50 WP	0	[illegible]	0.20	11.10
					[illegible]	0.28	22.68
	6	6	50 WP	0	179.00	1.93	180.93
					72.00	0.69	72.69
Kingsburg, CA	2	6	50 WP	0	[illegible]	<0.05	7.45
					[illegible]	<0.05	5.85

Table I-22. (*continued*).

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Porterville, CA	2	6	50 WP	0	[illegible]	<0.05	3.73
					[illegible]	<0.05, <0.05	1.35
Watervliet, MI	2	6	50 WP	0	[illegible]	0.14	11.04
					[illegible]	0.12	8.22
Phelps, NY	2	6	50 WP	0	[illegible]	0.19, 0.11 [c]	7.31
					[illegible]	0.14	6.58
					[illegible]	0.14	6.54
					[illegible]	0.19, 0.18 [c]	4.99
Wenatchee, WA	2	6	50 WP	0	[illegible]	<0.05	0.98
					[illegible]	<0.05	1.35

[a] Rate reported is single application rate.
[b] Retreatment intervals were 7-50 days.
[c] Duplicate analysis of a single sample.
[d] Redlined data were used to calculate an average.2

MRID 40745405 (5/16/88)

Two tests were conducted in 1987 in NY. Multiple foliar applications of captan (50% WP) were made to grapes at 2 lb ai/A/application for a total of six applications (12 lb ai/A/season). Residue samples were stored frozen for up to 2 months prior to extraction for analysis. Residue data were generated using Method No. RM-1K-2 with minor modifications. Method recoveries were adequate. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-23.

Table I-23. Residues of captan and THPI in/on grapes[d].

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Phelps, NY	2	6	50 WP	0	[illegible]	0.06, 0.08	3.20, 4.00
					[illegible]	<0.05	2.23
					[illegible]	<0.05	2.15
Phelps, NY	2	6	50 WP	0	[illegible]	0.21	8.17
					[illegible]	0.22	8.58
					[illegible]	0.25	8.25

[a] Rate reported is single application rate.
[b] Captan was applied at 12- to 28-day intervals.
[c] Duplicate analysis of a single sample.
[d] Redlined data were used to calculate an average.

MRID 42254202 (12/19/90)

Five tests were conducted in 1989 in CA, MI, NY, PA and WA. Two to four foliar applications of captan (50% WP) were made to grapes at 2 lb ai/A/application for a total of 4-8 lb ai/A/season. Residue samples were stored frozen for up to 5 months prior to

extraction for analysis. Residue data were generated using ICI Americas Method No. WRC 89-51. Method recoveries were adequate. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-24.

Table I-24. Residues of captan and THPI in/on grapes.

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Sultana, CA	2	2	50 WP	113	0.17	<0.05	0.22
		3	50 WP	95	0.94	<0.05	0.99
		4	50 WP	81	0.10	<0.05	0.15
Benton Harbor, MI	2	2	50 WP	100	<0.05	<0.05	<0.10
		3	50 WP	80	<0.05	<0.05	<0.10
		4	50 WP	68	<0.05, <0.05	<0.05, <0.05	<0.10, <0.10
Phelps, NY	2	2	50 WP	113	<0.05	<0.05	<0.10
		3	50 WP	90	<0.05	<0.05	<0.10
		4	50 WP	78	0.07 0.08 [c]	<0.05, <0.05	0.12, 0.13
Orefield, PA	2	2	50 WP	93	<0.05	<0.05	<0.10
		3	50 WP	81	<0.05	<0.05	<0.10
		4	50 WP	74	<0.05, <0.05	<0.05, <0.05	<0.10, <0.10
Battleground, WA	2	2	50 WP	76	0.07	<0.05	0.12
		3	50 WP	67	0.17	<0.05	0.22
		4	50 WP	57	0.24	<0.05	0.29

[a] Rate reported is single application rate.
[b] Retreatment intervals were 6-23 days.
[c] Duplicate analysis of a single sample.

MRID 42296001 (12/19/90)
This study is a duplicate of the study described in MRID 42254202, which is discussed above.

Grape Processing Studies

MRID 00128355 (1973-1980)
Nine tests were conducted between 1973 and 1980 in CA and NY. Multiple foliar applications of captan (50% WP and 10% D) were made to grapes at 1-3.6 lb ai/A/application. Total seasonal application rates ranged from 5 to 32.4 lb ai/A/season. Fruits were harvested 1-86 days after the last application. Residue samples were stored frozen for up to 13 months prior to extraction for analysis. Whole grapes were processed into juice and wet and dry pomace; only grapes at the CA test sites were processed into raisins and raisin waste. Raisins were stored at 50 C for up to 5 months prior to processing. Residue data were generated using Method Nos. RM-1F-1 and RM-1K-2. Method recoveries

were adequate. Residues of captan were nondetectable (<0.05 ppm) in/on the control sample from NY, and 0.23-0.43 ppm in/on control samples from CA. Results are presented in Table I-25. Residues of captan *per se* did not concentrate in grape juice and pomace, but concentrated by averages of 1.7x and 3.4x in raisins and raisin waste, respectively. Residues of THPI *per se* concentrated (averages) in juice (6.5x), wet pomace (2x), raisins (6.2x) and raisin waste (19x).

Table I-25. Residues of captan and THPI in/on grapes and grape processed fractions.

Location Commodity	Application Rate (lb ai/A) [a]	Residues Found (ppm)			Concentration Factors		
		Captan	THPI	Total [b]	Captan	THPI	Total
Fresno, CA Whole Fruit	5.0	0.32, 0.35 (0.34)	NR	0.32, 0.35 (0.34)	–	–	–
Wet Pomace		0.19, 0.30 (0.25)	NR	0.19, 0.30 (0.25)	0.7	–	0.7
Dry Pomace		0.04, 0.04 (0.04)	NR	0.04, 0.04 (0.04)	0.1	–	0.1
Fredonia, NY Whole Fruit	15.0	0.83	NR	0.83	–	–	–
Wet Pomace		0.[illegible] (0.49)	NR	0.58, 0.40 (0.49)	0.6	–	0.6
Dry Pomace		0.08, 0.13 (0.11)	NR	0.08, 0.13 (0.11)	0.1	–	0.1
Fresno, CA Whole Fruit	10.8	1.4, 1.2 (1.3)	0.06, 0.04 (0.05)	1.46, 1.22 (1.34)	–	–	–
Juice		0.94, 1.20 (1.07)	0.31, 0.35 (0.33)	1.25, 1.55 (1.40)	0.8	6.6	1.0
Pomace [c]		0.27, 0.30 (0.29)	0.11, 0.09 (0.10)	0.38, 0.39 (0.39)	0.2	2.0	0.3
Raisins [d]		3.6, 3.8 (3.7)	0.44, 0.54 (0.49)	4.04, 4.34 (4.19)	2.9	9.8	3.1
Raisin Waste		6.8, 9.7 (9.3)	1.0, 1.2 (1.1)	9.8, 10.9 (10.35)	7.2	22.0	7.7
Whole Fruit	32.4	12.0, 9.1 (10.6)	0.47, 0.46 (0.47)	12.47, 9.56 (11.02)	–	–	–
Juice		12.0, 17.0 (14.5)	3.0, 3.1 (3.1)	15.0, 20.1 (17.55)	1.4	6.6	1.6
Pomace [c]		8.0, 7.3 (7.65)	1.2, 1.0 (1.1)	9.2, 8.3 (8.75)	0.7	2.3	0.8
Raisins [d]		10.0, 18.0 (14.0)	4.4, 4.5 (4.5)	14.4, 22.5 (18.45)	1.3	9.6	1.7
Raisin Waste		16.0, 20.0 (18.0)	6.0, 5.4 (5.7)	22.0, 25.4 (23.7)	1.7	12.1	2.2
Whole Fruit	32.4	13.0, 10.0 (11.5)	0.51, 0.22 (0.37)	13.51, 10.22 (11.87)	–	–	–
Juice		17.0, 17.0 (17.0)	2.4, 2.2 (2.3)	19.4, 19.2 (19.3)	1.5	6.2	1.6

Table I-25. (*continued*).

Location Commodity	Application Rate (lb ai/A) [a]	Residues Found (ppm)			Concentration Factors		
		Captan	THPI	Total [b]	Captan	THPI	Total
Pomace [c]		2.7, 2.8 (2.75)	0.57, 0.60 (0.59)	3.27, 3.40 (3.34)	0.2	1.6	0.3
Raisins [d]		21.0, 14.0 (17.5)	3.3, 3.8 (3.55)	24.3, 17.8 (21.05)	1.5	9.6	1.8
Raisin Waste		16.0, 16.0 (16.0)	8.6, 8.4 (8.5)	24.6, 24.4 (24.5)	1.4	23.0	2.1
Whole Fruit	27.6	8.82, 17.0 (12.91)	0.64, 0.69 (0.67)	9.48, 17.69 (13.59)	–	–	–
Raisins [d]		5.39, 8.16 (6.78)	2.51, 2.58 (2.55)	7.90, 10.74 (9.32)	0.5	3.8	0.7
Whole Fruit	27.6	13.0, 15.7 (14.35)	0.90. 1.11 (1.01)	13.90, 16.81 (15.36)	–	–	–
Raisins [d]		20.7, 15.5 (18.10)	2.99, 2.98 (2.99)	23.69, 18.48 (21.09)	1.3	3.0	1.4
Whole Fruit	24.0	8.95, 8.02 (8.49)	0.55, 0.62 (0.59)	9.50, 8.64 (9.07)	–	–	–
Raisins [d]		15.5, 16.6 (16.05)	2.40, 2.16 (2.28)	17.90, 18.76 (18.33)	1.9	3.9	2.0
Whole Fruit	20.6	4.33, 5.82 (5.08)	0.42, 0.35 (0.39)	4.75, 6.17 (5.46)	–	–	–
Raisins [d]		14.4, 12.1 (13.25)	1.82, 1.54 (1.68)	16.22, 13.64 (14.93)	2.6	4.3	2.7

[a] Rate reported is the total seasonal application rate.
[b] Residue averages in parentheses were used to calculate the concentration factors.
[c] The type of pomace (wet or dry) was not specified.
[d] After field drying, raisins were stored at 50 C for up to 5 months prior to processing.

MRID 00159601 and 00162037 (5/29/86)

These submissions contain data from processing studies conducted in 1985 in CA, NY, and WA. Multiple foliar applications of captan (50% WP) were made to grapes at 3 lb ai/A/application starting at prebloom, for a total of five (WA) or seven (CA and NY) applications (15 and 21 lb ai/A/season) at 9- to 42-day intervals. Grapes were harvested on the day of the last application (0-day) in the NY and WA tests and 85 days posttreatment in CA. Whole grapes from NY and WA were processed into juice and wet and dry pomace. Residue samples were stored frozen for up to 8 months prior to extraction for analysis. Residue data were generated using Method No. RM-1K-2. Method recoveries were adequate. Residues of captan in/on control grape samples were nondetectable (<0.01 ppm) in CA, 0.01 ppm in NY, and 0.49 ppm in WA. Residues of THPI in/on control grape samples were 0.03 ppm in WA and <0.01 ppm in NY and CA. Results are presented in Table I-26. Residues of captan *per se* did not concentrate in grape juice or pomace. Average concentrations of THPI *per se* were 24.2x in juice, 15.4x wet pomace, and 41.6x dry pomace.

Table I-26. Residues of captan and THPI in/on grapes and grape processed fractions.

Location Commodity	Application Rate (lb ai/A) [a]	Residues Found (ppm)			Concentration Factors		
		Captan	THPI	Total [b]	Captan	THPI	Total
Geneva, NY							
Whole Fruit	21	4.95, 5.69 (5.32)	0.08, 0.13 (0.11)	5.03, 5.82 (5.43)	–	–	–
Washed Fruit		2.02	0.03	2.05	0.4	0.3	0.4
Juice		<0.01	2.79	2.80	<0.01	25.4	0.5
Wet Pomace		0.53	1.74	2.36	0.1	15.8	0.4
Dry Pomace		0.62	4.64	5.17	0.1	42.2	1.0
Fresno, CA							
Whole Fruit	21	1.92, 1.56 (1.74)	0.03, 0.01 (0.02)	1.95, 1.57 (1.76)	–	–	–
Washed Fruit		0.67	0.03	0.70	0.4	1.5	0.4
Prosser, WA							
Whole Fruit	15	11.80, 9.80 (10.80)	0.21, 0.21 (0.21)	12.01, 10.01 (11.01)	–	–	–
Juice		<0.01, <0.01 (<0.01)	3.32, 6.25 (4.80)	3.33, 5.26 (4.80)	<0.01	22.9	0.4
Wet Pomace		<0.01, 0.02 (0.01)	2.88, 3.36 (3.12)	2.89, 3.38 (3.14)	<0.01	14.9	0.3
Dry Pomace		<0.01, <0.01 (<0.01)	11.90, 5.29 (8.60)	11.91, 5.30 (8.61)	<0.01	41.0	0.8

[a] Rate reported is the total seasonal application rate.
[b] Residue averages in parentheses were used to calculate the concentration factors.

MRID 40189801 (3/3/87)
This submission summarizes residue data from numerous 1986 field studies, including processing data for grapes. These grape studies were submitted in full as MRID 40189812 and are discussed below in detail.

MRID 40189812 (3/3/87)
Two tests were conducted in 1986 in CA. Multiple foliar applications of captan (50% WP) were made to grapes at 2 and 6 lb ai/A/application starting at prebloom and ending on the day of harvest, for a total of six applications (12 and 36 lb ai/A/season) at 14- to 42-day intervals. Whole grapes were processed into juice, wet and dry pomace, raisin, washed raisins, and raisin waste. Residue samples were stored frozen for up to 7 months prior to extraction for analysis. Residue data were generated using Method No. RM-1K-2 with minor modifications. Method recoveries were adequate. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-27. Residues of captan *per se* did not concentrate in wet pomace, but concentrated in juice

(1.6x), dry pomace (1.3x), raisins (3.2x), and raisin waste (13.8x). Residues of THPI *per se* concentrated (on average) in juice (1.8x), wet pomace (1.2x), dry pomace (34x), raisins (20.3x), and raisin waste (17.1x).

Table I-27. Residues of captan and THPI in/on grapes and grape processed fractions.

Location Commodity	Application Rate (lb ai/A) [a]	Residues Found (ppm)			Concentration Factor		
		Captan	THPI	Total [b]	Captan	THPI	Total
Poplar, CA Whole Fruit	12	10.9, 22.4 (16.7)	0.20, 0.28 (0.24)	11.1, 22.7 (16.9)	–	–	–
	36	179.0, 72.0 (125.5)	1.93, 0.69 (1.31)	180.9, 72.7 (126.8)	–	–	–
Ground Whole Fruit	12	2.7	0.45	3.2	0.2	1.9	0.2
	36	62.8	0.81	63.6	0.5	0.6	0.5
Juice	12	82.4, 19.6 [c] (51.0)	0.7, 0.4 [c] (0.55)	83.1, 20.0 (51.5)	3.1	2.3	3.1
	36	51.2, 119.0 [c] (85.1)	0.9, 2.1 [c] (1.5)	52.1, 121.1 (86.6)	0.7	1.2	0.7
Wet Pomace	12	21.0, 14.8 [c] (17.9)	0.4, 0.4 [c] (0.4)	21.4, 15.2 (18.3)	1.1	1.7	1.1
	36	24.2, 52.8 [c] (38.5)	0.3, 1.2 [c] (0.75)	24.5, 54.0 (39.3)	0.3	0.6	0.3
Dry Pomace	12	20.4, 37.0 [c] (28.7)	10.4, 10.7 [c] (10.55)	30.8, 47.7 (39.3)	1.7	44	2.3
	36	55.2, 168.0 [c] (111.6)	6.4, 56.2 [c] (31.3)	61.6, 224.2 (142.9)	0.9	23.9	1.1
Raisins	12	79.5	7.7	87.2	4.8	32.1	5.2
	36	189.0, 186.0 (187.5)	11.0, 11.2 [c] (11.1)	200.0, 197.2 (198.6)	1.5	8.5	1.6
Washed Raisins	12	13.3	9.4	22.7	0.8	0.24	1.3
	36	13.8	10.0	23.8	0.1	7.6	0.2
Raisin Waste	12	316.0	5.6	321.6	18.9	23.3	19.0
	36	1080.0	14.3	1094.3	8.6	10.9	8.6

[a] Rate reported is the total seasonal application rate.
[b] Residue values in parentheses are averages that were used to calculate the concentration factors.
[c] Duplicate analysis of a single sample.

MRID 42296004 (3/26/91)
Nine tests were conducted in 1989 in CA and NY. Two to four foliar applications of captan (50% WP) were made to grapes at 2 lb ai/A/application at 5- to 23-day intervals starting at early prebloom and ending by 10-14 days postbloom, for a total of 4-8 lb ai/A/season. Grapes were harvested at maturity, 50-122 days following the last application. Whole grapes from each test location were processed into juice and wet and dry pomace; only grapes at the CA test sites were processed into raisins and raisin waste. Residue samples were stored frozen for up to 7 months prior to extraction for analysis. Residue data were generated using ICI Americas Method No. WRC 89-51, which is an updated version of Method No. RM-1K-

2 with minor modifications. Method recoveries were adequate. Apparent residues of captan (0.08 ppm) were detected in one control sample of raisins from CA; residues of both analytes were nondetectable (<0.05 ppm) in all other control samples. Results are presented in Table I-28. Residues of captan *per se* did not concentrate in juice or pomace, but concentrated in raisins by an average of 1.4x, and raisin waste by an average of 16.1x. Residues of THPI *per se* concentrated (average) in juice (1.3x), dry pomace (2x), raisins (1.2x), and raisin waste (1.7x).

Table I-28. Residues of captan and THPI in/on grapes and grape processed fractions.

Location Commodity	Application Rate (lb ai/A) [a]	Residues Found (ppm)			Concentration Factor		
		Captan	THPI	Total [b]	Captan	THPI	Total
Sultana, CA Whole Fruit	4	0.08, 0.07 (0.08)	<0.05, <0.05 (<0.05)	0.13, 0.12 (0.13)	–	–	–
	6	0.64, 0.38 (0.51)	<0.05, <0.05 (<0.05)	0.69, 0.43 (0.56)	–	–	–
	8	0.17, <0.05 (0.11)	<0.05, <0.05 (<0.05)	0.22, <0.10 (0.16)	–	–	–
Juice	4	<0.05	<0.05	<0.10	0.6	1.0	0.8
	6	0.51	0.12	0.63	1.0	2.4	1.1
	8	0.10	0.07	0.17	0.9	1.4	1.1
Wet Pomace	4	0.09	<0.05	0.14	1.1	1.0	1.1
	6	0.46	0.06	0.52	0.9	1.2	0.9
	8	0.17	<0.05	0.22	1.6	1.0	1.4
Dry Pomace	4	0.11	<0.05	0.16	1.4	1.0	1.2
	6	0.22	0.12	0.34	0.4	2.4	0.6
	8	0.09	0.09	0.18	0.8	1.8	1.1
Raisins	4	0.08	<0.05	0.13	1.0	1.0	1.0
	6	0.61	0.06	0.67	1.2	1.2	1.2
	8	0.29	<0.05	0.34	2.6	1.0	2.1
Raisin Waste	4	0.62	<0.05	0.67	7.8	1.0	5.2
	6	13.4	0.20	13.6	26.3	4.0	24.3
	8	5.75	0.10	5.85	52.3	2.0	36.6 (26.6) [c]
Shafter, CA Whole Fruit	4	<0.05, <0.05 (<0.05)	<0.05, <0.05 (<0.05)	<0.10, <0.10 (0.10)	–	–	–
	6	0.07, <0.05 (0.06)	<0.05, <0.05 (<0.05)	0.12, <0.10 (0.11)	–	–	–
	8	0.11, 0.22 (0.17)	<0.05, <0.05 (<0.05)	0.16, 0.27 (0.22)	–	–	–
Juice	4	<0.05	<0.05	<0.10	1.0	1.0	1.0
	6	0.05	<0.05	<0.10	0.8	1.0	0.9
	8	<0.05	0.09	0.14	0.3	1.8	0.6

Table I-28. (*continued*).

Location Commodity	Application Rate (lb ai/A) [a]	Residues Found (ppm)			Concentration Factor		
		Captan	THPI	Total [b]	Captan	THPI	Total
Wet Pomace	4	<0.05	<0.05	<0.10	1.0	1.0	1.0
	6	0.09	<0.05	0.14	1.5	1.0	1.3
	8	0.12	<0.05	0.17	0.7	1.0	0.8
Dry Pomace	4	<0.05	<0.05	<0.10	1.0	1.0	1.0
	6	<0.05	<0.05	<0.10	0.8	1.0	0.9
	8	0.09	<0.05	0.14	0.5	1.0	0.6
Raisins	4	<0.05	<0.05	<0.10	1.0	1.0	1.0
	6	0.08	<0.05	0.13	1.3	1.0	1.2
	8	0.19	<0.05	0.24	1.1	1.0	1.0
Raisin Waste	4	0.09	<0.05	0.14	1.8	1.0	1.4
	6	0.30	<0.05	0.35	5.0	1.0	3.2
	8	0.52	<0.05	0.57	3.1	1.0	2.6
Phelps, NY	4	<0.05	<0.05	<0.10	–	–	–
Whole Fruit	6	0.20, 0.08 (0.14)	<0.05, <0.05 (<0.05)	0.25, 0.13 (0.19)	–	–	–
	8	0.32, 0.29 (0.31)	<0.05, <0.05 (<0.05)	0.37, 0.34 (0.36)	–	–	–
Juice	4	<0.05	<0.05	<0.10	1.0	1.0	1.0
	6	<0.05	<0.05	<0.10	0.4	1.0	0.5
	8	0.07	<0.05	0.12	0.2	1.0	0.3
Wet Pomace	4	<0.05	<0.05	<0.10	1.0	1.0	1.0
	6	0.19	<0.05	0.24	1.4	1.0	1.3
	8	0.31	0.09	0.40	1.0	1.8	1.1
Dry Pomace	4	<0.05	0.07	0.12	1.0	1.4	1.2
	6	0.09	0.09	0.18	0.6	1.8	0.9
	8	0.29	0.39	0.68	2.2	7.8	1.9

[a] Rate reported is the total seasonal application rate.
[b] Values in parentheses are the averages that were used to calculate the concentration factors.
[c] Concentration factor determined using only the whole fruit sample with detectable residues (0.22 ppm).

MRID 42305402 (3/26/91)
This study is a duplicate of the study described in MRID 42296004, which is discussed above.

MRID 42563101 (11/6/92)
One test was conducted in 1990 in PA. Six foliar applications of captan (50% WP) were made to grapes at 2 lb ai/A/application at 8- to 22-day intervals for a total of 12 lb ai/A/season. Grapes were harvested at maturity, 36 days following the last application. Whole grapes were processed using simulated commercial practices into various commodities. Residue samples were stored frozen for up to 13 months prior to analysis using Method No. WRC 89-51. Method recoveries were adequate. Apparent residues of

captan and THPI were nondetectable (<0.05 ppm) in/on control samples, with the exception of the dry pomace control sample that contained 0.14 ppm THPI that was attributed to contamination of the sample. Results are presented in Table I-29. Residues of captan *per se* and the combines residues of captan and THPI did not concentrate in any processed fractions. Residues of THPI *per se* concentrated in juice (1.8-2.6x) and dry pomace (3.4x).

Table I-29. Residues of captan and THPI in/on grapes and grape processed commodities.

Location Commodity	Application Rate [a] (lb ai/A)	Residues Found (ppm) [b]			Concentration Factors		
		Captan	THPI	Total	Captan	THPI	Total
Orefield, PA Whole grapes	12	0.49, 0.51, 0.33 (0.44)	<0.05, <0.05, <0.05 (<0.05)	0.54, 0.56, 0.38 (0.49)	–	–	–
Whole grapes [c]	12	0.46, 0.32 (0.39)	0.0[illegible] 0.08 (0.08)	0.54, 0.40 (0.47)	–	–	–
Washed grapes	12	0.16, 0.44 (0.30)	0.08, <0.05 (0.07)	0.24, 0.49 (0.37)	0.8	0.9	0.8
185° juice	12	<0.05, <0.05 (<0.05)	0.22, 0.19 (0.21)	0.27, 0.24 (0.26)	<0.1	2.6	0.6
Clear juice	12	<0.05, <0.05 (<0.05)	0.11, 0.16 (0.14)	0.16, 0.21 (0.19)	<0.1	1.8	0.4
Thick juice	12	<0.05, <0.05 (<0.05)	0.19, 0.18 (0.19)	0.24, 0.23 (0.24)	<0.1	2.4	0.5
Filtered juice	12	<0.05, <0.05 (<0.05)	0.14, 0.17 (0.16)	0.19, 0.22 (0.21)	<0.1	2.0	0.4
Grape jelly	12	<0.05, <0.05 (<0.05)	0.07, 0.09 (0.08)	0.12, 0.14 (0.13)	<0.1	1.0	0.3
Canned juice	12	<0.05, <0.05 (<0.05)	0.18, 0.22 (0.20)	0.23, 0.27 (0.25)	<0.1	2.5	0.5
Wet pomace	12	<0.05, <0.05 (<0.05)	0.07, 0.07 (0.07)	0.12, 0.12 (0.12)	<0.1	0.9	0.3
Dry pomace	12	<0.05, <0.05 (<0.05)	0.23, 0.30 (0.27)	0.28, 0.35 (0.32)	<0.1	3.4	0.7

[a] Rate reported is the total seasonal application rate.
[b] Values in parentheses are the averages that were used to calculate the concentration factors.
[c] Residues in/on whole grapes sampled at processing were used to calculate concentration factors.

Other MRIDs

Six additional MRIDs (00046914, 00070201, 00085526, 00090988, 00098726, and 00098817) were cited by the Residue Chemistry Chapter of the 1985 Captan Registration Standard as containing residue data for grapes. These data will not be used for anticipated residue calculations because either supporting information was insufficient or the data were generated using a colorimetric method.

Nectarines

Use

U.S except CA. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to nectarines at up to 4 lb ai/A/application. A maximum seasonal application of 24 lb ai/A and a 0-day PHI are implied. The labels specify a minimum retreatment interval of 3 days. Applications may be made using either ground or aerial equipment.

California. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to nectarines at up to 4 lb ai/A/application. A maximum seasonal application of 20 lb ai/A is implied. The labels specify a 7-day PHI and a minimum retreatment interval of 3 days. Applications may be made using either ground or aerial equipment.

MRID 00128355 (1973-1980)

Eight tests were conducted in 1975-1980 in CA and IL. One to eight foliar applications of captan (50% WP) were made. Samples were stored frozen for up to 24 months prior to analysis using Method Nos. RRC-76-30R, RRC-78-20, and RM-1K-1. Method recoveries were adequate. Captan residues in controls were nondetectable (<0.05 ppm) except for two control samples that contained residues of 0.25 and 0.13 ppm. Results are presented in Table I-30.

Table I-30. Residues of captan and THPI in/on nectarines[a].

Location	Application Rate (lb ai/A)[b]	Number of Applications[b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Chester, Il	1	8	50 WP	1	0.25	NR=not reported	0.25
Kingsburg, CA	3	3	50 WP	18	0.47	NR	0.47
				12	0.24	NR	0.24
				12	<0.05	NR	<0.05
Sultana, CA	3	2	50 WP	20	0.13	NR	0.13
Parlier, CA	2	2	50 WP	18	0.20	NR	0.20

Table I-30. (*continued*).

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Parlier, CA	4	2	50 WP	18	<0.05	NR	<0.05
Reedley, CA	4	2	50 WP	17	<0.05	NR	<0.05
	6	1	50 WP	0	[illegible]	[illegible]	[illegible]
					[illegible]	1.0	3.6
				1	3.0	<0.05	3.05
					2.3	0.44	2.74
Reedley, CA (continued)				3	1.2	0.44	1.64
					2.0	0.11	2.11
				7	1.1	0.59	1.69
					2.1	0.39	2.49
				14	0.7	0.40	1.10
					0.8	<0.05	0.85
Fresno, CA	6	9	50 WP	0	[illegible]	0.28	10.28
				1	8.5	0.32	8.82
				3	6.6	0.21	6.81
				7	9.7	0.26	9.96
				10	3.2	0.20	3.40

[a] Rate reported is single application rate.
[b] Retreatment intervals were 3-150 days.
[c] Redlined data were used to calculate average.

MRID 40189801 (3/3/87)
This submission summarizes residue data from numerous 1986 field studies, including data for nectarines. These nectarine studies were submitted in full as MRID 40189813 and are discussed below in detail.

MRID 40189813 (3/3/87)
Three tests were conducted in 1986 in CA. Six foliar applications of captan (50% WP) were made. Residue samples were stored frozen for up to 7 months prior to analysis using Method No. RM-1K-2. Method recoveries were adequate. Residues in controls were nondetectable (<0.05 ppm). Results are presented in Table I-31.

Table I-31. Residues of captan and THPI in/on nectarines.

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Terra Bella, CA	2.5	6	50 WP	0	2.24	<0.05	2.29
					1.52	<0.05	1.57
Dinuba, CA	2.5	6	50 WP	0	1.26	0.06	1.32
					1.60	<0.05	1.65
Reedley, CA	2.5	6	50 WP	0	3.90	0.12	4.02
					2.56, 2.84 [c]	0.06, 0.07 [c]	2.62, 2.91

[a] Rate reported is single application rate.
[b] Retreatment intervals were 7-36 days.
[c] Duplicate analysis of same sample.

Peaches

Use

U.S except CA. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to peaches at up to 4 lb ai/A/application. A maximum seasonal application of 32 lb ai/A and a 0-day PHI are implied. The labels specify a minimum retreatment interval of 3 days. Applications may be made using either ground or aerial equipment.

California. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to peaches at up to 4 lb ai/A/application. A maximum seasonal application of 20 lb ai/A is implied. The labels specify a 7-day PHI, a minimum retreatment interval of 3 days. Applications may be made using either ground or aerial equipment.

MRID 00128355 (1973-1980)

Twenty-two tests were conducted in 1974-1980 in 13 locations. One to thirteen foliar applications of captan (50% and 32% WP) were made. Samples were stored for up to 14 months prior to analysis using Method Nos. RRC-76-30R, RRC-78-20, and RM-1K-1. Method recoveries were adequate. Captan residues in several controls were detectable (0.03-0.5 ppm). Results are presented in Table I-32.

Table I-32. Residues of captan and THPI in/on peaches.

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Colona, MI	1.5+0.75	4+5	50 WP	14	1.9	NR=not reported	1.9
					1.6	NR	1.6
Sanford, FL	1	3	32 WP	7	1.8	NR	1.8
Urbana, IL	0.5	8	50 WP	1	5.2	NR	5.2
Grimsby, ONT (Canada)	2	2	50 WP	3	1.4	NR	1.4
				3	1.8	NR	1.8
St. Catherines, ONT (Canada)	2	3	50 WP	1	4.8	NR	4.8
				3	0.82	NR	0.82
				7	0.66	NR	0.66
Grimsby, ONT (Canada)	2	2	50 WP	1	6.1	NR	6.1
				3	2.6	NR	2.6
				7	2.3	NR	2.3
	3	2	50 WP	3	5.5	NR	5.5
Johnston, SC	1	7	50 WP	2	0.25	NR	0.25
	1	7	50 WP	7	0.30	NR	0.30
Fort Valley, GA	1	6	50 WP	6	0.30	NR	0.30
	1	6	50 WP	12	0.25	NR	0.25
Hancock, MO	1.5	11	50 WP	7	8.0	NR	8.0
Mt. Holly, NJ	7+10	4+7	50 WP	0	1.96	NR	1.96
					5.56	NR	5.56
				3	8.52	NR	8.52
					8.37	NR	8.37
				7	11.4	NR	11.4
					12.4	NR	12.4
				14	8.31	NR	8.31
					9.30	NR	9.30
	5	13	50 WP	0	9.88	NR	9.88
					27.1	NR	27.1
Cream Ridge, NJ	0.5	8	50 WP	27	1.22	NR	1.22
Morristown, NJ	4	4	50 WP	6	0.29	0.01	0.30
					1.40	0.04	1.44
				14	0.37	0.02	0.39
Jackson Springs, NC	1	9	50 WP	8	1.44	NR	1.44
Charleston, WV	3	1	50 WP	0	11.6	0.83	12.43
				1	7.2	0.24	7.44
				3	4.4	0.89	5.29
				7	4.0	0.38	4.38
				14	2.8	0.51	3.31
Fort Valley, GA	3	3	50 WP	1	0.86	<0.05	0.91
Parlier, CA	3	3	50 WP	40	0.91	NR	0.91
Ballico, CA	2	2	50 WP	17	9.2	NR	9.2

Table I-32. (*continued*).

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Reedley, CA	4	1	50 WP	2	7.4	NR	7.4
					10.0	NR	10.0
					18.8	NR	18.8
	6	1	50 WP	0	7.8	1.0	8.8
				1	6.8	0.20	7.0
				3	3.6	0.60	4.20
				7	4.0	0.14	4.14
				14	2.0	0.08	2.08
Fresno, CA	5	7	50 WP	0	5.02	NR	5.02
					4.52	NR	4.52
		12	50 WP	0	22	NR	22
					15	NR	15
				3	20	NR	20
					14	NR	14
				7	21	NR	21
					17	NR	17
				14	17	NR	17
					20	NR	20

[a] Rate reported is single application rate.
[b] Retreatment intervals were 3-52 days.

MRID 40189801 3/3/87
This submission summarizes residue data from numerous 1986 field studies, including data for peaches. These peach studies were submitted in full as MRID 40189814 and are discussed below in detail.

MRID 40189814 (3/3/87)
Six tests were conducted in CA, SC, GA, NY, and MI in 1975-1980. Eight foliar applications of captan (50% WP) were made. Samples were stored for up to 9 months prior to analysis using Method No. RM-1K-2. Method recoveries were adequate. Residues in controls were nondetectable (<0.05 ppm). Results are presented in Table I-33.

Table I-33. Residues of captan and THPI in/on peaches[d].

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Porterville, CA	4	8	50 WP	0	[illegible]	0.08	9.98
					[illegible]	0.18	13.78
Reedley, CA	4	8	50 WP	0	[illegible]	0.29, 0.30 [c]	10.99, 9.90
					[illegible]	0.65	3.53
Elko, SC	4	8	50 WP	0	[illegible]	<0.05	7.49
					[illegible]	<0.05	3.45
Pike Road, GA	2	8	50 WP	0	[illegible]	<0.05	1.49
					[illegible]	<0.05	2.07
Watervliet, MI	4	8	50 WP	0	[illegible]	<0.05	5.61
					[illegible]	<0.05	6.05
Phelps, NY	4+1	6+2	50 WP	0	6.72, 8.64 [c]	0.16, 0.34 [c]	6.88, 8.98
					8.16, 9.84 [c]	0.53, 0.31 [c]	8.69, 10.15

[a] Rate reported is single application rate.
[b] Retreatment intervals were 7-28 days.
[c] Duplicate analysis of same sample.
[d] Redlined data were used to calculate average.

MRID 40745406 (5/16/88)

One test was conducted in 1987 in CA. Eight foliar applications of captan (50% WP) were made. Samples were stored frozen for up to 3 months prior to analysis using Method No. RM-1K-2. Method recoveries were adequate. Residues were nondetectable (<0.05 ppm) in/on controls. Results are presented in Table I-34.

Table I-34. Residues of captan and THPI in/on peaches[d].

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Denair, CA	4	8	50 WP	0	[illegible]	0.07	4.35
					[illegible]	<0.05	0.85
					[illegible]	<0.05	2.63
					[illegible] [c]	0.16, 0.14 [c]	8.46, 7.44
					[illegible]	0.16	7.01
					[illegible]	0.16	6.31
					[illegible]	0.50	11.10
					[illegible]	0.33	12.63
					[illegible]	0.24	11.84

[a] Rate reported is single application rate.
[b] Retreatment intervals were 7-93 days.
[c] Duplicate analysis of same sample.
[d] Redlined data were used to calculate average.

MRID 40745407 (5/16/88)
One test was conducted in 1987 in WA. Six applications of captan (50% WP) were made. Samples were stored frozen for up to 3 months prior to analysis using Method No. RM-1K-2. Method recoveries were adequate. Residues were nondetectable (<0.05 ppm) in/on controls. Results are presented in Table I-35.

Table I-35. Residues of captan and THPI in/on peaches[a].

Location	Application Rate (lb ai/A)[b]	Number of Applications[b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Ephorate, WA	4	6	50 WP	0	[illegible]	<0.05	3.61
					[illegible]	<0.05	2.57
					[illegible]	<0.05	4.39
					[illegible]	0.08	5.92
					[illegible]	0.07	3.05
					[illegible]	0.07, 0.08	2.75, 2.96

[a] Rate reported is single application rate.
[b] Retreatment intervals were 3-19 days.
[c] Duplicate analysis of same sample.
[d] [illegible] data were used to calculate average.

Other MRIDs
Four additional MRIDs were cited by the Residue Chemistry Chapter of the 1985 Captan Registration Standard as containing residue data for peaches; these are MRIDs 00044661, 00106602, 00070201, and 00090988. These data will not be used for anticipated residue calculations because these submissions contain insufficient supporting information.

Pears

Use
U.S. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for a postharvest spray or dip application to pears at 1.25 lb ai/100 gal water.

CA. The WP formulation is registered for foliar application to pears, 3 lbs. ai/A/application, with no specified maximum number of applications or seasonal application rate. The PHI is 14 days.

MRID 00128355 (1973-1980)
Twelve tests were conducted between 1975 and 1980 in CA, NH, NY, and WA. Multiple foliar applications of captan (50% WP) were made to pears at 0.75-6 lb ai/A/application. Residue samples were stored frozen for up to 13 months prior to extraction for analysis. Residue data were generated using Method Nos. RM-1F, RM-1K-2, RRC-76-30R, and RRC-78-20. Recoveries were adequate. Residues of captan were nondetectable (<0.01 ppm)

in/on the control samples. Results are presented in Table I-36.

Table I-36. Residues of captan and THPI in/on pears[a].

Location	Application Rate (lb ai/A)[a]	Number of Applications[b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Hampton Falls, NH	0.75 + 1.12	5 + 3	32 + 50 WP	14	0.28	NR=not reported	0.28
Nottingham, NH	1.9 + 3	8 + 4	32 + 50 WP	8	4.10	NR	4.10
Sodus, NY	2.25	2	50 WP	41	<0.05	NR	<0.05
Vancouver, WA	6	2	50 WP	0	1.60	2.30	3.90
				1	1.00	1.40	2.40
				3	0.50	0.16	0.66
				7	0.60	1.30	1.90
				14	0.30	0.05	0.35
	6	2	50 WP	0	1.50	<0.05	1.55
				1	1.00	<0.05	1.05
				3	0.50	<0.05	0.55
				7	0.60	<0.05	0.65
				14	0.30	<0.05	0.35
Fresno, CA	2.3-4.6	11	50 WP	0	0.05	NR	0.05
					0.09	NR	0.09
				1	0.07	NR	0.07
					0.03	NR	0.03
				7	0.04	NR	0.04
					0.11	NR	0.11
				14	0.07	NR	0.07
					0.09	NR	0.09
				21	0.07	NR	0.07
					0.09	NR	0.09
Ukiah, CA	2	1	50 WP	2	0.56	NR	0.56
					0.98	NR	0.98
					0.94	NR	0.94
					0.54	NR	0.54
					0.40	NR	0.40
					0.31	NR	0.31
					0.71	NR	0.71
					0.68	NR	0.68

Table I-36. (*continued*).

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Oswego, NY	3.5	9	50 WP	1	0.51, 0.52 [c]	0.02	0.53
					0.18, 0.19 [c]	0.01	0.19
				14	[illegible] [c]	0.01	0.21
					[illegible] [c]	0.01	0.17
				21	0.19, 0.21 [c]	0.01	0.20
					0.10, 0.14 [c]	0.01	0.11
				1	1.13	0.05	1.18
					1.88	0.07	1.95
				14	[illegible]	0.07	2.71
					[illegible]	0.05	1.54
				21	0.04	0.04	0.08
					1.50	0.04	1.54
				1	0.65	0.04	0.69
					0.50	0.03	0.53
				14	[illegible]	0.01	0.35
					[illegible]	0.01	0.44
				21	0.24	0.02	0.26
					0.20	0.02	0.22
				1	0.51	0.02	0.53
					0.58	0.03	0.61
				14	[illegible]	<0.01	0.53
					[illegible]	0.01	0.35
				21	0.44	0.02	0.46
					0.36	0.01	0.37
				1	0.54	0.03	0.57
					0.34	0.03	0.37
				14	[illegible]	0.03	0.87
					[illegible]	0.01	0.36
				21	0.32	0.02	0.34
					0.21	0.01	0.22

[a] Rate reported is single application rate.
[b] Captan was applied at 2- to 30-day intervals, with the majority of intervals between 7 and 14 days.
[c] Duplicate analysis of same sample.
[d] [illegible] data were used to calculate an average.

MRID 40189801 (3/3/87)
This submission summarizes residue data from numerous 1986 field studies, including data for pears. These pear studies were submitted in full as MRID 40189815 and are discussed below in detail.

MRID 40189815 (3/3/87)
Twelve tests were conducted in 1986 in CA, MI, NY, and WA. Multiple foliar applications of captan (50% WP) were made to pears at 4 lb ai/A/application for a total of five

applications (20 lb ai/A/season). Untreated and treated pears from CA and WA also received a postharvest dip application of captan (50% WP) at 1.25 lb ai/A immediately following harvest. Residue samples were stored frozen for up to 4 months prior to extraction for analysis. Residue data were generated using Method No. RM-1K-2. Method recoveries were adequate. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-37.

Table I-37. Residues of captan and THPI in/on pears[d].

Location	Application Method	Application Rate [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm) Captan	THPI	Total
Porterville, CA	Foliar	4	5	50 WP	0	0.90	<0.05	0.95
						1.62	<0.05	1.67
	Dip	1.25	1	50 WP	0	[illegible]	0.07	4.79
						[illegible]	0.06	3.10
	Foliar + Dip	4 + 1.25	5 + 1	50 WP	0	[illegible]	<0.05	2.65
						[illegible]	<0.05	2.93
Wenatchee, WA	Foliar	4	5	50 WP	0	4.28	<0.05	4.33
						1.34	<0.05	1.39
	Foliar	4	5	50 WP	7	2.88	<0.05	2.93
						2.88	<0.05	2.93
	Foliar	4	5	50 WP	14	[illegible]	<0.05	1.35
						[illegible]	<0.05	2.05
	Dip	1.25	1	50 WP	0	[illegible] [c]	0.47, 0.40 [c]	11.87, 10.80
						[illegible]	0.31	11.71
	Foliar + Dip	4 + 1.25	5 + 1	50 WP	0	[illegible]	<0.05	10.85
						[illegible]	<0.05	6.15
Phelps, NY	Foliar	4	5	50 WP	0	2.64, 3.20 [c]	<0.05, <0.05 [c]	2.69, 3.25
						1.64, 1.92 [c]	<0.05, <0.05 [c]	1.69, 1.97
					7	1.62	<0.05	1.67
						1.48	<0.05	1.53
					14	[illegible] [d]	0.08, 0.08 [d]	1.54, 1.70 [d]
						1.38	0.11	1.49
Watervliet, MI	Foliar	4	5	50 WP	0	5.40	<0.05	5.45
						5.70	<0.05	5.75

[a] Rates reported are single application rates and are expressed in lb ai/A for foliar applications and lb ai/100 gal for dip applications.
[b] Retreatment intervals were 7-75 days.
[c] Duplicate analysis of a single sample.
[d] Redlined data were used to calculate averages.

Other MRIDs

Five additional MRIDs (00070201, 00085526, 00098722, 00098726, and 00106602) were cited by the Residue Chemistry Chapter of the 1985 Captan Registration Standard as

containing residue data for pears. These data will not be used for anticipated residue calculations because either supporting information was insufficient or the data were generated using a colorimetric method.

Plums, Fresh Prunes

Use

Eastern U.S. The 50% and 80% WP and 75% DF formulations are registered for multiple foliar applications to plums and fresh prunes at up to 3 lb ai/A/application with a minimum interval of 7 days between applications. Captan may be applied through harvest (0-day PHI). The labels specify a maximum seasonal application rate of 27 lb ai/A/season. Applications may be made using either ground or aerial equipment.

Western U.S., excluding CA. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to plums and fresh prunes at up to 3 lb ai/A/application. The labels specify a maximum seasonal application rate of 27 lb ai/A/season. The labels imply a 0-day PHI, but do not state a minimum retreatment interval. Applications may be made using either ground or aerial equipment.

California. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to plums and fresh prunes at up to 3 lb ai/A/application with a maximum seasonal application rate of 15 lb ai/A/season and a 7-day PHI. The labels do not state a minimum retreatment interval. Applications may be made using either ground or aerial equipment.

MRID 00128355 (1975-1980)

Six tests were conducted between 1975 and 1980 in CA and NY. Multiple foliar applications of captan (50% WP) were made to plums at 3 and 6 lb ai/A/application starting at prebloom. Residue samples were stored frozen for up to 15 months prior to extraction for analysis. Residue data were generated using Method Nos. RM-1K-1, RRC-76-30R, and RRC-78-20. Recoveries for Method RM-1K-1 were adequate; recoveries for the other two methods were not reported. Results are presented in Table I-38.

Table I-38. Residues of captan and THPI in/on plums[c].

Location	Application Rate (lb ai/A)[a]	Number of Applications[b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Kingsburg, CA	3	3	50 WP	13	<0.05	NR=not reported	<0.05
Sodus, NY	3	13	50 WP	2	0.71	NR	0.71
Sodus, NY	3	9	50 WP	0	[illegible]	1.0	8.90
				3	4.8	0.16	4.96
				7	3.4	0.17	3.57
				10	2.6	0.22	2.82
Reedley, CA	6	1	50 WP	0	0.64	0.67	1.31
				1	0.47	0.34	0.81
				3	0.31	0.38	0.69
				7	0.81	0.60	1.41
				14	0.54	0.42	0.96
Fresno, CA	6	6	50 WP	0	5.52	0.07	5.59
				1	5.25	0.09	5.34
				3	4.00	0.06	4.06
				7	4.31	0.09	4.40
				10	4.70	0.13	4.83
Fresno, CA	6	6	50 WP	0	4.63	0.11	4.74
				1	8.61	0.14	8.75
				3	8.89	0.16	9.05
				7	6.14	0.10	6.24
				10	8.81	0.15	8.96

[a] Rate reported is single application rate.
[b] Captan was applied at 3- to 150-day intervals.
[c] Redlined data were used to calculate an average.

MRID 40189801 (3/3/87)
This submission summarizes residue data from numerous 1986 field studies, including data for plums. These plum studies were submitted in full as MRID 40189816 and are discussed below in detail.

MRID 40189816 (3/3/87)
Six tests were conducted in 1986 in CA and MI. Multiple foliar applications of captan (50% WP) were made to plums at 3 and 9 lb ai/A/application starting at prebloom, for a total of nine applications (27 and 81 lb ai/A/season). Residue samples were stored frozen for up to 7 months prior to extraction for analysis. Residue data were generated using Method No. RM-1K-2 with minor modifications. Method recoveries were adequate. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-39.

Table I-39. Residues of captan and THPI in/on plums[d].

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Terra Bella, CA	3	9	50 WP	0	[illegible] [c]	<0.05, <0.05	0.57, 0.42
					[illegible] [c]	<0.05, <0.05	0.21, 0.17
Porterville, CA	3	9	50 WP	0	[illegible]	<0.05	0.47
					[illegible]	<0.05	0.65
					[illegible]	<0.05	0.73
	9	9	50 WP	0	4.84	<0.05	4.89
					3.84	<0.05	3.89
					3.90	<0.05	3.95
Watervliet, MI	3	9	50 WP	0	[illegible]	<0.05	3.53
					[illegible]	<0.05	5.65
				7	3.00, 3.00 [c]	<0.05, <0.05	3.05, 3.05
					3.44	<0.05	3.49
				14	2.16	<0.05	2.21
					1.44, 1.56 [c]	<0.05, <0.05	1.49, 1.61

[a] Rate reported is single application rate.
[b] Retreatment intervals were 6-28 days.
[c] Duplicate analysis of a single sample.
[d] Redlined data were used to calculate an average.

Prunes, Processed Plums

MRID 40189817 (3/3/87)

One test was conducted in 1986 in MI. Multiple foliar applications of captan (50% WP) were made to plums (fresh prunes) at 3 lb ai/A/application at 6- to 28-day intervals for a total of nine applications (27 lb ai/A/season). Plums (fresh prunes) were harvested at 0, 7, and 14 days posttreatment. Plums harvested on day zero were composited and processed into prunes by washing and drying. Residue samples were stored frozen for up to 4 months prior to extraction for analysis. Residue data were generated using Method No. RM-1K-2. Method recoveries were adequate. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-40. Residues of captan *per se* did not concentrated in prunes; however, residues of THPI *per se* and the combined residues concentrated in prunes by 104x and 2.2x, respectively.

Table I-40. Residues of captan and THPI in/on plums and prunes.

Location Commodity	Application Rate [a] (lb ai/A)	PHI (days)	Residues Found (ppm)			Concentration Factors [b]		
			Captan	THPI	Total	Captan	THPI	Total
Watervliet, MI Whole Plums	27	0	3.48, 5.60	<0.05, <0.05	3.53, 5.65	–	–	–
		7	3.00, 3.00 [c], 3.44	<0.05, <0.05 [c], <0.05	3.05, 3.05, 3.49	–	–	
		14	2.16, 1.44, 1.56 [c]	<0.05, <0.05, <0.05 [c]	2.21, 1.49, 1.61	–	–	–
Composited Plums	27	0	2.58	<0.05	2.63	–	–	–
Prunes	27	0	0.59	5.20	5.79	0.2	104.0	2.2

[a] Rate reported is the total seasonal application rate.
[b] Concentration factor was calculated based on total residues in the 0-day PHI composited plum sample.
[c] Duplicate analysis of a single sample.

Other MRIDs

Three additional MRIDs (00046914, 00070201 and 00131736) were cited by the Residue Chemistry Chapter of the 1985 Captan Registration Standard as containing residue data for plums and fresh prunes. These data will not be used for anticipated residue calculations because either supporting information was insufficient or the data were generated using a colorimetric method.

Raspberries

Use 24(C)

The registrant has submitted revised labels for the 50% and 80% WP formulations. The labels specify multiple foliar applications to raspberries grown in WA. Five applications are implied. A maximum seasonal application rate of 10 lb ai/A (50 WP) and 10.4 lb ai/A (80 WP), a minimum spray volume of 45 gal/A, a retreatment interval of 10-14 days, and a PHI of 3 days are specified.

MRID 42712801/MRID 43086601 (3/19/93)

Five tests were conducted in 1991-92 in OR and WA. Five to eleven foliar applications of captan (50% WP) were made. Samples were stored frozen for up to 6 months prior to analysis using the ICI method described in Report No. WRC 89-51. Residues in controls were nondetectable (<0.05 ppm, captan ; <0.01 ppm for THPI). Recoveries from fortified control samples were not reported. Results are presented in Table I-41.

Table I-41. Residues of captan and THPI in/on raspberries[d].

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Aurora, OR	3 : 2.5	7+4	50 WP	0	9.0, 11.0 [c]	0.33, 0.5 [c]	9.33, 11.5
					10.6, 11.4	0.42, 0.42	11.02, 11.82
				7	8.3	.0.31	8.61
					7.8	0.41	8.21
	3+2.5	10	50 WP	3	[illegible]	0.19	6.89
					[illegible] [c]	0.2, 0.23 [c]	5.40, 7.43
Vancouver, WA	2.5	7	50 WP	0	37, 38 [c]	1.01, 0.66	38.01, 38.66
					24	0.50	24.50
				3	[illegible]	0.53	20.53
					[illegible] [c]	0.55, 0.79	38.55, 33.79
				7	18	1.01	19.01
					18	1.08	19.08
		5	50 WP	3	[illegible]	0.38	17.38
					[illegible]	0.45	14.45
					[illegible]	0.27	16.27
	2.0	5	50 WP	3	[illegible]	0.37	13.37
					[illegible]	0.65	12.65
					[illegible]	0.42	12.42
					[illegible]	0.49	13.49
					[illegible]	0.54	13.54

[a] Rate reported is single application rate.
[b] Retreatment intervals were 6-13 days.
[c] Duplicate analysis of same sample.
[d] Redlined data were used to calculate an average.

Other MRIDs

MRID 00098805 was cited by the Residue Chemistry Chapter of the 1985 Captan Registration Standard as containing residue data for raspberries after treatment with a dust formulation. This formulation is no longer supported for use on raspberries. These data will not be considered for risk assessment.

011423

Strawberry

Use

U.S., excluding CA. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to strawberries at up to 3 lb ai/A/application with a minimum interval (some labels) of 7 days between applications. The maximum seasonal application rate is 24 lbs. a.i./A/season, except the 4 lb/gal FlC which has no maximum seasonal rate. The PHI is 0 day. Applications may be made using either ground or aerial equipment.

California. The 50% and 80% WP, 4 lb/gal FlC, and 75% DF formulations are registered for multiple foliar applications to strawberries at up to 2.5 lb ai/A/application with a minimum interval of 10 days between applications. The labels specify a maximum seasonal application rate of 16 lbs. a.i./A/season and a PHI of 2 days, except the 4 lb/gal FlC label which specifies no PHI and no maximum seasonal rate. Applications may be made using either ground or aerial equipment.

MRID 00128355 (1973-1980)

Twenty tests were conducted between 1973 and 1980 in multiple locations. Multiple foliar applications of captan (50% WP and 4 lb/gal FlC) were made to strawberries at 1-3 lb ai/A/application. Total seasonal application rates ranged from 3 to 60 lb ai/A/season. Residue samples were stored frozen for up to 17 months prior to extraction for analysis. Residue data were generated using Method Nos. RM-1K-2, RRC-76-30R, and RRC-78-20. Method recoveries were adequate. Residues of captan were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-42.

Table I-42. Residues of captan and THPI in/on strawberries[c].

Location	Application Rate (lb ai/A)[a]	No. of Applications[b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Vineland, ONT (Canada)	3	5	50 WP	0	27.00	NR=not reported	27.00
				1	18.90	NR	18.90
				2	10.90	NR	10.90
	1	5	50 WP	0	6.10	NR	6.10
				1	6.10	NR	6.10
				2	4.70	NR	4.70
Phelps, NY	1	4	50 WP	1	0.18	NR	0.18
				7	0.45	NR	0.45

Table I-42. (*continued*).

Location	Application Rate (lb ai/A) [a]	No. of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Painter, VA	1.5	4	50 WP	0	1.45	NR	1.45
				1	0.66	NR	0.66
				3	1.03	NR	1.03
	1.5	4	50 WP	0	1.57	NR	1.57
				3	1.20	NR	1.20
	1	4	50 WP	0	0.97	NR	0.97
				1	0.77	NR	0.77
				3	1.10	NR	1.10
Watsonville, CA	3	3	50 WP	0	13.0	NR	13.0
Santa Maria, CA	3	3	50 WP	12	2.90	NR	2.90
Hancock, WI	2	6	50 WP	21	0.22	NR	0.22
Aumsville, OR	2.5 + 1	1 + 2	4 FlC	12	0.73	NR	0.73
Portland, OR	1	3	4 FlC	13	0.18	NR	0.18
Watsonville, CA	3	1	50 WP	0	6.40	NR	6.40
				1	5.40	NR	5.40
				3	4.00	NR	4.00
				7	1.33	NR	1.33
				14	0.52	NR	0.52
Painter, VA	2	4	50 WP	0	2.84	NR	2.84
				1	3.00	NR	3.00
				3	2.25	NR	2.25
				0	2.95	NR	2.95
				1	2.44	NR	2.44
				3	3.95	NR	3.95
	3	4	50 WP	0	5.82	NR	5.82
				1	3.86	NR	3.86
				3	5.61	NR	5.61
Lockport, NY	2	6	50 WP	1	1.90	0.51	2.41
				3	1.40	0.34	1.74
				7	1.00	0.65	1.65
Auburn, NY	3	1	50 WP	1	3.90	<0.05	3.95
				3	2.10	0.07	2.17
				6	1.60	0.54	2.14
				8	1.10	<0.05	1.15
Watsonville, CA	3	11	50 WP	0	7.26	NR	7.26
					6.92	NR	6.92
Burlington, NJ	3	10	50 WP	0	3.33	NR	3.33
					3.35	NR	3.35

Table I-42. (*continued*).

Location	Application Rate (lb ai/A) [a]	No. of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Dover, FL	3	16	50 WP	3	5.95	NR	5.95
					6.83	NR	6.83
				7	6.83	NR	6.83
					7.68	NR	7.68
		20	50 WP	0	[redacted]	NR	8.01
					[redacted]	NR	8.32

[a] Rate reported is single application rate.
[b] Captan was applied at 3- to 14-day intervals.
[c] [redacted] data were used to calculate an average.

MRID 00159607 (1985)

Three tests were conducted in 1985 in CA and OR. Multiple foliar applications of captan (50% WP) were made to strawberries at 3 lb ai/A/application for a total of 12 applications (36 lb ai/A/season). In addition to residue data for the RAC, residue data were also provided for strawberries following washing and cooking. Residue samples were stored frozen for up to 4 months prior to extraction for analysis. Residue data were generated using Method No. RM-1K-2. Method recoveries were adequate. Residues of both analytes were nondetectable (<0.01 ppm) in/on control samples. Results are presented in Table I-43.

Table I-43. Residues of captan and THPI in/on strawberries.

Location	Commodity	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
						Captan	THPI	Total
Watsonville, CA	Unwashed RAC	3	12	50 WP	0	[redacted]	0.29	7.47
						[redacted]	0.34	10.29
	Washed	3	12	50 WP	0	1.18	0.42	1.60
	Washed & cooked	3	12	50 WP	0	<0.01	0.54	0.55
Watsonville, CA	Unwashed RAC	3	12	50 WP	0	[redacted]	0.90	12.80
						[redacted]	0.64	7.34
	Washed	3	12	50 WP	0	0.27	0.37	0.64
	Washed & cooked	3	12	50 WP	0	<0.01	0.45	0.46
Hood River, OR	Unwashed RAC	3	12	50 WP	0	[redacted]	0.23	8.93
						[redacted]	0.26	8.82
	Washed	3	12	50 WP	0	1.14	0.04	1.18
	Washed & cooked	3	12	50 WP	0	<0.01	0.55	0.56

[a] Rate reported is single application rate.
[b] Retreatment intervals were 4-10 days.
[c] [redacted] data were used to calculate an average.

MRID 40189801 (3/3/87)
This submission summarizes residue data from numerous 1986 field studies, including data for strawberries. These strawberry studies were submitted in full as MRID 40189822 and are discussed below in detail.

MRID 40189822 (3/3/87)
Seven tests were conducted in 1986 in CA, FL, MI, NC, and WA. Multiple foliar applications of captan (50% WP) were made to strawberries at 3 lb ai/A/application for a total of 6 to 8 applications (18 to 24 lb ai/A/season). Residue samples were stored frozen for up to 8 months prior to extraction for analysis. Residue data were generated using Method No. RM-1K-2. Method recoveries were adequate. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-44.

Table I-44. Residues of captan and THPI in/on strawberries[d].

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Santa Maria, CA	3	8	50 WP	0	[illegible]	1.36	13.16
					[illegible] [c]	1.44, 1.24 [c]	12.94, 10.74
King City, CA	3	8	50 WP	0	[illegible] [c]	0.53, 0.51 [c]	5.89, 5.39
					[illegible]	0.83	5.59
Dover, FL	3	6	50 WP	0	[illegible]	0.14	1.72
					[illegible]	0.15	2.15
		7	50 WP	0	[illegible]	0.08	1.54
					[illegible]	0.19	2.75
Watervliet, MI	3	8	50 WP	0	[illegible]	0.50	4.36
					[illegible]	0.43	3.39
Raleigh, NC	3	8	50 WP	0	[illegible]	0.25	7.45
					[illegible]	0.30	8.00
Wenatchee, WA	3	7	50 WP	0	[illegible]	0.15	3.73
					[illegible]	0.22	4.58

[a] Rate reported is single application rate.
[b] Retreatment intervals were 2-30 days, with the majority of intervals being 7 days.
[c] Duplicate analysis of a single sample.
[d] [illegible] data were used to calculate an average.

MRID 40745408 (5/16/88)
Three tests were conducted in 1987 in CA. Multiple foliar applications of captan (50% WP) were made to strawberries at 3 lb ai/A/application for a total of eight applications (24 lb ai/A/season). Residue samples were stored frozen for 4 months prior to extraction for analysis. Residue data were generated using Method No. RM-1K-2. Method recoveries were adequate. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-45.

Table I-45. Residues of captan and THPI in/on strawberries[d].

Location	Application Rate (lb ai/A) [a]	Number of Applications [b]	Formulation	PHI (days)	Residues Found (ppm)		
					Captan	THPI	Total
Ceres, CA	3	8	50 WP	0	[redacted]	0.08	0.92
					[redacted]	0.08	0.68
					[redacted]	0.09	1.13
					[redacted]	0.61	13.51
					[redacted] [c]	0.48, 0.54 [c]	8.58, 9.44
					[redacted]	0.42	6.82
					[redacted]	0.39	15.39
					[redacted]	0.69	13.89
					[redacted]	0.22	9.07

[a] Rate reported is single application rate.
[b] Retreatment intervals were 4-23 days.
[c] Duplicate analysis of a single sample.
[d] Redlined data were used to calculate an average.

Other MRIDs

Five additional MRIDs (00046914, 00070201, 00090988, 00098713, and 00117088) were cited by the Residue Chemistry Chapter of the 1985 Captan Registration Standard as containing residue data for strawberries. These data will not be used for anticipated residue calculations because either supporting information was insufficient or the data were generated using a colorimetric method.

Captan Seed Treatments

The available data on seed treatment of beets, field corn, sweet corn, oats, potatoes, rice, soybeans, spinach, and wheat are summarized in this section. These data will be used to make anticipated residue calculations for all crops with registered captan seed treatments.

Beets

Use

WP, FlC, and EC formulations are registered for slurry treatment of beet seeds at 6 oz ai/100 lb of seed. A 75% D formulation is registered for treatment at 9 oz ai/100 lb of seed.

MRID 40189801 (3/3/87)

This submission summarizes residue data from numerous 1986 field studies, including data on beet seed treatment. These beet studies were submitted in full as MRID 40189806 and are discussed below in detail.

011423

MRID 40189806 (3/3/87)
One test was conducted in 1986 in NY depicting residues of captan and THPI in/on beet roots and beet tops grown from seed treated with captan (50% WP) at 1 oz ai/100 lb of seed. Samples were stored frozen for up to 4 months prior to analysis using Method No. RM-1K-2. Adequate recoveries from fortified controls were obtained for captan and THPI. Residues of captan and THPI were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-46.

Table I-46. Residues of captan and THPI in/on beet commodities grown from captan treated seed.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Phelps, NY						
Beet roots	1	50 WP	72	<0.05	<0.05	<0.10
Beet tops	1	50 WP	72	<0.05	<0.05	<0.10

MRID 41149104 (5/5/89)
Three tests were conducted in 1988 in CA, IL, and NC depicting residues of captan and THPI in/on beet roots and beet tops grown from seed treated with captan (4 lb/gal FlC) at 6 oz ai/100 lb of seed. Samples were stored frozen for up to 3 months prior to analysis using Method No. RM-1K-2. Adequate recoveries of both analytes were obtained from fortified control samples. Residues of captan and THPI were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-47.

Table I-47. Residues of captan and THPI in/on beet commodities grown from captan treated seed.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Visalia, CA						
Beet roots	6	4 FlC	66	<0.05	<0.05	<0.10
Beet tops	6	4 FlC	66	<0.05	<0.05	<0.10
Seymour, IL						
Beet roots	6	4 FlC	73	<0.05	<0.05	<0.10
Beet tops	6	4 FlC	73	<0.05	<0.05	<0.10
Goldsboro, NC						
Beet roots	6	4 FlC	101	<0.05	<0.05	<0.10
Beet tops	6	4 FlC	101	<0.05	<0.05	<0.10

Corn

Use
WP, FlC, D, and EC formulations are registered for field and sweet corn seed treatments at 0.075 and 0.125 lb ai/100 lb of seed, respectively. Captan formulated as a dust is also registered for corn (unspecified) seed treatment in the planter box at 0.125 lb ai/100 lb of seed.

MRID 00128355 (1973-1980)
Two tests were conducted in 1979 in IA and MS depicting residues of captan and THPI in/on field corn grain grown from seed treated with captan (12.5% D) at 0.063 lb ai/100 lb of seed. Residue samples were stored frozen for up to 24 months prior to analysis using Method Nos. RM-1K-2, RM-1F-2, or RM-1J. Method recoveries were adequate for each analyte. Residues were nondetectable (<0.03 ppm, captan; <0.01 ppm, THPI) in/on control samples of grain. Results are presented in Table I-48.

Table I-48. Residues of captan and THPI in/on field corn grain grown from captan treated seeds.

Location Commodity	Application Rate (lb ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Dallas Center, IA Corn grain	0.063	12.5 D	150	<0.03	<0.01	<0.04
				<0.03	<0.01	<0.04
Greenville, MS	0.063	12.5 D	104	<0.03	<0.01	<0.04
				<0.03	<0.01	<0.04

MRID 40189801 (3/3/87)
This submission summarizes residue data from numerous 1986 field studies, including data for corn seed treatments. These corn data were submitted in full as MRID 40189809 and are discussed below in detail.

MRID 40189809 (3/3/87)
Two tests were conducted in 1986 in CA and IA depicting captan and THPI residues in/on sweet and field corn commodities grown from seed treated at 0.11 or 0.06 lb ai/100 lb of seed with the 4 lb/gal FlC and 65% WP formulations, respectively. Samples were stored frozen for up to 6 months prior to analysis using Method No. RM-1K-2. Adequate recoveries from fortified controls were obtained for captan and THPI. Residues of captan and THPI were nondetectable (<0.05 ppm) in/on all controls except two which bore residues of captan at 0.32 and 0.24 ppm and of THPI at 0.10 and <0.05 ppm. Results are presented in Table I-49. The submitter stated that detectable residues in experimental samples and controls were likely due to contamination.

Table I-49. Residues of captan and THPI in/on field and sweet corn commodities grown from treated seed.

Location Commodity	Application Rate (lb ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Phelps, NY						
Sweet corn ears	0.11	4 FlC	85	<0.05	<0.05	<0.10
Sweet Corn Forage	0.11	4 FlC	50	<0.05	<0.05	<0.10
W. Burlington, IA						
Field Corn Grain	0.06	63 WP	166	0.14	<0.05	0.19
Field Corn Forage	0.06	63 WP	70	0.08	<0.05	0.13
Field Corn Fodder	0.06	63 WP	166	0.28	<0.05	0.33
				0.21	<0.05	0.26

MRID 41149103 (1989)

Three tests were conducted in 1988 in NC, CA, and IL depicting residues of captan and THPI in/on sweet corn and forage grown from seed treated with captan (4 lb/gal FlC) as a slurry 1 day prior to planting at 0.125 lb ai/100 lb of seed. Forage and sweet corn ear samples were stored frozen for up to 6 months prior to analysis using Method No. RM-1K-2. Method recoveries for both analytes were adequate for each matrix. Residues of captan and THPI were nondetectable (<0.05 ppm) in/on controls. Results are presented in Table I-50.

Table I-50. Residues of captan and THPI in/on sweet corn and forage grown from treated seed.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Goldsboro, NC						
Forage	2	4 FlC	53	<0.05	<0.05	<0.10
Sweet corn	2	4 FlC	66	<0.05	<0.05	<0.10
Visalia, CA						
Forage	2	4 FlC	54	<0.05	<0.05	<0.10
Sweet corn	2	4 FlC	81	<0.05	<0.05	<0.10
Seymour, IL						
Forage	2	4 FlC	44	<0.05	<0.05	<0.10
Sweet corn	2	4 FlC	58	<0.05	<0.05	<0.10

Oats

Use

WP, FlC, D, and EC formulations are registered for dust or slurry treatments of oat seeds at 2 oz ai/100 lb of seed. A 75% D formulation is registered for planter box treatment at 0.8 oz ai/100 lb of seed.

MRID 00003025 (1976)
Two tests were conducted in 1975 in WI and IA depicting residues of captan in/on grain grown from oat seeds treated with captan formulated as a 20% D and 37.5% WP at 0.8 and 1.13 oz ai/100 lb of seed, respectively. Samples were stored frozen for up to 8 months prior to analysis using Method No. RM-1. Adequate recoveries from fortified controls were obtained. Residues were nondetectable (<0.05 ppm) in/on controls. Results are presented in Table I-51.

Table I-51. Residues of captan in/on oat grain grown from captan treated seeds.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Captan Residues (ppm)
Madison, IL Oat Grain	0.8	20 D	NR*	<0.05 <0.05
Dallas Center, IA Oat Grain	1.13	37.5 WP	126	<0.03 <0.03

* Not reported.

MRID 00128355 (1973-1980)
This MRID contains data described above in MRID 00003025.

Potatoes

Use
Captan dust formulations are registered for treatment of potato seed pieces at 1.2 oz ai/100 lb seed pieces.

MRID 00128355 (1973-1980)
Seven tests were conducted in 1975 and 1978 in IA, MS, NJ, NY, VA and Canada depicting residues of captan and THPI in/on potatoes grown from seed pieces treated with captan (7.5 and 10% D) at 1.2-1.6 oz ai/100 lb of seed. Samples were stored frozen for up to 11 months prior to analysis using Method No. RM-1F-2. Adequate recoveries were obtained from fortified control samples. Residues were nondetectable (<0.01-<0.05 ppm) in/on control samples. Results are presented in Table I-52.

Table I-52. Residues of captan and THPI in/on potatoes grown from captan treated potato seed pieces.

Location	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Prince Edward Is., Can	1.2	7.5 D	147	<0.05	NR=Not reported	<0.05
				<0.05	NR	<0.05

Table I-52. (*continued*). 94

Location	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Dallas Center, IA	1.2	10 D	211	<0.01	NR	<0.01
				<0.01	NR	<0.01
	1.6	10 D	211	<0.01	NR	<0.01
				<0.01	NR	<0.01
Greenville, MS	1.2	10 D	112	<0.03	NR	<0.03
				<0.03	NR	<0.03
Riverhead, NY	1.2	10 D	155	<0.03	<0.01	<0.04
				<0.03	<0.01	<0.04
Morristown, NJ	1.2	10 D	140	<0.03	<0.01	<0.04
				<0.03	0.24	<0.27
Painter, VA	1.2	10 D	136	<0.03	0.06	0.09

MRID 40189801 (3/3/87)
This submission summarizes residue data from numerous 1986 studies, including data for potatoes. These potato studies were submitted in full as MRID 40189818 and are discussed below in detail.

MRID 40189818 (3/3/87)
Two tests were conducted in 1986 in CA and ME depicting residues of captan and THPI in/on potatoes grown from potato seed pieces treated with an unspecified captan formulation at 0.75 and 1.35 oz ai/100 lb of seed. Samples were stored frozen for up to 6 months prior to analysis using Method No. RM-1K-2. Adequate method recoveries were obtained. Residues were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-53.

Table I-53. Residues of captan and THPI in/on potatoes grown from captan treated seed pieces.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Porterville, CA Potatoes	1.24	? D	74	<0.05	<0.05	<0.1
			116	<0.05	<0.05	<0.1
Monson, ME Potatoes	0.8	? D	61	<0.05	<0.05	<0.1
			105	<0.05	<0.05	<0.1

Rice

Captan is not currently registered for seed treatments on rice. The seed treatment data on rice are presented below for their consideration in determining captan residues on cereal grains resulting from seed treatment.

MRID 00128355 (1976)
One test was conducted in 1976 in MS depicting residues of captan in/on grain grown from rice seeds treated with captan (37.5% WP) at 0.75 oz ai/100 lb of seed. Samples were stored frozen for up to 3 months prior to analysis using Method No. RM-1F-1. Adequate recoveries were obtained from fortified control samples. Residues were nondetectable (<0.03 ppm) in/on controls. Results are presented in Table I-54.

Table I-54. Residues of captan in/on rice grain grown from captan treated seeds.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Captan Residues (ppm)
Stoneville, MS Rice Grain	0.75	37.5 WP	167	<0.03 <0.03

MRID 40189801 (3/3/87)
This submission summarizes residue data from numerous 1986 studies, including data for rice. These rice studies were submitted in full as MRID 40189819 and are discussed below in detail.

MRID 40189819 (3/3/87)
Two tests were conducted in 1986 in CA and MS depicting residues of captan and THPI in/on grain and straw grown from rice seeds treated with captan (4 and 2.4 lb/gal FlC) at 1.24 and 0.8 oz ai/100 lb of seed. Samples were stored frozen for up to 5 months prior to analysis using Method No. RM-1K-2. Adequate method recoveries were obtained. Residues were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-55.

Table I-55. Residues of captan and THPI in/on rice commodities grown from captan treated seeds.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Biggs, CA Grain	1.24	4 FlC	NR *	<0.05	<0.05	<0.1
Straws	1.24	4 FlC	NR	<0.05	<0.05	<0.1
Glen Alen, MS Grain	0.8	2.4 FlC	114	<0.05	<0.05	<0.1
Straw	0.8	2.4 FlC	114	<0.05	<0.05	<0.1

* Not reported.

011423

Soybeans

Use
WP, FlC, and EC formulations are registered for slurry treatment of soybean seeds at 1.3 oz ai/100 lb of seed. A 75% D formulation is registered for dust treatment at 1.9 oz ai/100 lb of seed and at 0.6 oz ai/100 seed for planter box treatment.

MRID 00128355 (1973-1980)
Four tests were conducted between 1977-78 in SC and AR depicting residues of captan in/on beans and hay grown from soybean seeds treated with captan (50% WP, 2.4 lb/gal FlC, and 37% D) at 1.7-2 oz ai/100 lb of seed. Samples were stored frozen for up to 25 months prior to analysis using Method No. RRC-76-30R. Method recoveries from fortified controls were adequate. Residues were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-56. The submission also included data from foliar applications of captan to soybeans; these data are not presented as foliar uses of captan on soybeans are no longer supported.

Table I-56. Residues of captan and THPI in/on soybean commodities grown from captan treated seed.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Captan Residues (ppm)
Darlington, SC				
Beans	1.7	50 WP	154	<0.05
Hay	1.7	50 WP	154	<0.05
Garland City, AR				
Beans	1.9	37 D	136	<0.05
Hay	1.9	37 D	136	<0.05
Beans	1.7	50 WP	136	<0.05
Hay	1.7	50 WP	136	<0.05
Beans	2.0	2.4 FlC	136	<0.05
Hay	2.0	2.4 FlC	136	<0.05

MRID 40189801 (3/3/87)
This submission summarizes residue data from numerous 1986 studies, including data for soybeans. These soybean studies were submitted in full as MRID 40189820 and are discussed below in detail.

MRID 40189820 (3/3/87)
Two tests were conducted in 1986 in MS and IA depicting residues of captan and THPI in/on beans, forage, and hay grown from soybean seed treated with captan formulated as a 65% WP and 2.4 lb/gal FlC at 0.6 and 1.3 oz ai/100 lb of seed, respectively. Samples were stored frozen for up to 8 months prior to analysis using Method No. RM-1K-2. Adequate method recoveries were obtained from fortified control samples. Residues were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-57.

Table I-57. Residues of captan and THPI in/on soybean commodities grown from captan treated seeds.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Glen Allen, MS						
Forage	0.6	2.4 FlC	70	<0.05	<0.05	<0.1
Beans	0.6	2.4 FlC	151	<0.05	<0.05	<0.1
Hay	0.6	2.4 FlC	151	<0.05	<0.05	<0.1
West Burlington, IA						
Forage	1.3	65 WP	81	<0.05	<0.05	<0.1
Beans	1.3	65 WP	146	0.37	<0.05	0.42
Hay	1.3	65 WP	146	<0.05	<0.05	<0.1

MRID 41149101 (5/15/89)

Two tests were conducted in 1988 in IL and AL depicting residues of captan and THPI in/on forage, hay, and beans grown from soybean seeds treated with captan (4 lb/gal FlC) at 1.25 oz ai/100 lb of seed. Samples were stored frozen for up to 4 months prior to analysis using Method No. RM-1K-2. Adequate method recoveries were obtained from fortified control samples. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-58.

Table I-58. Residues of captan and THPI in/on soybean commodities grown from captan treated seeds.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Seymour, IL						
Hay	1.25	4 FlC	98	<0.05	<0.05	<0.1
Beans	1.25	4 FlC	98	<0.05	<0.05	<0.1
Enterprise, AL						
Forage	1.25	4 FlC	69	<0.05	<0.05	<0.1
Hay	1.25	4 FlC	137	<0.05	<0.05	<0.1
Beans	1.25	4 FlC	137	<0.05	<0.05	<0.1

MRID 41306102 (10/30/89)

Two tests were conducted in 1989 in NC and IL depicting captan and THPI residues in/on forage grown from soybean seed treated with captan (4 lb/gal FlC) at 1.25 oz ai/100 lb of seed. Samples were stored frozen for up to 1 month prior to analysis using Method No. RM-1K-2. Adequate method recoveries were obtained from fortified control samples. Residues of both analytes were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-59.

Table I-59. Residues of captan and THPI in/on soybean commodities grown from captan treated seeds.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Mahomet, IL Forage	1.25	4 FlC	57	<0.05	<0.05	<0.01
Goldsboro, NC Forage	1.25	4 FlC	94	<0.05	<0.05	<0.1

Spinach

Use

WP, FlC, and EC formulations are registered for slurry treatment of spinach seeds at 3.3 oz ai/100 lb of seed. A 75% D formulation is registered for planter-box treatment at 1 oz ai/100 lb of seed.

MRID 40189801 (3/3/87)

This submission summarizes residue data from numerous 1986 field studies, including data on spinach seed treatment. These spinach studies were submitted in full as MRID 40189821 and are discussed below in detail.

MRID 40189821 (3/3/87)

Two tests were conducted in 1986 in CA and NY depicting captan and THPI residues in/on spinach grown from seed treated with captan (4 lb/gal FlC) at 1-2.18 oz ai/100 lb of seed. Samples were stored frozen for up to 6 months prior to analysis using Method No. RM-1K-2. Adequate recoveries for both analytes were obtained from fortified controls. Residues of captan and THPI were 0.24 and 0.1 ppm, respectively, in/on the control seed sample from NY. The report stated that the CA trial was lost and restarted twice. Results are presented in Table I-60. The Agency concluded that these data are of questionable validity and are to be disregarded.

Table I-60. Residues of captan and THPI in/on spinach grown from captan treated seed.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Manteca, CA Spinach	2.18	4 FlC	73	1.10	2.60	3.70
Phelps, NY Spinach	1.0	50 WP	70	1.10	<0.05	1.15

MRID 41149102 (5/15/89)

Four tests were conducted in 1988 in CA, IL, MS, and NC depicting captan and THPI residues in/on spinach grown from seed treated with captan (4 lb/gal FlC) at 3 oz ai/100 lb of seed. Samples were stored up to 3 months prior to analysis using Method No. RM-1K-2.

Adequate recoveries of both analytes were obtained from fortified controls. Residues of captan and THPI were nondetectable (<0.05 ppm) in/on control samples. Results are presented in Table I-61.

Table I-61. Residues of captan and THPI in/on spinach grown from captan treated seed.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
Visalia, CA Spinach	3	4 FlC	66	<0.05	<0.05	<0.10
Seymour, IL Spinach	3	4 FlC	43	<0.05	<0.05	<0.10
Leland, MS Spinach	3	4 FlC	51	<0.05	<0.05	<0.10
Goldsboro, NC Spinach	3	4 FlC	101	<0.05	<0.05	<0.10

Other MRIDs

MRID 00070201 was cited by the Residue Chemistry Chapter of the 1985 Captan Registration Standard as containing residue data for spinach. These data will not be used for anticipated residue calculations because this submission contains insufficient supporting information.

Wheat

Use

WP, D, and EC formulations are registered for wheat seed treatment at 0.8-1.0 oz ai/100 lb of seed. A 4 lb/gal FlC formulation is registered for wheat seed treatment at 2.0 oz ai/100 lb of seed.

MRID 00003025 (1976)

Two tests were conducted in 1975 in IL depicting residues of captan in/on wheat grain grown from wheat seed treated with captan formulated as a 37.5% WP and 20% D at 0.75 and 0.8 oz ai/100 lb of seed, respectively. Residue samples were stored frozen for up to 5 months prior to analysis using Method No. RM-1F-1. Method recoveries were adequate. Residues of captan were 0.03 and <0.02 ppm in/on the two control samples of grain. Results are presented in Table I-62.

Table I-62. Residues of Captan and THPI in/on wheat grain grown from captan treated seeds.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Captan Residues (ppm)
Brownstown, IL Wheat grain	0.75	37.5 WP	269	<0.03
				<0.03
Wheat grain	0.8	20 D	269	<0.02
				0.03

MRID 00128355 (1973-1980)
This MRID contains data described above in MRID 00003025.

MRID 41306101 (1989)
Four tests were conducted in 1988 in CA, IL, MS, and SC depicting residues of captan and THPI in/on wheat grain, forage and straw grown from seed treated with captan (4 lb/gal FlC) at 2 oz ai/100 lb of seed. Samples were stored frozen for up to 3 months prior to analysis using Method No. RM-1K-2. Recoveries of captan and THPI from each matrix were adequate. Residue data are presented in Table I-63.

Table I-63. Residues of captan and THPI in/on wheat forage, straw and grain grown from captan treated seed.

Location Commodity	Application Rate (oz ai/CWT)	Formulation	PHI (days)	Residues found (ppm)		
				Captan	THPI	Total
CA Forage	2.0	4 FlC	82	<0.05	<0.05	<0.10
Straw	2.0	4 FlC	190	<0.05	<0.05	<0.10
Grain	2.0	4 FlC	190	<0.05	<0.05	<0.10
IL Forage	2.0	4 FlC	209	<0.05	<0.05	<0.10
Straw	2.0	4 FlC	226	<0.05	<0.05	<0.10
Grain	2.0	4 FlC	226	<0.05	<0.05	<0.10
MS Forage	2.0	4 FlC	27	<0.05	<0.05	<0.10
Straw	2.0	4 FlC	276	<0.05	<0.05	<0.10
Grain	2.0	4 FlC	276	<0.05	<0.05	<0.10
SC Forage	2.0	4 FlC	110	<0.05	<0.05	<0.10
Straw	2.0	4 FlC	186	<0.05	<0.05	<0.10
Grain	2.0	4 FlC	186	<0.05	<0.05	<0.10

APPENDIX II

CAPTAN SURVEY (FDA AND PDP) DATA

US FDA survey data for captan in/on relevant raw agricultural commodities were used for the years 1990 - 1993. Compliance data were excluded, because compliance monitoring implies a targeted situation of expected tolerance violation. Surveillance monitoring data, both domestic and foreign, were used, and domestic was not segregated from foreign for statistical treatment. The domestic nondetects were adjusted for per cent crop treated. The total number of domestic nondetects multiplied by the per cent crop treated was assigned a value of 0.005 ppm, or 50% of the nominal limit of quantitation. The remaining domestic nondetects were assigned a value of 0 (0.0001 ppm). All foreign nondetects were assumed to contain captan at 50% the limit of quantitation, i.e., 100% crop treated.

USDA PDP monitoring data were used for 1992 and part of 1993 (designated 1992). All nondetects were assigned a value of 0.05 ppm, or 50% of the highest limit of quantitation. The limit of quantitation varied with the laboratory performing the analyses.

Means and upper confidence limits were determined using a CBRS statistical software package. The manual data entries of FDA and PDP printouts and the resulting statistical treatments are summarized by crop on the following pages.

APPLE MONITORING DATA

BLACKBERRY MONITORING DATA

BLUEBERRY MONITORING DATA

CHERRY MONITORING DATA

GRAPE MONITORING DATA

NECTARINE MONITORING DATA

PEACH MONITORING DATA

PEAR MONITORING DATA

PLUM MONITORING DATA

RASPBERRY MONITORING DATA

011423

STRAWBERRY MONITORING DATA

011425

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

OCT 26 1994

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Reregistration of Captan; Chemical No. 81301; Branch No.: None; DP Barcode No.: None; MRID No.: None

FROM: Christine L. Olinger, Chemist
Reregistration Section I
Chemistry Branch II - Reregistration Support
Health Effects Division (7509C)

Stephen R. Funk, Ph.D., Chemist
Special Review Section I
Chemistry Branch II - Reregistration Support
Health Effects Division (7509C)

THRU: Edward Zager, Chief
Chemistry Branch II - Reregistration Support
Health Effects Division (7509C)

TO: Debra F. Edwards, Ph.D., Chief
Chemical Coordination Branch
Health Effects Division (7509C)

CCB has asked for CBRS clarification of the apparent inconsistencies between the Captan Residue Chemistry RED Chapter (C. Olinger, 9/07/94) and the Captan Anticipated Residue Assessment (S. Funk, 9/22/94, Barcodes 207075 and 207149, CBRS Nos. 14284 and 14301). The acute anticipated residue provided to CCB was higher than the reassessed tolerance reported in the RED chapter for three commodities. Each commodity will be addressed below individually.

Caneberries

The current tolerances for blackberries and raspberries are both set at 25 ppm captan; the calculated anticipated residue is 28 ppm. The field trial residue data are incomplete, so the tolerance was not reassessed in the RED chapter. The acute anticipated residues are based on the highest value present in the limited field trial data available. The tolerance will be reassessed when all data have been submitted, but the risk assessment should be based on the

anticipated residue calculated.

Strawberries

The tolerance for strawberries has been reassessed at its current level, 25 ppm, but the anticipated residue for acute risk provided to DRES was 75 ppm. This value was calculated using monitoring data from the State of Florida from the 1993-94 strawberry growing season. FL has not been able to determine the cause of this and other over-tolerance residue incidents (C. Olinger, review in progress, Barcode 206525, CBRS Nos. 14402 and 14403). During the 1993-94 growing season 6 of 84 samples tested showed over-tolerance residues of captan on strawberries grown in FL. Florida represents approximately 20% of the U.S. strawberry production. It is highly unlikely that the routine monitoring done by the State of Florida represents only the highest values found, and that a considerable number of strawberries bearing over-tolerance residues remained in the U.S. market. Therefore CBRS considers it prudent to base the anticipated residues for the acute risk assessment on the monitoring data.

The tolerance value is based only on field trial studies. Residues in/on samples from the field trial are generally well below the current tolerance, so the tolerance was reassessed at the current level. Some additional field trial data was requested in response to the over-tolerance residues found in Florida last year, but the registrant has requested a waiver of the studies (C. Olinger, review in progress, Barcode 206525, CBRS Nos. 14402 and 14403). CBRS is requesting the registrant to meet with the Agency to discuss any risk mitigation programs they may have initiated (such as grower education programs) in response to the apparent problem of over-tolerance residues.

In summary, CBRS considers it necessary as a measure to protect the public health to maintain the existing tolerance of 25 ppm. However to calculate the acute risk a value of 75 ppm should be used, since it appears there is some chance that strawberries bearing such high residues reach the market.

Grapes

The use patterns used in the magnitude of residue studies available to CBRS do not reflect current labels. Almost all of the field trial studies have been conducted at appropriate application rates but with 0-day PHIs. Current labels require a minimum 14 day PHI (45 day in CA). Most residue values with a 0-day PHI are less than 10 ppm. For those samples showing residues greater than 10 ppm, a decline curve was applied to extrapolate to a 14 day PHI, resulting in residues below 10 ppm. This was the basis for the recommendation that the tolerance be lowered from 50 to 10 ppm.

Since there is an inherent uncertainty with the extrapolations using the decline studies, the extrapolation was not done when calculating anticipated residues for an acute risk. CBRS chose to provide the most conservative estimate by using the field trial data reflecting application the day of harvest. FDA monitoring data do show values for imported commodities up to 19 ppm, so the anticipated residue of 23 ppm appears to be consistent with the residues to which the public is currently exposed. Using a similar logic as applied to strawberries, CBRS continues to recommend for a reassessed tolerance of 10 ppm, but the acute risk assessment should be done with the 23 ppm value provided.

011423

cc: CLOlinger (CBRS), Circulate, Reg Std File, RF, SF
7509C:CBRS:CLOlinger:clo:CM#2:Rm 816G:305-5406: 10/25/94
RDI: SRFunk: 10/19/94 PADeschamp: 10/18/94 MMetzger: 10/20/94 EZager: 10/26/94

ATTACHMENT IV

011423

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

NOV 10 1994

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

Memorandum

SUBJECT: **Captan**: Dietary Exposure Analysis in Support of the Reregistration Eligibility Decision.

FROM: Jennifer M. Wintersteen
Dietary Risk Evaluation Section
Science Analysis Branch/HED (7509C)

TO: John C. Redden, Chemical Manager
Chemical Coordination Branch
Health Effects Division (7509C)

THROUGH: William L. Burnam, Branch Chief
Science Analysis Branch
Health Effects Division

Action Requested

Provide an estimate of chronic, upper bound carcinogenic and acute dietary risks from the uses of captan which are either published or being recommended through reregistration.

Discussion

1. Toxicological Endpoints:

Reference Dose for Chronic Analysis

The HED Reference Dose (RfD) Committee on September 23, 1993 concluded that an RfD for Captan should be established based upon a NOEL of 12.5 mg/kg bwt/day in one- and three- generations reproductive toxicity studies. The LEL was 250 mg/kg bwt/day for decreased pup body weight. An uncertainty factor of 100 was used to account for the inter-species extrapolation and intra-species variability. On this basis the RfD was calculated to be 0.13 mg/kg/day.

Carcinogenicity Classification

Captan is classified as group B2 (probable human carcinogen) for carcinogenicity. The Q_1^* is 3.6×10^{-3} $(mg/kg/day)^{-1}$ based only on the adenoma and carcinoma of duodenum and jejunum-ileum in male and female ICR-derived CD-mice (Cancer Peer Review 12/29/86 and 7/20/88).

Acute Toxicity

A risk assessment is required for an acute dietary (one day) exposure based on developmental toxicity in rabbits. The endpoint for acute dietary risk assessment is the NOEL (10 mg/kg/day). The LEL (30 mg/kg/day) from the developmental study was based upon increased post-implantation loss, reduced mean fetal weight, and increased skeletal defects in fetuses (Toxicology Endpoint Selection Document for Captan, P. Chin and K. Baetcke memo, 3/2/94).

2. Residue Information

Food uses evaluated in this analysis were the published uses of captan listed in 40 CFR §180.103 and 185.500 and the Tolerance Index System (TIS). Residues to be regulated are from the captan *per se* for most commodities and for captan and its metabolite THPI for livestock commodities (C. Olinger memo, 9/7/94).

Chemistry Branch Reregistration Support recommends for tolerance reassessments for captan on several commodities for reregistration (C. Olinger memo, 9/7/94). Where tolerances could not be reassessed the published tolerance was used in the risk assessment analysis.

CBRS recommends for a decrease in the tolerance for almonds, apricots, cherries, grapes, nectarines, peaches, and plums due to revised, more restrictive use patterns[1]. CBRS recommends for no change in the present tolerance for apples, pears, and blueberries.

CBRS recommends for tolerances from seed treatment usage on many raw agricultural commodities, see below for a full listing of these tolerances. Tolerances exist for cattle but sheep, goat and horse tolerances as well as milk tolerances are being recommended for reregistration.

The following seed-treatment RACs were added to the captan DRES file:

Barley grain	Corn grain and pop
Oat grain	Rye grain
Sorghum grain	Wheat grain
Flax seed	Rape seed
Safflower seed	Sesame seed
Sunflower seed	Okra
Peanuts	Radish, root and top
Sugar beets, root and top	Swiss Chard

Percent Crop Treated

BEAD provided a Quantitative Usage Analysis for Captan (Kathleen Vinlove memo, 3/31/94) which provided ranges of percent of site treated for certain agricultural uses. When a range was provided the highest value was used in the DRES analysis. When anticipated residues were provided from survey or monitoring data no percent of crop treated data was

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[1]Usually when a tolerance has been reassessed in reregistration and is *lower* than the existing tolerance, the higher tolerance is used in the dietary risk evaluation. CBRS has provided ARs for chronic dietary risk assessment for reregistration. The TMRC for captan reflects the reassessed tolerances and the ARC reflects the anticipated residues for captan.

incorporated into DRES as per CBRS recommendation. When no information was available to the contrary, 100 percent of crops were assumed treated with captan. This could lead to an overestimation of exposure.

Anticipated Residues

CBRS provided anticipated residues (ARs) for use in chronic dietary risk evaluation and separate ARs for upper bound carcinogenicity risk assessment. ARs for use in the acute dietary risk assessment were also provided (S. Funk memo, 9/22/94). ARs for some commodities were higher than the tolerance or reassessed tolerance for that commodity, e.g., grapes (reassessed tol = 10 ppm, AR = 23 ppm), raisins (reassessed tol = 20 ppm, AR = 46 ppm) and strawberries (tol = 25 ppm, AR = 75 ppm). CBRS explains this unusual situation in a C. Olinger memo dated 10/26/94. All acute ARs recommended by CBRS were used in the acute dietary analysis, whether or not the value was higher than the tolerance or reassessed tolerance for reregistration.

3. Results:

The DRES chronic analysis used tolerance level residues to calculate the Theoretical Maximum Residue Contribution (TMRC) for the overall U.S. population and 22 population subgroups. Refinements in residue information and percent of crop treated were considered in calculating the Anticipated Residue Contribution (ARC) for those same population groups. These exposure estimates were then compared to the RfD for captan.

Chronic Exposure from Supported Uses of Captan for Reregistration

Using Tolerances:

The Theoretical Maximum Residue Contribution (TMRC) for the overall U.S. population from published tolerances as well as reassessed tolerances being supported in reregistration are listed below.

Subgroup	Exposure(mg/kg/day)	%Reference Dose
U.S. population	0.035844	28
Non-nursing Infants	0.303975	234

Using Anticipated Residues:

The Anticipated Residue Contribution (ARC) for the overall U.S. population from published uses supported in reregistration are listed below.

Subgroup	Exposure(mg/kg/day)	%Reference Dose
U.S. population	0.001012	1
Non-nursing Infants	0.004537	4

When only the uses supported in reregistration are considered the ARCs for the U.S. population and all DRES subgroups are well below the Reference Dose. THE CHRONIC DIETARY RISK POSED FROM CAPTAN IS NOT OF CONCERN WHEN PUBLISHED COMMODITIES AND COMMODITIES RECOMMENDED THROUGH REREGISTRATION ARE CONSIDERED.

Carcinogenic Risk and Exposure

The upper bound carcinogenic risk from food uses of captan were calculated using the following equation:

Upper Bound Cancer Risk = Dietary Exposure (ARC) x Q_1^*

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Based on a Q^* of 0.0036 $(mg/kg/day)^{-1}$, the upper bound cancer risk was calculated to be 1.2 x 10^{-6}, contributed through all the recommended uses for captan for reregistration. A summary of commodity contributions by raw agricultural commodity (RAC) for the overall U.S. population subgroup is attached as Table 4. THE UPPER BOUND CANCER RISK FROM CAPTAN IS WITHIN THE RANGE OF RISK THAT THE AGENCY GENERALLY CONSIDERS AS NEGLIGIBLE.

Acute Exposure

The DRES detailed acute exposure analysis evaluates individual food consumption as reported by respondents in the USDA 77-78 Nationwide Food Consumption Survey (NFCS) and estimates the distribution of single day exposures through the diet for the U.S. population and certain subgroups. The analysis assumes uniform distribution of captan in the commodity supply. Since the toxicological effect to which high end exposure is being compared to in this analysis is developmental toxicity, the subgroup of concern is Females 13+ which represents women of child bearing age. For substances whose acute NOEL is based on animal studies, the Agency is not generally concerned unless the MOE is below 100.

High end anticipated residues were supplied by CBRS in a S. Funk memo, 9/22/94. Published uses of captan and uses supported in reregistration were included in the acute analysis. High end ARs were used to calculate the high-end exposure for the subgroup of concern. Some raw agricultural commodities had acute ARs above tolerance level.

Captan RACS over tolerance level for Acute ARs

1. Blackberries
2. Blueberries
3. Dewberries
4. Grapes
5. Raspberries
6. Strawberries

The estimated percent of potential person days that are consumers of at least one of the published or recommended commodities for reregistration is 99% of the population. The high end MOE and an estimate of the 95th percentile MOE are listed below for the Females 13+ subgroup:

High End Exposure = 0.3 mg/kg/day
NOEL/Exposure = 10 mg/kg/day ÷ 0.3 mg/kg/day = 33

Exposure from estimated 95th Percentile = 0.10 mg/kg/day
NOEL/Exposure = 10 mg/kg/day ÷ 0.1 mg/kg/day = 100

ACUTE DIETARY RISK IS OF CONCERN FOR THE HIGHEST EXPOSED INDIVIDUAL. WHEN THE ESTIMATED 95TH PERCENTILE CONSUMER IS CONSIDERED, HOWEVER, THE MOE IS AT THE LEVEL THE AGENCY GENERALLY CONSIDERS NEGLIGIBLE FOR ACUTE DIETARY RISK.

A second acute analysis was conducted with raw agricultural commodities (RACs) that had acute ARs higher than tolerance level, listed above, included *at tolerance level*. **The acute risk was still of concern with an MOE of 56 for the highest exposed individual.** Acute risk from exposure to the estimated 95th percentile consumer for this same scenario was estimated to be 125.

Conclusions

To the extent that this analysis uses anticipated residues, percent-crop-treated information and recommended (not published) tolerances, it is not a "worst-case" picture of the dietary risk from captan. The chronic dietary risk from exposure of captan appears to be of minimal concern, with all DRES subgroups having ARC values well below the RfD.

The upper bound carcinogenic risk from captan, 1.2×10^{-6}, is within the range of risk that the Agency generally considers as negligible.

Acute dietary risk is of concern for the highest exposed individual. DRES notes, however, that while the residue estimates used are likely to be found in the market place the assumption that all foods for which captan has tolerances could be eaten at a single meal is likely an overestimate. Another assumption could be that a large amount of one food eaten at a single meal, for example, oranges, would contain tolerance level residues on each orange eaten at that one meal is again a likely overestimate of acute risk. The high end estimate of acute dietary risk is therefore probably higher than should be expected in the real world.

Finally, the CBRS recommendation of acute ARs from FDA monitoring data with residues *above tolerance level* for grapes, caneberries and strawberries is of great concern from a dietary risk standpoint.

Attachments

cc: DRES, Tox I, CBRS, Caswell #159

011423

Table 1: Chronic ARs for
Captan RED

ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 159 DATE: 11/02/94 PAGE: 1

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 q*: 0.00360	No data gaps. q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

FOOD CODE	FOOD	FOOD FORM	PET.#	TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
01002AA	BLACKBERRIES	10 RAW-FRESH OR NFS	15	P 25.000000	0.440000		100.00	0.440000
01002AA	BLACKBERRIES	21 COOKED-NFS	15	P 25.000000	0.440000		100.00	0.440000
01002AA	BLACKBERRIES	62 COOKED-FRESH OR FROZEN-BAKED	15	P 25.000000	0.440000		100.00	0.440000
01004AA	DEWBERRIES	00 NOT SPECIFIED (NO CONSUMPTION)	15	P 25.000000	3.000000		100.00	3.000000
01006AA	RASPBERRIES	10 RAW-FRESH OR NFS	15	P 25.000000	3.000000		100.00	3.000000
01006AA	RASPBERRIES	15 RAW-FRESH OR CANNED	15	P 25.000000	3.000000		100.00	3.000000
01006AA	RASPBERRIES	31 COOKED-FRESH OR CANNED	15	P 25.000000	3.000000		100.00	3.000000
01006AA	RASPBERRIES	62 COOKED-FRESH OR FROZEN-BAKED	15	P 25.000000	3.000000		100.00	3.000000
01006AA	RASPBERRIES	70 RAW-FROZEN	15	P 25.000000	0.170000		100.00	0.170000
01009AA	BLUEBERRIES	10 RAW-FRESH OR NFS	15	P 25.000000	0.170000		100.00	0.170000
01009AA	BLUEBERRIES	21 COOKED-NFS	15	P 25.000000	0.170000		100.00	0.170000
01009AA	BLUEBERRIES	22 COOKED-FRESH-BAKED	15	P 25.000000	0.170000		100.00	0.170000
01009AA	BLUEBERRIES	62 COOKED-FRESH OR FROZEN-BAKED	15	P 10.000000	1.500000		100.00	1.500000
01014AA	GRAPES-FRESH	10 RAW-FRESH OR NFS	15	P 10.000000	1.500000		100.00	1.500000
01014AA	GRAPES-FRESH	21 COOKED-NFS	15	P 10.000000	1.500000		100.00	1.500000
01014AA	GRAPES-FRESH	31 COOKED-FRESH OR CANNED	15	P 20.000000	3.000000C		100.00	3.000000
01014DA	GRAPES-RAISINS	10 RAW-FRESH OR NFS	15	P 20.000000	3.000000C		100.00	3.000000
01014DA	GRAPES-RAISINS	21 COOKED-NFS	15	P 20.000000	3.000000C		100.00	3.000000
01014DA	GRAPES-RAISINS	22 COOKED-FRESH-BAKED	15	P 10.000000	1.500000C		100.00	1.500000
01014JA	GRAPES-JUICE	10 RAW-FRESH OR NFS	15	P 10.000000	1.500000C		100.00	1.500000
01014JA	GRAPES-JUICE	15 RAW-FRESH OR CANNED	15	P 10.000000	1.500000C		100.00	1.500000
01014JA	GRAPES-JUICE	21 COOKED-NFS	15	P 25.000000	1.500000		100.00	1.500000
01016AA	STRAWBERRIES	10 RAW-FRESH OR NFS	15	P 25.000000	1.500000		100.00	1.500000
01016AA	STRAWBERRIES	21 COOKED-NFS	15	P 25.000000	1.500000		10.00	0.007000
01016AA	STRAWBERRIES	70 RAW-FROZEN	15	P 0.250000	0.070000		10.00	0.007000
03001AA	ALMONDS	10 RAW-FRESH OR NFS	15	P 0.250000	0.070000		10.00	0.007000
03001AA	ALMONDS	21 COOKED-NFS	15	P 0.250000	0.070000		100.00	0.410000
03001AA	ALMONDS	22 COOKED-FRESH-BAKED	15	P 25.000000	0.410000		100.00	0.410000
04001AA	APPLES-FRESH	10 RAW-FRESH OR NFS	15	P 25.000000	0.410000		100.00	0.410000
04001AA	APPLES-FRESH	21 COOKED-NFS	15	P 25.000000	0.410000		100.00	0.410000
04001AA	APPLES-FRESH	31 COOKED-FRESH OR CANNED	15	P 25.000000	0.410000		100.00	3.300000
04001AA	APPLES-FRESH	62 COOKED-FRESH OR FROZEN-BAKED	15	P 25.000000	3.300000C		100.00	3.300000
04001DA	APPLES-DRIED	10 RAW-FRESH OR NFS	15	P 25.000000	3.300000C		100.00	3.300000
04001DA	APPLES-DRIED	22 COOKED-FRESH-BAKED	15	P 25.000000	3.300000C		100.00	0.130000
04001DA	APPLES-DRIED	62 COOKED-FRESH OR FROZEN-BAKED	15	P 25.000000	0.130000		100.00	0.130000
04001JA	APPLES-JUICE	15 RAW-FRESH OR CANNED	15	P 25.000000	0.130000		100.00	0.110000
04001JA	APPLES-JUICE	31 COOKED-FRESH OR CANNED	15	P 25.000000	0.110000		100.00	0.110000
04003AA	PEARS-FRESH	10 RAW-FRESH OR NFS	15	P 25.000000	0.110000		100.00	0.110000
04003AA	PEARS-FRESH	31 COOKED-FRESH OR CANNED	15	P 25.000000	0.110000			
04003AA	PEARS-FRESH	51 COOKED-CANNED						

Table 1.

ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 159 DATE: 11/02/94 PAGE: 2

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED WOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01 18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

FOOD CODE	FOOD	FOOD FORM	PET.#		TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
04003AA	PEARS-FRESH	62 COOKED-FRESH OR FROZEN-BAKED	15	P	25.000000	0.110000		100.00	0.110000
04003DA	PEARS-DRIED	10 RAW-FRESH OR NFS	15	P	25.000000	0.490000C		100.00	0.490000
04003DA	PEARS-DRIED	21 COOKED-NFS	15	P	25.000000	0.490000C		100.00	0.490000
05001AA	APRICOTS-FRESH	10 RAW-FRESH OR NFS	15	P	10.000000	0.540000		100.00	0.540000
05001AA	APRICOTS-FRESH	21 COOKED-NFS	15	P	10.000000	0.540000		100.00	0.540000
05001AA	APRICOTS-FRESH	31 COOKED-FRESH OR CANNED	15	P	10.000000	0.540000		100.00	0.540000
05001DA	APRICOTS-DRIED	10 RAW-FRESH OR NFS	15	P	10.000000	3.300000C		100.00	3.300000
05001DA	APRICOTS-DRIED	22 COOKED-FRESH-BAKED	15	P	10.000000	3.300000C		100.00	3.300000
05002AA	CHERRIES-FRESH	10 RAW-FRESH OR NFS	15	P	50.000000	0.070000		100.00	0.070000
05002AA	CHERRIES-FRESH	21 COOKED-NFS	15	P	50.000000	0.070000		100.00	0.070000
05002AA	CHERRIES-FRESH	31 COOKED-FRESH OR CANNED	15	P	50.000000	0.070000		100.00	0.070000
05002AA	CHERRIES-FRESH	62 COOKED-FRESH OR FROZEN-BAKED	15	P	50.000000	0.070000		100.00	0.070000
05002DA	CHERRIES-DRIED	00 NOT SPECIFIED (NO CONSUMPTION)	15	P	50.000000	0.280000C		100.00	0.280000
05002JA	CHERRIES-JUICE	15 RAW-FRESH OR CANNED	15	P	50.000000	0.110000C		100.00	0.110000
05002JA	CHERRIES-JUICE	21 COOKED-NFS	15	P	50.000000	0.110000C		100.00	0.110000
05003AA	NECTARINES	10 RAW-FRESH OR NFS	15	P	25.000000	0.016000		100.00	0.016000
05004AA	PEACHES-FRESH	10 RAW-FRESH OR NFS	15	P	15.000000	0.530000		100.00	0.530000
05004AA	PEACHES-FRESH	21 COOKED-NFS	15	P	15.000000	0.530000		100.00	0.530000
05004AA	PEACHES-FRESH	31 COOKED-FRESH OR CANNED	15	P	15.000000	0.530000		100.00	0.530000
05004AA	PEACHES-FRESH	51 COOKED-CANNED	15	P	15.000000	0.530000		100.00	0.530000
05004DA	PEACHES-DRIED	10 RAW-FRESH OR NFS	15	P	15.000000	3.800000C		100.00	3.800000
05004DA	PEACHES-DRIED	21 COOKED-NFS	15	P	15.000000	3.800000C		100.00	3.800000
05005AA	PLUMS-FRESH	10 RAW-FRESH OR NFS	15	P	10.000000	0.063000		100.00	0.063000
05005AA	PLUMS-FRESH	31 COOKED-FRESH OR CANNED	15	P	10.000000	0.063000		100.00	0.063000
05005DA	PLUMS-PRUNES	10 RAW-FRESH OR NFS	15	P	10.000000	0.020000		100.00	0.020000
05005DA	PLUMS-PRUNES	21 COOKED-NFS	15	P	10.000000	0.020000		100.00	0.020000
05005DA	PLUMS-PRUNES	31 COOKED-FRESH OR CANNED	15	P	10.000000	0.020000		100.00	0.020000
05005JA	PRUNE-JUICE	10 RAW-FRESH OR NFS	15	P	10.000000	0.100000C		100.00	0.100000
05005JA	PRUNE-JUICE	62 COOKED-FRESH OR FROZEN-BAKED	15	P	10.000000	0.100000C		100.00	0.100000
10002AA	CANTALOUPES-UNSP	00 NOT SPECIFIED (NO CONSUMPTION)	15	P	0.050000	0.010000		5.00	0.000500
10002AB	CANTALOUPES-PULP	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		5.00	0.000500
10002AB	CANTALOUPES-PULP	21 COOKED-NFS	15	P	0.050000	0.010000		5.00	0.000500
10005AA	HONEYDEW MELONS	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		5.00	0.000500
10008AA	WATERMELON	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		5.00	0.000500
10008AA	WATERMELON	21 COOKED-NFS	15	P	0.050000	0.010000		100.00	0.010000
10010AA	CUCUMBERS	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		100.00	0.010000
10010AA	CUCUMBERS	11 RAW-FRESH-PICKLED,CORNED,OR CURED	15	P	0.050000	0.010000		100.00	0.010000
10010AA	CUCUMBERS	21 COOKED-NFS	15	P	0.050000	0.010000		100.00	0.010000
10011AA	PUMPKIN	21 COOKED-NFS	15	P	0.050000	0.010000		100.00	0.010000
10011AA	PUMPKIN	22 COOKED-FRESH-BAKED							

Table 1.

ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 159 DATE: 11/02/94 PAGE: 3

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CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED VOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 q*: 0.00360	No data gaps. q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

FOOD CODE	FOOD	FOOD FORM	PET.#	TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
10011AA	PUMPKIN	62 COOKED-FRESH OR FROZEN-BAKED	15	P 0.050000	0.010000		100.00	0.010000
10013AA	SQUASH-SUMMER	10 RAW-FRESH OR NFS	15	P 0.050000	0.010000		100.00	0.010000
10013AA	SQUASH-SUMMER	21 COOKED-NFS	15	P 0.050000	0.010000		100.00	0.010000
10014AA	SQUASH-WINTER	10 RAW-FRESH OR NFS	15	P 0.050000	0.010000		100.00	0.010000
10014AA	SQUASH-WINTER	21 COOKED-NFS	15	P 0.050000	0.010000		100.00	0.010000
10014AA	SQUASH-WINTER	31 COOKED-FRESH OR CANNED	15	P 0.050000	0.010000		5.00	0.000500
11001AA	EGGPLANT	10 RAW-FRESH OR NFS	15	P 0.050000	0.010000		5.00	0.000500
11001AA	EGGPLANT	21 COOKED-NFS	15	P 0.050000	0.010000		5.00	0.000500
11001AA	EGGPLANT	25 COOKED-FRESH-FRIED	15	P 0.050000	0.010000		5.00	0.000500
11003AA	PEPPERS,SWEET	10 RAW-FRESH OR NFS	15	P 0.050000	0.010000		5.00	0.000500
11003AA	PEPPERS,SWEET	21 COOKED-NFS	15	P 0.050000	0.010000		5.00	0.000500
11003AB	CHILI PEPPERS	00 NOT SPECIFIED (NO CONSUMPTION)	15	P 0.050000	0.010000		5.00	0.000500
11003AD	PEPPERS-OTHER	10 RAW-FRESH OR NFS	15	P 0.050000	0.010000		5.00	0.000500
11003AD	PEPPERS-OTHER	21 COOKED-NFS	15	P 0.050000	0.010000		5.00	0.000500
11003AD	PEPPERS-OTHER	51 COOKED-CANNED	15	P 0.050000	0.010000		5.00	0.000500
11004AA	PIMIENTOS	10 RAW-FRESH OR NFS	15	P 0.050000	0.010000		5.00	0.000500
11004AA	PIMIENTOS	21 COOKED-NFS	15	P 0.050000	0.010000		5.00	0.000500
11004AA	PIMIENTOS	31 COOKED-FRESH OR CANNED	15	P 0.050000	0.010000		100.00	0.010000
13001AA	BEETS-TOPS	31 COOKED-FRESH OR CANNED	15	P 0.050000	0.010000		100.00	0.010000
13001AA	BEETS-TOPS	63 COOKED-FRESH OR FROZEN-BOILED	15	P 0.050000	0.010000		100.00	0.010000
13005AA	BROCCOLI	21 COOKED-NFS	15	P 0.050000	0.010000		100.00	0.010000
13005AA	BROCCOLI	31 COOKED-FRESH OR CANNED	15	P 0.050000	0.010000		100.00	0.010000
13005AA	BROCCOLI	63 COOKED-FRESH OR FROZEN-BOILED	15	P 0.050000	0.010000		100.00	0.010000
13006AA	BRUSSEL SPROUTS	21 COOKED-NFS	15	P 0.050000	0.010000		100.00	0.010000
13006AA	BRUSSEL SPROUTS	23 COOKED-FRESH-BOILED	15	P 0.050000	0.010000		100.00	0.010000
13007AA	CABBAGE	10 RAW-FRESH OR NFS	15	P 0.050000	0.010000		100.00	0.010000
13007AA	CABBAGE	11 RAW-FRESH-PICKLED,CORNED,OR CURED	15	P 0.050000	0.010000		100.00	0.010000
13007AA	CABBAGE	21 COOKED-NFS	15	P 0.050000	0.010000		100.00	0.010000
13008AA	CAULIFLOWER	10 RAW-FRESH OR NFS	15	P 0.050000	0.050000		100.00	0.050000
13008AA	CAULIFLOWER	21 COOKED-NFS	15	P 0.050000	0.010000		100.00	0.010000
13009AA	COLLARDS	51 COOKED-CANNED	15	P 0.050000	0.010000		100.00	0.010000
13009AA	COLLARDS	63 COOKED-FRESH OR FROZEN-BOILED	15	P 0.050000	0.010000		100.00	0.010000
13010AA	CABBAGE-CHINESE	10 RAW-FRESH OR NFS	15	P 0.050000	0.010000		100.00	0.010000
13010AA	CABBAGE-CHINESE	21 COOKED-NFS	15	P 0.050000	0.010000		5.00	0.000500
13011AA	KALE	63 COOKED-FRESH OR FROZEN-BOILED	15	P 0.050000	0.010000		5.00	0.000500
13013AA	LETTUCE-LEAFY	10 RAW-FRESH OR NFS	15	P 0.050000	0.010000		5.00	0.000500
13020AA	LETTUCE-UNSPEC	10 RAW-FRESH OR NFS	15	P 0.050000	0.010000		5.00	0.000500
13021AA	MUSTARD GREENS	21 COOKED-NFS	15	P 0.050000	0.010000		5.00	0.000500
13021AA	MUSTARD GREENS	63 COOKED-FRESH OR FROZEN-BOILED	15	P 0.050000	0.010000		5.00	0.000500
13024AA	SPINACH	10 RAW-FRESH OR NFS	15	P 0.050000	0.010000			

ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 159 DATE: 11/02/94 PAGE: 4

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

FOOD CODE	FOOD	FOOD FORM	PET.#		TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
13024AA	SPINACH	21 COOKED-NFS	15	P	0.050000	0.010000		5.00	0.000500
13024AA	SPINACH	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		5.00	0.000500
13025AA	SWISS CHARD	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		100.00	0.010000
13025AA	SWISS CHARD	31 COOKED-FRESH OR CANNED	REREG	N	0.050000	0.010000		100.00	0.010000
13025AA	SWISS CHARD	63 COOKED-FRESH OR FROZEN-BOILED	REREG	N	0.050000	0.010000		100.00	0.010000
13026AA	TURNIPS-TOPS	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		100.00	0.010000
13026AA	TURNIPS-TOPS	21 COOKED-NFS	15	P	0.050000	0.010000		100.00	0.010000
13026AA	TURNIPS-TOPS	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		100.00	0.010000
13045AA	LETTUCE-HEAD	10 RAW-FRESH OR NFS	15	P	0.050000	0.050000		100.00	0.050000
13045AA	LETTUCE-HEAD	21 COOKED-NFS	15	P	0.050000	0.050000		100.00	0.050000
14001AA	BEETS-ROOTS	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		100.00	0.010000
14001AA	BEETS-ROOTS	21 COOKED-NFS	15	P	0.050000	0.010000		100.00	0.010000
14001AA	BEETS-ROOTS	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	15	P	0.050000	0.010000		100.00	0.010000
14001AA	BEETS-ROOTS	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		100.00	0.010000
14003AA	CARROTS	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		100.00	0.010000
14003AA	CARROTS	21 COOKED-NFS	15	P	0.050000	0.010000		100.00	0.010000
14003AA	CARROTS	23 COOKED-FRESH-BOILED	15	P	0.050000	0.010000		100.00	0.010000
14003AA	CARROTS	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		100.00	0.010000
14003AA	CARROTS	51 COOKED-CANNED	15	P	0.050000	0.010000		100.00	0.010000
14011AA	ONIONS-DRY-BULB	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		100.00	0.010000
14011AA	ONIONS-DRY-BULB	21 COOKED-NFS	15	P	0.050000	0.010000		100.00	0.010000
14011AA	ONIONS-DRY-BULB	22 COOKED-FRESH-BAKED	15	P	0.050000	0.010000		100.00	0.010000
14011AA	ONIONS-DRY-BULB	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		100.00	0.010000
14011DA	ONIONS-DRIED	12 RAW-FRESH-DRILD	15	P	0.050000	0.010000		5.00	0.000500
14013AA	POTATO(WH)-WHOLE	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		5.00	0.000500
14013AA	POTATO(WH)-WHOLE	21 COOKED-NFS	15	P	0.050000	0.010000		5.00	0.000500
14013AA	POTATO(WH)-WHOLE	22 COOKED-FRESH-BAKED	15	P	0.050000	0.010000		5.00	0.000500
14013AB	POTATO(WH)-UNSPE	22 COOKED-FRESH-BAKED	15	P	0.050000	0.010000		5.00	0.000500
14013AC	POTATO(WH)-PULP	21 COOKED-NFS	15	P	0.050000	0.010000		5.00	0.000500
14013AC	POTATO(WH)-PULP	22 COOKED-FRESH-BAKED	15	P	0.050000	0.010000		5.00	0.000500
14013AC	POTATO(WH)-PULP	23 COOKED-FRESH-BOILED	15	P	0.050000	0.010000		5.00	0.000500
14013AC	POTATO(WH)-PULP	25 COOKED-FRESH-FRIED	15	P	0.050000	0.010000		5.00	0.000500
14013DA	POTATO(WH)-DRY	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		5.00	0.000500
14013DA	POTATO(WH)-DRY	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		5.00	0.000500
14013HA	POTATO(WH)-PEEL	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		100.00	0.010000
14014AA	RADISHES-ROOTS	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		100.00	0.010000
14014AB	RADISHES-TOPS	00 NOT SPECIFIED (NO CONSUMPTION)	15	P	0.050000	0.010000		100.00	0.010000
14015AA	RUTABAGAS ROOTS	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		100.00	0.010000
14015AA	RUTABAGAS ROOTS	21 COOKED-NFS	15	P	0.050000	0.050000		100.00	0.050000
14019AA	TURNIPS ROOTS	10 RAW-FRESH OR NFS							

Table

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ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 159 DATE: 11/02/94 PAGE: 5

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

FOOD CODE	FOOD	FOOD FORM	PET.#		TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
14019AA	TURNIPS-ROOTS	21 COOKED-NFS	15	P	0.050000	0.050000		100.00	0.050000
15001AA	BEANS-DRY-GRT NO	00 NOT SPECIFIED (NO CONSUMPTION)	15	P	0.050000	0.010000		90.00	0.009000
15001AB	BEANS-DRY-KIDNEY	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000
15001AB	BEANS-DRY-KIDNEY	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		90.00	0.009000
15001AC	BEANS-DRY-LIMA	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000
15001AD	BEANS-DRY-NAVY	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000
15001AD	BEANS-DRY-NAVY	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		90.00	0.009000
15001AE	BEANS-DRY-OTHER	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000
15001AE	BEANS-DRY-OTHER	25 COOKED-FRESH-FRIED	15	P	0.050000	0.010000		90.00	0.009000
15001AE	BEANS-DRY-OTHER	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		90.00	0.009000
15001AF	BEANS-DRY-PINTO	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000
15002AA	BEANS-SUCC-LIMA	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		90.00	0.009000
15002AA	BEANS-SUCC-LIMA	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000
15003AA	BEANS-SUCC-GREEN	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000
15003AB	BEANS-SUCC-OTH	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		90.00	0.009000
15003AB	BEANS-SUCC-OTH	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000
15003AC	BEANS-SUCC-WAX	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000
15004AA	CORN,POP	21 COOKED-NFS	REREG	N	0.050000	0.010000		5.00	0.000500
15005AA	CORN,SWEET	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		5.00	0.000500
15005AA	CORN,SWEET	21 COOKED-NFS	15	P	0.050000	0.010000		5.00	0.000500
15005AA	CORN,SWEET	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		5.00	0.000500
15006AA	PEANUTS-WHOLE	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		70.00	0.007000
15006AA	PEANUTS-WHOLE	21 COOKED-NFS	REREG	N	0.050000	0.010000		70.00	0.007000
15006AA	PEANUTS-WHOLE	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		70.00	0.007000
15007AA	PEAS DRY-GARDEN	21 COOKED-NFS	15	P	0.050000	0.010000		100.00	0.010000
15007AA	PEAS DRY-GARDEN	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		100.00	0.010000
15009AA	PEAS SUCC-GARDEN	21 COOKED-NFS	15	P	0.050000	0.010000		100.00	0.010000
15009AA	PEAS SUCC-GARDEN	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		100.00	0.010000
15013AA	MUNG BEANS	10 RAW-FRESH OR NFS	15	P	0.050000	0.050000		100.00	0.050000
15013AA	MUNG BEANS	21 COOKED-NFS	15	P	0.050000	0.050000		100.00	0.050000
15015AA	OKRA	21 COOKED-NFS	REREG	N	0.050000	0.010000		100.00	0.010000
15015AA	OKRA	25 COOKED-FRESH-FRIED	REREG	N	0.050000	0.010000		100.00	0.010000
15018AA	SUNFLOWER-SEEDS	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		5.00	0.000500
15021AA	ALFALFA SPROUTS	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		100.00	0.010000
15022AA	BEANS-DRY-BROAD	00 NOT SPECIFIED (NO CONSUMPTION)	15	P	0.050000	0.010000		90.00	0.009000
15022AB	BEANS-SUCC-BROAD	00 NOT SPECIFIED (NO CONSUMPTION)	15	P	0.050000	0.010000		90.00	0.009000
15023AA	BEANS-DRY-PIGEON	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000
15026AA	SESAME SEEDS	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		100.00	0.010000
15026AA	SESAME SEEDS	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		100.00	0.010000
15027AA	BEANS-UNSPEC	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg .00 ppm LEL= .0000 mg/kg 500.00 ppm ONCO: B2 (HED WOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

FOOD CODE	FOOD	FOOD FORM	PET.#		TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
15029AA	SOYBEAN-SPROUTED	00 NOT SPECIFIED (NO CONSUMPTION)	15	P	0.050000	0.010000		5.00	0.000500
15030AA	BEANS-DRY-HYAC	00 NOT SPECIFIED (NO CONSUMPTION)	15	P	0.050000	0.010000		90.00	0.009000
15030AB	BEANS-SUCC-HYAC	00 NOT SPECIFIED (NO CONSUMPTION)	15	P	0.050000	0.010000		90.00	0.009000
15031AA	BLKEYE PEAS-DRY	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000
15032AA	BEANS-DRY	21 COOKED-NFS	15	P	0.050000	0.010000		90.00	0.009000
15032AA	BEANS-DRY	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		90.00	0.009000
16004AA	ONIONS-GREEN	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		5.00	0.000500
16004AA	ONIONS-GREEN	21 COOKED-NFS	15	P	0.050000	0.010000		5.00	0.000500
16004AA	ONIONS-GREEN	25 COOKED-FRESH-FRIED	15	P	0.050000	0.010000		5.00	0.000500
24001AA	BARLEY	21 COOKED-NFS	REREG	N	0.050000	0.010000		5.00	0.000500
24002EA	CORN,GRAIN-ENDO	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		100.00	0.010000
24002EA	CORN,GRAIN-ENDO	21 COOKED-NFS	REREG	N	0.050000	0.010000		100.00	0.010000
24002EA	CORN,GRAIN-ENDO	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		100.00	0.010000
24002EA	CORN,GRAIN-ENDO	23 COOKED-FRESH-BOILED	REREG	N	0.050000	0.010000		100.00	0.010000
24002HA	CORN,GRAIN-BRAN	00 NOT SPECIFIED (NO CONSUMPTION)	REREG	N	0.050000	0.010000		100.00	0.010000
24002SA	CORN SUGAR	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		100.00	0.010000
24002SA	CORN SUGAR	21 COOKED-NFS	REREG	N	0.050000	0.010000		100.00	0.010000
24002SA	CORN SUGAR	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		100.00	0.010000
24003AA	OATS	21 COOKED-NFS	REREG	N	0.050000	0.010000		5.00	0.000500
24003AA	OATS	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		5.00	0.000500
24003AA	OATS	23 COOKED-FRESH-BOILED	REREG	N	0.050000	0.010000		5.00	0.000500
24005AA	RYE-ROUGH	00 NOT SPECIFIED (NO CONSUMPTION)	REREG	N	0.050000	0.010000		5.00	0.000500
24005GA	RYE-GERM	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		5.00	0.000500
24005MA	RYE-FLOUR	21 COOKED-NFS	REREG	N	0.050000	0.010000		5.00	0.000500
24005MA	RYE-FLOUR	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		5.00	0.000500
24006AA	SORGHUM	00 NOT SPECIFIED (NO CONSUMPTION)	REREG	N	0.050000	0.010000		100.00	0.010000
24007AA	WHEAT-ROUGH	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		5.00	0.000500
24007AA	WHEAT-ROUGH	21 COOKED-NFS	REREG	N	0.050000	0.010000		5.00	0.000500
24007AA	WHEAT-ROUGH	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		5.00	0.000500
24007AA	WHEAT-ROUGH	23 COOKED-FRESH-BOILED	REREG	N	0.050000	0.010000		5.00	0.000500
[illegible]	WHEAT-GERM	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		5.00	0.000500
[illegible]	WHEAT-GERM	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		5.00	0.000500
2400[illegible]	WHEAT-BRAN	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		5.00	0.000500
2400[illegible]	WHEAT-BRAN	21 COOKED-NFS	REREG	N	0.050000	0.010000		5.00	0.000500
2400[illegible]	WHEAT-BRAN	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		5.00	0.000500
24007MA	WHEAT-FLOUR	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		5.00	0.000500
24007MA	WHEAT-FLOUR	21 COOKED-NFS	REREG	N	0.050000	0.010000		5.00	0.000500
24007MA	WHEAT-FLOUR	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		5.00	0.000500
24007MA	WHEAT-FLOUR	25 COOKED-FRESH-FRIED	REREG	N	0.050000	0.010000		5.00	0.000500
25002SA	BEET SUGAR	10 RAW-FRESH OR NFS	REREG	N	0.050000	0.010000		100.00	0.010000

Table 1.

ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 159 DATE: 11/02/94 PAGE: 7

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED VOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

FOOD CODE	FOOD	FOOD FORM	PET.#		TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
25002SA	BEET SUGAR	21 COOKED-NFS	REREG	N	0.050000	0.010000		100.00	0.010000
25002SA	BEET SUGAR	22 COOKED-FRESH-BAKED	REREG	N	0.050000	0.010000		100.00	0.010000
25002SA	BEET SUGAR	31 COOKED-FRESH OR CANNED	REREG	N	0.050000	0.010000		100.00	0.010000
26011AA	GUAR BEANS	00 NOT SPECIFIED (NO CONSUMPTION)	15	P	0.050000	0.050000		100.00	0.050000
27002OA	CORN,GRAIN-OIL	18 PROCESSED OIL	REREG	N	0.050000	0.010000		100.00	0.010000
27003OA	COTTONSEED-OIL	18 PROCESSED OIL	15	P	0.050000	0.010000		50.00	0.005000
27003WA	COTTONSEED-MEAL	18 PROCESSED OIL	15	P	0.050000	0.010000		50.00	0.005000
27004AA	FLAX SEED	00 NOT SPECIFIED (NO CONSUMPTION)	REREG	N	0.050000	0.010000		100.00	0.010000
27007OA	PEANUTS-OIL	18 PROCESSED OIL	REREG	N	0.050000	0.010000		70.00	0.007000
27008AA	SAFFLOWER-SEED	00 NOT SPECIFIED (NO CONSUMPTION)	REREG	N	0.050000	0.010000		100.00	0.010000
27008OA	SAFFLOWER-OIL	18 PROCESSED OIL	REREG	N	0.050000	0.010000		100.00	0.010000
27009OA	SESAME-OIL	18 PROCESSED OIL	REREG	N	0.050000	0.010000		100.00	0.010000
27010OA	SOYBEANS-OIL	18 PROCESSED OIL	15	P	0.050000	0.010000		5.00	0.000500
27011OA	SUNFLOWER-OIL	18 PROCESSED OIL	UNKNOWN	P	0.050000	0.010000		100.00	0.010000
27017AA	RAPE SEED	00 NOT SPECIFIED (NO CONSUMPTION)	REREG	N	0.050000	0.010000		5.00	0.000500
28023AA	SOYBEANS-UNSPEC	21 COOKED-NFS	15	P	0.050000	0.010000		5.00	0.000500
28023AB	SOYBEANS-DRY	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		5.00	0.000500
28023AB	SOYBEANS-DRY	21 COOKED-NFS	15	P	0.050000	0.010000		5.00	0.000500
28023AB	SOYBEANS-DRY	23 COOKED-FRESH-BOILED	15	P	0.050000	0.010000		5.00	0.000500
28023AB	SOYBEANS-DRY	25 COOKED-FRESH-FRIED	15	P	0.050000	0.010000		5.00	0.000500
28023AB	SOYBEANS-DRY	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		5.00	0.000500
28023WA	SOY-FL, FULL FAT	21 COOKED-NFS	15	P	0.050000	0.010000		5.00	0.000500
28023WA	SOY-FL, FULL FAT	22 COOKED-FRESH-BAKED	15	P	0.050000	0.010000		5.00	0.000500
28023WA	SOY-FL, FULL FAT	31 COOKED-FRESH OR CANNED	15	P	0.050000	0.010000		5.00	0.000500
28023WB	SOY-FL, LOW FAT	21 COOKED-NFS	15	P	0.050000	0.010000		5.00	0.000500
28023WC	SOY-FL,DEFAT	10 RAW-FRESH OR NFS	15	P	0.050000	0.010000		5.00	0.000500
28023WC	SOY-FL,DEFAT	21 COOKED-NFS	15	P	0.050000	0.010000		5.00	0.000500
28023WC	SOY-FL,DEFAT	22 COOKED-FRESH-BAKED	15	P	0.050000	0.010000		5.00	0.000500
28023WC	SOY-FL,DEFAT	51 COOKED-CANNED	15	P	0.050000	0.010000		5.00	0.000500
28023WC	SOY-FL,DEFAT	53 COOKED-CANNED-BOILED	15	P	0.050000	0.010000		5.00	0.000500
43058AA	WINE AND SHERRY	10 RAW-FRESH OR NFS	9E0755	P	10.000000	1.500000		100.00	1.500000
43058AA	WINE AND SHERRY	21 COOKED-NFS	9E0755	P	10.000000	1.500000		100.00	1.500000
50000DB	MILK-NON-FAT SOL	10 RAW-FRESH OR NFS	REREG	N	0.150000	0.010000		100.00	0.010000
50000DB	MILK-NON-FAT SOL	21 COOKED-NFS	REREG	N	0.150000	0.010000		100.00	0.010000
50000DB	MILK-NON-FAT SOL	51 COOKED-CANNED	REREG	N	0.150000	0.010000		100.00	0.010000
50000FA	MILK-FAT SOLIDS	10 RAW-FRESH OR NFS	REREG	N	0.150000	0.010000		100.00	0.010000
50000FA	MILK-FAT SOLIDS	21 COOKED-NFS	REREG	N	0.150000	0.010000		100.00	0.010000
50000FA	MILK-FAT SOLIDS	51 COOKED-CANNED	REREG	N	0.150000	0.010000		100.00	0.010000
50000SA	MILK SUG (LACT)	21 COOKED-NFS	REREG	N	0.150000	0.010000		100.00	0.010000
50000SA	MILK SUG (LACT)	51 COOKED-CANNED	REREG	N	0.150000	0.010000		100.00	0.010000

ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 159 DATE: 11/02/94 PAGE: 8

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

FOOD CODE	FOOD	FOOD FORM	PET.#		TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
53001BA	BEEF-MEAT BYP	21 COOKED-NFS	3E13671	P	0.400000	0.020000		100.00	0.020000
53001BA	BEEF-MEAT BYP	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	3E13671	P	0.400000	0.020000		100.00	0.020000
53001BB	BEEF-OTH ORGAN	21 COOKED-NFS	3E13671	P	0.400000	0.020000		100.00	0.020000
53001BB	BEEF-OTH ORGAN	51 COOKED-CANNED	3E13671	P	0.400000	0.020000		100.00	0.020000
53001DA	BEEF-DRIED	21 COOKED-NFS	3E13671	P	0.300000	0.020000		100.00	0.010000
53001FA	BEEF-FAT	10 RAW-FRESH OR NFS	3E13671	P	0.250000	0.010000		100.00	0.010000
53001FA	BEEF-FAT	21 COOKED-NFS	3E13671	P	0.250000	0.010000		100.00	0.010000
53001FA	BEEF-FAT	22 COOKED-FRESH-BAKED	3E13671	P	0.250000	0.010000		100.00	0.010000
53001FA	BEEF-FAT	23 COOKED-FRESH-BOILED	3E13671	P	0.250000	0.010000		100.00	0.010000
53001FA	BEEF-FAT	24 COOKED-FRESH-BROILED	3E13671	P	0.250000	0.010000		100.00	0.010000
53001FA	BEEF-FAT	25 COOKED-FRESH-FRIED	3E13671	P	0.400000	0.020000		100.00	0.020000
53001KA	BEEF-KIDNEY	21 COOKED-NFS	3E13671	P	0.400000	0.020000		100.00	0.020000
53001LA	BEEF-LIVER	25 COOKED-FRESH-FRIED	3E13671	P	0.400000	0.020000		100.00	0.020000
53001LA	BEEF-LIVER	31 COOKED-FRESH OR CANNED	3E13671	P	0.300000	0.020000		100.00	0.020000
53001MA	BEEF-LEAN	10 RAW-FRESH OR NFS	3E13671	P	0.300000	0.020000		100.00	0.020000
53001MA	BEEF-LEAN	21 COOKED-NFS	3E13671	P	0.300000	0.020000		100.00	0.020000
53001MA	BEEF-LEAN	22 COOKED-FRESH-BAKED	3E13671	P	0.300000	0.020000		100.00	0.020000
53001MA	BEEF-LEAN	23 COOKED-FRESH-BOILED	3E13671	P	0.300000	0.020000		100.00	0.020000
53001MA	BEEF-LEAN	24 COOKED-FRESH-BROILED	REREG	N	0.400000	0.020000		100.00	0.020000
53002BA	GOAT-MEAT BYP	00 NOT SPECIFIED (NO CONSUMPTION)	REREG	N	0.400000	0.020000		100.00	0.010000
53002BB	GOAT-OTH ORGAN	00 NOT SPECIFIED (NO CONSUMPTION)	REREG	N	0.250000	0.010000		100.00	0.010000
53002FA	GOAT-FAT	23 COOKED-FRESH-BOILED	REREG	N	0.250000	0.010000		100.00	0.020000
53002FA	GOAT-FAT	25 COOKED-FRESH-FRIED	REREG	N	0.400000	0.020000		100.00	0.020000
53002KA	GOAT-KIDNEY	00 NOT SPECIFIED (NO CONSUMPTION)	REREG	N	0.400000	0.020000		100.00	0.020000
53002LA	GOAT-LIVER	00 NOT SPECIFIED (NO CONSUMPTION)	REREG	N	0.300000	0.020000		100.00	0.020000
53002MA	GOAT-LEAN	23 COOKED-FRESH-BOILED	REREG	N	0.300000	0.020000		100.00	0.020000
53002MA	GOAT-LEAN	25 COOKED-FRESH-FRIED	REREG	N	0.400000	0.020000		100.00	0.020000
53003AA	HORSE	00 NOT SPECIFIED (NO CONSUMPTION)	REREG	N	0.400000	0.020000		100.00	0.020000
53005BA	SHEEP-MEAT BYP	21 COOKED-NFS	REREG	N	0.400000	0.020000		100.00	0.010000
53005BB	SHEEP-OTH ORGAN	21 COOKED-NFS	REREG	N	0.250000	0.010000		100.00	0.020000
53005FA	SHEEP-FAT	21 COOKED-NFS	REREG	N	0.400000	0.020000		100.00	0.020000
53005KA	SHEEP-KIDNEY	21 COOKED-NFS	REREG	N	0.400000	0.020000		100.00	0.020000
53005LA	SHEEP-LIVER	00 NOT SPECIFIED (NO CONSUMPTION)	REREG	N	0.300000	0.020000		100.00	0.020000
53005MA	SHEEP-LEAN	21 COOKED-NFS	REREG	N	0.300000	0.020000		100.00	0.020000
53005MA	SHEEP-LEAN	31 COOKED-FRESH OR CANNED	3E13671	P	0.400000	0.020000		100.00	0.020000
53006BA	PORK-MEAT BYP	21 COOKED-NFS	3E13671	P	0.400000	0.020000		100.00	0.020000
53006BB	PORK-OTH ORGAN	21 COOKED-NFS	3E13671	P	0.400000	0.020000		100.00	0.010000
53006BB	PORK-OTH ORGAN	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	3E13671	P	0.250000	0.010000		100.00	0.010000
53006FA	PORK-FAT	10 RAW-FRESH OR NFS	3E13671	P	0.250000	0.010000			
53006FA	PORK-FAT	21 COOKED-NFS							

Table 1.

ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 159 DATE: 11/02/94 PAGE: 9

011423

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

FOOD CODE	FOOD	FOOD FORM	PET.#		TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
53006FA	PORK-FAT	23 COOKED-FRESH-BOILED	3E13671	P	0.250000	0.010000		100.00	0.010000
53006FA	PORK-FAT	25 COOKED-FRESH-FRIED	3E13671	P	0.250000	0.010000		100.00	0.010000
53006FA	PORK-FAT	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	3E13671	P	0.250000	0.010000		100.00	0.010000
53006KA	PORK-KIDNEY	21 COOKED-NFS	3E13671	P	0.400000	0.020000		100.00	0.020000
53006LA	PORK-LIVER	21 COOKED-NFS	3E13671	P	0.400000	0.020000		100.00	0.020000
53096LA	PORK-LIVER	25 COOKED-FRESH-FRIED	3E13671	P	0.400000	0.020000		100.00	0.020000
53006MA	PORK-LEAN	21 COOKED-NFS	3E13671	P	0.300000	0.020000		100.00	0.020000
53006MA	PORK-LEAN	25 COOKED-FRESH-FRIED	3E13671	P	0.300000	0.020000		100.00	0.020000
53006MA	PORK-LEAN	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	3E13671	P	0.300000	0.020000		100.00	0.020000

Table 2.

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS DATE: 11/02/94 PAGE: 1

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

POPULATION SUBGROUP	TOTAL TMRC (MG/KG BODY WEIGHT/DAY) CURRENT TMRC*	NEW TMRC**	NEW TMRC AS PERCENT OF RFD	DIFFERENCE AS PERCENT OF RFD	EFFECT OF ANTICIPATED RESIDUES ARC	%RFD
U.S. POPULATION - 48 STATES	0.034141	0.035844	27.572068	1.309548	0.001012	0.77863
U.S. POPULATION - SPRING SEASON	0.031069	0.032654	25.118310	1.218887	0.000972	0.74782
U.S. POPULATION - SUMMER SEASON	0.033352	0.035025	26.942552	1.287318	0.001022	0.78639
U.S. POPULATION - FALL SEASON	0.036315	0.038093	29.302525	1.367733	0.001025	0.78823
U.S. POPULATION - WINTER SEASON	0.035603	0.037372	28.747795	1.360919	0.001001	0.76985
NORTHEAST REGION	0.041341	0.043113	33.163468	1.362429	0.001169	0.89951
NORTH CENTRAL REGION	0.032377	0.034147	26.267128	1.361961	0.001008	0.77520
SOUTHERN REGION	0.025241	0.026716	20.551119	1.135192	0.000726	0.55823
WESTERN REGION	0.042137	0.044034	33.872084	1.459105	0.001264	0.97218
HISPANICS	0.035550	0.037690	28.992005	1.645937	0.000946	0.72761
NON-HISPANIC WHITES	0.035684	0.037385	28.757794	1.308872	0.001062	0.81655
NON-HISPANIC BLACKS	0.022808	0.024281	18.678072	1.133150	0.000678	0.52185
NON-HISPANIC OTHERS	0.036236	0.038105	29.311864	1.438151	0.000910	0.69975
NURSING INFANTS (< 1 YEAR OLD)	0.209609	0.211780	162.907405	1.669358	0.002632	2.02439
NON-NURSING INFANTS (< 1 YEAR OLD)	0.293998	0.303975	233.827279	7.675068	0.004537	3.48982
FEMALES (13+ YEARS, PREGNANT)	0.021888	0.023093	17.763542	0.926847	0.000750	0.57656
FEMALES 13+ YEARS, NURSING	0.031350	0.032930	25.330448	1.215157	0.001093	0.84111
CHILDREN (1-6 YEARS OLD)	0.100483	0.105400	81.076618	3.782057	0.002577	1.98237
CHILDREN (7-12 YEARS OLD)	0.046047	0.049076	37.750416	2.329608	0.001397	1.07496
MALES (13-19 YEARS OLD)	0.021449	0.023328	17.944261	1.445406	0.000675	0.51907
FEMALES (13-19 YEARS OLD, NOT PREG. OR NURSING)	0.021265	0.022694	17.456769	1.099239	0.000657	0.50509
MALES (20 YEARS AND OLDER)	0.018503	0.019435	14.949716	0.716854	0.000683	0.52540
FEMALES (20 YEARS AND OLDE., NOT PREG. OR NURS)	0.020681	0.021507	16.543464	0.635008	0.000734	0.56493

*Current TMRC does not include new or pending tolerances.
**New TMRC includes new, pending, and published tolerances.

Table 3.

011423

TOLERANCE ASSESSMENT SUMMARY FOR Captan DATE: 11/02/94
USING ANTICIPATED RESIDUES
CASWELL #159

ANALYSIS FOR POPULATION SUB-GROUP: U.S. POPULATION - 48 STATES

EXISTING ANTICIPATED RESIDUES (PUBLISHED ONLY)		
RESULT IN AN ARC OF:	0.000898	MG/KG/DAY
THE EXISTING ARC IS EQUIVALENT TO:	0.691	% OF THE ADI.
PROPOSED NEW ANTICIPATED RESIDUES (CURRENT PETITION ONLY)		
RESULT IN AN ARC OF:	0.000114	MG/KG/DAY
THESE NEW ANTICIPATED RESIDUES WILL OCCUPY:	0.088	% OF THE ADI.
IF THE NEW ANTICIPATED RESIDUES (CURRENT PETITION ONLY)		
ARE APPROVED THE RESULTANT ARC WILL BE:	0.001012	MG/KG/DAY
THE NEW ARC WILL OCCUPY	0.779	% OF THE ADI.

NO OTHER PENDING ANTICIPATED RESIDUES ARE IN THE FILE

ANALYSIS FOR POPULATION SUB-GROUP: NON-NURSING INFANTS (< 1 YEAR OLD)

EXISTING ANTICIPATED RESIDUES (PUBLISHED ONLY)		
RESULT IN AN ARC OF:	0.003868	MG/KG/DAY
THE EXISTING ARC IS EQUIVALENT TO:	2.975	% OF THE ADI.
PROPOSED NEW ANTICIPATED RESIDUES (CURRENT PETITION ONLY)		
RESULT IN AN ARC OF:	0.000669	MG/KG/DAY
THESE NEW ANTICIPATED RESIDUES WILL OCCUPY:	0.515	% OF THE ADI.
IF THE NEW ANTICIPATED RESIDUES (CURRENT PETITION ONLY)		
ARE APPROVED THE RESULTANT ARC WILL BE:	0.004537	MG/KG/DAY
THE NEW ARC WILL OCCUPY	3.490	% OF THE ADI.

NO OTHER PENDING ANTICIPATED RESIDUES ARE IN THE FILE

Table 4 : Captan RED using Cancer ARs

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

COMMODITY CONTRIBUTION BY RAC FOR: U.S. POPULATION - 48 STATES

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	TMRC ONCO RISK	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD	ARC ONCO RISK
15015AA	OKRA	0.050	N	0.000732	0.001	0.00000000264				
	21 COOKED-NFS						0.01000	0.000136	0.000	0.00000000049
	25 COOKED-FRESH-FRIED						0.01000	0.000010	0.000	0.00000000004
15018AA	SUNFLOWER-SEEDS	0.050	N	0.000087	0.000	0.00000000031				
	10 RAW-FRESH OR NFS						0.00050	0.000001	0.000	0.00000000000
15021AA	ALFALFA SPROUTS	0.050	N	0.000007	0.000	0.00000000003				
	10 RAW-FRESH OR NFS						0.01000	0.000001	0.000	0.00000000000
15026AA	SESAME SEEDS	0.050	N	0.000022	0.000	0.00000000008				
	10 RAW-FRESH OR NFS						0.01000	0.000002	0.000	0.00000000001
	22 COOKED-FRESH-BAKED						0.01000	0.000003	0.000	0.00000000001
26011AA	GUAR BEANS	0.050	P	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.05000	0.000000	0.000	0.00000000000
27003OA	COTTONSEED-OIL	0.050	P	0.001020	0.001	0.00000000367				
	18 PROCESSED OIL						0.00500	0.000102	0.000	0.00000000037
27003WA	COTTONSEED-MEAL	0.050	P	0.000006	0.000	0.00000000002				
	18 PROCESSED OIL						0.00500	0.000001	0.000	0.00000000000
27004AA	FLAX SEED	0.050	N	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.01000	0.000000	0.000	0.00000000000
27008AA	SAFFLOWER-SEED	0.050	N	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.01000	0.000000	0.000	0.00000000000
27008OA	SAFFLOWER-OIL	0.050	N	0.000078	0.000	0.00000000028				
	18 PROCESSED OIL						0.01000	0.000016	0.000	0.00000000006
27009OA	SESAME-OIL	0.050	N	0.000001	0.000	0.00000000000				
	18 PROCESSED OIL						0.01000	0.000000	0.000	0.00000000000
27011OA	SUNFLOWER-OIL	0.050	P	0.000124	0.000	0.00000000045				
	18 PROCESSED OIL						0.01000	0.000025	0.000	0.00000000009
27017AA	RAPE SEED	0.050	N	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00050	0.000000	0.000	0.00000000000
43058AA	WINE AND SHERRY	10.000	P	0.841956	0.648	0.00000303104				
	10 RAW-FRESH OR NFS						1.50000	0.124797	0.096	0.00000044927
	21 COOKED-NFS						1.50000	0.001497	0.001	0.00000000539
	CROP GROUP TOTALS FOR UNSPECIFIED:			0.844033	0.649	0.00000303852		0.126591	0.097	0.00000045573
14001AA	BEETS-ROOTS	0.050	P	0.001081	0.001	0.00000000389				
	10 RAW-FRESH OR NFS						0.01000	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.01000	0.000158	0.000	0.00000000057
	26 COOKED-FRESH-PICKLED,CORNED,OR CURED						0.01000	0.000032	0.000	0.00000000012
	31 COOKED-FRESH OR CANNED						0.01000	0.000025	0.000	0.00000000009
14003AA	CARROTS	0.050	P	0.008674	0.007	0.00000003123				
	10 RAW-FRESH OR NFS						0.01000	0.000401	0.000	0.00000000144

Captan RED using cancer ARs

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS

DATE: 11/02/94 PAGE: 2

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

011423

COMMODITY CONTRIBUTION BY RAC FOR: U.S. POPULATION - 48 STATES

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	TMRC ONCO RISK	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD	ARC ONCO RISK
	21 COOKED-NFS						0.01000	0.000508	0.000	0.00000000183
	23 COOKED-FRESH-BOILED						0.01000	0.000091	0.000	0.00000000033
	31 COOKED-FRESH OR CANNED						0.01000	0.000332	0.000	0.00000000120
	51 COOKED-CANNED						0.01000	0.000403	0.000	0.00000000145
14013AA	POTATOES(WHITE)-WHOLE	0.050	P	0.017003	0.013	0.00000006121				
	10 RAW-FRESH OR NFS						0.00050	0.000023	0.000	0.00000000008
	21 COOKED-NFS						0.00050	0.000075	0.000	0.00000000027
	22 COOKED-FRESH-BAKED						0.00050	0.000072	0.000	0.00000000026
14013AB	POTATOES(WHITE)-UNSPECIFIED	0.050	P	0.000004	0.000	0.00000000001				
	22 COOKED-FRESH-BAKED						0.00050	0.000000	0.000	0.00000000000
14013AC	POTATOES(WHITE)-PEELED	0.050	P	0.039213	0.030	0.00000014117				
	21 COOKED-NFS						0.00050	0.000036	0.000	0.00000000013
	22 COOKED-FRESH-BAKED						0.00050	0.000021	0.000	0.00000000008
	23 COOKED-FRESH-BOILED						0.00050	0.000217	0.000	0.00000000078
	25 COOKED-FRESH-FRIED						0.00050	0.000118	0.000	0.00000000042
14013DA	POTATOES(WHITE)-DRY	0.050	P	0.000422	0.000	0.00000000152				
	10 RAW-FRESH OR NFS						0.00050	0.000002	0.000	0.00000000001
	31 COOKED-FRESH OR CANNED						0.00050	0.000002	0.000	0.00000000001
14013HA	POTATOES(WHITE)-PEEL ONLY	0.050	P	0.000001	0.000	0.00000000000				
	22 COOKED-FRESH-BAKED						0.00050	0.000000	0.000	0.00000000000
14014AA	RADISHES-ROOTS	0.050	N	0.000078	0.000	0.00000000028				
	10 RAW-FRESH OR NFS						0.01000	0.000016	0.000	0.00000000006
14015AA	RUTABAGAS-ROOTS	0.050	P	0.000140	0.000	0.00000000050				
	10 RAW-FRESH OR NFS						0.01000	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.01000	0.000028	0.000	0.00000000010
14019AA	TURNIPS-ROOTS	0.050	P	0.000412	0.000	0.00000000148				
	10 RAW-FRESH OR NFS						0.05000	0.000026	0.000	0.00000000009
	21 COOKED-NFS						0.05000	0.000386	0.000	0.00000000139
25002SA	BEET SUGAR	0.050	N	0.016606	0.013	0.00000005978				
	10 RAW-FRESH OR NFS						0.01000	0.000381	0.000	0.00000000137
	21 COOKED-NFS						0.01000	0.000857	0.001	0.00000000309
	22 COOKED-FRESH-BAKED						0.01000	0.000562	0.000	0.00000000202
	31 COOKED-FRESH OR CANNED						0.01000	0.001521	0.001	0.00000000548
	CROP GROUP TOTALS FOR ROOT AND TUBER VEGETABLES:			0.083634	0.064	0.00000030108		0.006293	0.005	0.00000002265

Captan RED using cancer ARs

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS

DATE: 11/02/94 PAGE: 3

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

01142

COMMODITY CONTRIBUTION BY RAC FOR: U.S. POPULATION - 48 STATES

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	TMRC ONCO RISK	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD	ARC ONCO RISK
13001AA	BEETS-TOPS(GREENS)	0.050	P	0.000041	0.000	0.00000000015				
	31 COOKED-FRESH OR CANNED						0.01000	0.000007	0.000	0.00000000003
	63 COOKED-FRESH OR FROZEN-BOILED						0.01000	0.000002	0.000	0.00000000001
13026AA	TURNIPS-TOPS	0.050	P	0.000736	0.001	0.00000000265				
	10 RAW-FRESH OR NFS						0.01000	0.000044	0.000	0.00000000016
	21 COOKED-NFS						0.01000	0.000035	0.000	0.00000000013
	31 COOKED-FRESH OR CANNED						0.01000	0.000068	0.000	0.00000000024
14014AB	RADISHES-TOPS	0.050	N	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.01000	0.000000	0.000	0.00000000000
	CROP GROUP TOTALS FOR LEAVES OF ROOT AND TUBER VEG.:			0.000777	0.001	0.00000000280		0.000156	0.000	0.00000000056
14011AA	ONIONS-DRY-BULB (CIPOLLINI)	0.050	P	0.005303	0.004	0.00000001909				
	10 RAW-FRESH OR NFS						0.01000	0.000185	0.000	0.00000000067
	21 COOKED-NFS						0.01000	0.000708	0.000	0.00000000255
	22 COOKED-FRESH-BAKED						0.01000	0.000103	0.000	0.00000000037
	31 COOKED-FRESH OR CANNED						0.01000	0.000064	0.000	0.00000000023
14011DA	ONIONS-DEHYDRATED OR DRIED	0.050	P	0.000054	0.000	0.00000000019				
	12 RAW-FRESH-DRIED						0.01000	0.000011	0.000	0.00000000004
16004AA	ONIONS-GREEN	0.050	P	0.000098	0.000	0.00000000035				
	10 RAW-FRESH OR NFS						0.00050	0.000001	0.000	0.00000000000
	21 COOKED-NFS						0.00050	0.000000	0.000	0.00000000000
	25 COOKED-FRESH-FRIED						0.00050	0.000000	0.000	0.00000000000
	CROP GROUP TOTALS FOR BULB VEGETABLES:			0.005455	0.004	0.00000001964		0.001072	0.001	0.00000000386
13013AA	LETTUCE-LEAFY VARIETIES	0.050	P	0.000222	0.000	0.00000000080				
	10 RAW-FRESH OR NFS						0.00050	0.000002	0.000	0.00000000001
13020AA	LETTUCE-UNSPECIFIED	0.050	P	0.000460	0.000	0.00000000166				
	10 RAW-FRESH OR NFS						0.00050	0.000005	0.000	0.00000000002
13024AA	SPINACH	0.050	P	0.002177	0.002	0.00000000784				
	10 RAW-FRESH OR NFS						0.00050	0.000004	0.000	0.00000000001
	21 COOKED-NFS						0.00050	0.000003	0.000	0.00000000001
	31 COOKED-FRESH OR CANNED						0.00050	0.000015	0.000	0.00000000005
13025AA	SWISS CHARD	0.050	N	0.000085	0.000	0.00000000031				
	10 RAW-FRESH OR NFS						0.01000	0.000001	0.000	0.00000000000
	31 COOKED-FRESH OR CANNED						0.01000	0.000015	0.000	0.00000000005
	63 COOKED-FRESH OR FROZEN-BOILED						0.01000	0.000001	0.000	0.00000000000
13045AA	LETTUCE-HEAD VARIETIES	0.050	P	0.010614	0.008	0.00000003821				
	10 RAW-FRESH OR NFS						0.05000	0.010413	0.008	0.00000003749
	21 COOKED-NFS						0.05000	0.000201	0.000	0.00000000072

Captan RED using cancer ARs

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS

DATE: 11/02/94 PAGE: 4

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED VOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

01142

COMMODITY CONTRIBUTION BY RAC FOR: U.S. POPULATION - 48 STATES

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	TMRC ONCO RISK	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD	ARC ONCO RISK
	CROP GROUP TOTALS FOR LEAFY VEGETABLES (EXCL. BRASSICAE):			0.013558	0.010	0.00000004881		0.010660	0.008	0.00000003838
13005AA	BROCCOLI	0.050	P	0.002456	0.002	0.00000000884				
	21 COOKED-NFS						0.01000	0.000034	0.000	0.00000000012
	31 COOKED-FRESH OR CANNED						0.01000	0.000405	0.000	0.00000000146
	63 COOKED-FRESH OR FROZEN-BOILED						0.01000	0.000052	0.000	0.00000000019
13006AA	BRUSSEL SPROUTS	0.050	P	0.000342	0.000	0.00000000123				
	21 COOKED-NFS						0.01000	0.000011	0.000	0.00000000004
	23 COOKED-FRESH-BOILED						0.01000	0.000057	0.000	0.00000000021
13007AA	CABBAGE-GREEN AND RED	0.050	P	0.004682	0.004	0.00000001686				
	10 RAW-FRESH OR NFS						0.01000	0.000384	0.000	0.00000000138
	11 RAW-FRESH-PICKLED,CORNED,OR CURED						0.01000	0.000119	0.000	0.00000000043
	21 COOKED-NFS						0.01000	0.000433	0.000	0.00000000156
13008AA	CAULIFLOWER	0.050	P	0.000792	0.001	0.00000000285				
	10 RAW-FRESH OR NFS						0.01000	0.000009	0.000	0.00000000003
	21 COOKED-NFS						0.05000	0.000744	0.001	0.00000000268
13009AA	COLLARDS	0.050	P	0.000945	0.001	0.00000000340				
	51 COOKED-CANNED						0.01000	0.000002	0.000	0.00000000001
	63 COOKED-FRESH OR FROZEN-BOILED						0.01000	0.000187	0.000	0.00000000067
13010AA	CABBAGE-CHINESE/CELERY, INC. BOK CHOY	0.050	P	0.000228	0.000	0.00000000082				
	10 RAW-FRESH OR NFS						0.01000	0.000002	0.000	0.00000000001
	21 COOKED-NFS						0.01000	0.000043	0.000	0.00000000015
13011AA	KALE	0.050	P	0.000075	0.000	0.00000000027				
	63 COOKED-FRESH OR FROZEN-BOILED						0.00050	0.000001	0.000	0.00000000000
13021AA	MUSTARD GREENS	0.050	P	0.000726	0.001	0.00000000261				
	21 COOKED-NFS						0.00050	0.000000	0.000	0.00000000000
	63 COOKED-FRESH OR FROZEN-BOILED						0.00050	0.000007	0.000	0.00000000003
	CROP GROUP TOTALS FOR BRASSICA (COLE) LEAFY VEGETABLES:			0.010246	0.008	0.00000003689		0.002490	0.002	0.00000000896
15001AA	BEANS-DRY-GREAT NORTHERN	0.050	P	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00900	0.000000	0.000	0.00000000000
15001AB	BEANS-DRY-KIDNEY	0.050	P	0.000682	0.001	0.00000000246				
	21 COOKED-NFS						0.00900	0.000106	0.000	0.00000000038
	31 COOKED-FRESH OR CANNED						0.00900	0.000016	0.000	0.00000000006
15001AC	BEANS-DRY-LIMA	0.050	P	0.000399	0.000	0.00000000144				
	21 COOKED-NFS						0.00900	0.000072	0.000	0.00000000026
15001AD	BEANS-DRY-NAVY (PEA)	0.050	P	0.001870	0.001	0.00000000673				
	21 COOKED-NFS						0.00900	0.000080	0.000	0.00000000029
	31 COOKED-FRESH OR CANNED						0.00900	0.000257	0.000	0.00000000093

Captan RED using cancer ARs

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS

DATE: 11/02/94 PAGE: 5

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

011423

COMMODITY CONTRIBUTION BY RAC FOR: U.S. POPULATION - 48 STATES

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	TMRC ONCO RISK	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD	ARC ONCO RISK
15001AE	BEANS-DRY-OTHER	0.050	P	0.001991	0.002	0.00000000717				
	21 COOKED-NFS						0.00900	0.000157	0.000	0.00000000057
	25 COOKED-FRESH-FRIED						0.00900	0.000058	0.000	0.00000000021
	31 COOKED-FRESH OR CANNED						0.00900	0.000144	0.000	0.00000000052
15001AF	BEANS-DRY-PINTO	0.050	P	0.001817	0.001	0.00000000654				
	21 COOKED-NFS						0.00900	0.000327	0.000	0.00000000118
15002AA	BEANS-SUCCULENT-LIMA	0.050	P	0.001283	0.001	0.00000000462				
	10 RAW-FRESH OR NFS						0.00900	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.00900	0.000231	0.000	0.00000000083
15003AA	BEANS-SUCCULENT-GREEN	0.050	P	0.010003	0.008	0.00000003601				
	21 COOKED-NFS						0.00900	0.001800	0.001	0.00000000648
15003AB	BEANS-SUCCULENT-OTHER	0.050	P	0.001319	0.001	0.00000000475				
	10 RAW-FRESH OR NFS						0.00900	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.00900	0.000237	0.000	0.00000000085
15003AC	BEANS-SUCCULENT-YELLOW,WAX	0.050	P	0.000273	0.000	0.00000000098				
	21 COOKED-NFS						0.00900	0.000049	0.000	0.00000000018
15006AA	PEANUTS-WHOLE	0.050	N	0.003479	0.003	0.00000001252				
	10 RAW-FRESH OR NFS						0.00700	0.000007	0.000	0.00000000003
	21 COOKED-NFS						0.00700	0.000450	0.000	0.00000000162
	22 COOKED-FRESH-BAKED						0.00700	0.000029	0.000	0.00000000010
15007AA	PEAS(GARDEN)-MATURE SEEDS,DRY	0.050	P	0.000088	0.000	0.00000000032				
	21 COOKED-NFS						0.01000	0.000008	0.000	0.00000000003
	31 COOKED-FRESH OR CANNED						0.01000	0.000010	0.000	0.00000000004
15009AA	PEAS(GARDEN)-GREEN IMMATURE	0.050	P	0.008600	0.007	0.00000003096				
	21 COOKED-NFS						0.01000	0.001544	0.001	0.00000000556
	31 COOKED-FRESH OR CANNED						0.01000	0.000176	0.000	0.00000000063
15013AA	MUNG BEANS (SPROUTS)	0.050	P	0.000333	0.000	0.00000000120				
	10 RAW-FRESH OR NFS						0.05000	0.000038	0.000	0.00000000014
	21 COOKED-NFS						0.05000	0.000295	0.000	0.00000000106
15022AA	BEANS-DRY-BROADBEANS(MATURE SEED)	0.050	P	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00900	0.000000	0.000	0.00000000000
15022AB	BEANS-SUCCULENT-BROADBEANS(IMMAT. SEED)	0.050	P	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00900	0.000000	0.000	0.00000000000
15023AA	BEANS-DRY-PIGEON BEANS	0.050	P	0.000002	0.000	0.00000000001				
	21 COOKED-NFS						0.00900	0.000000	0.000	0.00000000000
15027AA	BEANS-UNSPECIFIED	0.050	P	0.000262	0.000	0.00000000094				
	21 COOKED-NFS						0.00900	0.000047	0.000	0.00000000017
15029AA	SOYBEANS-SPROUTED SEEDS	0.050	P	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00050	0.000000	0.000	0.00000000000
15030AA	BEANS-DRY-HYACINTH(MATURE SEEDS)	0.050	P	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00900	0.000000	0.000	0.00000000000

Captan RED using cancer ARs

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS DATE: 11/02/94 PAGE: 6

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

011423

COMMODITY CONTRIBUTION BY RAC FOR: U.S. POPULATION - 48 STATES

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	TMRC ONCO RISK	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD	ARC ONCO RISK
15030AB	BEANS-SUCCULENT-HYACINTH(YOUNG PODS)	0.050	P	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00900	0.000000	0.000	0.00000000000
15031AA	BEANS-DRY-BLACKEYE PEAS(COWPEAS)	0.050	P	0.000124	0.000	0.00000000045				
	21 COOKED-NFS						0.00900	0.000022	0.000	0.00000000008
15032AA	BEANS-DRY-GARBANZO(CHICK PEA)	0.050	P	0.000026	0.000	0.00000000009				
	21 COOKED-NFS						0.00900	0.000004	0.000	0.00000000001
	31 COOKED-FRESH OR CANNED						0.00900	0.000001	0.000	0.00000000000
270070A	PEANUTS-OIL	0.050	N	0.000261	0.000	0.00000000094				
	18 PROCESSED OIL						0.00700	0.000037	0.000	0.00000000013
270100A	SOYBEANS-OIL	0.050	P	0.016108	0.012	0.00000005799				
	18 PROCESSED OIL						0.00050	0.000161	0.000	0.00000000058
28023AA	SOYBEANS-UNSPECIFIED	0.050	P	0.000026	0.000	0.00000000009				
	21 COOKED-NFS						0.0005C	0.000000	0.000	0.00000000000
28023AB	SOYBEANS-MATURE,SEEDS DRY	0.050	P	0.000045	0.000	0.00000000016				
	10 RAW-FRESH OR NFS						0.00050	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.00050	0.000000	0.000	0.00000000000
	23 COCKED-FRESH-BOILED						0.00050	0.000000	0.000	0.00000000000
	25 COOKED-FRESH-FRIED						0.00050	0.000000	0.000	0.00000000000
	31 COOKED-FRESH OR CANNED						0.00050	0.000000	0.000	0.00000000000
28023WA	SOYBEANS-FLOUR, FULL FAT	0.050	P	0.000146	0.000	0.00000000053				
	21 COOKED-NFS						0.00050	0.000000	0.000	0.00000000000
	22 COOKED-FRESH-BAKED						0.00050	0.000001	0.000	0.00000000000
	31 COOKED-FRESH OR CANNED						0.00050	0.000000	0.000	0.00000000000
28023WB	SOYBEANS-FLOUR, LOW FAT	0.050	P	0.000048	0.000	0.00000000017				
	21 COOKED-NFS						0.00050	0.000000	0.000	0.00000000000
28023WC	SOYBEANS-FLOUR,DEFATTED	0.050	P	0.000623	0.000	0.00000000224				
	10 RAW-FRESH OR NFS						0.00050	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.00050	0.000000	0.000	0.00000000000
	22 COOKED-FRESH-BAKED						0.00050	0.000003	0.000	0.00000000001
	51 COOKED-CANNED						0.00050	0.000002	0.000	0.00000000001
	53 COOKED-CANNED-BOILED						0.00050	0.000001	0.000	0.00000000000
	CROP GROUP TOTALS FOR LEGUME VEGETABLES:			0.049808	0.038	0.00000017931		0.006370	0.005	0.00000002293
11001AA	EGGPLANT	0.050	P	0.000309	0.000	0.00000000111				
	10 RAW-FRESH OR NFS						0.00050	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.00050	0.000003	0.000	0.00000000001
	25 COOKED-FRESH-FRIED						0.00050	0.000000	0.000	0.00000000000
11003AA	PEPPERS,SWEET,GARDEN	0.050	P	0.001078	0.001	0.00000000388				
	10 RAW-FRESH OR NFS						0.00050	0.000003	0.000	0.00000000001
	21 COOKED-NFS						0.00050	0.000007	0.000	0.00000000003

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COMMODITY CONTRIBUTION BY RAC FOR: U.S. POPULATION - 48 STATES

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	TMRC ONCO RISK	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD	ARC ONCO RISK
11003AB	CHILI PEPPERS	0.050	P	0.000205	0.000	0.00000000074				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00050	0.000002	0.000	0.00000000001
11003AD	PEPPERS-OTHER	0.050	P	0.000218	0.000	0.00000000078				
	10 RAW-FRESH OR NFS						0.00050	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.00050	0.000002	0.000	0.00000000001
	51 COOKED-CANNED						0.00050	0.000000	0.000	0.00000000000
11004AA	PIMIENTOS	0.050	P	0.000097	0.000	0.00000000035				
	10 RAW-FRESH OR NFS						0.00050	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.00050	0.000000	0.000	0.00000000000
	31 COOKED-FRESH OR CANNED						0.00050	0.000000	0.000	0.00000000000
	CROP GROUP TOTALS FOR FRUITING VEGETABLES (EXCL. CUCURBITS):			0.001907	0.001	0.00000000687		0.000017	0.000	0.00000000006
10002AA	CANTALOUPES-UNSPECIFIED	0.050	P	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00050	0.000000	0.000	0.00000000000
10002AB	CANTALOUPES-PULP	0.050	P	0.002221	0.002	0.00000000800				
	10 RAW-FRESH OR NFS						0.00050	0.000022	0.000	0.00000000008
	21 COOKED-NFS						0.00050	0.000000	0.000	0.00000000000
10005AA	HONEYDEW MELONS	0.050	P	0.000918	0.001	0.00000000330				
	10 RAW-FRESH OR NFS						0.00050	0.000009	0.000	0.00000000003
10008AA	WATERMELON	0.050	P	0.003825	0.003	0.00000001377				
	10 RAW-FRESH OR NFS						0.00050	0.000038	0.000	0.00000000014
	21 COOKED-NFS						0.00050	0.000000	0.000	0.00000000000
10010AA	CUCUMBERS	0.050	P	0.003604	0.003	0.00000001297				
	10 RAW-FRESH OR NFS						0.01000	0.000385	0.000	0.00000000139
	11 RAW-FRESH-PICKLED,CORNED,OR CURED						0.01000	0.000313	0.000	0.00000000113
	21 COOKED-NFS						0.01000	0.000023	0.000	0.00000000008
10011AA	PUMPKIN	0.050	P	[illegible]	0.000	0.00000000080				
	21 COOKED-NFS						0.01000	0.000004	0.000	0.00000000001
	22 COOKED-FRESH-BAKED						0.01000	0.000006	0.000	0.00000000002
	62 COOKED-FRESH OR FROZEN-BAKED						0.01000	0.000035	0.000	0.00000000013
10013AA	SQUASH-SUMMER	0.050	P	0.001582	0.001	0.00000000570				
	10 RAW-FRESH OR NFS						0.01000	0.000013	0.000	0.00000000005
	21 COOKED-NFS						0.01000	0.000303	0.000	0.00000000109
10014AA	SQUASH-WINTER	0.050	P	0.001622	0.001	0.00000000584				
	10 RAW-FRESH OR NFS						0.01000	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.01000	0.000283	0.000	0.00000000102
	31 COOKED-FRESH OR CANNED						0.01000	0.000041	0.000	0.00000000015
	CROP GROUP TOTALS FOR FRUITING VEGETABLES (CUCURBITS):			0.013993	0.011	0.00000005037		0.001475	0.001	0.00000000531

Captan RED using cancer ARs

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS DATE: 11/02/94 PAGE: 8

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
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04001AA	APPLES-FRESH	25.000	P	11.418225	8.783	0.00004110561				
	10 RAW-FRESH OR NFS						0.06000	0.018447	0.014	0.00000006641
	21 COOKED-NFS						0.06000	0.000398	0.000	0.00000000143
	31 COOKED-FRESH OR CANNED						0.06000	0.007144	0.005	0.00000002572
	62 COOKED-FRESH OR FROZEN-BAKED						0.06000	0.001415	0.001	0.00000000509
04001DA	APPLES-DRIED	25.000	P	0.041280	0.032	0.00000014861				
	10 RAW-FRESH OR NFS						0.50000	0.000410	0.000	0.00000000148
	22 COOKED-FRESH-BAKED						0.50000	0.000156	0.000	0.00000000056
	62 COOKED-FRESH OR FROZEN-BAKED						0.50000	0.000260	0.000	0.00000000094
04001JA	APPLES-JUICE	25.000	P	8.311838	6.394	0.00002992262				
	15 RAW-FRESH OR CANNED						0.01900	0.004870	0.004	0.00000001753
	31 COOKED-FRESH OR CANNED						0.01900	0.001447	0.001	0.00000000521
04003AA	PEARS-FRESH	25.000	P	3.061837	2.355	0.00001102261				
	10 RAW-FRESH OR NFS						0.06200	0.003268	0.003	0.00000001176
	31 COOKED-FRESH OR CANNED						0.06200	0.002893	0.002	0.00000001041
	51 COOKED-CANNED						0.06200	0.001416	0.001	0.00000000510
	62 COOKED-FRESH OR FROZEN-BAKED						0.06200	0.000017	0.000	0.00000000006
04003DA	PEARS-DRIED	25.000	P	0.005225	0.004	0.00000001881				
	10 RAW-FRESH OR NFS						0.28000	0.000052	0.000	0.00000000019
	21 COOKED-NFS						0.28000	0.000007	0.000	0.00000000003
	CROP GROUP TOTALS FOR POME FRUITS:			22.838405	17.568	0.00008221826		0.042200	0.032	0.00000015192
05001AA	APRICOTS-FRESH	10.000	P	0.336893	0.259	0.00000121281				
	10 RAW-FRESH OR NFS						0.23000	0.001314	0.001	0.00000000473
	21 COOKED-NFS						0.23000	0.001790	0.001	0.00000000644
	31 COOKED-FRESH OR CANNED						0.23000	0.004645	0.004	0.00000001672
05001DA	APRICOTS-DRIED	10.000	P	0.024240	0.019	0.00000008726				
	10 RAW-FRESH OR NFS						1.40000	0.002879	0.002	0.00000001036
	22 COOKED-FRESH-BAKED						1.40000	0.000516	0.000	0.00000000186
05002AA	CHERRIES-FRESH	50.000	P	1.608770	1.238	0.00000579157				
	10 RAW-FRESH OR NFS						0.05600	0.000413	0.000	0.00000000149
	21 COOKED;NFS						0.05600	0.000247	0.000	0.00000000089
	31 COOKED-FRESH OR CANNED						0.05600	0.000702	0.001	0.00000000253
	62 COOKED-FRESH OR FROZEN-BAKED						0.05600	0.000439	0.000	0.00000000158
05002DA	CHERRIES-DRIED	50.000	P	0.000200	0.000	0.00000000072				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.22000	0.000001	0.000	0.00000000000
05002JA	CHERRIES-JUICE	50.000	P	0.255600	0.197	0.00000092016				
	15 RAW-FRESH OR CANNED						0.08400	0.000394	0.000	0.00000000142
	21 COOKED-NFS						0.08400	0.000035	0.000	0.00000000013
05003AA	NECTARINES	25.000	P	0.324155	0.249	0.00000116696				
	10 RAW-FRESH OR NFS						0.01600	0.000207	0.000	0.00000000075

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05004AA	PEACHES-FRESH	15.000	P	3.230874	2.485	0.00001163115				
	10 RAW-FRESH OR NFS						0.15000	0.015071	0.012	0.00000005426
	21 COOKED-NFS						0.15000	0.001475	0.001	0.00000000531
	31 COOKED-FRESH OR CANNED						0.15000	0.011983	0.009	0.00000004314
	51 COOKED-CANNED						0.15000	0.003780	0.003	0.00000001361
05004DA	PEACHES-DRIED	15.000	P	0.005208	0.004	0.00000001875				
	10 RAW-FRESH OR NFS						1.10000	0.000203	0.000	0.00000000073
	21 COOKED-NFS						1.10000	0.000179	0.000	0.00000000064
05005AA	PLUMS(DAMSONS)-FRESH	10.000	P	0.248626	0.191	0.00000089505				
	10 RAW-FRESH OR NFS						0.04400	0.000819	0.001	0.00000000295
	31 COOKED-FRESH OR CANNED						0.04400	0.000275	0.000	0.00000000099
05005DA	PLUMS-PRUNES(DRIED)	10.000	P	0.174213	0.134	0.00000062717				
	10 RAW-FRESH OR NFS						0.01000	0.000018	0.000	0.00000000006
	21 COOKED-NFS						0.01000	0.000130	0.000	0.00000000047
	31 COOKED-FRESH OR CANNED						0.01000	0.000026	0.000	0.00000000009
05005JA	PLUMS,PRUNE-JUICE	10.000	P	0.192567	0.148	0.00000069324				
	10 RAW-FRESH OR NFS						0.06200	0.001192	0.001	0.00000000429
	62 COOKED-FRESH OR FROZEN-BAKED						0.06200	0.000002	0.000	0.00000000001
	CROP GROUP TOTALS FOR STONE FRUITS:			6.401346	4.924	0.00002304485		0.048735	0.037	0.00000017545
01002AA	BLACKBERRIES	25.000	P	0.160670	0.124	0.00000057841				
	10 RAW-FRESH OR NFS						0.24000	0.000191	0.000	0.00000000069
	21 COOKED-NFS						0.24000	0.000683	0.001	0.00000000246
	62 COOKED-FRESH OR FROZEN-BAKED						0.24000	0.000668	0.001	0.00000000240
01004AA	DEWBERRIES	25.000	P	0.058575	0.045	0.00000021087				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.55000	0.001289	0.001	0.00000000464
01006AA	RASPBERRIES	25.000	P	0.071652	0.055	0.00000025795				
	10 RAW-FRESH OR NFS						0.55000	0.000949	0.001	0.00000000342
	15 RAW-FRESH OR CANNED						0.55000	0.000177	0.000	0.00000000064
	31 COOKED-FRESH OR CANNED						0.55000	0.000149	0.000	0.00000000054
	62 COOKED-FRESH OR FROZEN-BAKED						0.55000	0.000155	0.000	0.00000000056
	70 RAW-FROZEN						0.55000	0.000146	0.000	0.00000000053
01009AA	BLUEBERRIES	25.000	P	0.226185	0.174	0.00000081427				
	10 RAW-FRESH OR NFS						0.11000	0.000590	0.000	0.00000000212
	21 COOKED-NFS						0.11000	0.000119	0.000	0.00000000043
	22 COOKED-FRESH-BAKED						0.11000	0.000054	0.000	0.00000000019
	62 COOKED-FRESH OR FROZEN-BAKED						0.11000	0.000233	0.000	0.00000000084
01014AA	GRAPES-FRESH	10.000	P	0.437931	0.337	0.00000157655				
	10 RAW-FRESH OR NFS						0.24000	0.005822	0.004	0.00000002096
	21 COOKED-NFS						0.24000	0.000193	0.000	0.00000000069

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

01142

COMMODITY CONTRIBUTION BY RAC FOR: U.S. POPULATION - 48 STATES

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	TMRC ONCO RISK	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD	ARC ONCO RISK
	31 COOKED-FRESH OR CANNED						0.24000	0.004495	0.003	0.00000001618
01014DA	GRAPES-RAISINS	20.000	P	0.339460	0.261	0.00000122206				
	10 RAW-FRESH OR NFS						0.48000	0.004907	0.004	0.00000001767
	21 COOKED-NFS						0.48000	0.000462	0.000	0.00000000166
	22 COOKED-FRESH-BAKED						0.48000	0.002778	0.002	0.00000001000
01014JA	GRAPES-JUICE	10.000	P	1.081152	0.832	0.00000389215				
	10 RAW-FRESH OR NFS						0.24000	0.002006	0.002	0.00000000722
	15 RAW-FRESH OR CANNED						0.24000	0.018821	0.014	0.00000006776
	21 COOKED-NFS						0.24000	0.000796	0.001	0.00000000287
01016AA	STRAWBERRIES	25.000	P	0.867723	0.667	0.00000312380				
	10 RAW-FRESH OR NFS						0.70000	0.016943	0.013	0.00000006099
	21 COOKED-NFS						0.70000	0.003480	0.003	0.00000001253
	70 RAW-FROZEN						0.70000	0.003874	0.003	0.00000001395
	CROP GROUP TOTALS FOR SMALL FRUITS AND BERRIES:			3.243348	2.495	0.00001167605		0.069980	0.054	0.00000025193
15004AA	CORN,POP	0.050	N	0.000339	0.000	0.00000000122				
	21 COOKED-NFS						0.00050	0.000003	0.000	0.00000000001
15005AA	CORN,SWEET	0.050	P	0.011835	0.009	0.00000004261				
	10 RAW-FRESH OR NFS						0.00050	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.00050	0.000100	0.000	0.00000000036
	31 COOKED-FRESH OR CANNED						0.00050	0.000019	0.000	0.00000000007
24001AA	BARLEY	0.050	N	0.002865	0.002	0.00000001031				
	21 COOKED-NFS						0.00050	0.000029	0.000	0.00000000010
24002EA	CORN,GRAIN-ENDOSPERM	0.050	N	0.008270	0.006	0.00000002977				
	10 RAW-FRESH OR NFS						0.01000	0.000006	0.000	0.00000000002
	21 COOKED-NFS						0.01000	0.000218	0.000	0.00000000078
	22 COOKED-FRESH-BAKED						0.01000	0.001229	0.001	0.00000000442
	23 COOKED-FRESH-BOILED						0.01000	0.000201	0.000	0.00000000072
24[illegible]	CORN GRAIN-BRAN	0.050	N	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.01000	0.000000	0.000	0.00000000000
2[illegible]	CORN SUGAR	0.050	N	0.007287	0.006	0.00000002623				
	10 RAW-FRESH OR NFS						0.01000	0.000057	0.000	0.00000000021
	21 COOKED-NFS						0.01000	0.001264	0.001	0.00000000455
	22 COOKED-FRESH-BAKED						0.01000	0.000137	0.000	0.00000000049
24003AA	OATS	0.050	N	0.004129	0.003	0.00000001486				
	21 COOKED-NFS						0.00050	0.000004	0.000	0.00000000001
	22 COOKED-FRESH-BAKED						0.00050	0.000019	0.000	0.00000000007
	23 COOKED-FRESH-BOILED						0.00050	0.000018	0.000	0.00000000006
24005AA	RYE-ROUGH	0.050	N	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00050	0.000000	0.000	0.00000000000

Captan RED using cancer ARs

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS

DATE: 11/02/94 PAGE: 11

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WW; reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

COMMODITY CONTRIBUTION BY RAC FOR: U.S. POPULATION - 48 STATES

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	TMRC ONCO RISK	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD	ARC ONCO RISK
24005GA	RYE-GERM	0.050	N	0.000014	0.000	0.00000000005				
	22 COOKED-FRESH-BAKED						0.00050	0.000000	0.000	0.00000000000
24005WA	RYE-FLOUR	0.050	N	0.000201	0.000	0.00000000072				
	21 COOKED-NFS						0.00050	0.000000	0.000	0.00000000000
	22 COOKED-FRESH-BAKED						0.00050	0.000002	0.000	0.00000000001
24006AA	SORGHUM (INCLUDING MILO)	0.050	N	0.001188	0.001	0.00000000428				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.01000	0.000238	0.000	0.00000000086
24007AA	WHEAT-ROUGH	0.050	N	0.007031	0.005	0.00000002531				
	10 RAW-FRESH OR NFS						0.00050	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.00050	0.000004	0.000	0.00000000001
	22 COOKED-FRESH-BAKED						0.00050	0.000043	0.000	0.00000000015
	23 COOKED-FRESH-BOILED						0.00050	0.000023	0.000	0.00000000008
24007GA	WHEAT-GERM	0.050	N	0.000040	0.000	0.00000000014				
	10 RAW-FRESH OR NFS						0.00050	0.000000	0.000	0.00000000000
	22 COOKED-FRESH-BAKED						0.00050	0.000000	0.000	0.00000000000
24007HA	WHEAT-BRAN	0.050	N	0.000608	0.000	0.00000000219				
	10 RAW-FRESH OR NFS						0.00050	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.00050	0.000000	0.000	0.00000000000
	22 COOKED-FRESH-BAKED						0.00050	0.000006	0.000	0.00000000002
24007WA	WHEAT-FLOUR	0.050	N	0.062862	0.048	0.00000022630				
	10 RAW-FRESH OR NFS						0.00050	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.00050	0.000351	0.000	0.00000000126
	22 COOKED-FRESH-BAKED						0.00050	0.000231	0.000	0.00000000083
	25 COOKED-FRESH-FRIED						0.00050	0.000047	0.000	0.00000000017
27002OA	CORN,GRAIN-OIL	0.050	N	0.001140	0.001	0.00000000410				
	18 PROCESSED OIL						0.01000	0.000228	0.000	0.00000000082
	CROP GROUP TOTALS FOR CEREAL GRAINS:			0.107809	0.083	0.00000038811		0.004477	0.003	0.00000001612
03001AA	ALMONDS	0.250	P	0.000701	0.001	0.00000000252				
	10 RAW-FRESH OR NFS						0.00700	0.000009	0.000	0.00000000003
	21 COOKED-NFS						0.00700	0.000007	0.000	0.00000000003
	22 COOKED-FRESH-BAKED						0.00700	0.000004	0.000	0.00000000001
	CROP GROUP TOTALS FOR TREE NUTS:			0.000701	0.001	0.00000000252		0.000020	0.000	0.00000000007

011423

Captan RED using cancer ARs

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS

DATE: 11/02/94 PAGE: 12

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

COMMODITY CONTRIBUTION BY RAC FOR: U.S. POPULATION - 48 STATES

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	TMRC ONCO RISK	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD	ARC ONCO RISK
53001BA	BEEF-MEAT BYPRODUCTS	0.400	P	0.007065	0.005	0.00000002543				
	21 COOKED-NFS						0.00100	0.000016	0.000	0.00000000006
	26 COOKED-FRESH-PICKLED,CORNED,OR CURED						0.00100	0.000001	0.000	0.00000000000
53001BB	BEEF(ORGAN MEATS)-OTHER	0.400	P	0.002414	0.002	0.00000000869				
	21 COOKED-NFS						0.00100	0.000005	0.000	0.00000000002
	51 COOKED-CANNED						0.00100	0.000001	0.000	0.00000000000
53001DA	BEEF-DRIED	0.300	P	0.000760	0.001	0.00000000274				
	21 COOKED-NFS						0.00100	0.000003	0.000	0.00000000001
53001FA	BEEF(BONELESS)-FAT (BEEF TALLOW)	0.250	P	0.093019	0.072	0.00000033487				
	10 RAW-FRESH OR NFS						0.00100	0.000001	0.000	0.00000000000
	21 COOKED-NFS						0.00100	0.000148	0.000	0.00000000053
	22 COOKED-FRESH-BAKED						0.00100	0.000025	0.000	0.00000000009
	23 COOKED-FRESH-BOILED						0.00100	0.000033	0.000	0.00000000012
	24 COOKED-FRESH-BROILED						0.00100	0.000142	0.000	0.00000000051
	25 COOKED-FRESH-FRIED						0.00100	0.000022	0.000	0.00000000008
53001KA	BEEF(ORGAN MEATS)-KIDNEY	0.400	P	0.000192	0.000	0.00000000069				
	21 COOKED-NFS						0.00100	0.000000	0.000	0.00000000000
53001LA	BEEF(ORGAN MEATS)-LIVER	0.400	P	0.008279	0.006	0.00000002980				
	25 COOKED-FRESH-FRIED						0.00100	0.000020	0.000	0.00000000007
	31 COOKED-FRESH OR CANNED						0.00100	0.000000	0.000	0.00000000000
53001MA	BEEF(BONELESS)-LEAN (W/O REMOVEABLE FAT)	0.300	P	0.348597	0.268	0.00000125495				
	10 RAW-FRESH OR NFS						0.00100	0.000000	0.000	0.00000000000
	21 COOKED-NFS						0.00100	0.000692	0.001	0.00000000249
	22 COOKED-FRESH-BAKED						0.00100	0.000048	0.000	0.00000000017
	23 COOKED-FRESH-BOILED						0.00100	0.000074	0.000	0.00000000027
	24 COOKED-FRESH-BROILED						0.00100	0.000349	0.000	0.00000000126
53002BA	GOAT-MEAT BYPRODUCTS	0.400	N	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00100	0.000000	0.000	0.00000000000
53002BB	GOAT(ORGAN MEATS)-OTHER	0.400	N	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00100	0.000000	0.000	0.00000000000
53002FA	GOAT(BONELESS)-FAT	0.250	N	0.000010	0.000	0.00000000004				
	23 COOKED-FRESH-BOILED						0.00100	0.000000	0.000	0.00000000000
	25 COOKED-FRESH-FRIED						0.00100	0.000000	0.000	0.00000000000
53002KA	GOAT(ORGAN MEATS)-KIDNEY	0.400	N	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00100	0.000000	0.000	0.00000000000
53002LA	GOAT(ORGAN MEATS)-LIVER	0.400	N	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00100	0.000000	0.000	0.00000000000
53002MA	GOAT(BONELESS)-LEAN (W/O REMOVEABLE FAT)	0.300	N	0.000057	0.000	0.00000000021				
	23 COOKED-FRESH-BOILED						0.00100	0.000000	0.000	0.00000000000
	25 COOKED-FRESH-FRIED						0.00100	0.000000	0.000	0.00000000000
53003AA	HORSE	0.400	N	0.000000	0.000	0.00000000000				
	00 NOT SPECIFIED (NO CONSUMPTION)						0.00100	0.000000	0.000	0.00000000000

Captan RED using cancer ARs

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 081301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 q*: 0.00360	No data gaps. q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

COMMODITY CONTRIBUTION BY RAC FOR: U.S. POPULATION - 48 STATES

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	TMRC ONCO RISK	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD	ARC ONCO RISK
53005BA	SHEEP-MEAT BYPRODUCTS	0.400	N	0.000020	0.000	0.00000000007	0.00100	0.000000	0.000	0.00000000000
	21 COOKED-NFS	0.400	N	0.000008	0.000	0.00000000003	0.00100	0.000000	0.000	0.00000000000
53005BB	SHEEP(ORGAN MEATS)-OTHER									
	21 COOKED-NFS	0.250	N	0.001074	0.001	0.00000000387	0.00100	0.000004	0.000	0.00000000001
53005FA	SHEEP(BONELESS)-FAT									
	21 COOKED-NFS	0.400	N	0.000003	0.000	0.00000000001	0.00100	0.000000	0.000	0.00000000000
53005KA	SHEEP(ORGAN MEATS)-KIDNEY									
	21 COOKED-NFS	0.400	N	0.000000	0.000	0.00000000000	0.00100	0.000000	0.000	0.00000000000
53005LA	SHEEP(ORGAN MEATS)-LIVER									
	00 NOT SPECIFIED (NO CONSUMPTION)	0.300	N	0.003745	0.003	0.00000001348	0.00100	0.000012	0.000	0.00000000004
53005MA	SHEEP(BONELESS)-LEAN (W/O REMOVEABLE FAT						0.00100	0.000001	0.000	0.00000000000
	21 COOKED-NFS						0.00100	0.000025	0.000	0.00000000009
	31 COOKED-FRESH OR CANNED	0.400	P	0.010032	0.008	0.00000003612				
53006BA	PORK-MEAT BYPRODUCTS									
	21 COOKED-NFS	0.400	P	0.001540	0.001	0.00000000554	0.00100	0.000004	0.000	0.00000000001
53006BB	PORK(ORGAN MEATS)-OTHER						0.00100	0.000000	0.000	0.00000000000
	21 COOKED-NFS									
	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	0.250	P	0.052051	0.040	0.00000018738	0.00100	0.000002	0.000	0.00000000001
53006FA	PORK(BONELESS)-FAT (INCLUDING LARD)						0.00100	0.000097	0.000	0.00000000035
	10 RAW-FRESH OR NFS						0.00100	0.000023	0.000	0.00000000008
	21 COOKED-NFS						0.00100	0.000024	0.000	0.00000000009
	23 COOKED-FRESH-BOILED						0.00100	0.000062	0.000	0.00000000022
	25 COOKED-FRESH-FRIED									
	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	0.400	P	0.000004	0.000	0.00000000001	0.00100	0.000000	0.000	0.00000000000
53006KA	PORK(ORGAN MEATS)-KIDNEY									
	21 COOKED-NFS	0.400	P	0.001928	0.001	0.00000000694	0.00100	0.000004	0.000	0.00000000001
53006LA	PORK(ORGAN MEATS)-LIVER						0.00100	0.000001	0.000	0.00000000000
	21 COOKED-NFS									
	25 COOKED-FRESH-FRIED	0.300	P	0.117374	0.090	0.00000042255	0.00100	0.000182	0.000	0.00000000066
53006MA	PORK(BONELESS)-LEAN (W/O REMOVEABLE FAT)						0.00100	0.000048	0.000	0.00000000017
	21 COOKED-NFS						0.00100	0.000162	0.000	0.00000000058
	25 COOKED-FRESH-FRIED									
	26 COOKED-FRESH-PICKLED,CORNED,OR CURED									
	CROP GROUP TOTALS FOR RED MEAT:			0.648172	0.499	0.00000233342		0.002231	0.002	0.00000000803

Captan RED using cancer ARs

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Captan Caswell #159 CAS No. 133-06-2 A.I. CODE: 091301 CFR No. 180.103 185.500	3gen reprod- rat NOEL= 12.5000 mg/kg 250.00 ppm LEL= 25.0000 mg/kg 500.00 ppm ONCO: B2 (HED NOTE)	Decreased pup body wts. ADI based on results of 1-gen. and 3-gen. reproduction studies. Evidence of oncogenicity in rats and mice.	ADI UF -->100 OPP RfD= 0.130000 EPA RfD= 0.130000 Q*: 0.00360	No data gaps. Q* calculated.	EPA verified 03/26/86 HED complete 12/22/88 EPA verified 01/18/89 WHO reviewed 1990 RfD/PR reviewed 09/23/93 On IRIS.

COMMODITY CONTRIBUTION BY RAC FOR: U.S. POPULATION - 48 STATES

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	TMRC ONCO RISK	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD	ARC ONCO RISK
50000DB	MILK-NON-FAT SOLIDS	0.150	N	1.066929	0.821	0.00000384094				
	10 RAW-FRESH OR NFS						0.00100	0.005704	0.004	0.00000002053
	21 COOKED-NFS						0.00100	0.001156	0.001	0.00000000416
	51 COOKED-CANNED						0.00100	0.000253	0.000	0.00000000091
50000FA	MILK-FAT SOLIDS	0.150	N	0.507542	0.390	0.00000182715				
	10 RAW-FRESH OR NFS						0.00100	0.002664	0.002	0.00000000959
	21 COOKED-NFS						0.00100	0.000710	0.001	0.00000000256
	51 COOKED-CANNED						0.00100	0.000010	0.000	0.00000000004
50000SA	MILK SUGAR (LACTOSE)	0.150	N	0.005614	0.004	0.00000002021				
	21 COOKED-NFS						0.00100	0.000000	0.000	0.00000000000
	51 COOKED-CANNED						0.00100	0.000037	0.000	0.00000000013
	CROP GROUP TOTALS FOR DAIRY PRODUCTS:			1.580085	1.215	0.00000568831		0.010534	0.008	0.00000003792
	GRAND TOTALS FOR U.S. POPULATION - 48 STATES			35.843277	27.572	0.00012903580		0.333301	0.256	0.000001199RR

TOLERANCE TYPE: N=NEW; A=PENDING; P=PUBLISHED
TMRC=THEORETICAL MAXIMUM RESIDUE CONTRIBUTION
ARC = ANTICIPATED RESIDUE CONTRIBUTION
RFD = REFERENCE DOSE

011423

DRES Acute analysis using recommended Acute ARs

DETAILED ACUTE ANALYSIS INCLUDING AR'S: ALL STATISTICS BASED ON USERS' DAILY CONSUMPTION 14:33 Wednesday, September 28, 1994 68

	STUDY	RDV	NOEL	SF	STUDY TYPE	SPECIES	EFF. LEV.	CORE GRADE	DOC. NO.
*NAME: CAPTAN									*
*CASWELL NO: 159 CFR NO: CFR180.103	A	00000.0130	000250.000	001000					*
*CAS NO: 00133-06-2 SHAUGHNESSY NO: 081301	B								*
*STATUS CODES:	C								*

RDV INFO: The LD value used in this analysis is 0.10 MG/KG of BODY WEIGHT/DAY AR DATA: No User Modifications

*FILE INFO: No Tolerance Data Are Used--Without User Modifications.

FEMALES(13+ YRS)

ESTIMATES BASED ON	ESTIMATED % OF POTENTIAL PERSON DAYS THAT ARE USER-DAYS	MEAN DAILY RESIDUE CONTRIBUTION PER USER-DAY MG/KG BODY WEIGHT/DAY	AS PERCENT OF RDV
TOLERANCES:	0.00	0.000000	0.00
ANTICIPATED RESIDUES:	99.85	0.022913	22.91

ESTIMATED % OF POPULATION USER-DAYS WITH RESIDUE CONTRIBUTION EXCEEDING X TIMES THE RDV, FOR X=

	0	.2	.4	.6	.8	1	1.2	1.4	1.6	1.8	2	3	4	5	10	15	20
TOLERANCES:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANTICIPATED RESIDUES:	100	29	20	13	8	5	4	3	2	1	1	0	0	0	0	0	0

1425

Exposure = RDV x X = 0.10 x 3 = 0.3 mg/kg/day
NOEL/Exposure = 10 mg/kg/day ÷ 0.3 mg/kg/day = 33

011423

DRES Acute analysis for Captan including fruits at tolerance level and ARs

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*NAME: CAPTAN		STUDY	RDV	NOEL	SF	STUDY TYPE	SPECIES	EFF. LEV.	CORE GRADE	DOC. NO.*
*CASWELL NO: 159	CFR NO: CFR180.103	A	00000.0130	000250.000	001000					*
*CAS NO: 00133-06-2	SHAUGHNESSY NO: 081301	B								*
*STATUS CODES:		C								*

RDV INFO: The LD value used in this analysis is 0.1 MG/KG of BODY WEIGHT/DAY AR DATA: No User Modifications

*FILE INFO: No Tolerance Data Are Used--Without User Modifications.

FEMALES(13+ YRS)

ESTIMATES BASED ON	ESTIMATED % OF POTENTIAL PERSON DAYS THAT ARE USER-DAYS	MEAN DAILY RESIDUE CONTRIBUTION PER USER-DAY MG/KG BODY WEIGHT/DAY	AS PERCENT OF RDV
TOLERANCES:	0.00	0.000000	0.00
ANTICIPATED RESIDUES:	99.85	0.017850	17.85

ESTIMATED % OF POPULATION USER-DAYS WITH RESIDUE CONTRIBUTION EXCEEDING X TIMES THE RDV, FOR X=

	0	.2	.4	.6	.8	1	1.2	1.4	1.6	1.8	2	3	4	5	10	15	20
TOLERANCES:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANTICIPATED RESIDUES:	100	26	17	10	5	3	2	1	1	0	0	0	0	0	0	0	0

Exposure = RDV x X = 1.8 x 0.1 = 0.18 mg/kg/day

MOE = NOEL ÷ Exposure = 10 mg/kg/day ÷ 0.18 mg/kg/day = 56