12-16-88

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, DC 20460

DEC 16 1988

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OFFICE OF
PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: ID:100-529; Atrazine; Assessment of risk due to dietary exposure.

TO: Jude Andreasen/Jack Housenger
Special Review and Reregistration Division (TS-767C)

FROM: Marion P. Copley, D.V.M., Acting Section Head
Section 2, Toxicology Branch I (IRS)
Health Effects Division (TS-769C)

THRU: Judith W. Hauswirth, Ph.D., Acting Branch Chief
Toxicology Branch I (IRS)
Health Effects Division (TS-769C) Judith W Hauswirth 12/16/88

Tox. Chem. No.:63
Proj. No.:8-0061
Record No.: NA

cc: Albin Kocialski
Caswell file

CONCLUSIONS:

The most appropriate method for assessing dietary risk appears to be the percent "ADI" (including an additional uncertainty factor of 10 added to the RfD) rather than using either the Margin of Safety (MOS) or Margin of Exposure (MOE) (see Applicator Risk Assessment memo dated 11/15/88).

The percent "ADI" for overall U.S. population considering total exposure (drinking water, food water and total feed exposure) is only 51 %. The total exposure for non-nursing infants (<1 year) and children aged 1 to 6 result in 173.6 and 120.0 % of the "ADI", respectively (see table 1 for details).

BACKGROUND:

As discussed in the memo concerning applicator risk assessment (11/15/88), "Atrazine is oncogenic (mammary tumors) in rats but not mice. A Registration Standard was completed in 1983 and a FRSTR is currently scheduled for early 1989. The Scientific Advisory Panel (SAP), in September, 1988 concurred with the Toxicology Branch Peer Review Committee classifying Atrazine as a C oncogen. Although the Peer Review Committee

felt that quantitative risk assessment (using the Weibull model) was not appropriate considering the current data base, it was their opinion that the oncogenicity risk should be taken into consideration by using an additional uncertainty factor of 10 with the traditional RfD, which is usually an uncertainty factor of 100."

The NOEL used for the above calculations is 0.5 mg/kg/day obtained from the 1 year dog feeding study. The lesion of concern was cardiotoxicity. The resulting "ADI" is 0.0005 mg/kg body weight/day.

MOS and MOE as used in the above mentioned applicator risk assessment memo (11/15/88) are based on applicator exposure which is either acute or subchronic. Due to the lack of adequate subacute studies chronic endpoints were used.

DETERMINATION OF DIETARY RISK

Since dietary exposure and the toxicologic endpoints of concern (cardiotoxicity and oncogenicity) are both chronic, it is not appropriate to calculate the MOS or MOE for dietary risk. The third HED Peer Review Committee document for atrazine (11/22/88) recommended using the Percent ADI occupied using an additional uncertainty factor of 10 with the RfD to account for the oncogenic potential when determining allowable exposure." Total percent greater than 100 % would be considered to be of toxicologic concern.

TABLE 1 Exposure to Atrazine

	Overall U.S. Population	Non-Nursing Infants	Children Aged 1 - 6
Total Food Exposure	31.0 %	86.6 %	77.9 %
Total Food + Drinking Water	38.8 %	103.3 %	95.0 %
Total Dietary Exposure[2]	51.1 %	173.6 %	120.0 %

[1] Percent of "ADI" occupied (including an additional uncertainty factor of 10 added to the RfD.
[2] Total Food + Drinking Water + Food Water.

COPLEY, PC6\ATRAZINE\DIET-EXP.1, Proj 9-0061, #63, 12/16/88

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

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MEMORANDUM:

OFFICE OF PESTICIDES AND TOXIC SUBSTAN

SUBJECT: Dietary Exposure Analysis for Atrazine in Food and Water

FROM: J. Robert Tomerlin, Ph.D.
Tolerance Assessment System Staff
HED/SACB (TS 769C)

THROUGH: R. Bruce Jaeger
Head, Special Analysis and Outreach Section
HED/SACB (TS 769C)

TO: J. E. Housenger/Jude Andreasen
Risk/Benefit Section I
Special Review Branch (TS 767C)

Action Requested

Provide a dietary exposure analysis for atrazine based on registered uses on food crops and the Office of Drinking Water's Health Advisory Level of 3 ppb in water (J. Housenger memorandum, 11/3/88).

Discussion

1. Toxicology Endpoint: The routine chronic TAS analysis used a reference dose (ADI) of 0.005 mg/kg body weight/day, based upon a NOEL of 0.48 mg/kg body weight/day and a safety factor of 100 from a 1 year dog feeding study. The ADI has been approved by Division (06/03/88) and Agency (06/22/88) reference dose committees.

The Toxicology Peer Review Committee recently determined that atrazine is a Category C (possible human) oncogen for which quantitative risk assessment is inappropriate. The Committee also decided that the reference dose (RfD) used by the Office of Pesticide Programs did not adequately account for the oncogenic potential of atrazine. The Committee therefore suggested that an additional 10-fold safety factor be used when assessing risk attributable to exposure to atrazine (draft memorandum from the Peer Review Committee and personal communication, Reto Engler). Therefore, exposure estimates in this analysis were compared to 10 per cent of the RfD, or 0.0005 mg/kg body weight/day.

2. Residue Information: The published food uses in 40 CFR 180.220 were used in the analysis. The residue levels analyzed were the average residues from field trial studies (M. S. Metzger memorandum, 9/14/88). These anticipated residues were further adjusted for per cent crop treated (R. Torla, cited in M. S. Metzger memorandum, 9/14/88). These anticipated residue values are shown in Table 1 under the heading "RES. VALUE USED IN TAS RUN (ppm)".

The anticipated residues in eggs and in the meat, fat, and meat byproducts of poultry are zero. It should be noted that the anticipated residues for millet grain and sugarcane molasses are higher than the published tolerances.

NOTE: M. S. Metzger's memorandum did not include sugarcane molasses as a human food item. However, after an examination of Foods and Food Production Encyclopedia (D. M. Considine and G. D. Considine, 1982), Mr. Metzger agreed that sugarcane molasses should be considered a human food item. Therefore, a residue value of .65 ppm was used for the TAS food item "SUGAR-MOLASSES" in the analysis.

The atrazine residue in water was assumed to be the Health Advisory Level of 3 ppb calculated by the Office of Drinking Water. A summary of the residue information used in the analysis is attached as Table 1.

3. Exposure Analysis: Table 2 includes summaries of the Theoretical Maximum Residue Contribution (TMRC) and the Anticipated Residue Contribution (ARC) exposure data. TMRC's are calculated using residues at tolerance levels and assuming 100 per cent crop treated and will not be discussed in this report.

The ARC for the overall U.S. population is 0.000256 mg/kg body weight/day which represents 51 per cent of one tenth of the RfD. The ARC's for the two most highly exposed subgroups, non-nursing infants and children aged 1 to 6, are 0.000868 mg/kg body weight/day (174% of 10% of the RfD) and 0.0006 mg/kg body weight/day (120% of 10% of the RfD), respectively.

NOTE: figures in the columns labeled "NEW TMRC AS PERCENT OF RFD" and "%RFD" in Table 2 actually refer to the exposure expressed as a percentage of one tenth of the RfD.

The exposure from various food groups for the overall U.S. population and the two most highly exposed population subgroups is shown in the table on the next page.

Exposure to Atrazine

Food	Overall U.S. Population	Non-Nursing Infants	Children Aged 1 - 6
Sugar	0.049824[a] (10.0)[b]	0.056530 (11.3)	0.112133 (22.4)
Milk	0.042136 (8.4)	0.261097 (52.2)	0.123763 (24.8)
Grains	0.038334 (7.7)	0.093261 (18.7)	0.095196 (19.0)
Meat	0.022572 (4.5)	0.021918 (4.4)	0.041182 (8.2)
Other[c]	0.002263 (0.4)	0.011512 (2.3)	0.017177 (3.4)
Total Food Exposure	0.152866 (31.0)	0.432806 (86.6)	0.389451 (77.9)
Drinking Water	0.038910 (7.8)	0.083515 (16.7)	0.085456 (17.1)
Food Water[d]	0.061654 (12.3)	0.340101 (68.0)	0.12487 (25.0)
Total Exposure	0.255693 (51.1)	0.867934 (173.6)	0.599777 (120.0)

[a]ARC for the commodity in ug/kg body weight/day.
[b]ARC for the commodity expressed as a percentage of 10% of the RfD, or 0.0005 mg/kg body weight/day.
[c]Guava, macadamia nuts, and pineapple.
[d]Water used to prepare food as well as water component of milk, coffee, tea, and water used to prepare food. Some of the water used to prepare food would also be tap water, but it is not possible to determine how much.

4. Comments: One of the purposes of this analysis was to estimate exposure to atrazine in drinking (tap) water. TAS separates water consumption into two categories, drinking water and food water, and includes tap water in both.

Food water includes tap water used to prepare food, as well as the water component of commodities such as milk, which presumably is not from the tap. Exposure estimates from drinking water only would not account for tap water used to prepare food and would be too low. On the other hand, exposure estimates from drinking water plus food water overestimates the exposure from tap water. Exposure estimates from both drinking and food water are provided in the table on the previous page.

The "Total Exposure" line in the table on the previous page includes exposure from water from all sources, which is an overestimate of the atrazine exposure from local water.

Atrazine contamination of water supplies is a localized phenomenon. In areas where atrazine does not contaminate the water supply, the exposure would be adequately estimated by the "Total Food Exposure" line in the table on the previous page. Exposure to atrazine in areas in which the local water supply may be contaminated could then be estimated by adding the exposure from water to the "Total Food Exposure".

Attachments

cc: Tomerlin (SACB), DEB, TAS File, Caswell File 063, Marion Copley (SACB), C. W. Kent (RB TS 767C), E. Saito (EFED/SACS TS 767C)

Table 1

ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 063 DATE 11/07/88 PAGE 1

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Atrazine Caswell #063 CAS No. 1912-24-9 A.I. CODE: 080803 CFR No. 180.220	1yr feeding- dog NOEL= 0.4800 mg/kg 15.00 ppm LEL= 4.9700 mg/kg 150.00 ppm ONCO: Class C (Tox NOTE)	Significant decr P-II waves in F at day 175 & cardiac toxicity seen in two male dogs. Evidence of oncogenicity in rats (mammary).	ADI SF -->100 OPP RfD= 0.005000 EPA RfD= 0.005000	No data gaps NOTE: 10% of ADI used in analyses Rat Reproduction study as co-critical; NOEL=0.5 mg/kg/kg/day.	HED complete 07/09/86 EPA verified 05/20/87 HED reassess 06/03/88 EPA verified 06/22/88 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)
03007AA	MACADAMIA NUTS	10 RAW-FRESH OR NFS	7F0620	P 0.250000	0.100000		50.00	0.050000
06006AA	GUAVA	10 RAW-FRESH OR NFS	0E2393	P 0.050000	0.010000		80.00	0.008000
06006AA	GUAVA	21 COOKED-NFS	0E2393	P 0.050000	0.010000		80.00	0.008000
06006AA	GUAVA	62 COOKED-FRESH OR FROZEN-BAKED	0E2393	P 0.050000	0.010000		80.00	0.008000
06013AA	PINEAPPLE-PULP	10 RAW-FRESH OR NFS	7F0620	P 0.250000	0.030000		80.00	0.024000
06013AA	PINEAPPLE-PULP	21 COOKED-NFS	7F0620	P 0.250000	0.030000		80.00	0.024000
06013AA	PINEAPPLE-PULP	31 COOKED-FRESH OR CANNED	7F0620	P 0.250000	0.030000		80.00	0.024000
06013DA	PINEAPPLE-DRIED	10 RAW-FRESH OR NFS	7F0620	P 0.250000	0.030000		80.00	0.024000
06013JA	PINEAPPLE-JUICE	10 RAW-FRESH OR NFS	7F0620	P 0.250000	0.030000		80.00	0.024000
06013JA	PINEAPPLE-JUICE	15 RAW-FRESH OR CANNED	7F0620	P 0.250000	0.030000		80.00	0.024000
06013JA	PINEAPPLE-JUICE	21 COOKED-NFS	7F0620	P 0.250000	0.030000		80.00	0.024000
06013JA	PINEAPPLE-JUICE	31 COOKED FRESH OR CANNED	7F0620	P 0.250000	0.030000		80.00	0.024000
15004AA	CORN,POP	21 COOKED-NFS	7F0620	P 0.250000	0.100000		70.00	0.070000
15005AA	CORN,SWEET	10 RAW-FRESH OR NFS	7F0620	P 0.250000	0.100000		60.00	0.060000
15005AA	CORN,SWEET	21 COOKED-NFS	7F0620	P 0.250000	0.100000		60.00	0.060000
15005AA	CORN,SWEET	31 COOKED-FRESH OR CANNED	7F0620	P 0.250000	0.100000		60.00	0.060000
24002EA	CORN,GRAIN-ENDO	10 RAW-FRESH OR NFS	7F0620	P 0.250000	0.100000		70.00	0.070000
24002EA	CORN,GRAIN-ENDO	21 COOKED NFS	7F0620	P 0.250000	0.100000		70.00	0.070000
24002EA	CORN,GRAIN-ENDO	22 COOKED-FRESH-BAKED	7F0620	P 0.250000	0.100000		70.00	0.070000
24002EA	CORN,GRAIN-ENDO	23 COOKED-FRESH-BOILED	7F0620	P 0.250000	0.100000		70.00	0.070000
24002HA	CORN,GRAIN-BRAN	00 NOT SPECIFIED (NO CONSUMPTION)	7F0620	P 0.250000	0.100000		70.00	0.070000
24002SA	CORN SUGAR	10 RAW-FRESH OR NFS	7F0620	P 0.250000	0.100000		70.00	0.070000
24002SA	CORN SUGAR	21 COOKED-NFS	7F0620	P 0.250000	0.100000		70.00	0.070000
24002SA	CORN SUGAR	22 COOKED-FRESH-BAKED	7F0620	P 0.250000	0.100000		70.00	0.070000
24006AA	SORGHUM	00 NOT SPECIFIED (NO CONSUMPTION)	7F0525	P 0.250000	0.130000		70.00	0.091000
24007AA	WHEAT-ROUGH	10 RAW-FRESH OR NFS	7F0620	P 0.250000	0.020000		1.00	0.000200
24007AA	WHEAT-ROUGH	21 COOKED-NFS	7F0620	P 0.250000	0.020000		1.00	0.000200
24007AA	WHEAT-ROUGH	22 COOKED-FRESH-BAKED	7F0620	P 0.250000	0.020000		1.00	0.000200
24007AA	WHEAT-ROUGH	23 COOKED-FRESH-BOILED	7F0620	P 0.250000	0.020000		1.00	0.000200
24007GA	WHEAT-GERM	10 RAW-FRESH OR NFS	7F0620	P 0.250000	0.020000		1.00	0.000200
24007GA	WHEAT-GERM	22 COOKED-FRESH-BAKED	7F0620	P 0.250000	0.020000		1.00	0.000200
24007HA	WHEAT-BRAN	10 RAW-FRESH OR NFS	7F0620	P 0.250000	0.020000		1.00	0.000200
24007HA	WHEAT-BRAN	21 COOKED-NFS	7F0620	P 0.250000	0.020000		1.00	0.000200
24007HA	WHEAT-BRAN	22 COOKED-FRESH-BAKED	7F0620	P 0.250000	0.020000		1.00	0.000200
24007WA	WHEAT FLOUR	10 RAW-FRESH OR NFS	7F0620	P 0.250000	0.020000		1.00	0.000200
24007WA	WHEAT FLOUR	21 COOKED-NFS	7F0620	P 0.250000	0.020000		1.00	0.000200
24007WA	WHEAT-FLOUR	22 COOKED-FRESH BAKED	7F0620	P 0.250000	0.020000		1.00	0.000200
24007WA	WHEAT FLOUR	25 COOKED FRESH FRIED	7F0620	P 0.250000	0.020000		1.00	0.000200
24012AA	MILLET	10 RAW FRESH OR NFS	8E2076	P 0.250000	0.680000		1.00	0.006800
24012AA	MILLET	21 COOKED NFS	8E2076	P 0.250000	0.680000		1.00	0.006800

Table 1, continued

ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 061 DATE: 11/01/88 PAGE 2

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Atrazine	1yr feeding- dog	Significant decr P II	ADI SF -->100	No data gaps.	HED complete 07/09/86.
Caswell #061	NOEL= 0.4800 mg/kg	waves in F at day 175 &	OPP RfD= 0.005000		EPA verified 05/20/87
CAS No 1912-24-9	15.00 ppm	cardiac toxicity seen in	EPA RfD= 0.005000	Rat Reproduction study as	HED reassess 06/03/88
A I CODE 080803	LEL= 4.9700 mg/kg	two male dogs		co-critical; NOEL=0.5 mg/	EPA verified 06/27/88.
CFR No 180.220	150.00 ppm	Evidence of oncogenicity		kg/kg/day.	
	ONCO: Class C (Tox NOTE)	in rats (mammary)			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)
25001SA	CANE SUGAR	10 RAW-FRESH OR NFS		P 0.250000.	0.160000		40.00	0.064000
25001SA	CANE SUGAR	21 COOKED-NFS		P 0.250000	0.160000		40.00	0.064000
25001SA	CANE SUGAR	22 COOKED-FRESH-BAKED		P 0.250000	0.160000		40.00	0.064000
25001SA	CANE SUGAR	31 COOKED-FRESH OR CANNED		P 0.250000	0.160000		40.00	0.064000
25003SB	SUGAR-MOLASSES	10 RAW-FRESH OR NFS		P 0.250000	0.650000		40.00	0.260000
25003SB	SUGAR-MOLASSES	21 COOKED-NFS		P 0.250000	0.650000		40.00	0.260000
25003SB	SUGAR-MOLASSES	22 COOKED-FRESH-BAKED		P 0.250000	0.650000		40.00	0.260000
25001SB	SUGAR-MOLASSES	31 COOKED-FRESH OR CANNED		P 0.250000	0.650000		40.00	0.260000
27002OA	CORN,GRAIN-OIL	18 PROCESSED OIL	7F0620	P 0.250000	0.100000		70.00	0.070000
50000DB	MILK-NON-FAT SOL	10 RAW-FRESH OR NFS	7F0620	P 0.020000	0.004000		100.00	0.004000
50000DB	MILK-NON-FAT SOL	21 COOKED-NFS	7F0620	P 0.020000	0.004000		100.00	0.004000
50000DB	MILK-NON-FAT SOL	51 COOKED-CANNED	7F0620	P 0.020000	0.004000		100.00	0.004000
50000FA	MILK-FAT SOLIDS	10 RAW-FRESH OR NFS	7F0620	P 0.020000	0.004000		100.00	0.004000
50000FA	MILK-FAT SOLIDS	21 COOKED-NFS	7F0620	P 0.020000	0.004000		100.00	0.004000
50000FA	MILK-FAT SOLIDS	51 COOKED-CANNED	7F0620	P 0.020000	0.004000		100.00	0.004000
50000SA	MILK SUG (LACT)	21 COOKED-NFS	7F0620	P 0.020000	0.004000		100.00	0.004000
50000SA	MILK SUG (LACT)	51 COOKED-CANNED	7F0620	P 0.020000	0.004000		100.00	0.004000
53001BA	BEEF-MEAT BYP	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53001BA	BEEF-MEAT BYP	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	7F0620	P 0.020000	0.010000		100.00	0.010000
53001BB	BEEF-OTH ORGAN	21 COOKED NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53001BB	BEEF-OTH ORGAN	51 COOKED-CANNED	7F0620	P 0.020000	0.010000		100.00	0.010000
53001DA	BEEF DRIED	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53001FA	BEEF FAT	10 RAW-FRESH OR NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53001FA	BEEF-FAT	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53001FA	BEEF-FAT	22 COOKED-FRESH-BAKED	7F0620	P 0.020000	0.010000		100.00	0.010000
53001FA	BEEF-FAT	23 COOKED-FRESH-BOILED	7F0620	P 0.020000	0.010000		100.00	0.010000
53001FA	BEEF-FAT	24 COOKED-FRESH-BROILED	7F0620	P 0.020000	0.010000		100.00	0.010000
53001FA	BEEF-FAT	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.010000		100.00	0.010000
53001KA	BEEF KIDNEY	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53001LA	BEEF LIVER	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.020000		100.00	0.020000
53001LA	BEEF LIVER	31 COOKED-FRESH OR CANNED	7F0620	P 0.020000	0.020000		100.00	0.020000
53001MA	BEEF-LEAN	10 RAW-FRESH OR NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53001MA	BEEF-LEAN	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53001MA	BEEF-LEAN	22 COOKED-FRESH-BAKED	7F0620	P 0.020000	0.010000		100.00	0.010000
53001MA	BEEF-LEAN	23 COOKED-FRESH-BOILED	7F0620	P 0.020000	0.010000		100.00	0.010000
53001MA	BEEF-LEAN	24 COOKED-FRESH-BROILED	7F0620	P 0.020000	0.010000		100.00	0.010000
53002DA	GOAT MEAT BYP	00 NOT SPECIFIED (NO CONSUMPTION)	7F0620	P 0.020000	0.010000		100.00	0.010000
53002BB	GOAT OTH ORGAN	00 NOT SPECIFIED (NO CONSUMPTION)	7F0620	P 0.020000	0.010000		100.00	0.010000
53002FA	GOAT FAT	23 COOKED-FRESH-BOILED	7F0620	P 0.020000	0.010000		100.00	0.010000
53002FA	GOAT FAT	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.010000		100.00	0.010000

Table 1, continued

ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 063 DATE 11/01/88 PAGE 1

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Atrazine	1yr feeding dog	Significant decr P-II	ADI SF -->100	No data gaps	HED complete 07/09/8-
Caswell #063	NOEL= 0.4800 mg/kg	waves in F at day 175 &	OPP RfD= 0.005000		EPA verified 05/20/87
CAS No. 1912-24-9	15.00 ppm	cardiac toxicity seen in	EPA RfD= 0.005000	Rat Reproduction study as	HED reassess 06/03/88
A.I. CODE 080803	LEL= 4.9700 mg/kg	two male dogs		co-critical, NOEL=0.5 mg/	EPA verified 06/22/88
CFR No. 180.220	150.00 ppm	Evidence of oncogenicity		kg/kg/day	
	ONCO: Class C (Tox NOTE)	in rats (mammary)			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)
53002KA	GOAT-KIDNEY	00 NOT SPECIFIED (NO CONSUMPTION)	7F0620	P 0.020000	0.010000		100.00	0.010000
53002LA	GOAT-LIVER	00 NOT SPECIFIED (NO CONSUMPTION)	7F0620	P 0.020000	0.020000		100.00	0.020000
53002MA	GOAT-LEAN	23 COOKED-FRESH-BOILED	7F0620	P 0.020000	0.010000		100.00	0.010000
53002MA	GOAT-LEAN	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.010000		100.00	0.010000
53003AA	HORSE	00 NOT SPECIFIED (NO CONSUMPTION)	7F0620	P 0.020000	0.010000		100.00	0.010000
53005BA	SHEEP-MEAT BYP	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53005BB	SHEEP-OTH ORGAN	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53005FA	SHEEP-FAT	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53005KA	SHEEP-KIDNEY	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53005LA	SHEEP-LIVER	00 NOT SPECIFIED (NO CONSUMPTION)	7F0620	P 0.020000	0.020000		100.00	0.020000
53005MA	SHEEP-LEAN	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53005MA	SHEEP-LEAN	31 COOKED-FRESH OR CANNED	7F0620	P 0.020000	0.010000		100.00	0.010000
53006BA	PORK-MEAT BYP	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53006BB	PORK-OTH ORGAN	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53006BB	PORK-OTH ORGAN	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	7F0620	P 0.020000	0.010000		100.00	0.010000
53006FA	PORK-FAT	10 RAW-FRESH OR NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53006FA	PORK-FAT	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53006FA	PORK-FAT	23 COOKED-FRESH-BOILED	7F0620	P 0.020000	0.010000		100.00	0.010000
53006FA	PORK-FAT	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.010000		100.00	0.010000
53006FA	PORK-FAT	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	7F0620	P 0.020000	0.010000		100.00	0.010000
53006KA	PORK-KIDNEY	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53006LA	PORK-LIVER	21 COOKED-NFS	7F0620	P 0.020000	0.020000		100.00	0.020000
53006LA	PORK-LIVER	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.020000		100.00	0.020000
53006MA	PORK-LEAN	21 COOKED-NFS	7F0620	P 0.020000	0.010000		100.00	0.010000
53006MA	PORK-LEAN	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.010000		100.00	0.010000
53006MA	PORK-LEAN	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	7F0620	P 0.020000	0.010000		100.00	0.010000
55008BA	TURKEY-BYP	21 COOKED-NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55008BA	TURKEY-BYP	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	7F0620	P 0.020000	0.000000		100.00	0.000000
55008LA	TURKEY ORGAN	21 COOKED-NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55008LA	TURKEY ORGAN	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.000000		100.00	0.000000
55008MA	TURKEY W/O SKIN	21 COOKED-NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55008MA	TURKEY W/O SKIN	31 COOKED-FRESH OR CANNED	7F0620	P 0.020000	0.000000		100.00	0.000000
55008MA	TURKEY W/O SKIN	62 COOKED-FRESH OR FROZEN-BAKED	7F0620	P 0.020000	0.000000		100.00	0.000000
55008MB	TURKEY+SKIN	21 COOKED-NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55008MB	TURKEY+SKIN	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.000000		100.00	0.000000
55008MC	TURKEY-UNSPEC	21 COOKED-NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55013BA	POULTRY,OTH-BYP	00 NOT SPECIFIED (NO CONSUMPTION)	7F0620	P 0.020000	0.000000		100.00	0.000000
55013LA	POULTRY,ORGAN	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.000000		100.00	0.000000
55013MA	POULTRY,OTHER	21 COOKED-NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AA	EGGS WHOLE	10 RAW-FRESH OR NFS	7F0620	P 0.020000	0.000000		100.00	0.000000

Table 1, continued

ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 063 DATE 11/01/89 PAGE 4

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Atrazine Caswell #063 CAS No 1912-24-9 A I CODE 080803 CFR No 180.220	1yr feeding- dog NOEL= 0.4800 mg/kg 15.00 ppm LEL= 4.9700 mg/kg 150.00 ppm ONCO: Class C (Tox NOTE)	Significant decr P-II waves in F at day 175 & cardiac toxicity seen in two male dogs Evidence of oncogenicity in rats (mammary)	ADI SF -->100 OPP RfD= 0.005000 EPA RfD= 0.005000	No data gaps Rat Reproduction study as co-critical; NOEL=0.5 mg/kg/kg/day.	RED complete 02/09/90. EPA verified 05/20/91 RED revised 06/01/84 EPA verified 06/22/89 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)
55014AA	EGGS-WHOLE	21 COOKED-NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AA	EGGS-WHOLE	22 COOKED-FRESH-BAKED	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AA	EGGS-WHOLE	23 COOKED-FRESH-BOILED	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AA	EGGS-WHOLE	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AB	EGGS-WHITE ONLY	10 RAW-FRESH OR NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AB	EGGS-WHITE ONLY	21 COOKED-NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AB	EGGS-WHITE ONLY	22 COOKED-FRESH-BAKED	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AB	EGGS-WHITE ONLY	62 COOKED-FRESH OR FROZEN-BAKED	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AB	EGGS-WHITE ONLY	81 COOKED-FROZEN	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AC	EGGS-YOLK ONLY	10 RAW-FRESH OR NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AC	EGGS-YOLK ONLY	21 COOKED-NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AC	EGGS-YOLK ONLY	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.000000		100.00	0.000000
55014AC	EGGS-YOLK ONLY	31 COOKED-FRESH OR CANNED	7F0620	P 0.020000	0.000000		100.00	0.000000
55015BA	CHICKEN-B/P	00 NOT SPECIFIED (NO CONSUMPTION)	7F0620	P 0.020000	0.000000		100.00	0.000000
55015LA	CHICKEN ORGAN	21 COOKED-NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55015LA	CHICKEN-ORGAN	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.000000		100.00	0.000000
55015LA	CHICKEN-ORGAN	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	7F0620	P 0.020000	0.000000		100.00	0.000000
55015MA	CHICKEN-W/O SKIN	21 COOKED-NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55015MA	CHICKEN-W/O SKIN	22 COOKED-FRESH-BAKED	7F0620	P 0.020000	0.000000		100.00	0.000000
55015MA	CHICKEN-W/O SKIN	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.000000		100.00	0.000000
55015MA	CHICKEN-W/O SKIN	31 COOKED-FRESH OR CANNED	7F0620	P 0.020000	0.000000		100.00	0.000000
55015MA	CHICKEN-W/O SKIN	53 COOKED-CANNED-BOILED	7F0620	P 0.020000	0.000000		100.00	0.000000
55015MB	CHICKEN+SKIN	21 COOKED-NFS	7F0620	P 0.020000	0.000000		100.00	0.000000
55015MB	CHICKEN+SKIN	25 COOKED-FRESH-FRIED	7F0620	P 0.020000	0.000000		100.00	0.000000
65015AA	WATER-FOOD BASED	10 RAW-FRESH OR NFS		N 0.003000	0.003000		100.00	0.003000
65015AA	WATER-FOOD BASED	21 COOKED-NFS		N 0.003000	0.003000		100.00	0.003000
65015AC	WATER--NON-FOOD	10 RAW-FRESH OR NFS		N 0.003000	0.003000		100.00	0.003000

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Table 2

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS DATE 11/01/88 PAGE 1

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
Atrazine	1yr feeding- dog	Significant decr P-II	ADI SF -->100	No data gaps NOTE 10%	HED complete 07/09/86
Caswell #063	NOEL= 0.4800 mg/kg	waves in F at day 175 &	OPP RfD= 0.005000	of ADI used in analyses	EPA verified 05/20/87
CAS No. 1912-24-9	15.00 ppm	cardiac toxicity seen in	EPA RfD= 0.005000	Rat Reproduction study is	HED reassess 06/01/88
A.I. CODE: 080803	LEL= 4.9700 mg/kg	two male dogs		co-critical; NOEL=0.5 mg/	EPA verified 06/22/88
CFR No. 180.220	150.00 ppm	Evidence of oncogenicity		kg/kg/day	
	ONCO: Class C (Tox NOTE)	in rats (mammary)			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	0.000991	0.001091	218.290000	20.112600	0.000256	51.13860
U.S. POPULATION - SPRING SEASON	0.000954	0.001053	210.505800	19.681800	0.000249	49.88100
U.S. POPULATION - SUMMER SEASON	0.000988	0.001094	218.754400	21.056600	0.000264	52.76920
U.S. POPULATION - FALL SEASON	0.001000	0.001100	220.081200	20.044600	0.000257	51.32890
U.S. POPULATION - WINTER SEASON	0.000997	0.001095	219.096400	19.672600	0.000253	50.58360
NORTHEAST REGION	0.000977	0.001066	213.202000	17.890000	0.000237	47.31620
NORTH CENTRAL REGION	0.001015	0.001116	223.257400	20.327400	0.000262	52.19460
SOUTHERN REGION	0.000959	0.001063	212.657400	20.842200	0.000259	51.75660
WESTERN REGION	0.000998	0.001105	221.069600	21.538800	0.000267	53.39460
HISPANICS	0.001100	0.001219	243.782400	23.861800	0.000305	61.01500
NON-HISPANIC WHITES	0.000980	0.001079	215.703400	19.637200	0.000250	50.06520
NON HISPANIC BLACKS	0.000959	0.001065	213.092000	21.263600	0.000266	53.17200
NON-HISPANIC OTHERS	0.000998	0.001105	220.999600	21.467800	0.000266	53.22260
NURSING INFANTS (< 1 YEAR OLD)	0.000629	0.000767	153.392400	27.604000	0.000295	50.96040
NON-NURSING INFANTS (< 1 YEAR OLD)	0.002326	0.002750	549.913800	84.723200	0.000868	173.58680
FEMALES (13+ YEARS, PREGNANT)	0.000710	0.000786	157.254200	15.324400	0.000187	37.31740
FEMALES 13+ YEARS, NURSING	0.000827	0.000914	182.800000	17.474200	0.000211	42.21660
CHILDREN (1-6 YEARS OLD)	0.002429	0.002639	527.851600	42.065000	0.000600	119.95540
CHILDREN (7-12 YEARS OLD)	0.001668	0.001797	359.307000	25.722000	0.000395	78.97440
MALES (13-19 YEARS OLD)	0.001107	0.001197	239.361000	17.897000	0.000263	52.68780
FEMALES (13-19 YEARS OLD, NOT PREG. OR NURSING)	0.000885	0.000965	192.901000	15.812600	0.000221	44.20820
MALES (20 YEARS AND OLDER)	0.000690	0.000767	153.357800	15.336800	0.000181	36.25200
FEMALES (20 YEARS AND OLDER, NOT PREG. OR NURS)	0.000597	0.000676	135.121800	15.665800	0.000170	33.94980

*Current TMRC does not include new or pending tolerances.
**New TMRC includes new, pending, and published tolerances.