ANNEX B

Ziram

B.6 Residue data

B.6.0 Storage stability of residue samples.

Storage stability of Ziram in or on frozen apples, peaches and almond meats and hulls, 1988 (Bookbinder M., 1989a).
Guidelines :
EPA Guidelines, Subdivision O, Section 171-4 (e)
GLP :
No - not required at the time the study was conducted.
Material and Methods :
Frozen samples of ground apples, peaches, and almonds (nuts and hulls) were fortified with 2 ppm ziram and stored at -20 ± 2 °C for 0 day, 2 weeks, 1 month, 3 months, 4 months (apples and peaches) and 6 months (apples, peaches and almond nuts).
Before and after storage, samples were analyzed for CS_2 associated levels.
Findings :
The table herebelow gives the results of the study.
Table B.6.0-1 : Recovery of ziram from laboratory - fortified commodities

Commodity	% recovery of ziram after					
	0 day	2 weeks	1 month	3 months	4 months	6 months
Almond nuts	78.5	88.5	92.5	90	-	87.5
Almond hulls	77.5	79.5	83	75	-	-
Apples	88.5	93.5	83.5	69	49	44.5
Peaches	95	99	101.5	70.5	60	55

Conclusions :
Ziram residues declined in ground frozen apples and peaches to ± 70 and 50 % of their initial levels after storage of 3 and 6 months respectively.
Residue levels did not decline similarly in almond nuts and hulls.
In residue trials, analyses were generally carried out several months after sampling and initial residue level may have declined significantly. In order to remove this uncertainty, a new storage stability study should be carried out with fortification of the whole fruit.

B.6.1 Metabolism, distribution and expression of residues in plants (Annex IIA 6.1)

14C-ziram - Plant metabolism study in field grown apple (Wyss-Benz M., 1994)
Guidelines :
EPA Guidelines, Subdivision O, Section 171-4 (a) (2)
EPA Guidelines Subdivision O, Addendum 3
GLP :
Yes
Material and Methods :
^{14}C-ziram labelled on the thiocarbonyl moiety was applied once at a dose rate of 34 kg a.s./ha (corresponding to 12X the maximum intended field rate) to apples of 3.5 to 5 cm diameter and leaves by hand-spraying. Samples of apples were taken on days 0, 14, 28, 56 and 80 (maturity).
Samples were rinsed with acetonitrile and with acetonitrile/water (9:1 and 1:1) to determine the surface radioactivity. This radioactivity was measured by LSC and analyzed by TLC and HPLC. To analyze ziram by HPLC it was transformed into a water-soluble sodium salt by treatment with an EDTA (as sodium-EDTA) solution. Ziram was therefore analyzed as dimethyldithiocarbamate derivative (DDC).

Apples were then separated into peel and pulp. Plant parts were homogenized and subject to combustion analysis. The homogenized samples were extracted with acetonitrile and with acetonitrile/water (9:1 and 1:1) and combined extracts were analyzed by one-dimensional TLC with at least 2 different solvent systems. HPLC-analysis was not

possible due to the low radioactivity present in the extracts. The CS_2-associated radioactivity in the extracts was determined by GC-headspace-injection, in order to detect all substances still containing a $^{14}CS_2$-structure.

The non-extracted residue in peel and pulp of the day 80 was subsequently treated with a surfactant and with cellulase, β-glucosidase and protease on one hand and with weak and strong acid and base hydrolysis on the other.

Findings :
The table B.6.1-1 gives an overview of the results obtained in the course of the study.

The ratio between surface and incorporated residues changed dramatically during the course of the study. Just after application 97% of the residues were removable by surface rinses. This ratio decreased to 24% 14 days after the application and to 4% at normal harvest time.
Surface residues were shown to be ziram directly after application. After 14 days, although ziram was still present, other major compounds had been formed but have not been identified.
The extractable fraction of incorporated residues has been analyzed by TLC and contains very polar compounds remaining at the origin of the TLC-plate. Maximum 2% of these incorporated residues still contain the CS_2 structure.
The effects of enzymatic and hydrolysis treatments on the bound fraction of the residues the incorporation to a wide range of natural plant products.

Conclusion:
This study indicates that ziram is extensively degraded on apples and that ultimate degradation products enter into the composition of natural plant products. However information on the intermediary degradation products is lacking. It is not possible to propose a metabolic pathway.

Table B.6.1-1 : Results of the metabolism study in apples

Days after application	**0**	**14**	**28**	**56**	**80**
TRR: Total radioactive residues whole apples (rinses + residues in fruits) **(mg ziram equiv./kg)**					
	96.61	9.86	5.47	3.24	2.56
Surface residues (removed with ACN and ACN/water rinses)					
%TRR	96.8	24.2	19.1	4.6	4.2
Characterization/identification					
HPLC	at day 0, one single fraction corresponding to ziram, analyzed as sodium dimethyldithiocarbamate; at days 14 and 28 other fractions corresponding to more polar substances are also present at important levels; HPLC was not perfomed at days 56 and 80.				
TLC	at day 0, 2 fractions corresponding to ziram and another compound assumed to be the dimethyldithiocarbamate salt; at day 56, parent compound is still present but represent a minor amount in comparison to other compounds not identified; TLC was not performed at days 14 and 28.				
Incorporated residues in peel					
%TRR	2.6	40.1	41.2	39.9	45.5
extractable (ACN and ACN/water) %TRR	1.0	18.6	22.6	18.1	23.4
not extractable %TRR	1.6	21.5	18.6	21.8	22.1
Characterization/identification	extractable fraction: TLC: most of the radioactivity remains at the origin and is not identified GC: CS_2-associated residues represent max. 5% of the incorporated residues in peel not extractable fraction: surfactant and enzymatic treatment, acid and base hydrolysis: more than 50% of the bound residues are released, mainly with cellulase and with hydrolysis conditions				
Incorporated residues in pulp					
%TRR	0.7	35.7	39.8	55.5	50.3
extractable (ACN and ACN/water) %TRR	0.2	22.8	25.4	29.8	37.0
not extractable %TRR	0.5	12.9	14.4	25.7	13.3
Characterization/identification	extractable fraction: TLC: most of the radioactivity remains at the origin and is not identified - trace of ziram at day 0 GC: no CS_2-associated residues not extractable fraction: surfactant and enzymatic treatment, acid and base hydrolysis:				

	more than 50% of the bound residues are released, mainly with cellulase and with hydrolysis conditions

B.6.2 Metabolism, distribution and expression of residues in livestock (Annex IIA 6.2)

B.6.2.1 Metabolism, distribution and expression of residues in poultry

The study is not required (intended uses of the a.s. are foliar applications on fruit trees)

B.6.2.2 Metabolism, distribution and expression of residues in lactating cows or goats

Ziram : Nature of the residue in lactating goats. (Bodden R., 1993)
Guidelines :
EPA/FIFRA § 171-4
GLP :
Yes
Material and Methods :
Two lactating goats received oral doses of ^{14}C-ziram labelled on the thiocarbonyl moiety each morning for 6 consecutive days. These doses were contained in gelatine capsules and corresponded to 11.9 and 13.2 mg/kg body weight /day. The animals were sacrificed approximately 6 hours after the last dose.
Milk, excreta, and after sacrifice, the gastrointestinal tract with contents, bile, urine from the bladder and tissue were collected for radioanalysis.
Levels of carbon disulfide generators (ziram and of other compounds containing the intact CS_2 moiety) were measured after acid hydrolysis in the presence of $SnCl_2$ as reducing agent in milk, urine and tissues. Analysis for nitrosodimethylamines was also performed in the same matrices.
Milk was extracted with acetonitrile and protease. The acetonitrile extract was partitioned with hexane. The radioactivity associated with casein and lactose was also determined.
Liver and kidney were extracted with chloroform and with aqueous methanol. The aqueous methanol fraction was analyzed by HPLC. The chloroform fraction was partitioned between acetonitrile and hexane and the acetonitrile fraction analyzed by HPLC. The solid residues were treated with protease.
Muscle and fat were extracted with chloroform and with aqueous methanol.
Residues in urine were characterized by TLC and HPLC. Urine was also extracted with chloroform to determine the presence of organosoluble ^{14}C residues.

Findings :
The major part of the radioactivity was excreted via the feces (41.66% and 61.11% respectively for each goat)
Taking into account the radioactivity eliminated with milk, urine and feces as well as the residual radioactivity in tissues, 45.75% for one goat and 65.49% for the other of the radioactivity were recovered. It is presumed that the lacking radioactivity has been expired.

The table B.6.2.2-1gives an overview of the results obtained in the course of the study

Table B.6.2.2-1 : Results of the metabolism study in the goat

Sample	% of total dose		TRR (mg/kg)		Characterization or remarks
	goat 1	goat 2	goat 1	goat 2	
feces	41.66 (1)	61.11 (1)	-	-	(1): content of gastrointestinal tract included
urine	2.88	3.08	-	-	CS_2 generators represent about 30% of the radioactivity in urine. Minimal amounts of radioactivity were organosoluble (<1% for chloroform and <2% for ethyl acetate). no discrete components in HPLC analysis. Several components by TLC. 4% of the radioactivity in urine was urea.
bile, blood	<0.02	<0.02	-	-	
milk	0.28	0.51	0.61-0.95 (2)	1.44-1.85	(2): at steady state from day 3 to day 6. 10% of the radioactivity is organosoluble (hexane) but has not been further characterized. 35% of the radioactivity is extractable with ACN and consist mainly in lactose. a major part of the unextracted radioactivity (35% of the milk radioactivity) is associated to proteins.
liver	0.90	0.73	27.96	22.03	CS_2 generators represent 10% of the radioactivity in liver. 35% of the radioactivity is extractable with aqueous MeOH and 3 (liver)-13 (kidney)% with chloroform. no discrete components in HPLC analysis. 2 thirds of the unextracted radioactivity can be released with protease treatment.
kidney	0.01	0.02	2.87	3.41	
muscle	0.02	0.03	0.45	0.81	48% of the radioactivity is extractable with aqueous methanol and 8% with chloroform.
fat	<0.01	<0.01	0.16-0.17	0.18-0.20	32% of the radioactivity is extractable with aqueous methanol and 18% with chloroform.
total	45.75	65.49			

Liver was the tissue containing the highest level of radioactivity. The extractable radioactivity was mostly of polar nature.
Dithiocarbamoyl structures were recovered in liver and urine. Their actual presence in other tissues cannot be estimated because the detection limit for this analysis was approximately 1 mg/kg, thus too high in comparison to the total radioactive residues present. However radiolabeled lactose (29.7% of the radioactivity) and casein (36.5% of the radioactivity) in milk and urea (4% of the radioactivity) in urine indicate that ziram is extensively metabolized in goats.
Nitrosodimethylamines were not detected in the different matrices (limit of detection of the method = 1 µg/kg).

Conclusions :
Ziram is extensively metabolized in goats. However information on the nature of intermediary degradation products is lacking. It is not possible to propose a metabolic pathway.

B.6.2.3 Metabolism, distribution and expression of residues in pigs

The study is not required (intended uses of the a.s. are foliar applications on fruit trees)

B.6.3 Definition of the residue

Plant products

Residue definition for monitoring
At this stage the proposed residue definition for plant products is ziram, based on the following reasons:
- ziram has a lower ADI than other dithiocarbamates and particular MRLs are needed to protect adequately the consumer;
- ziram represents a major constituant of the residue on the surface of fruits.

Residue definition for risk assessment
Ziram and its metabolites containing the CS_2 moiety

Remarks:
1) Due to the deficiencies in the plant metabolism study, it is not possible to take a position at this stage about the toxicological significance of the intermediary degradation products of ziram as their nature has not been determined. The proposed residue definition must be therefore considered as provisional until submission of supplementary informations about the metabolism in plants.
A special attention should be payed to the possible formation of dimethylformamide that has been showed to be a major degradation product by photolysis.
2) No specific method is available for the analysis of ziram. Such a method should be developped.
3) All the residue trials have been generated with the unspecific residue method. Although these data cannot be used to fix MRLs for ziram, they will be used for estimating the exposure of the consumer.

Animal products

As residues of ziram are not expected at significant levels in animal products no residue definition is proposed.

B.6.4 Use pattern

See point B.6.5

B.6.5 Identification of critical GAPs

Table B.6.5-1 : List of intended uses of ziram - Critical GAPs are indicated in bold

Crop Disease	Country	Maximum rate per application (kg a.s./ha)	Maximum rate per season (kg a.s./ha)	Spray concen-tration (g a.s./hl)	Maxi mum number of applications per season	spray interval in days	Pre-harvest interval in days
Apple Scab *(Venturia inaequalis)*	**All Europe**	**2.70**	**16.20**	**94 to 270**	**6 (treatments against *Gloeosporium* included)**	**7-14 days - First application on young leaves**	**14**
Apple *Gloeosporium*	All Europe	1.18	(rate already taken into account in the Venturia applica-tions)	75 to 118	4	7-14 days - First application half June	14
Pear Scab *(Venturia pirina)*	**All Europe**	**2.70**	**16.20**	**94 to 270**	**6 (treatments against *Gloe-osporium* included)**	**7-14 days - First application on young leaves**	**14**
Pear *Gloeosporium*	All Europe	1.18	(rate already taken into account in the Venturia applica-tions)	75 to 118	4	7-14 days - First application half June	14
Medlar Scab *(Venturia inaequalis*)	**All Europe**	**2.35**	**8.46**	**235**	**3**	**7-14 days - First application just before blooming**	**28**
Cherry *Stigmina carpophila, Monilinia spp. Venturia cerasi*	**All Europe**	**3.04**	**9.12**	**133 to 304**	**3**	**7-14 days - First application before/during flowering**	**10**
Plum Rust *(Tranzschellia pruni-spinosa*) *Stigmina carpophila Monilia spp.*	**All Europe**	**3.04**	**9.12**	**114 to 304**	**3**	**7-14 days - First application before/during flowering**	**10**
Almond *Taphrina deformans*	South-Europe	1.78	5.34	133 to 178	3	7-14 days - Winter/Spring treatment; First	14

Crop Disease	Country	Maximum rate per application (kg a.s./ha)	Maximum rate per season (kg a.s./ha)	Spray concen-tration (g a.s./hl)	Maxi mum number of applications per season	spray interval in days	Pre-harvest interval in days
						application on very young foliage	
Almond *Fusicoccum amygdali*	South-Europe	1.78	5.34	133 to 178	3	7-14 days - Autumn/ Winter treatment after harvest	14
Almond ***Monilinia spp. Coryneum***	**South-Europe**	**2.70**	**8.1**	**133 to 270**	**3**	**7-14 days - First application when disease occurs**	**14**
Apricot ***Monilia***	**South-Europe**	**2.70**	**10.80**	**152-270**	**4**	**7-14 days Winter/Spring treatment; First application on young foliage;**	**14**
Apricot *Coryneum beijerinckii*	South-Europe	1.52	6.08	114 to 152	4	Autumn/ Winter treatment after harvest	-
Peach ***Taphrina deformans Stigmina carpophila Monilinia spp.***	**All Europe**	**3.04**	**9.12**	**133 to 304**	**3**	**7-14 days Winter/Spring treatment; First application on young foliage NL: Application before flowering. ?**	**14**
Peach *Coryneum beijerinckii (Stigmina carpophila) Fusicoccum amygdali*	All Europe	3.04	6.08	114 to 532	2	Autumn / Winter treatment after harvest	-

B.6.6 Residues resulting from supervised trials (Annex IIA 6.3; Annex IIIA 8.1)

B.6.6.0 Preliminary comment

All the supervised residue trials submitted were produced with the unspecific CS_2 method. No information is available concerning the ratio between ziram and eventual degradation products with the intact CS_2 moiety so that it is not possible to evaluate the part of ziram in the total CS_2 generated. As such these data cannot therefore be used to propose MRLs according to the proposed residue definition (Point B.6.3).
These data will however be used in order to evaluate the potential intake of residues of ziram by the consumer. Their summary sheets are contained in the appendix to this section.

B.6.6.1 Almonds

Ziram : Magnitude of the residue in or on almonds treated by ground and aerial equipment in California, 1988 (Bookbinder M., 1989b).
5 trials carried out in California are submitted with 4 applications, the latest occuring 35 days after petal fall. No residue was present in nutmeat.
These data cannot be used for the European GAP supported by the company (latest application 14 days before harvest).
Conclusion:
Data must be submitted according to the intended GAP.

B.6.6.2 Pome fruit

Determination of Residues of Ziram in apples (Maestricht, Netherlands; UCB B-93-2) (Marx D., 1994a).
Determination of residues of Ziram in apples (Loire valley, France; UCB B-93-7) (Marx D., 1994b).
Determination of residues of Ziram in apples (Loire valley, France; UCB B-93-8) (Brielbeck B., 1994a)
Determination of residues of Ziram in apples (Fleurus, Belgium; UCB B-93-1) (Marx D., 1994c).
Résidus de ZIRAM sur Poires et Pommes (Vervier R., 1966).
Rapport d'expérimentation 1992 - Prélèvements en vue d'analyses de résidus sur poirier (UCB, 1992).
Determination of residues of Ziram in pears (Dame Maire les Blois, Loire Valley, France; UCB B-93-12) (Brielbeck B., 1994b).
Determination of residues of Ziram in pears UCB B 94-1 (B-6221 Saint Amand (HT), Belgium) (Brielbeck B., 1995a).
Determination of residues of Ziram in pears UCB B 94-2 (Redened NL, G 43-94) (Brielbeck B., 1995b).
Determination of residues of Ziram in apples (Quincieux, France; UCB B-93-5) (Marx D., 1994d).
Determination of residues of Ziram 76WG in Apples under Field Conditions at one location in Spain (Balluff M., 1995b).
Determination of residues of Pomarsol Z WG 81 WG in/on apple and pear under actual use conditions in Italy (Ohs, 1995a).
Determination of residues of Ziram 76WG in pears under Field Conditions at one location in France (Balluff M., 1995b).
Determination of residues of Ziram 76WG in pears under Field Conditions at one location in Spain (Balluff M., 1995c).
Determination of residues of Ziram on apples, pears and peaches (Gatti G., 1992).

Residue trials on apples and pears have been carried out in Belgium, France, Italy, Spain and the Netherlands for the critical GAP of 2.7 kg/ha and 14 days PHI. Residues were measured using the total CS_2 method. The results (expressed in CS2) are listed here below.

Apple North: 0.70 - 1.38 - 1.94 - 0.58 mg/kg
Pear North: 0.78 - 3.63* - 0.66 - 0.58 mg/kg (3.63 is an outlier following Dixon Q-test)
STMR: 0.74 mg/kg (apples and pears results combined)
Mean residue: 1.28 mg/kg (apples and pears results combined)
R(max): 1.28+3.188x1.063 = 4.67 mg/kg (apples and pears results combined) - outlier included
R(max): 0.946+3.401x0.519 = 2.71 mg/kg (apples and pears results combined) - outlier not included
R(ber): 2x(0.25x1.38+0.75x1.94) = 3.60 mg/kg (apples and pears results combined)

Apple South: 0.53 - 0.90(10d) - 1.1(21d) mg/kg
Pear South: 0.64(10d) - 1.05 - 1.05 mg/kg
STMR: 0.98 mg/kg (apples and pears results combined)
Mean residue: 0.88 mg/kg (apples and pears results combined)
R(max): 0.88+3.711x0.241 = 1.78 mg/kg (apples and pears results combined)
R(ber): 2x(0.75x1.05+0.25x1.1) = 2.13 mg/kg (apples and pears results combined)

No data are presented for medlars. However it is possible to use the results of trials on apples and pears with sampling at 28 days before harvest:
For the North (apples and pears results combined): 0.44 - 0.78 - 2.41 - 0.61 - 0.26 - 3.76 mg/kg
Mean residue: 1.38 mg/kg
For the South (apples and pears results combined): 0.29 - 0.36 - 0.8 - 0.33 - 1.2 - 0.65 mg/kg
Mean residue: 0.61 mg/kg

Conclusion :
- TMDI calculations for pome fruits will be based on a residue level of 3 mg/kg of CS_2.
- The use of ziram does not seem to lead to CS2 residues higher than 3 mg/kg which is the current proposal in the framework of directive 90/642/EEC.

B.6.6.3 Peaches and apricots

Determination of residues of Ziram on apples, pears and peaches (Gatti G., 1992).
Determination of residues of Ziram in peaches (Les Cheres, France; UCB B-93-6) (Brielbeck B., 1994c).
Determination of residues of Pomarsol Z WG 81 WG in/on peaches and nectarines under actual use conditions in Italy (Ohs, 1995b).
Determination of residues of Ziram 76WG in Peaches under Field Conditions at two locations in Spain (Balluff M., 1995d).

6 Residue trials were carried out in France, Italy and Spain in support of the critical GAP for peaches (3.04 kg ai/ha, PHI of 14 days) with the following results (expressed in CS2): 1.79 - 0.66 - 1.40(10d) - 0.23 - 0.65 - 1.15 mg/kg
STMR: 0.91 mg/kg
Mean residue: 0.98 mg/kg
R(max): 0.98+3.711x0.572 = 3.10 mg/kg
R(ber): 2x(0.75x1.40+0.25x1.79) = 3.00 mg/kg

Conclusion :
- TMDI calculations for peaches and apricots will be based on a residue level of 3 mg/kg of CS_2.
- The use of ziram may result in CS_2 residues higher than the level set by directive 90/642/EEC (2 mg/kg)

B.6.6.4 Plums and cherries

Determination of residues of Ziram 76WG in Cherries under Field Conditions at two locations in Spain (Balluff M., 1995e).
Determination of residues of Ziram 76WG in Plums under Field Conditions at one location in South France (Balluff M., 1995f).
Determination of residues of Ziram 76WG in Plums under Field Conditions at one location in Spain (Balluff M., 1995g).

2 Trials (Spain) are available for the critical GAP on plums (3.04 kg ai/ha, PHI of 10 days). Residues are found at about 0.5 mg/kg in both cases.
2 Trials are also available for cherries (France and Spain) with a result of 1 mg/kg in one of them.

Conclusions :
- These data are not sufficient
- For intake calculations a level of 1 mg/kg of CS_2 residues in plums and cherries will be considered.

B.6.7 Effects of industrial processing and/or household preparation on the residue (Annex IIA 6.5; Annex

IIIA 8.4)

B.6.7.1 Effects of industrial processing and/or household preparation on the residue levels.

B.6.7.1.1 Processing of apples.

Magnitude of the residue in or on commodities processed from apples treated by ground equipment in New York, 1989 (Meikle S., 1992)
Guidelines :
40 CFR § 158.240 subdivision O - Pesticide assessment guidelines chemistry : residue chemistry 171-4
GLP :
Yes
Material and Methods :
Formulation ZIRAM GRANUFLO (WG containing 760 ga.s./kg) was applied 7 times (from 04/05/89 to 27/09/89) by airblast equipment at a rate of 34 kg a.s./ha.
Samples were taken 5 days after last treatment.
Ziram was converted to CS2 and analyzed by headspace gas chromatography. Average recoveries from fortified samples was 87% for apples, 87%, 77 and 102% for apple juice, wet pomace and dry pomace, respectively.

Findings :

Table B.6.7.1.1-1 : Analytical results of apple and apple processed commodities.

Commodity	**Residue level (mg a.s./kg matrix)**	**Concentration factor**
Apple, whole fruit	16.8	
Apple juice	1.59 1.69	0.1
Wet pomace	21.8 23.6	1
Dry pomace (<10% moisture)	30.3 31.3	2

Conclusions :
The transfer of ziram residues in juice is limited. Residues concentrate in dry pomace by a factor of about 2 in comparison with the initial residues on the fresh fruit.
2 Further studies should be normally carried out to confirm these figures.
Data on transfer to sauce should also be provided.

B.6.7.1.2 Other commodities.

No useful processing data are available for commodities other then apples.
In order to establish transfer factors in the framework of residue directives, the following processing studies shoud be carried out:
- cherries: preserves;
- plums: puree, prunes

B.6.7.2 Effects of industrial processing and/or household preparation on the nature of the residue.
No data submitted. The uses of ziram are targetted on fruits mostly eaten raw. In some cases (preparation of juice or preserves) a pasteurisation may be carried out.

At room temperature, ziram is hydrolyzed in acid condition and produces CS_2, with formation of unstable intermediary products. These reactions should be accelerated when plant commodities with residues of ziram are heated. A particular study would not give any further information.

B.6.8 Livestock feeding studies (Annex IIA 6.4; Annex IIIA 8.3)

B.6.8.1 Livestock feeding studies in lactating cows or goats

Dairy cattle and beef cattle may be fed with fruit pomace containing residues of Ziram.

The expected residue level in dry fruit pomace (<10% moisture) is 3mg/kg x 2 x 2 = 12 mg/kg ziram, with:
- 3 mg/kg being the maximum CS_2 residue level in fresh apples;
- 2 being the conversion factor CS_2 / ziram;
- the other 2 the concentration factor fresh apple / dry pomace

The potential intake of ziram residues by diary cattle can be calculated as 12 x 2/550 = 0.044 mg/kg bw/d, with:
- 12 mg/kg being the expected residue level in dry pomace;
- 2 kg/d being the amount of dry pomace that diary cattle may consume to cover 10% of its daily consumption of dry matter;
- 550 kg bw being the standard weight of dairy cattles

The same calculation for beef cattle leads to a potential intake of 0.15 mg/kg bw/d.

The metabolism study in lactating goat was carried out at doses rates of 11.9 and 13.2 mg/kg bw/d, representing thus 100 fold the maximum potential intake. Only in liver CS_2 residues were present at about 2 mg/kg.
Taking this into account, a feeding study in diary cattle is not necessary.

B.6.8.2 Livestock feeding studies in poultry

The study is not necessary (no exposure via the diet expected).

B.6.8.3 Livestock feeding studies in pigs

The study is not necessary (no exposure via the diet expected).

B.6.9 Residues in succeeding or rotational crops (Annex IIA 6.6; Annex IIIA 8.5)

As ziram is intended only in perenial crop (fruit trees), studies about residues in succeeding crops are not necessary.

B.6.10 Proposed pre-harvest intervals, re-entry intervals or withholding periods to minimize residues in crops, plants, plant products, treated areas or spaces (Annex IIA 6.8; Annex IIIA 8.7)

PHI almonds:14 days
PHI apples and pears: 14 days
PHI medlars: 28 days
PHI peaches and apricots: 14 days
PHI plums and cherries: 10 days

B.6.11 Estimates of the potential and actual exposure through diet and other means (Annex IIA 6.9; Annex IIIA 8.8)
The intake calculations are carried out according to the GEMS/Food guidelines for predicting dietary intake of pesticide residues.
They are based on the results of the residue trials and it is considered that metabolites with the intact CS2 moiety

included in the results of these trials have the same toxicological significance as ziram.

TMDI calculations.
The TMDI calculations rely on the following principles:
- the diet used is the FAO/WHO cultural diet for the European;
- only crops where an intended use exists are considered;
- for each crop the % of ADI consumed is based on a body weight of 60 kg;
- the ADI of ziram is 0.003 mg/kg bw/d, representing 0.18 mg/day for a person with a body weight of 60 kg;
- the conversion factor between CS_2 and ziram, based on their respective molecular weights is 2.

Commodity	Consumption (FAO diet) (kg/day)	Exposure (mg/kg)		TMDI (mg/day)	% ADI ziram
		as CS2	as ziram		
almonds	0.0018	?	?	?	? (1)
pome fruits	0.0513	3	6	0.308	171
peaches + apricots	0.016	3	6	0.096	53
plums and cherries	0.0074	1	2	0.015	8
TOTAL				0.419	**232**

(1): the exposure from almonds is supposed to be very low, and not significant in comparison to other fruits.

The TMDI exceeds largely the ADI of ziram. It is therefore necessary to carry out more refined calculations.

IEDI calculations
The same principles as for the TMDI have been applied, except that STMR have been used as exposure level instead of "MRLs"; No reduction factor due to processing has been applied because all the treated commodities can be eaten raw without peeling.

Commodity	Consumption (FAO diet) (kg/day)	Exposure (mg/kg)		TMDI (mg/day)	% ADI ziram
		as CS2	as ziram		
almonds	0.0018	?	?	?	? (1)
pome fruits	0.0513	0.98	1.96	0.101	56
peaches + apricots	0.016	0.91	1.82	0.029	16
plums and cherries	0.0074	1 (2)	2	0.015	8
TOTAL				0.145	80

(1): the exposure from almonds is supposed to be very low, and not significant in comparison to other fruits.
(2): data base insufficient to select a STMR

The IEDI calculations result in an intake of 80% of the ADI. However pome fruits represent more than 50% of the ADI and it is very likely that the intake by extreme consumers will exceed the ADI.

B.6.12 Community MRLs and MRLs in EU Member States (Document E-4)

Ziram is not covered by the European legislation on pesticide residues.

B.6.13 Proposed MRLs and justification and for the acceptability of those residues (Annex IIA 6.7; Annex IIIA 8.6)

It is not possible to propose MRL's at this stage for the following reasons:
- No method of analysis is available to measure selectively ziram as required by the residue definition;
- The residue trials have been performed using the CS_2 method and no information is available about the ratio between ziram and other generators of CS_2 present in the residue.

B.6.14 Summary and evaluation of residue behaviour

The metabolism of ziram has been investigated in apples and in goats. In both cases it was shown that ziram is extensively degraded and that ultimate degradation products enter into the composition of natural plant or animal products. Unfortunately the intermediary degradation products have not been identified. This means that it is not possible to conclude whether metabolism leads to the formation of products of toxicological concern or not.
For that reason all the proposals and conclusions of the rapporteur as far as residues are concerned must be considered as provisional.
The proposed residue definition for monitoring purposes is ziram. This is necessary as ziram has a particularly low ADI in comparison with other dithiocarbamate, requiring specific residue levels. This residue definition makes it necessary to develop a specific method of analysis.
Residue trials have been carried out with the CS_2 method of analysis. Their results cannot be used for proposing MRLs because they can possibly overestimate the actual level of parent residues.
For assessing the risk for the consumer it has been considered that metabolites with the intact CS2 moiety included in the results of the residue trials have the same toxicological significance as ziram. The results of IEDI calculations indicate an acceptable intake of the average consumer, but it is very likely that extreme consumers of pome fruits will exceed the ADI.

B.6.15 References relied on

Residue data

Residue data for the active substance (Annex IIA 6)

Annex point(s) Dir 91/414/EEC	Author(s)	Title Generated by (company or organisation), Submitted by (company(ies) or organisation), Report/file No. of submitting company Date of report for publication: reference	GLP GEP	Published Protected
IIA 6.3	Balluff M.	Determination of residues of Ziram 76WG in Apples under Field Conditions at one location in Spain Generated by: GAB - Germany Submitted by: UCB S.A., ELF ATOCHEM Report No.: 94021/01-FPAP Date : 06-03-95a	yes	unpublished protected
IIA 6.3	Balluff M.	Determination of residues of Ziram 76WG in pears under Field Conditions at one location in France Generated by: GAB - Germany Submitted by: UCB S.A., ELF ATOCHEM Report No.: 94021/02-FPBI Date : 23-02-95b	yes	unpublished protected
IIA 6.3	Balluff M.	Determination of residues of Ziram 76WG in pears under Field Conditions at one location in Spain Generated by: GAB - Germany Submitted by: UCB S.A., ELF ATOCHEM report No.: 94021/01-FPBI Date : 07-03-95c	yes	unpublished protected
IIA 6.3	Balluff M.	Determination of residues of Ziram 76WG in Peaches under Field Conditions at two locations in Spain Generated by: GAB - Germany Submitted by: UCB S.A., ELF ATOCHEM Report No.: 94021/01-FPPF Date : 23-02-95d	yes	unpublished protected
IIA 6.3	Balluff M.	Determination of residues of Ziram 76WG in Cherries under Field Conditions at two locations in Spain Generated by: GAB - Germany Submitted by: UCB S.A., ELF ATOCHEM Report No.: 94021/01-FPKI Date : 06-03-95e	yes	unpublished protected
IIA 6.3	Balluff M.	Determination of residues of Ziram 76WG in Plums under Field Conditions at one location in South France Generated by: GAB - Germany Submitted by: UCB S.A., ELF ATOCHEM Report No.: 94021/02-FPPL Date : 07-03-95f	yes	unpublished protected
IIA 6.3	Balluff M.	Determination of residues of Ziram 76WG in Plums under Field Conditions at one location in Spain Generated by: GAB - Germany	yes	unpublished protected

Annex point(s) Dir 91/414/EEC	Author(s)	Title Generated by (company or organisation), Submitted by (company(ies) or organisation), Report/file No. of submitting company Date of report for publication: reference	GLP GEP	Published Protected
		Submitted by: UCB S.A., ELF ATOCHEM Report No.: 94021/01-FPPL Date : 23-02-95g		
IIA 6.2	Bodden M.	Ziram : Nature of the residue in lactating goats Generated by : Hazelton Laboratories America Inc. Submitted by : UCB S.A., ELF ATOCHEM Report No. : HLA 6225-01 Date : 16/06/1993	yes	unpublished protected
IIA 6.3	Bookbinder M.	Storage stability of Ziram in or on frozen apples, peaches and almond meats and hulls, 1988 Generated by : Orius Associates Inc. Submitted by : UCB S.A., ELF ATOCHEM Report No. : 28-ZIR/89125 Date : 01/06/1989a	yes	unpublished protected
IIA 6.3	Bookbinder M.	Ziram : Magnitude of the residue in or on almonds treated by ground and aerial equipment in California, 1988 Generated by : Orius Associates Inc. Submitted by : UCB S.A., ELF ATOCHEM Report No. : 27-ZIR/89127 Date : 01/06/89b	yes	unpublished protected
IIA 6.3	Brielbeck B.	Determination of residues of Ziram in apples (Loire valley, France; UCB B-93-8) Generated by: STÄHLER, Stade (Germany) Submitted by: UCB S.A., ELF ATOCHEM Report No.: AB 93101-RU-010-5 Date : 06/10/1994a	yes	unpublished protected
IIA 6.3	Brielbeck B.	Determination of residues of Ziram in pears (Dame Maire les Blois, Loire Valley, France; UCB B-93-12) Generated by: STÄHLER, Stade (Germany) Submitted by: UCB S.A., ELF ATOCHEM Report No.: AB 93101-RU-010-7 Date : 06/10/1994b		unpublished protected
IIA 6.3	Brielbeck B.	Determination of residues of Ziram in peaches (Les Cheres, France; UCB B-93-6) Generated by: STÄHLER, Stade (Germany) Submitted by: UCB S.A., ELF ATOCHEM Report No.: AB 93101-RU-010-6 Date : 06/10/1994c	yes	unpublished protected
IIA 6.3	Brielbeck B.	Determination of residues of Ziram in pears UCB B 94-1 (B-6221 Saint Amand (HT), Belgium) Generated by : Stähler Agrochemie Submitted by : UCB S.A., ELF ATOCHEM Report No : AB 93101-RU-010-8	yes	unpublished protected

Annex point(s) Dir 91/414/EEC	Author(s)	Title Generated by (company or organisation), Submitted by (company(ies) or organisation), Report/file No. of submitting company Date of report for publication: reference Date : 11-08-1995a	GLP GEP	Published Protected
IIA 6.3	Brielbeck B.	Determination of residues of Ziram in pears UCB B 94-2 (Redened NL, G 43-94) Generated by : Stähler Agrochemie Submitted by : UCB S.A., ELF ATOCHEM Report No : AB 93101-RU-010-9 Date: 11-08-1995b	yes	unpublished protected
IIA 6.3	Gatti G.	Determination of residues of Ziram on apples, pears and peaches Generated by: Bayer (Field part) NEOTRON, Vignola (Italy) (analytical part) Submitted by: UCB S.A., ELF ATOCHEM Company file No.: UCB 211 Date : November 1992	yes	unpublished protected
IIA 6.3	Marx D.	Determination of Residues of Ziram in apples (Maestricht, Netherlands; UCB B-93-2) Generated by: STÄHLER Agrochemie - Stade (Germany) Submitted by: UCB S.A., ELF ATOCHEM Report No.: AB 93101-RU-010-2 Date : 06/10/1994a	yes	unpublished protected
IIA 6.3	Marx D.	Determination of residues of Ziram in apples (Loire valley, France; UCB B-93-7) Generated by: STÄHLER, Stade (Germany) Submitted by: UCB S.A., ELF ATOCHEM Report No.: AB 93101-RU-010-4 Date : 06/10/1994b	yes	unpublished protected
IIA 6.3	Marx D.	Determination of residues of Ziram in apples (Fleurus, Belgium; UCB B-93-1) Generated by: STÄHLER, Stade (Germany) Submitted by: UCB S.A., ELF ATOCHEM Report No.: AB 93101-RU-010-1 Date : 06/10/1994c	yes	unpublished protected
IIA 6.3	Marx D.	Determination of residues of Ziram in apples (Quincieux, France; UCB B-93-5) Generated by: STÄHLER, Stade (Germany) Submitted by: UCB S.A., ELF ATOCHEM Report No.: AB 93101-RU-010-3 Date : 06/10/1994d	yes	unpublished protected
IIA 6.5	Meikle S.	Ziram : Magnitude of residue in or on commodities processed from apples treated by ground equipment in New York, 1989 Generated by : Orius Associates Inc. Submitted by : UCB S.A., ELF ATOCHEM report No. : 27-ZIR/92003	yes	unpublished protected

Annex point(s) Dir 91/414/EEC	Author(s)	Title Generated by (company or organisation), Submitted by (company(ies) or organisation), Report/file No. of submitting company Date of report for publication: reference Date : 01/09/1992	GLP GEP	Published Protected
IIA 6.3	Ohs	Determination of residues of Pomarsol Z WG 81 WG in/on apple and pear under actual use conditions in Italy Generated by: Bayer AG Submitted by : UCB S.A., ELF ATOCHEM Report No: RA-2095/93 Date : 13/04/95a	yes	unpublished protected
IIA 6.3	Ohs	Determination of residues of Pomarsol Z WG 81 WG in/on peaches and nectarines under actual use conditions in Italy Generated by: Bayer AG Submitted by : UCB S.A., ELF ATOCHEM Report No : RA-2082/93 Date :13/04/95b	yes	unpublished protected
IIA 6.3	UCB	Rapport d'expérimentation 1992 - Prélèvements en vue d'analyses de résidus sur poirier Generated by: Agrotest France (field part) Laboratoire interregional de la repression des fraudes de Paris-Massy (analytical part) Submitted by: UCB S.A., ELF ATOCHEM Company file No.: 2/37 Date : 1992	no	unpublished protected
IIA 6.3	Vervier R.	Résidus de ZIRAM sur Poires et Pommes Generated by: Centre de Recherches de Phytopharmacie, Gembloux (Belgium) Submitted by: UCB S.A., ELF ATOCHEM Report No.: 66/09 Date : 1966	no	unpublished protected
IIA 6.1	Wyss-Benz M.	^{14}C-Ziram plant metabolism study in field grown apple. Generated by : RCC Umweltchemie AG Submitted by : UCB S.A., ELF ATOCHEM Report No. : RCC project 350673 Date : 12/12/1994	yes	unpublished protected

ANNEX B

Ziram

Appendix D : Residue data from supervised trials

Residue data from supervised residue trials

Apples	**p. 191**
Pears	**p. 195**
Cherries	**p. 198**
Peaches	**p. 199**
Plums	**p. 201**
Almonds	**p. 202**

The underlined values are those selected in the evaluation of the residue levels at harvest according to the intended GAPs.

FIELD TRIALS, CROP RESIDUE SUMMARY

Active ingredient (common name):	Ziram	Formulation (e.g. WP):	WG
Crop/crop group:	Apple/pomefruit	Producer of commercial product:	UCB
Commercial product (name):	THIONIC 76 WG	Submission date:	
Country:	North Europe	Indoor/outdoor:	outdoor
Content of active substance (g/kg or g/l) :	760 g/kg	Residues calculated as:	CS_2
Responsible body for reporting (name, address):	UCB SA, 326 av. Louise, B-1050 Brussels - Belgium	Other active substance in the formulation (common name and content):	-

1	2	3	4			5	6	7	8	9	10
Report No./ Location	Commodity/ Variety	Date of 1.Sowing or Planting 2.Flowering 3.Harvest	Application rate per treatment			Dates of treatment(s) or no. of treatment(s) and last date	Growth stage at last treatment or date	Portion analyzed	Residues mg/kg	PHI (days)	Re-marks:
			kg a.s./hl	Water (l/ha)	kg a.s./ ha						
AB93101- RU-010-2 6287 AA Eys (Maestricht) The Netherlands	Apples (Golden delicious)	1) 1989 2) 3)	0.37 to 0.25	650 to 950	2.4	6/22.09.33 7 days interval	Fruit of 7 cm	Whole fruit after removal of stem	2.09 0.71 0.70 0.54 0.44 0.23	0 7 14 21 28 35	CS_2 method
AB93101- RU-010-4 37110 Dame Marie Les Bois (Loire Valley) France-North	Apples (Wellspur)	1) 1975 2) 3)	0.42 to 0.28	600 to 850	2.4	6/06.09.93 7 days interval	fruit of 7 cm	Whole fruit after removal of stem	4.02 2.00 1.38 1.27 0.78 0.83	0 7 14 21 28 35	CS_2 method
AB93101- RU-010-5 37110 Dame	Apples (Golden delicious)	1) 1986 2) 3)	0.42 to 0.28	600 to 850	2.4	6/06.09.93 7 days interval	fruit of 6.5 cm	Whole fruit after removal of stem	5.23 5.63 1.94 1.14	0 7 14 21	CS_2 method

Marie Les Bois (Loire Valley) France-North									2.41 2.00	28 35	
UCB93/101- RU-010-1 6220 Fleurus Belgium	Apples (Jonagold)	1) 1989 2) 3)	0.37 to 0.23	650 to 1050	2.4	6/22.09.93 7 days intervals	14 days before harvest	Whole fruit after removal of stem	0.90 1.18 0.58 0.53 0.61 0.45	0 7 14 21 28 35	CS_2 method

FIELD TRIALS, CROP RESIDUE SUMMARY

Active ingredient (common name):	Ziram	Formulation (e.g. WP):	WP
Crop/crop group:	Apple/pomefruit	Producer of commercial product:	UCB
Commercial product (name):	-	Submission date:	
Country:	Belgium	Indoor/outdoor:	outdoor
Content of active substance (g/kg or g/l) :	900 g/kg	Residues calculated as:	ziram
Responsible body for reporting (name, address):	UCB SA, 326 av. Louise, B-1050 Brussels - Belgium	Other active substance in the formulation (common name and content):	-

1	2	3	4			5	6	7	8	9	10
Report No./ Location	Commodity/ Variety	Date of 1.Sowing or Planting 2.Flowering 3.Harvest	Application rate per treatment			Dates of treatment(s) or no. of treatment(s) and last date	Growth stage at last treatment or date	Portion analyzed	Residues mg/kg	PHI (days)	Remarks:
			kg a.s./hl	Water (l/ha)	kg a.s./ ha						
66/09 Gembloux Belgium	Apples (Reine des reinettes)	1) 2) 3)	0.18* 0.15**	2000	3.6* 2.7**	11/24.08. 66 3 weeks between the last 2 treatments	not specified	Peel	1.8 1.2 <0.4 1.0	0° 0 14 21	* the first 7 treatments ** the last treatment polarographic method; results calculated for total fruit - No recovery data 0° before treatment
66/09 Gembloux Belgium Be	Apples (Ellison's orange)	1) 2) 3)	0.18* 0.15**	2000	3.6* 2.7**	11/24.08.66 3 weeks between the last 2 treatments	not specified	Peel	<0.4 3.8 1.0 0.9 <0.4 <0.4	0° 0 2 7 14 21	* the first 7 treatments ** the last treatment polarographic method; results calculated for total fruit - No recovery data 0° before treatment

FIELD TRIALS, CROP RESIDUE SUMMARY

Active ingredient (common name):	Ziram	Formulation (e.g. WP):	WG
Crop/crop group:	Apple/pomefruit	Producer of commercial product:	UCB
Commercial product (name):	1) THIONIC 76 WG 2) POMARSOL Z WG 3) ZIRAM 76 WG	Submission date:	
Country:	South Europe	Indoor/outdoor:	outdoor
Content of active substance (g/kg or g/l) :	1) 760 g/kg 2) 810 g/kg 3) 760 g/kg	Residues calculated as:	CS_2
Responsible body for reporting (name, address):	UCB SA, 326 av. Louise, B-1050 Brussels - Belgium	Other active substance in the formulation (common name and content):	-

1	2	3	4			5	6	7	8	9	10
Report No./ Location	Commodity/ Variety	Date of 1.Sowing or Planting 2.Flowering 3.Harvest	Application rate per treatment			Dates of treatment(s) or no. of treatment(s) and last date	Growth stage at last treatment or date	Portion analyzed	Residues mg/kg	PHI (days)	Remarks:
			kg a.s./hl	Water (l/ha)	kg a.s./ ha						
AB93101-RU-010-3 69650 Quincieux France - South	Apples (Golden delicious)	1) 1950 2) 3)	0.24	950 to 1000	2.4	6/16.09.93 7 days interval	pre harvest	Whole fruit after removal of stem	1.45 1.16 0.53 0.21 0.29 0.33	0 6 13 20 27 34	CS_2 method
RA-2095/93 48100 Ravenna Italy	Apples (Perleberg 3)	1) 1978 2) 23.04.93-03.05.93 3) 21.09.93	0.16	1500	2.43	5/25.08.93 at 7 days interval	end of fruit development	Whole fruit	2.5 4.5 0.90 0.55 0.36 0.29	0* 0 10 21 28 35	CS_2 method 0* : before last treatment
94021/01/FPAP	Apples (Granny smith)	1) 1981 2)	0.23	1000	2.28	4/08.08.94	fruit size 70 % of final size	Whole fruit after removal of stem	1.9 1.1	0 21	CS_2 method

Almunia Zaragoza Spain	smith)	3)				10 days interval	of final size	removal of stem	0.8	28	

FIELD TRIALS, CROP RESIDUE SUMMARY

Active ingredient (common name):	Ziram	Formulation (e.g. WP):	WG
Crop/crop group:	Pear/pomefruit	Producer of commercial product:	UCB
Commercial product (name):	1) and 2) : THIONIC 76 WG 3) and 4) ZIRAM 76 WG	Submission date:	
Country:	North Europe	Indoor/outdoor:	outdoor
Content of active substance (g/kg or g/l) :	760 g/kg	Residues calculated as:	CS_2
Responsible body for reporting (name, address):	UCB SA, 326 av. Louise, B-1050 Brussels - Belgium	Other active substance in the formulation (common name and content):	-

1	2	3	4			5	6	7	8	9	10
Report No./ Location	Commodity/ Variety	Date of 1.Sowing or Planting 2.Flowering 3.Harvest	Application rate per treatment			Dates of treatment(s) or no. of treatment(s) and last date	Growth stage at last treatment or date	Portion analyzed	Residues mg/kg	PHI (days)	Remarks:
			kg a.s./hl	Water (l/ha)	kg a.s./ ha						
2-37 37190 Vallères France - North	Pears (Conference)	1) 1982 2) 3)	0.20	1200	2.4	14/27.08.92 at 7 day interval	fruit of 5 to 6 cm	Whole fruit after removal of stem	1.25 0.78 0.26	0 15 32	CS_2 method
			0.40		4.8				2.33 0.78 0.27	0 15 32	
AB93101-RU-010-7 37110 Dame Marie Les Bois (Loire Valley)	Pears (Williams)	1) 1975 2) 3)	0.54	450-550	2.4**	6/27.07.93 7 days interval	fruit of 5 cm	whole fruit after removal of stem	4.90 4.25 3.63 2.36 3.76 1.49	0 6 13 20 27 34	CS_2 method ** real obtained application rate : ± 3 kg a.s/ha

France-North											
AB93101- RU-010-8 1320 Nodebais Belgium	Pears (Conference)	1) ± 1990 2) 3)	0.228	1000	2.3	4/24.08.94 7 days interval	ruit size height 10.5-13 cm width 5.5-6.5 cm	Whole fruit after removal of stem	3.80 0.66 0.54	0 15 20	CS_2 method
AB93101- RU-010-9 6287 AA Eys The Netherlands	Pears (Conference)	1) 2) 3)	0.228	1050	2.4	4/18.08.94 7 days interval	fruit size height 10 cm width 6 cm	Whole fruit after removal of stem	1.61 0.58	0 14	CS_2 method

FIELD TRIALS, CROP RESIDUE SUMMARY

Active ingredient (common name):	Ziram	Formulation (e.g. WP):	WP
Crop/crop group:	Pear/pomefruit	Producer of commercial product:	UCB
Commercial product (name):	-	Submission date:	
Country:	Belgium	Indoor/outdoor:	outdoor
Content of active substance (g/kg or g/l) :	900 g/kg	Residues calculated as:	ziram
Responsible body for reporting (name, address):	UCB SA, 326 av. Louise, B-1050 Brussels - Belgium	Other active substance in the formulation (common name and content):	-

1	2	3	4			5	6	7	8	9	10
Report No./ Location	Commodity/ Variety	Date of 1.Sowing or Planting 2.Flowering 3.Harvest	Application rate per treatment			Dates of treatment(s) or no. of treatment(s) and last date	Growth stage at last treatment or date	Portion analyzed	Residues mg/kg	PHI (days)	Remarks:
			kg a.s./hl	Water (l/ha)	kg a.s./ ha						
Gembloux 66/09 Be	Pears (Conference)	1) 2) 3)	0.18* 0.15**	2000	3.6* 2.7**	11/24.08.66	not specified	Peel	1.2 0.9 1.6 1.2 1 <0.4	0 0 2 7 14 21	* the first 7 treatments ** the last treatment polarographic method; results calculated for total fruit - No

											recovery data

FIELD TRIALS, CROP RESIDUE SUMMARY

Active ingredient (common name):	Ziram	Formulation (e.g. WP):	WG
Crop/crop group:	Pear/pomefruit	Producer of commercial product:	UCB
Commercial product (name):	1) POMARSOL Z WG 2) THIONIC 76 WG 3) ZIRAM 76 WG	Submission date:	
Country:	South Europe	Indoor/outdoor:	outdoor
Content of active substance (g/kg or g/l) :	1) 810 mg/kg 2) and 3) 760 g/kg	Residues calculated as:	CS_2
Responsible body for reporting (name, address):	UCB SA, 326 av. Louise, B-1050 Brussels - Belgium	Other active substance in the formulation (common name and content):	-

1	2	3	4			5	6	7	8	9	10
Report No./ Location	Commodity/ Variety	Date of 1.Sowing or Planting 2.Flowering 3.Harvest	Application rate per treatment			Dates of treatment(s) or no. of treatment(s) and last date	Growth stage at last treatment or date	Portion analyzed	Residues mg/kg	PHI (days)	Remarks:
			kg a.s./hl	Water (l/ha)	kg a.s./ ha						
RA-2095/93 48100 Ravenna Italy	Pears (William)	1) 1976 2) 10.04.93-26-04.93 3) 20.08.93	0.16	1700	2.754	5/20.07.93 at 7 days interval	begin of fruit maturity	Whole ruit	1.8 3.3 0.64 0.47 0.33 0.23	0* 0 10 21 28 35	CS_2 method 0* : before last treat.
94021/02 FPBI 13570 Barbentane France-South	Pears (Guyot)	1) 1960 2) 3)	0.23	1000	2.28	4/21.07.94 10 days interval	green	Whole fruit after removal of stem	2.6 1.75 1.05 1.15 1.2	0 7 14 21 28	CS_2 method
94021/01 FPBI Sanlucar (Sevilla)	Pears (Ercolini)	1) 1987 2) 3)	0.23	1000	2.28	4/15.06.94 7 days interval	beginning of ripening and colouring	Whole fruit after removal of stem	2.10 1.55 1.05 0.80	0 7 14 21	CS_2 method

Spain									0.65	28	

FIELD TRIALS, CROP RESIDUE SUMMARY

Active ingredient (common name):	Ziram	Formulation (e.g. WP):	WG
Crop/crop group:	Cherry/stonefruit	Producer of commercial product:	UCB
Commercial product (name):	THIONIC 76 WG	Submission date:	
Country:	Spain	Indoor/outdoor:	outdoor
Content of active substance (g/kg or g/l) :	760 g/kg	Residues calculated as:	CS_2
Responsible body for reporting (name, address):	UCB SA, 326 av. Louise, B-1050 Brussels - Belgium	Other active substance in the formulation (common name and content):	-

1	2	3	4			5	6	7	8	9	10
Report No./ Location	Commodity/ Variety	Date of 1.Sowing or Planting 2.Flowering 3.Harvest	Application rate per treatment			Dates of treatment(s) or no. of treatment(s) and last date	Growth stage at last treatment or date	Portion analyzed	Residues mg/kg	PHI (days)	Remarks:
			kg a.s./hl	Water (l/ha)	kg a.s./ ha						
94021/01-FPKI Loc.1 Almunia Zaragoza Spain	Cherries (Sunburst)	1) 1987 2) 3)	0.23	1000	2.28	1/13.04.94 2/26.04.94 3/06.05.94	70% of final fruit size	Whole fruit	2.25 0.60 0.30 0.30 0.20	0 7 14 21 28	CS_2 method
94021/01-FPKI Loc.2 Altorricon Huesca Spain	Cherries (Stark Hardi)	1) 1977 2) 3)	0.23	1000	2.28	1/13.04.94 2/25.04.94 3/07.05.94	70% of final fruit size	Whole fruit	2.05 0.65 0.50 0.35 0.35	0 7 14 21 28	CS_2 method

FIELD TRIALS, CROP RESIDUE SUMMARY

Active ingredient (common name):	Ziram	Formulation (e.g. WP):	WG
Crop/crop group:	Peaches/stonefruit	Producer of commercial product:	UCB
Commercial product (name):	POMARSOL Z WG	Submission date:	
Country:	Italy	Indoor/outdoor:	outdoor
Content of active substance (g/kg or g/l) :	810 g/kg	Residues calculated as:	CS_2
Responsible body for reporting (name, address):	UCB SA, 326 av. Louise, B-1050 Brussels - Belgium	Other active substance in the formulation (common name and content):	-

1	2	3	4			5	6	7	8	9	10
Report No./ Location	Commodity/ Variety	Date of 1.Sowing or Planting 2.Flowering 3.Harvest	Application rate per treatment			Dates of treatment(s) or no. of treatment(s) and last date	Growth stage at last treatment or date	Portion analyzed	Residues mg/kg	PHI (days)	Remarks:
			kg a.s./hl	Water (l/ha)	kg a.s./ ha						
1) UCB 211 04022 Fondi Italy	Peaches (Red Haven)	1) 1985 2) 15.03.92-25.03.92 3) 09.07.92	0.16	1500	2.43	3/29.06.92 at 7 days interval	fruit size 50% of final size	Whole fruit	5.08 2.05 0.96 1.79 0.64	0 7 10 15 20	CS_2 method
RA-2082/93 48100 Ravenna Italy	Peaches (Red Haven)	1) 2) 02.04.93-12.04.93 3) 20.07.93	0.16	1500	2.43	3/22.06.93 at 7 days interval	30% of final fruit size	Whole fruit without stone/ whole fruit	/1.00 /2.00 /1.40 /1.30 1.10/1.00 0.57/0.53	*0 0 10 21 28 35	*0: before last treatment CS_2 method
RA-2082/93 48100 Ravenna Italy	Nectarine (Famtalade)	1) 1982 2) 10.04.93-27.04.93 3) 16.08.93	0.16	1500	2.43	3/21.07.93 at 7 days interval	70% of final fruit size	Whole fruit wihout stone/ whole fruit	/0.54 /0.71 /0.35 /0.27 /0.23 0.31/0.28	*0 0 7 10 14	*0: before last treatment CS_2 method

									0.13/0.12 0.12/0.11	21 28 35	

FIELD TRIALS, CROP RESIDUE SUMMARY

Active ingredient (common name):	Ziram	Formulation (e.g. WP):	WG
Crop/crop group:	Peaches/stonefruit	Producer of commercial product:	UCB
Commercial product (name):	1) THIONIC 76 WG 2) and 3) ZIRAM 76 WG	Submission date:	
Country:	South Europe	Indoor/outdoor:	outdoor
Content of active substance (g/kg or g/l) :	760 g/kg	Residues calculated as:	CS_2
Responsible body for reporting (name, address):	UCB SA, 326 av. Louise, B-1050 Brussels - Belgium	Other active substance in the formulation (common name and content):	-

1	2	3	4			5	6	7	8	9	10
Report No./ Location	Commodity/ Variety	Date of 1.Sowing or Planting 2.Flowering 3.Harvest	Application rate per treatment			Dates of treatment(s) or no. of treatment(s) and last date	Growth stage at last treatment or date	Portion analyzed	Residues mg/kg	PHI (days)	Remarks:
			kg a.s./hl	Water (l/ha)	kg a.s./ ha						
AB93101-RU-010-6 69380 Les Chères (Rhône) France	Peaches (Red Haven)	1) 1983 2) 3) 06.07.93-03.08.93 at 7 days interval	0.24	950 to 1050	2.400	3/06.07.93**	mature	Fruit whitout stone	2.17 2.12 0.66 0.42 0.57	0 7 14 21 28	CS_2 method ** 3 additional dithocarbamate treatments from 01/03 to 10/05
94021/01-FPPF Loc.1 Almunia Zaragoza	Peaches (Baby Gold 8)	1) 1990 2) 3)	0.23	1000	2.280	1/30.06.94 2/14.07.94 3/29.07.94	50% of final fruit size	Fruit without stone	2.30 0.65 0.80	0 14 21	CS_2 method

Spain											
94021/01-FPPF Loc.2 Almunia Zaragoza Spain	Peaches (Maria Serena)	1) 1984 2) 3)	0.23	1000	2.28	1/18.05.94 2/01.06.94 3/10.06.94	beginning of fruit colouring - softening of fruit	Fruit without stone	2.15 1.15 0.95	0 14 21	CS_2 method

FIELD TRIALS, CROP RESIDUE SUMMARY

Active ingredient (common name):	Ziram	Formulation (e.g. WP):	WG
Crop/crop group:	Plums/stonefruit	Producer of commercial product:	UCB
Commercial product (name):	THIONIC 76 WG	Submission date:	
Country:	South Europe	Indoor/outdoor:	outdoor
Content of active substance (g/kg or g/l) :	760 g/kg	Residues calculated as:	CS_2
Responsible body for reporting (name, address):	UCB SA, 326 av. Louise, B-1050 Brussels - Belgium	Other active substance in the formulation (common name and content):	-

1	2	3	4			5	6	7	8	9	10
Report No./ Location	Commodity/ Variety	Date of 1.Sowing or Planting 2.Flowering 3.Harvest	Application rate per treatment			Dates of treatment(s) or no. of treatment(s) and last date	Growth stage at last treatment or date	Portion analyzed	Residues mg/kg	PHI (days)	Remarks:
			kg a.s./hl	Water (l/ha)	kg a.s./ ha						
94021/02-FPPL 47110 Ste Livrade sur Lot	Plums (Ente 707)	1) 1959 2) 3) 07.09.94	0.23	1000	2.280	1/25.07.94 2/08.08.94 3/23.08.94	ripe	fruit without stone	1.05 1.00 1.00 0.40	0 7 14 21	CS_2 method
94021/01-FPPL Almonte Huelva Spain	Plums (Red Beaut 8)	1) 1986 2) 3)	0.23	1000	2.280	1/14.04.94 2/25.04.94 3/05.05.94	50% of final fruit size - nearly all fruits reached final size	Fruit without stone	0.40 <0.15 0.15 0.20 <0.15	0 8 14 21 28	CS_2 method

FIELD TRIALS, CROP RESIDUE SUMMARY

Active ingredient (common name):	Ziram	Formulation (e.g. WP):	WG
Crop/crop group:	Almond	Producer of commercial product:	UCB
Commercial product (name):	-	Submission date:	
Country:	California	Indoor/outdoor:	outdoor
Content of active substance (g/kg or g/l) :	760 g/kg	Residues calculated as:	Ziram (CS_2 method)
Responsible body for reporting (name, address):	UCB SA, 326 av. Louise, B-1050 Brussels - Belgium	Other active substance in the formulation (common name and content):	-

1	2	3	4			5	6	7	8	9	10
Report No./ Location	Commodity/ Variety	Date of 1.Sowing or Planting 2.Flowering 3.Harvest	Application rate per treatment			Dates of treatment(s) or no. of treatment(s) and last date	Growth stage at last treatment or date	Portion analyzed	Residues mg/kg	PHI (days)	Remarks:
			kg a.s./hl	Water (l/ha)	kg a.s./ ha						
27-ZIR/89127 30488 (80A-88) Ripon CA 95366	Almond (Nonpareil)	1) ± 1983 2) 3) 02.09.88	1.45	468	6.8	1/17.02.88 2/26.02.88 3/02.03.88 1/17.02.88 2/26.02.88 3/02.03.88 4/06.04.88	Petal fall 35 days after petal fall	nutmeat hulls nutmeat hulls	<0.05 0.473 <0.05 5.68	184 184 149 149	- CS_2 method - airblast sprayer
27-ZIR/89127 30488 (80B-88) Kerman CA 99630	Monterey	1) ± 1982 2) 3) 29.09.88	1.45	470	6.8	1/24.02.88 2/02.03.88 3/08.03.88 1/24.02.88 2/02.03.88 3/08.03.88 4/15.04.88	Petal fall 35 days after petal fall	nutmeat hulls nutmeat hulls	< 0.05 0.36 < 0.05 9.4	205 205 167 167	-CS_2 method - airblast sprayer
27-ZIR/89127	Nonpareil	1) ± 1974	1.45	420	6.8	1/17.02.88	Petal fall	nutmeat	< 0.05	178	- CS_2 method

1	2	3	4			5	6	7	8	9	10
Report No./ Location	Commodity/ Variety	Date of 1.Sowing or Planting 2.Flowering 3.Harvest	Application rate per treatment			Dates of treatment(s) or no. of treatment(s) and last date	Growth stage at last treatment or date	Portion analyzed	Residues mg/kg	PHI (days)	Remarks:
			kg a.s./hl	Water (l/ha)	kg a.s./ ha						
30488 (80C-88) Hughson CA 95326		2) 3) 01.09.88				2/24.02.88 3/07.03.88 1/17.02.88 2/24.02.88 3/07.03.88 4/11.04.88	 35 days after petal fall	hulls nutmeat hulls	0.64 < 0.05 11.1	178 143 143	- airblast sprayer
27-ZIR/89127 30488 (80G-88)+ Chico CA 95928	Nonpareil	1) ± 1977 2) 3) 09.09.88	2.4	280	6.8	1/19.02.88 2/23.02.88 3/02.03.88 1/19.02.88 2/23.02.88 3/02.03.88 4/06.04.88	Petal fall 35 days after petal fall	nutmeat hulls nutmeat hulls	< 0.05 0.60 < 0.05 2.08	191 191 156 156	- CS_2 method - airblast sprayer
27-ZIR/89127 30488 (80H-88) Hughson CA 95328	Nonpareil	1) ± 1967 2) 3) 02.09.88	1.6	420	6.8	1/20.02.88 2/24.02.88 3/12.03.88 1/20.02.88 2/24.02.88 3/12.03.88 4/16.04.88	Petal fall 35 days after petal fall	nutmeat hulls nutmeat hulls	< 0.05 0.75 < 0.05 6.81	174 174 139 139	- CS_2 method - airblast sprayer

ANNEX B