Rotterdam Convention - Operation of the Prior Informed Consent Procedure for Banned or Severely Restricted Chemicals

Decision Guidance Documents

2,4,5-T and its salts and esters

JOINT FAO/UNEP PROGRAMME
FOR THE OPERATION OF
PRIOR INFORMED CONSENT

Secretariat for the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

DISCLAIMER

The inclusion of these chemicals in the Prior Informed Consent Procedure is based on reports of control action submitted to the United Nations Environment Programme (UNEP) by participating countries, and which are presently listed in the UNEP-International Register of Potentially Toxic Chemicals (IRPTC) database on Prior Informed Consent. While recognizing that these reports from countries are subject to confirmation, the FAO/UNEP Joint Working Group of Experts on Prior Informed Consent has recommended that these chemicals be included in the Procedure. The status of these chemicals will be reconsidered on the basis of such new notifications as may be made by participating countries from time to time.

The use of trade names in this document is primarily intended to facilitate the correct identification of the chemical. It is not intended to imply approval or disapproval of any particular company. As it is not possible to include all trade names presently in use, only a number of commonly used and published trade names have been included here.

This document is intended to serve as a guide and to assist authorities in making a sound decision on whether to continue to import, or to prohibit import, of these chemicals because of health or environmental reasons. While the information provided is believed to be accurate according to data available at the time of preparation of this Decision Guidance Document, FAO and UNEP disclaim any responsibility for omissions or any consequences that may flow therefrom. Neither FAO or UNEP, nor any member of the FAO/UNEP Joint Group of Experts shall be liable for any injury, loss, damage or prejudice of any kind that may be suffered as a result of importing or prohibiting the import of these chemicals.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations or the United Nations Environment Programme concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

ABBREVIATIONS WHICH MAY BE USED IN THIS DOCUMENT

(N.B. : chemical elements and pesticides are not included in this list)

ADI	acceptable daily intake
ai	active ingredient
b.p.	boiling point
bw	body weight
^{o}C	degree Celsius (centigrade)
CCPR	Codex Committee on Pesticide Residues
DNA	Designated National Authority
EC	emulsion concentrate
EEC	European Economic Community
EPA	U.S. Environmental Protection Agency
ERL	extraneous residue limit
FAO	Food and Agriculture Organization of the United Nations
g	gram
μg	microgram
GAP	good agricultural practice
GL	guideline level
ha	hectare
IARC	International Agency for Research on Cancer
i.m.	intramuscular
i.p.	intraperitoneal
IPCS	International Programme on Chemical Safety
IRPTC	International Register of Potentially Toxic Chemicals
JMPR	Joint FAO/WHO Meeting on Pesticide Residues (Joint Meeting of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and a WHO Expert Group on Pesticide Residues)
k	kilo- (x 103)
kg	kilogram
l	litre
LC_{50}	lethal concentration, 50%
LD_{50}	lethal dose, median

m	metre
mg	milligram
ml	millilitre
m.p.	melting point
MRL	Maximum Residue Limit.
MTD	maximum tolerated dose
ng	nanogram
NOEL	no-observed-effect level
NOAEL	no-observed-adverse-effect level
NS	Not Stated
OP	organophosphorus pesticide
PHI	pre-harvest interval
ppb	parts per billion
ppm	parts per million (Used only in reference to the concentration of a pesticide in an experimental diet. In all other contexts the terms mg/kg or mg/l are used).
ppt	parts per trillion
sp gr	specific gravity
STEL	Short Term Exposure Limit
TADI	Temporary Acceptable Daily Intake
TLV	Threshold Limit Value
TMDI	theoretical maximum daily intake
TMRL	Temporary Maximum Residue Limit
TWA	Time Weighted Average
UNEP	United Nations Environment Programme
WHO	World Health Organization
WP	wettable powder
wt	weight
<	less than
<<	much less than
≤	less than or equal to
>	greater than
≥	greater than or equal to

Prior Informed Consent Decision Guidance Document

2,4,5-T and its salts and esters (with dioxin (TCDD) contaminant)

1 Identification

1.1	Common Name Other names/synonyms	2,4,5-T and its salts and esters
1.2	Chemical Type	Phenoxyacetic acid
1.3	Use	Pesticide (herbicide)
1.4	Chemical Name Contaminant	2,4,5-Trichlorophenoxy-acetic acid (IUPAC, CA) 2,3,7,8-tetrachlorodibenzo-p-dioxin
1.5	CAS No.	93-76-5
1.6	Trade Names	Dacamine, Ded-Weed, Farmco Fence Rider, Forron, Inverton 245, Line Rider, T-Nox, Transamine, Brushwood Killer, Brush-Rhap, Brushtox, Esterone, Fruitone A, Reddon, Spontox, Tormona, Tributon, Veon 245, Verton 2T, Visko Rhap Low Volatile Ester, Amine 2,4,5-T for Rice, Super D Weedone, Trinoxol, Weedar, Weedone (Farm Chemicals Handbook, 1991)
1.7	Mode of action as Pesticide	Post-emergence herbicide with growth hormone-type action (affects cellular division, activates phosphate metabolism and/or modifies nucleic acid metabolism)
1.8	Formulation Types	Emulsifiable concentrate (650 g acid equivalent 2,4,5-T-isoctyl, 500 a.e./l as ester); soluble concentrate (480 g a.e./l as amine salts)
1.9	Basic Manufacturers	(Discontinued): Marks, Synchemicals, Universal Crop Protection (UK); Vertac, Rhone-Poulenc, Dow Chemical (USA)

2 Summary of Control Actions

2.1 General

Control actions to ban or severely restrict 2,4,5-T have been reported by 14 countries, since the early 1970s. Thirteen countries have banned the product; one has severely restricted it. In one of the 13 countries, the manufacturer withdrew registration prior to the ban.

The actions reported by governments to IRPTC/UNEP are listed in Annex 1

2.2 Reasons for the Control Actions

Most countries have controlled 2,4,5-T for reasons of the high toxicity of the 2,3,7,8 TCDD contaminant. The contaminant has been found to be carcinogenic and to cause foetal abnormalities. Other reasons include long persistency and environmental effects, bioaccumulation potential, formation of highly toxic substances upon thermolysis, and the teratogenic and carcinogenic risks associated with the TCDD contaminant.

2.3 Bans and restrictions

With the exception of Malaysia, all countries reported that no pesticide uses were permitted.

Refer to Annex 1 for details.

2.4 Uses Reported to be Continued in Effect

One country reporting (Malaysia) continued uses restricts its use to small quantities which may be imported through import permit for research and educational purposes such as for use as analytical standards and other laboratory purposes.

2.5 Alternatives

Specific alternatives were suggested by Cuba, Thailand and the USA (Annex 2). Austria indicated that alternatives are available, but made no specific recommendations.

It is important to remember that the effectiveness of any alternative pesticide needs to be established under conditions of use in specific crops and countries.

2.6 Contacts for Further Information

FAO/UNEP Joint Data Base, IRPTC, Geneva; Designated National Authorities (DNAs) in countries taking control actions may be a source of information on alternatives (Annex 3).

3 Summary of Further Information on 2,4,5-T

3.1 Chemical and Physical Properties

2,4,5-T is produced commercially by condensation of sodium chloroacetate with sodium 2,4,5-trichlorophenoxide. At high temperatures the action of alkali on 2,4,5-trichlorophenol can produce some 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD, or dioxin).

All 2,4,5-T is contaminated with TCDD to varying degrees. Under uncontrolled manufacturing conditions, TCDD contamination has been found to be as high as 30-40 ppm, but current production standards typically limit TCDD to 0.05 ppm, and the most modern methods of production can reduce this level further to 0.01 ppm or less. It is impossible for manufacturers to produce 2,4,5-T without some TCDD contamination.

Technical grade 2,4,5-T (94%) takes the form of colourless crystals. Melting point is 153-156 ^{o}C. The vapour pressure is 700 nPa at 25^{o}C. It is sparingly soluble in water (150 mg/l), but its salts with alkali metals and amines are water soluble. Esters of 2,4,5-T are insoluble in water but soluble in oils. TCDD is soluble in water only at 0.2 ppb.

2,4,5-T is stable in aqueous solutions at pH 5-9.

3.2 Toxicological Characteristics

3.2.1 Classification

WHO Class I for formulations of a.i. with TCDD >0.01 mg/kg, Class II for formulations of a.i. with TCDD less than 0.01 mg/kg technical material.

Formulations of 2,4,5-T with a.i. containing <0.001 TCDD contaminant. Solids containing <950 g/kg a.i. are in Class III. Liquids containing

<250 g/l a.i. are in Class III.

EU Harmful (referred to 2,4,5-T-TCDD not classified)

IARC 2,4,5-T inadequate evidence for carcinogenicity to animals (IARC, 1986)
TCDD Group 2B (sufficient evidence for carcinogenicity to animals and inadequate evidence for carcinogenicity to humans) (IARC, 1987)

3.2.2 General

3.2.3 Acute Toxicity

Oral LD_{50} for rats, 500 mg/kg , dogs, 100 mg/kg (WHO, 1994)

Dermal LD_{50} for rats, >5000 mg/kg (Pesticide Manual, 1991)

3.2.4 Short-term Toxicity

2,4,5-T: Rats: a 90-day diet with added 2,4,5-T (containing less than 1 mg/kg TCDD) produced toxic symptoms (depression in body weight, decrease in food intake) at a concentration of 100/mg/kg bw daily. . Dogs: daily doses of 2,4,5-T of 20 mg/kg bw/day resulted in deaths 11-75 days after beginning of dosing (IARC, 1977).

TCDD:The short-term toxicity of the TCDD contaminant alone is widely variable among animal species (oral LD_{50}s range between 0.6 and 5000 µg/kg bw). Animals given a single dose or repeated oral doses of TCDD of 0.1 to 25 µg/kg bw demonstrated increased liver weights and lipid accumulation, thymic atrophy and histopathological changes in the liver and thymus.

Humans exposed to TCDD at levels of 6 ppm and possibly lower develop chloracne, a severe form of dermatitis. Porphyria cutanea tarda, a defect in hepatic metabolism of porphyrins, is also associated with TCDD exposure.

Teratogenicity

With a Maternally Effective Dose (MED) of 0,001 mg/kg/day, 2,3,7,8-TCDD has a very high potential for teratogenicity. With respect to reproductive effects, 2,4,5-T has been shown to be highly foetotoxic and teratogenic in all animal species tested. Effects were found at doses as low as 35 mg/kg (<0.05 ppm TCDD) in mice; 4.6 mg/kg (approximately 30 ppm TCDD) in rats; and 20 mg/kg (0.05 ppm TCDD) in hamsters. No-effect levels for foetotoxicity and teratogenicity have been observed at doses of 20 mg/kg (0.05 +/- 0.02 ppm TCDD) in mice and 25 to 150 mg/kg (0.05 +/- 0.02 ppm TCDD) in rats. Specific foetotoxic effects in test animals include reduced foetal size, skeletal deformities, injury to the kidneys and other internal organs, and death. Commercial samples of 2,4,5-T containing 0.1, 0.5, 2.9 or 45 mg/kg TCDD were foeticidal and teratogenic in Syrian Goldhamsters when administered orally on day 6-10 of pregnancy at levels of 20, 40, 80 or 100 mg/kg bw.

3.2.5 Chronic Toxicity

Carcinogenicity

TCDD: Studies indicate that TCDD is a very potential animal

carcinogen. 2,4,5-T containing less than 0.05 ppm TCDD and/or TCDD alone had oncogenic effects in two mouse strains and one rat strain. Another study of 2,4,5-T with a TCDD contamination level of 30 ppm showed significant oncogenic effects when administered subcutaneously but not when administered orally.
2,4,5-T: 2,4,5-T alone, without the TCDD contaminant (at detection limits from 0.12 to .033 ppb), has been found not be carcinogenic.

Mutagenicity — Results of mutagenicity tests on TCDD are inconclusive.

3.2.6 Epidemiological Data

Epidemiological studies suggest an increased incidence of tumorigenicity, especially soft-tissue sarcoma, due to 2,4,5-T exposure. A Swedish study reported seven cases of malignant tumours in 87 persons exposed over a 10-20 year period. A 1973 study reported an increased incidence of liver cancers among Vietnamese following the application as early as 1962 of "Agent Orange" (a mixture of 2,4,5-T and 2,4-D) in the Vietnam conflict. A 1979 US EPA study found a positive relationship between spontaneous abortions and 2,4,5-T use in the Alsea, Oregon region, but the study has been discontinued on methodological grounds by a number of authorities.
In general, human population studies on the long-term chronic effects of 2,4,5-T and/or the TCDD contaminant (including reports of spontaneous abortions and congenital malformations as a result of TCDD release over Seveso, Italy in 1976) have been inconclusive. In many cases, researchers have been unable to eliminate the possibility of effects stemming from concomitant exposure to other substances. Other problems have been the difficulty in verifying or measuring exposure, deficiencies in the available data on control populations, and the small size of the population actually studied.
A 1991 study on occupational exposure to TCDD by the US National Institute of Occupational Safety and Health has cast new doubt on TCDD's potential to cause chronic health effects at low doses. The substance may be harmful to humans only at an unspecified threshold amount that activates a receptor complex that is transported to and affects the cell nucleus. In view of these findings, the US EPA is currently reassessing the risk of dioxin to man.

3.3 Environmental Characteristics

3.3.1 Fate

2,4,5-T on the soil may be degraded chemically or biologically, volatilized, absorbed in the soil, or leached beyond the depth of plant roots. 2,4,5-T is moderately mobile in sandy and clay soils. Half-life on grass is 8-17 days, in soils 21-24 days. Normally, only small amounts enter water, where it does not persist as it is absorbed by clay or biota within a few days,. Esters of 2,4,5-T are

usually hydrolysed within a few days. There is no significant bioaccumulation.

TCDD is subject to UV decomposition on exposed grassland although not significantly photodecomposed on soil. It is immobile in sandy loams. Half-life of TCDD in an aquatic environment is 600 days.

3.3.2 Effects

In general, the long-term ecological impact of 2,4,5-T can be considered low, but increases with the level of TCDD impurity.
Phytotoxic to almost all broad-leaved crops, especially cotton, tomatoes, ornamentals, grapes and fruit trees.

Fish Eight-day dietary LC_{50} for bobwhite quail, 2776 mg/kg diet; LC_{50} for rainbow trout, 350, and for carp, 355 mg/l (96 hours). TCDD level not specified.

Birds Low toxicity to birds

Bees Honey bee LD_{50} 1.01 µg/bee in laboratory (48 hr, 65% relative humidity, 26.7°C)

3.4 Exposure

3.4.1 Food/drinking water

Market-basket surveys conducted in the USA during the 1970s indicate that very little 2,4,5-T gets into food. The 1979 JMPR Meeting felt "minimal" concern regarding food residues of 2,4,5-T.
Similarly, studies on the uptake of 2,4,5-T and TCDD by cattle feeding on treated pasture and rangeland, containing exaggerated levels of residue, showed no significant accumulation of residues in milk or tissue. Little evidence exists on presence in rice and fish from treated rice fields. Surface water used as drinking water is a possible source of human exposure

3.4.2 Occupational/Use

Applicators of 2,4,5-T products and other persons are potentially subject to both dermal and inhalation exposure to 2,4,5-T and its contaminants. Studies indicated that applicators using a backpack sprayer might be exposed to 6,8 mg/kg of 2,4,5-T and 0,0007Tug/kg/day of TCDD; tractor-mounted, low boom spraying might lead to an exposure of 1,8 mg/kg and 0,00018µg/kg/day.

3.4.3 Environment

A 1977 report by the US National Academy of Sciences stated that 2,4,5-T and TCDD have never been detected in drinking water at detection limits in parts per trillion. However, application of 2,4,5-T to rice fields may result in contamination of rivers and streams. Exposure to 2,4,5-T in the air may occur upon application as vapours or fine droplets on crops or in forests. Ambient air monitoring in agricultural areas around the USA found levels ranging from 0.06 to 14.6 $\mu g/m^3$. Exposure at the 0.06 $\mu g/m^3$ level would amount to inhalation of 0.025 µg/kg of bw per day for a 70 kg man.

3.4.4 Accidental Poisoning

A number of accidents during the manufacture of 2,4,5-T have been reported. Symptoms of affected workers included shortness of breath, skin eruptions, loss of sensation in the extremities, fatigue and vertigo.
Several cases of massive exposure to 2,4,5-T have produced mild to moderate episodes of nausea, headache, muscle cramps and fever.

Stomach cramps, vomiting, diarrhoea and blood in the stools may also occur. Chloracne has been reported in the case of a massive single exposure or repeated exposure at smaller doses over a prolonged period. It is generally accepted that most, if not all, occupational illnesses associated with exposure to 2,45-T are/were actually due to the TCDD that is present as a contaminant.
Victims of the accidental release of TCDD, with exposure levels presumably much higher than in the case of 2,4,5-T exposure, experienced burn-like lesions and other skin disorders, and chloracne.
TWA: 10 mg/m^3.

3.5 Measures to Reduce Exposures

In view of the fact that 2,4,5-T will be contaminated by often unknown levels of the highly toxic TCDD, all appropriate precautions should be taken to limit exposure. Advisable measures include the wearing of protective clothing suitable for prevailing climatic conditions, with particular care taken to avoid contact with the eyes or mouth. Exposure may be reduced if conditions allow the use of such protective clothing as one-piece long-sleeved jumpsuits, gloves and respirators. In view of possible reproductive effects, pregnant women should not enter treated areas.

3.6 Packaging and Labelling

Labels should include precautions and warnings related to applicator, handler and worker exposure, as well as hazards to pregnant women and aquatic organisms. Refer to the FAO Guidelines on Good Labelling Practice for Pesticides (1995).

3.7 Waste Disposal Methods (WHO/IPCS, 1990)

No specific disposal methods are available. Detailed guidelines are under development. In disposing of 2,4,5-T, care should be taken to avoid contamination of soil and natural waters. Do not deposit in landfills. Absorb spilled liquid products using earth or sand. Empty any product remaining in damaged or leaking containers into a clean empty container, which should be suitably labelled.

3.8 Maximum Residue Limits (mg/kg)

Codex/JMPR ADI: Withdrawn at the 27th session of the CCPR (ALINORM 95/24A).
Codex MRLs: Withdrawn at the 27th session of the CCPR (ALINORM 95/24A).

4 Major References

CIRAD (1990). Agricultural Requisites Scheme for Asia and the Pacific and International Co-operation Centre of Agricultural Research for Development. The ARSAP/CIRAD regional agro-pesticide index Asia

Federal Register/Environmental Protection Agency (1978). (Pesticide Programs, Rebuttable Presumption Against Registration and Continued Registration of Pesticide Products Containing 2,4,5-T. Washington, DC (April 21, 1978)

Federal Register/Environmental Protection Agency (1979). 2-4-5-Trichlorophenoxyacetic acid: Decision and Emergency Order Suspending Registration for Certain Uses. Washington, DC (28 Feb. 1979)

Federal Register/Environmental Protection Agency (1979). 2-4-5-Trichlorophenoxyacetic acid: Position document

1. Washington, DC (March 15, 1979)

Federal Register/Environmental Protection Agency (1979). 2-4-5-Trichlorophenoxyacetic acid: Position document 2/3. Washington, DC (July 9, 1979)

Federal Register/Environmental Protection Agency (1979). 2-4-5-Trichlorophenoxyacetic acid: Position document 4. Washington, DC

FAO (1980). Pesticide Residues in Food 1979 - Evaluations. FAO/WHO Joint Meeting on Pesticide Residues (JMPR), Food and Agriculture Organization, Rome. Pl. Prod. & Prot. Paper No. 20 Suppl.

FAO (1982). Pesticide Residues in Food 1981 - Evaluations. FAO/WHO Joint Meeting on Pesticide Residues (JMPR). Food and Agriculture Organization, Rome. Pl. Prod. & Prot. Paper No. 42

FAO (1995). Revised Guidelines for good labelling practices for pesticides. Food and Agriculture Organization, Rome

Farm Chemicals Handbook '90 (1990). Meister Publishing, Willoughby, Ohio, USA

IARC (1977). Monographs on the evaluation of the carcinogenic risk of chemicals to man, Vol. 15 pp 273-300. IARC, Lyons, France.

Royal Society of Chemistry (1991). The Agrochemicals Handbook (3rd ed.). Cambridge, United Kingdom

US National Institute of Occupational Safety and Health. TCDD, Current Intelligence Bulletin 40 (January 23, 1984)

US Department of Interior. Manual of acute toxicity: interpretations and data base for 410 chemicals and 66 species of freshwater animals. Washington DC, USA

WHO (1996). The World Health Organization Recommended Classification of Pesticides by Hazard and Guidelines to Classification 1996-1997. World Health Organization, Geneva, WHO/PCS/96.3.

WHO (1975). Data Sheets on Pesticides No. 13, 2,4,5-T. World Health Organization, Geneva.

Worthing, C.R. and R.J. Hance (Eds.) (1994). The Pesticide Manual: A World Compendium. (10th ed.). British Crop Protection Council, Surrey, United Kingdom

ANNEX 1

Summary of Control Actions and Remaining Uses as Reported by Countries
Actions taken and year effective

Bans

Austria

Control Action	All uses banned
Effective	1992
Uses still allowed	No remaining uses are allowed
Reasons for control action	Highly toxic impurities (tetrachlorodibenzodioxine - TCDD, which is a potential human carcinogen) in commercial products. The pesticide has a potential for contamination of water and therefore constitutes a high risk to human health

Belize

Control Action	The substance is banned for use
Effective	1988
Uses still allowed	No remaining uses are allowed
Reasons for control action	Oncogenicity due to dioxin contamination. Environmental pollution

China

Control Action	Banned for registration, production, sale and use as a pesticide
Effective	1994
Uses still allowed	No remaining uses are allowed
Reasons for control action	2,4,5-T is highly persistent. Its use as a pesticide will cause severely harmful effects to human health

Cuba

Control Action	The substance is banned for import, production and use by Res. 268 of the Minister of Public Health of 12.28.90
Effective	1990
Uses still allowed	No remaining uses allowed
Reasons for control action	Includes impurities (dioxins) with pronounced foetotoxic, teratogenic and mutagenic effects

Cyprus

Control Action	Banned for all use as a pesticide. Registration has been withdrawn
Effective	1979
Uses still allowed	No remaining uses allowed
Reasons for control action	Due to its contaminant dioxin and the possible toxic effects of this substance

Hungary	
Control Action	Banned in agricultural use
Effective	1971
Uses still allowed	No remaining uses are allowed
Reasons for control action	Dioxin content, carcinogen

India	
Control Action	2,4,5-T is banned for use as a pesticide. Deregistered. (Use of 2,4,5-T amine in rice was withdrawn prior to enforcement of legislation.)
Effective	1984
Uses still allowed	No remaining uses allowed
Reasons for control action	Decision based on reports by US scientists of oncogenic, mutagenic and foetotoxic effects due to dioxin impurities in the formulation

Netherlands	
Control Action	It is prohibited to sell, stock, store or use all pesticides containing 2,4,5-T as active ingredient
Effective	1978
Uses still allowed	No remaining uses are allowed
Reasons for control action	Pesticides containing 2,4,5-T are prohibited because of the presence of 2,3,7,8-TCDD in 2,4,5-T. 2,3,7,8-TCDD is (a.) very persistent in the environment, (b) a substance with high bioaccumulation potential, (c) an extremely toxic chemical

Norway	
Control Action	Banned.
Effective	1973
Uses still allowed	No remaining uses are allowed
Reasons for control action	Toxicological reasons

Sweden	
Control Action	2,4,5-T and derivatives are banned
Effective	1977
Uses still allowed	No remaining uses are allowed
Reasons for control action	Because of toxic impurities in commercial products

Switzerland	
Control Action	Totally banned chemical: manufacture, supply, import and use of the substance and of products which contain the substance are prohibited (applies to 2,4,5-trichlorophenoxyacetyl compounds)
Effective	1987
Uses still allowed	No remaining uses are allowed
Reasons for control action	Long persistence, highly toxic impurities, formation of highly toxic substances on thermolysis

Thailand	
Control Action	Banned: all agricultural uses.
Effective	1983
Uses still allowed	No remaining uses are allowed
Reasons for control action	Foetotoxic, teratogenic and carcinogenic effects

United States	
Control Action	The sale, distribution, shipment and use of existing stocks of products containing the chemical and its salts are banned in United States. Currently, the product is being consolidated and stored until disposal is carried out.
Effective	1985
Uses still allowed	No remaining uses are allowed
Reasons for control action	The dioxin contaminant in 2,4,5-T, TCDD has been found to be carcinogenic, and to cause foetal abnormalities in laboratory mice. Additionally, 2,4,5-T may pose an unacceptable risk of reproductive effects to pesticide applicators.

Severely Restricted

Malaysia	
Control Action	Product not registered. Last product registration expired on 1 June 1991. This means products containing 2,4,5-T cannot be imported, manufactured or sold locally
Effective	
Uses still allowed	Small quantities may be imported through import permit for research and educational purposes such as for use as analytical standards and other laboratory purposes.
Reasons for control action	i) Carcinogenic. ii) Mutagenic. iii) Teratogenic

ANNEX 2

Alternatives

The following alternatives were noted by countries reporting import decisions under the PIC procedure:

Country	
Cuba	2,4-D-salts and esters
Thailand	2,4-D
United States	Rangeland: DMA salt of dicamba; Rice: Propanil, molinate, 2,4-D, MCPA, bifenox, bentazon, oxadiazon, bromoxynil, Non-crop areas: 2,4-D, picloram, amitrole, glyphosate, hexazinone

It is essential that before a country considers substituting any of these reported alternatives, it ensures that the use is relevant to its national needs. A first step may be to contact the DNA in the country where the alternative has been reported (see address: Annex 3). It will then be necessary to determine the compatibility with national crop protection practices.

ANNEX 3

List of Pesticide DNAs in Countries Reporting Control Actions or Alternatives

Austria	CP	Ministry of the Environment Department II/3 Stubenbastei 5 A - 1010 Vienna	Tel: (0043-1-51522 2701 Fax: (0043-1-51522 7744
Belize	P	The Secretary Pesticides Control Board Department of Agriculture Central Farm Cayo	Tel: 501-92-2640 Fax: 501-92-2640 Tlx: 102 Foreign Bz
	C	Mr. Carlos Guerra Sanitation Engineer Ministry of Public Health Public Health Bureau Belize City	
China	P	The Director Institute for the Control of Agrochemicals (ICAMA) Ministry of Agriculture Liang Ma Qiao, Chaoyang Beijing 100026	Tel/Fax: 86 010 5025929
	CP	National Environmental Protection Agency (NEPA) No. 115, Xizhimennei Nanxiaojie Beijing 100035 (Attn.: Mrs Sun Lijin)	Tel: 8329911, Ext. 3555/3609 Tlx: 222359 NEPA CN Fax: 8328013
Cyprus	P	The Chairman Pest Control Products Bd. Department of Agriculture,, Ministry of Agriculture & Natural Resources Nicosia	Tel: 30-2250/30-2254 Tlx: 4660 Minagri CY Cab: MINAGRI CYPRUS Fax: 361425 Nicosia
	C	Director Environment Service Ministry of Agriculture, Natural Resources & Environment Nicosia	Tel: 30-2883 Tlx: 4660 Minagri CY Cab: MINAGRI CYPRUS Fax: 363945 Nicosia
Hungary	P	The Director Plant Health and Soil Cons. Dept. Ministry of Agriculture & Food Kossuth L.tér 11 1055 Budapest	Tel: 36 (1) 1533000 Tlx: 22-5445 Fax: 36 (1) 1530518
India	P	The Director/Deputy Secretary Plant Protection Division Dept. of Agriculture & Co-op. Room No. 244-A Krishi Bhavan, New Delhi	

India	C	Adviser (Chemicals) Dept. of Chemicals & Petrochemicals Ministry of Chemicals & Fertilizers Shastri Bhavan Rajendra Prasaid Road New Delhi - 110 001	Tel: 91 (11) 385736/382575 Tlx: 62455 Fax: 91 (11) 382604/337223
Malaysia	P	The Secretary Pesticides Board Department of Agriculture Jalan Gallagher 50480 Kuala Lumpur	Tel: (603) 2983077 Fax: (603) 2983646
	C	The Director-General Department of Environment Ministry of Science, Technology & Environment 12th & 13th Floor Wisma Sime Darby Jalan Raja Laut 50662 Kuala Lumpur	Tel: (603) 2938955 Fax: (603) 2931480 Tlx: 28154 MOSTEC MA Cable: SEKITAR
Netherlands	CP	The Director Chemicals Division Ministry of Housing, Physical Planning and Environment Directorate for Chemicals, External Safety and Radiation Protection P.O. Box 30945 2500 GX The Hague (Attn: Dr. K.A. Gijsbertsen)	Tel: 31 70 - 3393939 Fax: 31 70 - 3391297
Norway	P	The National Agricultural Inspection Service Pesticides Division P.O. Box 3 1430 Aas	
	C	Norwegian Pollution Control Authority Section for Chemicals Hazardous to Health P.O. Box 8100 Dep. N-0032 Oslo (Attn: Mrs Bjorg Fjeld)	Tel: 0047 22 573400 Fax: 004722 676706
Sweden	CP	National Chemicals Directorate Attn.: Mr. Ule Johansson P.O. Box 1384 171 27 Solna	Tel: 46 (8) 730 6004 Tlx: 10460 AMS S Fax: 46 (8) 735 7698
Switzerland	CP	Service des affaires internationales Office fédéral de l'environnement, des forêts et du paysage (OFEFP) Hallwylstr. 4, 3003 Berne	Tel: 41 31 322 99 73 Fax: 41 31 322 99 81 Tlx: 91 23 04
Thailand	P	The Director General Dept. of Agriculture Ministry of Agriculture and Cooperatives Rajadamnern Ave. Bangkok 10200	Tel: 66 (2) 281-9313
	CP	The Director-General Pollution Control Department 539/2 Gypsym Bldg., Fl. 16, 17 Si Ayutthaya Road, Phayathai Ratchathewi Bangkok 10400	Tel: 66 (2) 579-0586/579-6936 Tlx: 20838 MINISTEN TH Cab: NALENBO BANGKOK

USA	CP	The Assistant Administrator for Pesticides and Toxic Substances Environmental Protection Agency 401 M St. S.W. Washington DC 20460	Tel: 1 202 260 2902 Fax: 1 202 260 1847 Tlx: 892758 EPA WSH

	C	Industrial and consumer product chemicals	
	P	Pesticides	
	CP	Pesticides, industrial and consumer product chemicals	