



UNEP



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**Rotterdam Convention on the Prior Informed  
Consent Procedure for Certain Hazardous  
Chemicals and Pesticides in International Trade  
Chemical Review Committee**

Fifth meeting

Rome, 23–27 March 2009

Item 4 (b) (vi) of the provisional agenda\*

**Listing of chemicals in Annex III to the Rotterdam Convention:**

**Review of notifications of final regulatory actions to ban or severely restrict a chemical: phorate**

## **Phorate**

### **Note by the Secretariat**

1. Under Article 5 of the Rotterdam Convention, when the Secretariat has received at least one notification from each of two prior informed consent (PIC) regions containing the information required in Annex I to the Convention, it shall forward the notifications and accompanying documentation to the members of the Chemical Review Committee. The Committee shall review the documentation provided in such notifications and, in accordance with the criteria set out in Annex II to the Convention, recommend to the Conference of the Parties whether the chemical in question should be included in Annex III to the Convention and whether a decision guidance document should be drafted.
2. The Secretariat has received two notifications relating to the use of phorate as a pesticide that meet the information requirements of Annex I from two PIC regions (North America (Canada) and Asia (Thailand)). Summaries of those notifications were included in PIC Circular XXVIII of December 2008 and PIC Circular XVI of December 2002, respectively. The notifications, as received from the notifying countries, are set out in the annex to the present note.
3. The supporting documentation provided by Canada and Thailand is set out in documents UNEP/FAO/RC/CRC.5/9Add.1 and Add.2, respectively.
4. A list of other notifications previously considered by the Chemical Review Committee is set out in document UNEP/FAO/RC/CRC.5/INF/4.

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\* UNEP/FAO/RC/CRC.5/1.

**Annex**

**Notification of final regulatory action on phorate by Canada**

**Notification of final regulatory action on phorate by Thailand**

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**FORM  
FOR NOTIFICATION OF FINAL REGULATORY ACTION  
TO BAN OR SEVERELY RESTRICT A CHEMICAL**

**IMPORTANT: See instructions before filling in the form**

COUNTRY: CANADA

**PART I: PROPERTIES, IDENTIFICATION AND USES**

<b>1. IDENTITY OF CHEMICAL</b>		
<b>1.1</b>	<b>Common name</b>	Phorate
<b>1.2</b>	<b>Chemical name according to an internationally recognized nomenclature (e.g. IUPAC), where such nomenclature exists</b>	IUPAC: O,O-DIETHYL S-ETHYLTHIOMETHYL PHOSPHORODITHIOATE CAS: O,O-DIETHYL S-[(ETHYLTHIO)METHYL] PHOSPHORODITHIOATE
<b>1.3</b>	<b>Trade names and names of preparations</b>	Thimet 15G Soil & Systemic Insecticide Granular
<b>1.4</b>	<b>Code numbers</b>	
<b>1.4.1</b>	<b>CAS number</b>	298-02-2
<b>1.4.2</b>	<b>Harmonized System customs code</b>	
<b>1.4.3</b>	<b>Other numbers (specify the numbering system)</b>	EEC No. 206-052-2, Caswell Number 660, CCOHS Record Number 502, RCRA Waste Number P094, RTECS Number TD9450000

<b>1.5 Indication regarding previous notification on this chemical, if any</b>	
<b>1.5.1</b>	<input checked="" type="checkbox"/> This is a first time notification of final regulatory action on this chemical.
<b>1.5.2</b>	<input type="checkbox"/> This is a modification of a previous notification of final regulatory action on this chemical. The sections modified are: _____
	<input type="checkbox"/> This notification replaces all previously submitted notifications on this chemical.
Date of issue of the previous notification: _____	

**PLEASE RETURN THE COMPLETED FORM TO:**

Secretariat for the Rotterdam Convention  
Plant Protection Service  
Plant Production and Protection Division, FAO  
Viale delle Terme di Caracalla  
00100 Rome, Italy

OR

Secretariat for the Rotterdam Convention  
UNEP Chemicals

11-13, Chemin des Anémones  
CH - 1219 Châtelaine, Geneva, Switzerland

Tel: (+39 06) 5705 3441  
Fax: (+39 06) 5705 6347  
E-mail: pic@fao.org

Tel: (+41 22) 917 8183  
Fax: (+41 22) 797 3460  
E-mail: pic@unep.ch

<b>1.6 Information on hazard classification where the chemical is subject to classification requirements</b>	
<b>International classification systems</b>	<b>Hazard class</b>
UN/NA Number 2783	
WHO toxicity class (active ingredient)	1a
EPA (formulation)	1
EC risk	T+ (R27/28)
<b>Other classification systems</b>	<b>Hazard class</b>
Development codes EI 3911	
AC 3911 (Cyanamid)	
Official Codes ENT 24 042	
Source: The Pesticide Manual, Eleventh Edition, 1997.	

<b>1.7 Use or uses of the chemical</b>	
<b>1.7.1</b>	<input checked="" type="checkbox"/> <b>Pesticide</b>
	<b>Describe the uses of the chemical as a pesticide in your country:</b>
	Phorate is a systemic insecticide, which at the time of the regulatory action, was registered in Canada for use on potatoes, beans, corn, lettuce, and rutabagas.
	Source: - Proposed Acceptability for Continuing Registration (PACR 2003-01), Pest Management Regulatory Agency (PMRA) Re-evaluation of phorate, January 24, 2003.
<b>1.7.2</b>	<input type="checkbox"/> <b>Industrial</b>
	<b>Describe the industrial uses of the chemical in your country:</b>

<b>1.8 Properties</b>	
<b>1.8.1</b>	<b>Description of physico-chemical properties of the chemical</b>
Molecular Weight:	260.4
Molecular Formula	$C_7H_{17}O_2PS_3$
Melting Point:	< -15°C
Boiling Point:	118-120°C /0.8mmHg
Specific Gravity/Density:	1.167 at 25°C
Water Solubility:	50 mg/L (25°C )
Solubility in Other Liquids:	Miscible with alcohols, ketones, ethers, esters, aromatic, aliphatic and chlorinated hydrocarbons, dioxane, vegetable oils, and other organic solvents.
Vapour Pressure	85 mPa (25°C)
Kow log P	3.92
Source:	- The Pesticide Manual, Eleventh Edition, 1997.

**1.8.2 Description of toxicological properties of the chemical**

In laboratory animals, phorate was found to be extremely acutely toxic following acute oral, dermal and inhalation exposures. Following both single and repeated dosing, the most sensitive indicator of toxicity was the inhibition of acetylcholinesterase, an enzyme necessary for the proper functioning of the nervous system or clinical signs of cholinergic toxicity. Female animals were more sensitive to the toxic effects of phorate. Phosphorylated phorate metabolites (phorate sulfoxide and phorate sulfoxone) are of comparable toxicity to phorate. Phorate did not cause any apparent delayed neurotoxicity and there was no evidence of histopathological effects on the central nervous system in any of the available studies. Phorate was not found to be genotoxic nor was it carcinogenic to either rats or mice. Phorate did not cause fetal malformations in either rats or rabbits, nor did it cause reproductive toxicity in rats other than reduced viability of the young at doses that were maternally toxic. The developmental and reproductive toxicity studies did not demonstrate any sensitivity of young animals relative to adult animals although lack of cholinesterase measurements in these studies precluded a definitive assessment of this issue. On the basis of the available toxicity studies, phorate is anticipated to have a high dermal absorption potential. One of the most remarkable features of phorate was the steepness and potency of the dose-response with acute and short-term dosing. No observed adverse effect levels (NOAELs) were very close to dose levels that elicited mortality in the test animals.

Two key factors are considered when assessing health risks: the dose levels where no health effects occur and the dose levels to which people may be exposed. The dose levels used to assess risks are established to protect the most sensitive human population (e.g. children and nursing mothers). Only those uses where exposure is well below levels that cause no effects in animal testing are considered acceptable for continued registration.

Acute oral LD<sub>50</sub> for male and female rats 3.7 and 1.6 mg/kg, respectively.

Acute oral LD<sub>50</sub> for mice C. 6 mg/kg.

Skin and eye acute percutaneous LD<sub>50</sub> for male rats 6.2, female rats 2.5 guinea Pigs 20-30, male rabbits 5.6, female rabbits 2.9, Guinea pigs 30.0 mg/kg.

Inhalation LC<sub>50</sub> (1 h) for male rats 0.06 mg ai/L air; for females 0.011 mg/L air.

Acute Reference Dose: 0.00025 mg/kg bw

ADI : 0.00025 mg/kg bw/d

**Source:**

- Proposed Acceptability for Continuing Registration (PACR 2003-01), Pest Management Regulatory Agency (PMRA) Re-evaluation of phorate, January 24, 2003.

- The Pesticide Manual, Eleventh Edition, 1997.

**1.8.3 Description of ecotoxicological properties of the chemical**

The PMRA currently conducts a deterministic assessment of the environmental risk of pest control products. Environmental risk is characterized using the quotient method, which uses the ratio of the estimated environmental concentrations to the effects end point of concern. Quotient values less than one are considered indicative of a low hazard to non-target organisms, whereas values greater than one are considered to indicate that some degree of hazard exists for effects on non-target organisms.

Phorate is soluble in water at 50 mg/L and highly volatile with a vapour pressure of 85 mPa at 25°C. The *n*-octanol–water partition coefficient ( $\log K_{ow}$ ) is 3.92, which indicates potential for bioaccumulation. The Henry's law constant is  $4.368 \times 10^{-6}$ , which indicates there is potential to volatilize from water or moist soil.

Phorate in soil is transformed by chemical and microbial action. It is moderately persistent in soil (time required for 50% dissipation ( $DT_{50}$ ) = 49–75 d) under field conditions, as seen in field studies in British Columbia. The major transformation products phorate sulfoxide and phorate sulfone, that are formed as a result of microbial action, are moderately persistent ( $DT_{50}$  = 65–137 d) in soil under laboratory conditions. These transformation products retain the phosphorylated structure and are expected to exhibit cholinesterase inhibition and therefore be as toxic as the parent compound phorate.

Phorate is strongly sorbed to soil and is classified as having slight ( $K_{oc}$  = 2000–3000) to moderate mobility ( $K_{oc}$  = 224–450) in a range of soil types. Phorate sulfoxide and phorate sulfone partition preferentially into water and are both classified as having moderate ( $K_{oc}$  = 172–210) to high mobility ( $K_{oc}$  = 71–91) in a range of soil types. Phorate and its major transformation products can enter aquatic systems through run-off, however, the latter are more mobile than the parent compound.

Although there may be contamination of surface water through run-off, phorate is not persistent in water owing to rapid hydrolysis. In sterile water at pH 5, 7 and 9, the half-lives are 2.6, 3.2 and 3.9 d, respectively. Photolysis is also an important route of transformation (dark control adjusted half-life of 1.9 d in pH 7 buffer solutions after 7 d of continuous irradiation). Formaldehyde, phorate sulfoxide and phorate sulfone are major transformation products formed during hydrolysis and aqueous photolysis. Aerobic aquatic biotransformation studies with nonsterile pond water showed that the parent compound and transformation products did not persist in the water (phorate  $DT_{50}$  of 0.5 d, phorate sulfoxide  $DT_{50}$  of 9 d, phorate sulfone  $DT_{50}$  of 21 d and formaldehyde reached 17% of applied by 14 d after treatment).

Studies have shown that phorate is very highly toxic to birds on an acute oral basis (mallard duck mean lethal dose ( $LD_{50}$ ) = 0.62 mg a.i./kg), and is highly toxic to birds on a dietary basis (mallard duck  $LD_{50}$  = 248 mg a.i./kg). Phorate is very highly toxic to small mammals on an acute oral basis (rat  $LD_{50}$  = 1.1–3.7 mg a.i./kg), and on a dietary basis (rat  $LD_{50}$  = 28 mg a.i./kg). Phorate is very highly toxic on an acute basis to fish (rainbow trout mean lethal concentration ( $LC_{50}$ ) = 13  $\mu$ g a.i./L) and to aquatic invertebrates (*Gammarus fasciatus*  $LC_{50}$  = 4  $\mu$ g a.i./L). Phorate is moderately to highly toxic to bees on an acute contact basis (0.32–10.1  $\mu$ g a.i./bee).

Risk quotients and margins of safety calculated for applications of Thimet 15-G indicate risks for all groups of organisms (birds, mammals, fish and aquatic invertebrates) for all application scenarios. Based on the available toxicity data, risk is classified as high to extremely high risk for freshwater aquatic organisms and high to extremely high risk for birds. Similarly, risk to mammals is classified as high risk for large mammals to extremely high risk to small mammals.

The identified risks to birds and fish are supported by reported incidents arising from labelled use of the products.

**Source:**

- Proposed Acceptability for Continuing Registration (PACR 2003-01), Pest Management Regulatory Agency (PMRA) Re-evaluation of phorate, January 24, 2003.

**PART II: FINAL REGULATORY ACTION**

<b>2. FINAL REGULATORY ACTION</b>	
<b>2.1</b>	The chemical is: <input type="checkbox"/> banned OR <input checked="" type="checkbox"/> severely restricted
<b>2.2</b>	<b>Information specific to the final regulatory action</b>
<b>2.2.1</b>	<p><b>Summary of the final regulatory action</b></p> <p>The use of phorate and associated end-use products (EP) entails an unacceptable risk of harm to the environment pursuant to Section 20 of the Canadian Pest Control Product (PCP) Regulations. As a result, the Pest Management Regulatory Agency (PMRA) has determined that all uses for phorate are to be phased out as outlined below.</p> <p>Uses of phorate and associated end-use products on corn, lettuce, beans and rutabagas were phased-out as end of December 2004.</p> <p>Due to the lack of alternatives to phorate for control of wireworm on potatoes, the registration of phorate, for this use only, will be continued for the short term, with interim mitigation to protect workers (engineering controls, requirements regarding additional Personal Protective Equipment (PPE)) and the environment (environmental statements on the label). Please refer to the RRD 2004-11, Appendix II for proposed engineering controls, PPE and other proposed label statements.</p>
<b>2.2.2</b>	<p><b>Reference to the regulatory document</b></p> <ul style="list-style-type: none"> <li>- Proposed Acceptability for Continuing Registration (PACR 2003-01), Pest Management Regulatory Agency (PMRA) Re-evaluation of Phorate, January 24, 2003.</li> <li>- Re-evaluation Decision Document (RRD 2004-11), Phorate, 13 May 2004.</li> <li>- Re-Evaluation Note, REV2007-07, Update on the Use of Phorate on Potatoes, 5 June 2007.</li> <li>- PMRA Web Site, Re-evaluation Summary Table (<a href="http://www.pmra-arla.gc.ca/">http://www.pmra-arla.gc.ca/</a>).</li> </ul>
<b>2.2.3</b>	<p><b>Date of entry into force of the final regulatory action</b></p> <p>No further use was allowed after December 2004, except on potatoes.</p>



2.3	<b>Was the final regulatory action based on a risk or hazard evaluation?</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>If yes, give information on such evaluation</b>  The PMRA has concluded that the use of phorate and its associated end-use products entails an unacceptable risk of harm to the environment pursuant to Section 20 of the Pest Control Product (PCP) Regulations.		
<b>Reference to the relevant documentation</b>  - Proposed Acceptability for Continuing Registration (PACR 2003-01), Pest Management Regulatory Agency (PMRA) Re-evaluation of Phorate, January 24, 2003.  - Re-evaluation Decision Document (RRD 2004-11), Phorate, 13 May 2004.  - Re-Evaluation Note, REV2007-07, Update on the Use of Phorate on Potatoes, 5 June 2007.  - PMRA Web Site, Re-evaluation Summary Table ( <a href="http://www.pmra-arla.gc.ca/">http://www.pmra-arla.gc.ca/</a> ).		

2.4	<b>Reasons for the final regulatory action</b>	
2.4.1	<b>Is the reason for the final regulatory action relevant to the human health?</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>If yes, give summary of the known hazards and risks presented by the chemical to human health, including the health of consumers and workers</b>  		
<b>Reference to the relevant documentation</b>  		
<b>Expected effect of the final regulatory action</b>  		

2.4.2	<b>Is the reason for the final regulatory action relevant to the environment?</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>If yes, give summary of the known hazards and risks to the environment</b>		
<p>The PMRA currently conducts a deterministic assessment of the environmental risk of pest control products. Environmental risk is characterized using the quotient method, which uses the ratio of the estimated environmental concentrations to the effects end point of concern. Quotient values less than one are considered indicative of a low hazard to non-target organisms, whereas values greater than one are considered to indicate that some degree of hazard exists for effects on non-target organisms.</p>		
<p>Phorate is highly toxic to all terrestrial and aquatic species tested. Incident reports of bird and mammal fatalities in Canada, the U.S. and the U.K. support the conclusion that phorate presents a significant risk to birds and wildlife. One granule is sufficient to kill a small bird or mammal.</p>		
<p>Surface broadcast application presents the greatest risk owing to the large number of exposed granules. Although soil incorporation is expected to lower the risk of terrestrial and aquatic exposure, it still presents a very high risk owing to unincorporated granules remaining exposed on the surface. The risk to small and moderate sized birds and small or moderately sized mammals remains high to very high with either method of application. Owing to its extreme toxicity to all organisms tested, the very high risk to moderate and smaller sized birds and mammals, the incident reports of bird and mammal mortalities (including large raptors in Canada), plus the persistence and mobility of the toxic sulfoxide and sulfone transformation products, the PMRA has concluded that the use of phorate in Canada presents a high risk to the environment.</p>		
<b>Reference to the relevant documentation</b>		
<p>- Proposed Acceptability for Continuing Registration (PACR 2003-01), Pest Management Regulatory Agency (PMRA) Re-evaluation of Phorate, January 24, 2003.</p>		
<b>Expected effect of the final regulatory action</b>		
<p>- Reducing the risk of environmental exposure to phorate in a manner that is the least disruptive to the need to protect agricultural crops from pests.</p>		

<b>2.5 Category or categories where the final regulatory action has been taken</b>		
2.5.1	<b>Final regulatory action has been taken for the chemical category</b>	<input type="checkbox"/> Industrial
<b>Use or uses prohibited by the final regulatory action</b>		
<b>Use or uses that remain allowed</b>		
2.5.2	<b>Final regulatory action has been taken for the chemical category</b>	<input checked="" type="checkbox"/> Pesticide
<b>Formulation(s) and use or uses prohibited by the final regulatory action</b>		
<p>All formulation of phorate and all uses were phased-out as 2004, with the exception of use on potatoes.</p>		
<b>Formulation(s) and use or uses that remain allowed</b>		

	Registration of Thimet 15G Soil & Systemic Insecticide Granular on potatoes continues for the short term.
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2.5.3 Estimated quantity of the chemical produced, imported, exported and used, where available.		
	Quantity per year (MT)	Year
Produced		
Imported		
Exported		
Used		

<b>2.6 Indication, to the extent possible, of the likely relevance of the final regulatory action to other states and regions</b>	
	Phorate can cause harm to the environment. Preventing use of this chemical protects the environment and non-target organisms from the risk of exposure in other regions.

<b>2.7 Other relevant information that may cover:</b>
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<b>2.7.1 Assessment of socio-economic effects of the final regulatory action</b>	<ul style="list-style-type: none"><li>- Significant challenge for PMRA is a regulatory decision that moves towards the goal of eliminating phorate in a manner that is the least disruptive to the need to protect agricultural crops from pests. To meet its challenge, the PMRA has considered the availability of alternatives and the need for a transition period for those uses for which no or limited alternatives are available.</li><li>- Significant challenge for industry is to develop alternatives in the relatively short time frame of proposed phase-outs.</li><li>- Significant challenge for the agricultural sector is to reduce use during the transition period and be open to using alternatives.</li></ul>
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<b>2.7.2 Information on alternatives and their relative risks</b>	<p>Phorate was registered on rutabaga for the control of cabbage maggot (CM). Other organophosphate insecticides, azinphos-methyl, chlorpyrifos, diazinon and terbufos, were also registered as a prophylactic treatment at planting to control CM.</p> <p>Phorate was registered for corn rootworm control. Alternative soil insecticides that were registered for control of this insect include carbaryl, chlorpyrifos, diazinon, terbufos and tefluthrin.</p>
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<b>2.7.3 Relevant additional information</b>	
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UNEP/FAO/PIC/FORM/1/E/5-04

**PART III : GOVERNMENT AUTHORITIES**

<b>Ministry/Department and authority responsible for issuing/enforcing the final regulatory action</b>	
<b>Institution</b>	Pest Management Regulatory Agency, Health Canada
<b>Address</b>	2720 Riverside Drive Ottawa, Ontario K1A 0K9 Canada
<b>Telephone</b>	+ 1 613 736-3660
<b>Telefax</b>	+ 1 613 736-3659
<b>E-mail address</b>	Trish_MacQuarie@hc-sc.gc.ca
<b>Designated National Authority</b>	
<b>Institution</b>	Pest Management Regulatory Agency, Health Canada
<b>Address</b>	2720 Riverside Drive Ottawa, Ontario K1A 0K9 Canada
<b>Name of person in charge</b>	Trish MacQuarrie
<b>Position of person in charge</b>	Director General, Policy, Communications and Regulatory Affairs Directorate
<b>Telephone</b>	+ 1 613 736-3660
<b>Telefax</b>	+ 1 613 736-3659
<b>E-mail address</b>	Trish_MacQuarie@hc-sc.gc.ca

Date, signature of DNA and official seal:



Sept 3, 2008



No. AC 0912/1434

Department of Agriculture,  
Chatuchak, Bangkok 10900  
Thailand  
Tel:66-2-5793577 Fax:5614695

13 March B.E. 2544 (2001)

Dear Sir,

We refer to Article 5 of the Rotterdam Convention regarding procedures for banned or severely restricted chemicals. At present, Thailand has adopted final regulatory actions to ban 62 pesticides, lists of which are attached herewith. Among them 32 pesticides (Set 1) had been notified under the Amended London Guidelines during voluntary implementation of PIC procedure. The pesticides in sets 2 and 3 are now notifying but not include chlordane and monocrotophos which have been listed in Annex III of the convention. We wish to submit the forms of notification to you for your information.

With kind regards.

Yours sincerely,

(Dr. Ananta Dalodom)

Director-General

Interim Secretariat for the Rotterdam Convention,  
Plant Production and Protection Division, FAO,  
Viale delle Terme di Caracalla,  
00100 Rome, ITALY

**List of banned pesticides (Type 4 Hazardous Substances)**

**Set 1 Pesticides banned during 1977 - 1994 according to Notification of Ministry of**

*Industry entitled List of Hazardous Substances B.E. 2538 (1995) dated 1 May 1995*

No.	Common name	Use category	Month/Year banned	Reason
1	chlordimeform	insecticide	April 1997	Possible carcinogen
2	leptophos	insecticide	April 1997	Manufacturer voluntarily withdrew product from the market because it had tendency to have carcinogenic effect
3	BHC	insecticide	March 1980	Very long residual effect and possible carcinogen
4	sodium arsenite	insecticide	January 1981	Long residue in soil, can cause fetotoxic effect
5	endrin	insecticide	July 1981	Long residual effect, high risk to user and consumer, export seeds often rejected because residue exceed accepted limit, harmful to non-target organism, highly toxic to fish
6	DDT	insecticide	March 1983	Has tendency to have carcinogenic effect, Long residual effect
7	toxaphene	insecticide	March 1983	Has tendency to have carcinogenic effect, Long residual effect
8	2,4,5-T	Herbicide	September 1983	Has tendency to have carcinogenic effect, Long residual effect, has fetotoxic effect
9	TEPP	insecticide	June 1984	Very high acute toxicity, extremely risk to user
10	EDB	fumigant	July 1986	Possible carcinogen, has fetotoxic effect
11	sodium chlorate	Herbicide	October 1986	Strong oxidant, highly inflammable, high risk to store, explosive
12	dinoseb	Herbicide	November 1986	Possible teratogenic and carcinogenic to mammals
13	captafol	fungicide	April 1987	Possible carcinogen
14	fluoroacetamide	rodenticide	July 1987	Very high acute toxicity, extremely risk to user
15	sodium fluoroacetate	rodenticide	July 1987	Very high acute toxicity, extremely risk to user

No.	Common name	Use category	Month/Year banned	Reason
16	cyhexatin	acaricide	May 1988	High risk to the environment because it contains a heavy metal (tin).
17	parathion methyl	insecticide	May 1988	Very high acute toxicity to humans especially dermal toxicity
18	dieldrin	insecticide	May 1988	Long residual effect, accumulate in human and animals, no evidence of chronic effect, higher risk to users than other pesticides in the same group
19	aldrin	insecticide	September 1988	Long residual effect, accumulate in human and animals
20	heptachlor	insecticide	September 1988	Long residual effect, accumulate in human and animal bodies
21	daminozide	plant growth regulator	April 1989	Possible carcinogen
22	binapacryl	acaricide	February 1991	Has adverse effect to fetus and possible carcinogen
23	pentachloro-phenol	fungicide	August 1993	High acute toxicity, skin injury, fastly absobed through skin of humans and animals, persistent, long residue in the environment
24	pentachloro-phenate sodium	fungicide	August 1993	High acute toxicity, skin injury, fastly absobed through skin of humans and animals, persistent, long residue in the environment
25	mercury compounds	insecticide	August 1993	High acute toxicity, persistent, long residue in the environment, toxic to fish and aquatic animals
26	ethylene chloride	fumigant	September 1994	Possible carcinogen
27	aminocarb	insecticide	September 1994	Very low ADI, high risk for user
28	bromophos	insecticide	September 1994	Very low ADI, high risk for user
29	bromophos ethyl	insecticide	September 1994	Very low ADI, high risk for user
30	demeton	insecticide	September 1994	Very low ADI, high risk for user
31	fentin	fungicide	September 1994	Very low ADI, high risk for user
32	nitrofen	herbicide	September 1994	Very low ADI, high risk for user



**Set 2 Pesticides banned on 8 May 2000 according to Notification of Ministry of Industry entitled List of Hazardous Substances( 2 nd version ) B.E. 2543 ( 2000 )**

No.	Common name	Use category	Month/Year banned	Reason
33	aramite	acaricide	May 2000	Possible carcinogen and no import for use at present
34	chlordane	insecticide	May 2000	Possible carcinogen, long residual effect, has adverse effect to environment and living organisms, banned or restricted use in many countries, many alternatives
35	chlordecone	insecticide	May 2000	Possible carcinogen and no import for use at present
36	chlorophenois	herbicide	May 2000	Possible carcinogen and no import for use at present
37	2,4,5-TP	herbicide	May 2000	Possible carcinogen and no import for use at present
38	phenothiol	herbicide	May 2000	Possible carcinogen and no import for use at present
39	MCPB	herbicide	May 2000	Possible carcinogen and no import for use at present
40	mecoprop	herbicide	May 2000	Possible carcinogen and no import for use at present
41	DBCP	fumigant	May 2000	Possible carcinogen and no import for use at present
42	monocrotophos	insecticide	May 2000	Very high acute toxicity and banned in many countries
43	azinphos ethyl	insecticide	May 2000	Very high acute toxicity and banned in many countries
44	mevinphos	insecticide	May 2000	Very high acute toxicity and banned in many countries
45	phosphamidon	insecticide	May 2000	Very high acute toxicity and banned in many countries

**Set 3 Pesticides banned on 26 May 2000 according to Notification of Ministry of Industry entitled List of Hazardous Substances( 3 rd version ) B.E. 2543 ( 2000 )**

No.	Common name	Use category	Month/Year banned	Reason
46	aziphos methyl	insecticide	May 2000	Very high acute toxicity and banned in many countries
47	calcium arsenate	insecticide, herbicide	May 2000	Very high acute toxicity and banned in many countries
48	chlorthiophos	insecticide, acaricide	May 2000	Very high acute toxicity and banned in many countries
49	cycloheximide	fungicide	May 2000	Very high acute toxicity and banned in many countries
50	demephion	insecticide	May 2000	Very high acute toxicity and banned in many countries
51	dimefox	insecticide, acaricide	May 2000	Very high acute toxicity and banned in many countries
52	dinoterb	herbicide	May 2000	Very high acute toxicity and banned in many countries
53	disulfoton	insecticide, acaricide	May 2000	Very high acute toxicity and banned in many countries
54	DNOC	insecticide	May 2000	Very high acute toxicity and banned in many countries
55	fensulfothion	nematicide	May 2000	Very high acute toxicity and banned in many countries
56	fonofos	insecticide	May 2000	Very high acute toxicity and banned in many countries
57	mephospholan	insecticide	May 2000	Very high acute toxicity and banned in many countries
58	paris green	insecticide	May 2000	Very high acute toxicity and banned in many countries
59	phorate	insecticide	May 2000	Very high acute toxicity and banned in many countries
60	prothoate	insecticide	May 2000	Very high acute toxicity and banned in many countries

No.	Common name	Use category	Month/Year banned	Reason
61	schradan	insecticide, acaricide	May 2000	Very high acute toxicity and banned in many countries
62	sulfotep	insecticide, acaricide	May 2000	Very high acute toxicity and banned in many countries



**FORM**  
**FOR NOTIFICATION OF FINAL REGULATORY ACTION**  
**TO BAN OR SEVERELY RESTRICT A CHEMICAL**

IMPORTANT: See instructions before filling in the form

COUNTRY: Thailand

**PART I: PROPERTIES, IDENTIFICATION AND USES**

<b>1. IDENTITY OF CHEMICAL</b>		
1.1	Common name	phorate
1.2	Chemical name according to an internationally recognized nomenclature (e.g. IUPAC), where such nomenclature exists	O,O-diethyl S-ethylthiomethyl phosphorodithioate
1.3	Trade names and names of Preparations	Thimet, Cekuforatox, Dhan, Kuranai, Umet, Volphor, Warrants.
1.4	Code numbers	
1.4.1	CAS number	CAS RN [298-02-2]
1.4.2	Harmonized System customs code	
1.4.3	Other numbers (specify the numbering system)	EEC no. 206-052-2

1.5	Indication regarding previous notification on this chemical, if any	
1.5.1	<input checked="" type="checkbox"/>	This is a first time notification of final regulatory action on this chemical
1.5.2	<input type="checkbox"/>	This is a modification of a previous notification of final regulatory action on this chemical. The sections modified are: _____
	<input type="checkbox"/>	This notification replaces all previously submitted notifications on this chemical.
	Date of issue of the previous notification: _____	

**PLEASE RETURN THE COMPLETED FORM TO:**

Interim Secretariat for the Rotterdam Convention  
Plant Protection Service  
Plant Production and Protection Division, FAO  
Viale delle Terme di Caracalla  
00100 Rome, Italy

OR

Interim Secretariat for the Rotterdam Convention  
UNEP Chemicals

11 - 13, Chemin des Anémones  
CH - 1219 Châtelaine, Geneva, Switzerland

Tel: (+39 06) 5705 3441  
Fax: (+39 06) 5705 6347  
E-mail: pic@fao.org

Tel: (+4122) 917 8183  
Fax: (+4122) 797 3460  
E-mail: pic@unep.ch

1.6 Information on hazard classification where the chemical is subject to classification requirements	
International classification systems	Hazard class
WHO (Technical product)	Ia
Other classification systems	Hazard class
EPA (Formulation)	I
EC risk	T+ (R 27/28)

1.7 Use or uses of the chemical	
1.7.1	<input checked="" type="checkbox"/> Pesticide
	Describe the uses of the chemical as a pesticide in your country:  Insecticide and acaricide. Used for controlling brown plant hoppers, leaf hoppers, gallmidge, thrips, aphids, red mites and leaf miner in rice, cotton, maize, sorghum, peanut, tobacco, sugar cane, soy bean and vegetables. Application rate : Basal dressing of phorate 10 %GR 6.25-20 kg/ha. Re-entry period 10 days.
1.7.2	<input type="checkbox"/> Industrial
	Describe the industrial uses of the chemical in your country:

1.8 Properties	
1.8.1	Description of physico-chemical properties of the chemical
	Technical grade is > 90 % pure. Molecular weight : 260.4. Molecular formula : $C_7H_{17}O_2PS_3$ . Form : Colourless liquid. Melting point : $<-15^{\circ}C$ Boiling point : $118-120^{\circ}C/0.8$ mm Hg. Vopour pressure : 85 mPa ( $25^{\circ}C$ ). $K_{ow}$ : $\log P = 3.92$ . Specific gravity/density : 1.167. (tech., $25^{\circ}C$ ). Solubility : In water 50 mg/l ( $25^{\circ}C$ ). Miscible with alcohols, ketones, ethers, esters, and other organic solvents. Stable under normal storage conditions for at least 2 y. Aqueous solutions degraded by light ( $DT_{50}$ 1.1 d); stability to hydrolysis optimum at pH 5-7, $DT_{50}$ 3.2 d (pH 7), 3.9 d (pH 9).

1.8.2	<p><b>Description of toxicological properties of the chemical</b></p> <p>Acute oral LD<sub>50</sub> for male rats 3.7, female rats 1.6, mice 6 mg/kg. Skin and eye : Acute percutaneous LD<sub>50</sub> for male rats 6.2, female rats 2.5, guinea pigs 20-30, male rabbits 5.6, female rabbits 2.9, guinea pigs 30 mg/kg. Inhalation: LC<sub>50</sub> (1h) for male rats 0.06, female rats 0.011 mg/l. NOEL : (90 d) for rats 6 mg/kg diet no. ill-effects other than depression of cholinesterase levels. ADI (JMPR) 0.0005 mg/kg b.w. (1994). Not mutagenic, not terratogenic, not carcinogenic.</p>
1.8.3	<p><b>Description of ecotoxicological properties of the chemical</b></p> <p>Birds : Acute oral LD<sub>50</sub> for mallard ducks 0.62 , ring-necked pheasants 7.1 mg/kg. Fish : LC<sub>50</sub> (96 h) for rainbow trout 0.013, channel catfish 0.28 mg/l. Toxic to bees, LD<sub>50</sub> (topical) 10 µg/bee.</p>

**PART II: FINAL REGULATORY ACTION**

<b>2. FINAL REGULATORY ACTION</b>	
2.1	<p>The chemical is: <input checked="" type="checkbox"/> banned OR <input type="checkbox"/> severely restricted</p>
2.2 Information specific to the final regulatory action	
2.2.1	<p><b>Summary of the final regulatory action</b></p> <p>Banned for import, production, having in possession and use as an agricultural pesticide.</p>
2.2.2	<p><b>Reference to the regulatory document</b></p> <p>Notification of Ministry of Industry dated 26 May 2000, published in the Royal Gazette volume no. 117, section 61 Ng, dated 23 June 2000.</p>
2.2.3	<p><b>Date of entry into force of the final regulatory action</b></p> <p>24 June 2000.</p>

2.3	Was the final regulatory action based on a risk or hazard evaluation?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
	If yes, give information on such evaluation	
	The acute oral LD <sub>50</sub> = 0.62 mg/kg is very high risk to human.	
	Reference to the relevant documentation	
	The Pesticide Manual, 11 <sup>th</sup> edition, entry 570.	

2.4	Reasons for the final- regulatory action	
2.4.1	Is the reason for the final regulatory action relevant to the human health?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
	If yes, give summary of the known hazards and risks presented by the chemical to human health, including the health of consumers and workers	
	Extremely hazardous to workers during formulating and application by spraying because of very high acute toxicity.	
	Reference to the relevant documentation	
	The Pesticide Manual, 11 <sup>th</sup> edition, entry 570.	
	Expected effect of the final regulatory action	
	No poisoning case caused by phorate is reported.	

2.4.2	Is the reason for the final regulatory action relevant to the environment?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
	If yes, give summary of the known hazards and risks to the environment	
	Reference to the relevant documentation	
	Expected effect of the final regulatory action	

2.5	Category or categories where the final regulatory action has been taken	
2.5.1	Final regulatory action has been taken for the chemical category	<input type="checkbox"/> Industrial
	Use or uses prohibited by the final regulatory action	
	Use or uses that remain allowed	



2.5.2	Final regulatory action has been taken for the chemical category	<input checked="" type="checkbox"/> Pesticide				
	<table border="1"> <tr> <td data-bbox="225 226 1214 264">Formulation(s) and use or uses prohibited by the final regulatory action</td> <td data-bbox="1214 226 1509 264"></td> </tr> <tr> <td colspan="2" data-bbox="225 264 1509 555">All formulation and uses were prohibited by the final regulatory action.</td> </tr> </table>		Formulation(s) and use or uses prohibited by the final regulatory action		All formulation and uses were prohibited by the final regulatory action.	
Formulation(s) and use or uses prohibited by the final regulatory action						
All formulation and uses were prohibited by the final regulatory action.						
	<table border="1"> <tr> <td data-bbox="225 555 1214 593">Formulation(s) and use or uses that remain allowed</td> <td data-bbox="1214 555 1509 593"></td> </tr> <tr> <td colspan="2" data-bbox="225 593 1509 911">None</td> </tr> </table>		Formulation(s) and use or uses that remain allowed		None	
Formulation(s) and use or uses that remain allowed						
None						

<b>2.5.3 Estimated quantity of the chemical produced, imported, exported and used, where available.</b>		
	Quantity per year (MT)	Year
Produced	-	-
Imported	25.00	1980 (final year of import)
Exported	-	-
Used	-	-

2.6	Indication, to the extent possible, of the likely relevance of the final regulatory action to other states and regions

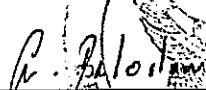
<b>2.7 Other relevant information that may cover:</b>	
2.7.1	Assessment of socio-economic effects of the final regulatory action

2.7.2	<b>Information on alternatives and their relative risks</b>  Brown plant hoppers, leaf hoppers : propoxur (LD <sub>50</sub> = 95 mg/kg), fipronil (LD <sub>50</sub> = 92 mg/kg) , isoprocarb (LD <sub>50</sub> = 403 mg/kg), fenobucarb (LD <sub>50</sub> = 620 mg/kg) Aphids, thrips : phosalone (LD <sub>50</sub> = 120 mg/kg), malathion (LD <sub>50</sub> = 2,100 mg/kg) Red mite : dicofol (LD <sub>50</sub> = 690 mg/kg), propagite (LD <sub>50</sub> = 2,200 mg/kg), sulfur (LD <sub>50</sub> = 3,000 mg/kg) Leafminer : carbaryl (LD <sub>50</sub> = 300 mg/kg), deltamethrin (LD <sub>50</sub> = 135 mg/kg)
2.7.3	<b>Relevant additional information</b>

### PART III : GOVERNMENT AUTHORITIES

Ministry/Department and authority responsible for issuing/enforcing the final regulatory action	
Institution	Department of Agriculture
Address	50 Phaholyothin Rd., Chatuchak, Bangkok 10900 Thailand.
Telephone	66 -2-5790586
Telefax	66-2-5615024
E-mail address	anantad@doa.go.th
Designated National Authority	
Institution	Department of Agriculture
Address	50 Phaholyothin Rd., Chatuchak, Bangkok 10900 Thailand.
Name of person in charge	Dr. Ananta Dalodom.
Position of person in charge	Director-General
Telephone	66 -2-5790586
Telefax	66-2-5615024
E-mail address	anantad@doa.go.th

Date, signature of DNA and official seal:

 x   
 Mr. Ananta Dalodom  
 Director-General
 