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United Nations Environment Programme

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Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade
Chemical Review Committee
First meeting
Geneva, 11–18 February 2005
Item 7 (e) of the provisional agenda*

Inclusion of chemicals in Annex III of the Rotterdam Convention: review of notifications of final regulatory actions to ban or severely restrict a chemical: methyl bromide

Methyl bromide

Note by the secretariat

1. In line with article 5 of the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, when the secretariat has received at least one notification from each of two prior informed consent (PIC) regions that contain 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 information provided in such notifications and, in accordance with the criteria set out in Annex II, recommend to the Conference of the Parties whether the chemical in question should be included in Annex III and a decision guidance document drafted.

2. In addition to the two verified notifications from two PIC regions relating to methyl bromide (Asia – Republic of Korea; and Europe – Netherlands), which were distributed in document UNEP/FAO/RC/CRC.1/18, an additional notification has been received from Switzerland. A summary of this notification will be included in PIC Circular XXI, for June 2005. The notification as received from the notifying country is annexed to the present note.

3. The supporting documentation provided by Switzerland, where available, will be found in document UNEP/FAO/RC/CRC.1/18/Add.4.

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

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Annex

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

UNEP

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

IMPORTANT: See instructions before filling in the form

COUNTRY: SWITZERLAND

PART I: PROPERTIES, IDENTIFICATION AND USES

1.	**IDENTITY OF CHEMICAL**	
1.1	**Common name**	Bromomethane
1.2	**Chemical name according to an internationally recognized nomenclature (e.g. IUPAC), where such nomenclature exists**	Methyl bromide (IUPAC), Bromomethane (CAS)
1.3	**Trade names and names of preparations**	
1.4	**Code numbers**	
1.4.1	**CAS number**	74-83-9
1.4.2	**Harmonized System customs code**	2903 30 33
1.4.3	**Other numbers (specify the numbering system)**	PA4900000 (RTECS), 1062 (UN), 602-002-00-2 (EC), 200-813-2 (EINECS)

1.5	**Indication regarding previous notification on this chemical, if any**
1.5.1	✓ This is a first time notification of final regulatory action on this chemical.
1.5.2	This is a modification of a previous notification of final regulatory action on this chemical. The sections modified are: _____ This notification replaces all previously submitted notifications on this chemical.

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

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

OR

Interim Secretariat for the Rotterdam Convention
UNEP Chemicals

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

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

	Date of issue of the previous notification: _____

1.6	Information on hazard classification where the chemical is subject to classification requirements	
	International classification systems	**Hazard class**
	UN Hazard Class	2.3
	IARC	Group 3 *(The agent (mixture or exposure circumstance) is not classifiable as to its carcinogenicity to humans)*
	UN Vienna Convention for the Protection of the Ozone Layer & Montreal Protocol on Substances that Deplete the Ozone Layer	Ozone-depleting potential: 0.6
	Other classification systems	**Hazard class**
	EU	T toxic R23 Toxic by inhalation R36/37/38 Irritating to eyes, respiratory system and skin
	Switzerland	Poison Class 1* (prohibited for general use)

1.7	Use or uses of the chemical
1.7.1	✓ **Pesticide**
	Describe the uses of the chemical as a pesticide in your country:
	Methyl bromide was used as a soil fumigant
1.7.2	✓ **Industrial**
	Describe the industrial uses of the chemical in your country:
	Methyl bromide was used as a building block in chemical synthesis (introduction of methyl groups).

1.8	Properties
1.8.1	**Description of physico-chemical properties of the chemical**
	Molecular formula: CH_3Br; molecular mass: 94.9; Physical state; appearance: Odourless and colourless compressed liquefied gas, heavier than air; Boiling point: 4°C; Melting point: -94°C; Relative density (water = 1): 1.7; Solubility in water, 1.5 ml/100 ml (20°C), freely soluble in common solvents; Relative vapour density (air = 1): 3.3; Auto-ignition temperature: 537°C; Explosive limits, vol% in air: 10-16; Octanol/water partition coefficient as log Pow: 1.19 IPCS, CEC (1994): International Chemical Safety Card Methyl bromide (0109) (http://www.inchem.org/documents/icsc/icsc/eics0109.htm)

1.8.2 Description of toxicological properties of the chemical

Human exposure to methyl bromide (through inhalation and skin contact) is predominantly occupational, particularly during soil or bulk fumigation, but also during manufacture.
The results of inhalation studies on rats, beagles, and humans have shown that methyl bromide is rapidly absorbed through the lungs. It is also rapidly absorbed in rats following oral administration. After absorption, methyl bromide or its metabolites are rapidly distributed to many tissues including the lungs, adrenal glands, kidneys, liver, nasal turbinates, brain, testes, and adipose tissue.
In a rat inhalation study, the methyl bromide concentration in tissues reached a maximum 1 h after exposure, but then decreased rapidly with no traces 48 h later. The metabolism of methyl bromide has not been elucidated, though glutathione may play a role.
Methylation of proteins and lipids has been observed in tissues from several species, including humans, exposed via inhalation. Methylated DNA adducts have also been detected following *in vivo* and *in vitro* exposure of rodents or rodent cells.
In inhalation studies using [^{14}C]-labelled methyl bromide, exhalation of $^{14}C0_2$ was the major route of elimination of ^{14}C. A lesser amount of ^{14}C was excreted in the urine. Following oral administration of methylbromide, urinary excretion was the major route of elimination of ^{14}C.
The central nervous system is an important target for methyl bromide. Changes in monoamine, amino acid contents and possibly catecholamine contents may be factors involved in methyl bromide-induced neurotoxicity.
In 1988, the JMPR evaluated the toxicology of the bromide ion and concluded that the level causing no toxicological effect was:
Rat: 240 ppm, equivalent to 12 mg bromide/kg body weight per day
Human: 9 mg bromide/kg body weight per day
The acceptable daily intake (ADI) of 1 mg/kg body weight was confirmed.

UNEP/ILO/WHO (1994) International Programme on Chemical Safety, Health and Safety Guide No. 86:Methyl bromide (http://www.inchem.org/documents/hsg/hsg/hsg86.htm)
UNEP/ILO/WHO (1995) International Programme on Chemical Safety, Environmental Health Criteria No. 166: Methyl bromide (http://www.inchem.org/documents/ehc/ehc/ehc166.htm)

1.8.3 Description of ecotoxicological properties of the chemical

Methyl bromide is predominantly a naturally occurring compound. Oceans are believed to be a major natural source of methyl bromide. Another source(s) may exist in the tropics, which is yet to be explained. Anthropogenic sources from fumigation and, to a much lesser extent, motor vehicles (from the combustion of organic bromine additives in leaded petrol) add to these. Present data indicate that the globally averaged atmospheric abundance of methyl bromide is between 9 and 13 pptv, equivalent to a total atmospheric loading of 150-220 thousand tonnes. If the atmospheric lifetime is two years (assuming only atmospheric removal processes are significant), anthropogenic sources of methyl bromide represent about 25% (±10%) of the total emissions. The world production of methyl bromide in 1990 was 69 000 tonnes, having increased at a rate of 6% per year from 1984 to 1990. About 50% of the methyl bromide produced is released into the atmosphere during, or after, use. Although methyl bromide reacts with the hydroxyl radical in the troposphere, some methyl bromide is transferred by upward diffusion to the stratosphere, where it photolyses. Active bromine species react with ozone in the lower stratosphere and are partly responsible for the depletion of the ozone layer. It is estimated that anthropogenic releases of methyl bromide cause about 3% of the present total stratospheric ozone loss.
Methyl bromide is used as a fungicide, partial bactericide, nematocide, insecticide, herbicide, and rodenticide.
In soil, about 50% of methyl bromide is degraded by hydrolysis and microbial activity. The remainder eventually dissipates into the atmosphere. The principal degradation product is inorganic bromide, which remains as a residue in soil. Some bromide may be leached out into water or taken up by plants.
Soil fumigation using methyl bromide (with 2% chloropicrin) affects both target and non-target organisms: various soil microflora and fauna are adversely affected, at least temporarily, by fumigation. High mortality of non-target insects bas been noticed following fumigation under plastic covers.
Methyl bromide was detected in different soil types up to 3 weeks after fumillation, the highest levels being found in the upper layers (0-40 cm) of the soil.

Although methyl bromide is highly toxic for aquatic organisms, it is generally of no risk to the aquatic environment. The lowest median effect concentration (EC_{50}) or median lethal concentration (LC_{50}) values reported are 2.8 mg/litre for algae, 1.7 mg/litre for daphnids, and 0.3 mg/litre for fish. No-observed-effect concentrations (NOEC) in long-term studies were low (0.06 mg/litre) for daphnids and fish. Toxic concentrations are not expected to be reached under normal circumstances, because most of the methyl bromide applied on soil is degraded or lost through evaporation before it reaches surface water via run-off. In very special situations (intensive leaching of green-house soils fumigated with methyl bromide to reduce the organic bromide content), levels of methly bromide in the mg/litre range can occur in water; concentrations of up to 9.3 mg methyl bromide/litre have been found in drainage water.

However, relatively high levels of bromide (up to 72 mg/litre) can be found in the drainage water from greenhouses and could adversely affect aquatic organisms. An EC_{50} value of 27 mg bromide/litre for daphnia and a lowest NOEC for different fish species of 25 mg bromide/litre were determined with long-term exposure to bromide ion.

Methyl bromide is often used in preference to other insecticides because of its ability to penetrate quickly and deeply into bulk materials and soils. Dosages for methyl bromide, as a storage fumigant, range mostly from 16 to 100 g/m^3 for 2-3 days, depending on temperature. A higher dosage is required to kill eggs and pupae than adult insects. There is a variation in tolerance between different species and stages of insect and between different strains of the same insect.

There are no data on the direct effects of methyl bromide on birds and wild mammals.

UNEP/ILO/WHO (1994) International Programme on Chemical Safety, Health and Safety Guide No. 86:Methyl bromide (http://www.inchem.org/documents/hsg/hsg/hsg86.htm)
UNEP/ILO/WHO (1995) International Programme on Chemical Safety, Environmental Health Criteria No. 166: Methyl bromide (http://www.inchem.org/documents/ehc/ehc/ehc166.htm)

Ozone depletion

Methyl bromide (MB) was listed under the Montreal Protocol as an ozone depleting substance in 1992 and is listed in Annex E, Group 1. Control schedules leading to phase-out were agreed in 1995 and 1997. There are a number of concerns apart from ozone depletion that have also led countries to impose restrictions on its use. These concerns include residues in food, toxicity to humans and associated operator safety and public health, and detrimental effects on soil biodiversity. In some countries, pollution of surface and ground water by MB and its derived bromide ion are also concerns.

Parties reported MB consumption of about 60,200 tonnes in 1998 (excluding QPS), although some sources indicate higher consumption. On the basis mainly of Ozone Secretariat data, MBTOC estimated that, for controlled uses, at least 49,170 tonnes MB was consumed in 1999 and at least 45,360 tonnes in 2000. Although the data set is incomplete, the data at country level indicates MB consumption has been reduced in non-Article 5(1) counties in line with the Protocol requirements. Controlled MB consumption in Article 5(1) countries rose from about 8,460 tonnes in 1991 to about 17,600 tonnes in 1998, representing an increase of 15% per year on average. However, since 1998 the consumption has decreased at an average rate of about 5% per year (1998-2000). Based on Ozone Secretariat data reported so far, MBTOC estimated the total Article 5(1) MB consumption to be around 16,440 tonnes in 2000. Between 1998 and 2000, national MB consumption fell by more than 20% in some Article 5(1) countries, but increased significantly in others.

Under current usage patterns, the proportions of applied MB eventually emitted to the atmosphere are estimated by MBTOC to be 40 - 87%, 85 - 98%, 69 - 79% and 90 - 98% of applied dosage for soil, perishable commodities, durable commodities and structural treatments respectively. These figures, weighted for proportion of use and particular treatments, correspond to a range of 50 - 87% overall emission from agricultural and related uses, with a best estimate of overall emissions of 73%, or 40,515 metric tonnes based on production of 55,500 tonnes in 2000.

The current control measures, agreed by the Parties at their ninth Meeting in Montreal in September 1997, can be paraphrased as:

For non-Article 5(1) Parties operating under the Protocol (developed countries) a 25% cut in production and consumption, based on 1991 levels, from 1 January 1999, a 50% cut from 1 January 2001, a 70% cut from 1 January 2003 and phase out by 1 January 2005 with provision for exemptions for any critical uses. A freeze on MB production and consumption based on 1991 levels already applies from 1 January 1995.

Emissions from fumigation operations occur through leakage and permeation during treatment (inadvertent emissions) and from venting at the end of a treatment (intentional emissions). Estimates of the proportion of MB used that is released into the atmosphere vary widely because of: differences in usage pattern; the condition and nature of the fumigated materials; the degree of gas-tightness; and local environmental conditions. Some MB may also be converted to non-volatile materials making it incorrect to equate production with emissions.

UNEP Montreal Protocol On Substances that Deplete the Ozone Layer (2002): Report of the Technology and Economic Assessment Panel (http://www.unep.org/ozone/pdf/teap-report2002.pdf)

PART II: FINAL REGULATORY ACTION

2.	**FINAL REGULATORY ACTION**			
2.1	**The chemical is:**	**✓banned**	**OR**	**severely restricted**

2.2 Information specific to the final regulatory action

2.2.1 Summary of the final regulatory action

There is no registration of methyl bromide as a plant protection product.

Methyl bromide is listed as an ozone depleting substance in Annex 3.4, Number 1 of the Ordinance relating to Environmentally Hazardous Substances.
The use, production, import and export of ozone depleting substances (as well as simple mixtures and products containing ozone depleting substances if they are in containers used solely to transport or store these substances,) is prohibited.
Exception: recycled ozone depleting substances which are not chemically changed by the process
Exception: manufacture of products or articles which may be supplied or imported in accordance with the provisions of Annexes 4.9 (compressed gas containers), 4.11 (plastics), 4.14 (solvents), 4.15 (refrigerants), and 4.16 (extinguishing agents). This applies only to imports / exports from / to States which adhere to the provisions of the Montreal Protocol of 16 September 1987, and its amendments of 29 June 1990, 25 November 1992, 17 September 1997, and 3 December 1999

2.2.2 Reference to the regulatory document

Ordinance relating to Environmentally Hazardous Substances (Ordinance on Substances, Osubst) of 9 June 1986; update 3 June 2003; Annex 3.4 (SR 814.013)
http://www.admin.ch/ch/d/sr/c814_013.html (German)
http://www.admin.ch/ch/f/rs/c814_013.html (French)
http://www.admin.ch/ch/i/rs/c814_013.html (Italian)

2.2.3 Date of entry into force of the final regulatory action

01.01.1996

2.3	**Was the final regulatory action based on a risk or hazard evaluation?**	**✓Yes**	**θ No**

If yes, give information on such evaluation

The hazard/risk evaluation was based on the Montreal Protocol which Switzerland has ratified and is thus obliged to enforce nationally.

Reference to the relevant documentation

There is no specific document.

2.4	Reasons for the final regulatory action		
2.4.1	Is the reason for the final regulatory action relevant to the human health?	✓Yes	θ 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		
	Reference to the relevant documentation		
	Expected effect of the final regulatory action		
	The reduction in CarbonTetrachloride emission, together with the reduction in emissions of other ozone depleting substances, is expected to reduce the risk of increase UV radiation due to depletion of stratospheric ozone ("ozone hole").		

2.4.2	Is the reason for the final regulatory action relevant to the environment?	✓Yes	θ 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		
	The reduction in CarbonTetrachloride emission, together with the reduction in emissions of other ozone depleting substances, is expected to reduce the risk of increase UV radiation due to depletion of stratospheric ozone ("ozone hole").		

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 ✓ **Industrial**

Use or uses prohibited by the final regulatory action

Ozone depleting substances shall not be used.
The following is prohibited:

a. the manufacture of ozone depleting substances; this prohibition shall not apply to the manufacture of ozone depleting substances by means of recycling used ozone depleting substances, if ozone depleting substances are not chemically changed by this process;
b. the import and export of ozone depleting substances; this prohibition shall not apply to imports from States and exports to States which adhere to the provisions of the Montreal Protocol of 16 September 1987 (SR 814.021) to phase out Ozone Depleting Substances (hereinafter Protocol), approved by Switzerland;
c. the import of products and articles containing ozone depleting substances; except for products and articles, which may be imported in accordance with the provisions of Annexes 4.9, 4.11, 4.14, 4.15 and 4.16;
d. the import of products and articles containing ozone depleting substances or manufactured using ozone depleting substances and listed in an appendix to the Protocol ; subject to Letter c, this prohibition shall not apply to imports from States which adhere to the provisions of the Protocol approved by Switzerland

Use or uses that remain allowed

Exemptions exist for the following purposes:

a. to manufacture products or articles which may be supplied or imported in accordance with the provisions of Number 22 and Annexes 4.9, 4.11, 4.14, 4.15 and 4.16;
b. for use as intermediate products for further chemical conversion;
c. for research purposes;
d. pest control with a permit under Article 35 of the Ordinance on Toxic Substances of 19 September 1983 (SR 813.01)

The Federal Agency may authorize limited exemptions for other uses, provided that:

a. according to the state of the art, no replacement is available for ozone depleting substances or for the products and articles manufactured using ozone depleting substances, and
b. no more than the minimum amount of ozone depleting substances necessary for the desired purpose is used

2.5.2 Final regulatory action has been taken for the chemical category ✓ **Pesticide**

Formulation(s) and use or uses prohibited by the final regulatory action

All uses and formulations are prohibited.

Formulation(s) and use or uses that remain allowed

2.5.3 Estimated quantity of the chemical produced, imported, exported and used, where available.

	Quantity per year (MT)	Year
Produced		
Imported		
Exported		

Used		

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

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

2.7.2	Information on alternatives and their relative risks
2.7.3	Relevant additional information

PART III : GOVERNMENT AUTHORITIES

Ministry/Department and authority responsible for issuing/enforcing the final regulatory action	
Institution	Federal Department of Environment, Transport, Energy and Communications
Address	Parliament Building North 3000 Berne, Switzerland
Telephone	+41 31 3225512 (General Secretary)
Telefax	+41 31 3242692 (General Secretary)
E-mail address	
Designated National Authority	
Institution	Swiss Agency for the Environment, Forests and Landscape Hazardous Substances, Soil and Biotechnology Division
Address	3003 Berne Switzerland
Name of person in charge	Prof. Dr. Georg Karlaganis
Position of person in charge	Head
Telephone	+41 31 3226955
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E-mail address	Georg.Karlaganis@buwal.admin.ch

Date, signature of DNA and official seal: _09 September 2004

Swiss Agency for the
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and Landscape
Substances, Soil and
Biotechnology Division
CH-3003 Bern