



zonAction



A newsletter dedicated to the protection of the ozone layer and implementation of the Montreal Protocol

UNEP IE quarterly publication

OzonAction Programme under the Multilateral Fund

View point

Heading for 1999



Marco Antonio González Salazar, Deputy Minister for Energy and the Environment, Costa Rica

As the 20th century draws to a close, a central item on the agenda of environmental management is putting a price tag on natural resources. Economic globalization, and the social and environmental situation need to be reconciled with development policies. During the past decade, Costa Rica has

invested in public education, health, infrastructure, and environmental conservation. Our President, Jose Maria Figueres Olsen has also given high priority to the challenge of sustainable development: integrating economic, social and environmental concerns into the development process. The strategy is simple and practical: we are seeking to conserve our natural resources; understand their potential by means of stocktaking, research and development; and wisely use our resource base for ecotourism, food, biotechnology, medicines, and environmental services.

Multilateral agreements are important instruments to achieve global cooperation

for sustainable development. However, they will be successful in the national context only if they also consider issues of social equity, market access, competitiveness and fair trade.

The Vienna Convention and the Montreal Protocol represent an excellent opportunity for us to take definite actions to protect the ozone layer, and are also examples of how global cooperation can succeed in solving an environmental problem.

The debates on the replenishment of the Protocol's Multilateral Fund for the period 1997–1999 have started. This will be the main agenda item during the 8th Meeting of the Parties to be held in Costa Rica in November 1996. Article 5 countries consider that the replenishment must be in accordance with the agreements reached by the Parties and with the compromises that have been made for the protection of the ozone layer, and should be according to the principles of common but differentiated responsibilities.

By 1999, developing countries will be facing their first control measures under the Protocol—a freeze in the production and consumption of Annex A substances. In the light of this, the final decision on the replenishment should reflect the political will of the Parties. This will ensure that the goals of the Montreal Protocol are achieved.

Costa Rica will be an ideal location for this decision to be made. We wish to welcome you and encourage you to work for the best.

*87 projects under the Multilateral Fund had phased out
10 740 tonnes of ozone-depleting substances as of 31 August 1996*

Debate on replenishment of the Multilateral Fund

Replenishment of the Multilateral Fund for 1997–99 was the main agenda item for the 13th meeting of the Open-ended Working Group (OEWG), held in Geneva during 26–29 August. UNEP's Technology and Economic Assessment Panel (TEAP) presented the results of its study of the replenishment of the Multilateral Fund, in which it estimated that US\$436.5 million would be needed for developing countries to implement the 1999 freeze on production and consumption of ODS. Another

US\$40–60 million would be required to continue the momentum of the developing countries that had already committed themselves to a more rapid phase out of ODS than required by the Protocol. These figures compare to US\$455 million for 1994–96.

The OEWG also made recommendations on essential use exemptions for 1997, control of trade in methyl bromide, illegal trade in controlled substances, and

... continued on page 8

OzonAction ISSN 1020-1602

View point	1
Debate on replenishment	1
News from international agencies	2
Industry and technology updates	3–5
Network news	6
Phase-out successes	6
Questions and answers: methyl bromide	7
Technology workshops in Viet Nam	7
Refrigeration training in Senegal	7
Ozone science news	8
Completed investment projects	8
Japan helps its Asian neighbours	8
Improvements in data reporting	9
TEAP reports on CFC inhalers	9
Ozone Day celebrations	9
In brief	9
World policy round-up	10
Ratification status	10
Publications/meetings	10

Editorial Board: Mrs J. Aloisi de Larderel, Dr S. Andersen, Dr S. Carvalho, Dr O. El-Arini, Mr K. Fay, Mr P. Horwitz, Dr M. Kerr, Mrs I. Kökeritz, Dr L. Kuijpers, Mr G. Nardini, Mr K. M. Sarma, Mr R. Shende, Mr Tan Meng Leng, Mr M. Verhille, Mr J. Whitelaw, Mr Liu Yi

Editor: Robin Clarke

Publication Manager: Ms Cecilia Mercado

Editorial Assistant: Mr Jim Curlin

UNITED NATIONS ENVIRONMENT PROGRAMME
INDUSTRY AND ENVIRONMENT (UNEP IE)

OZONACTION PROGRAMME

Tour Mirabeau

39–43 Quai Andre Citroën

75739 Paris Cedex 15, France

TEL: (33) 1 44 37 14 50

FAX: (33) 1 44 37 14 74

TELEX: 204 997 F

CABLE: UNITERRA PARIS

E-MAIL: ozonaction@unep.fr

Internet: <http://www.unepie.org/ozonaction.html>

Good News!

All developed countries have now paid their 1995 contributions to the Multilateral Fund in full. Nevertheless, OzonAction News will continue to publish details of countries that are in arrears, and the sums owing.

News from international agencies

**Fund Secretariat**

After sufficient funds had been received, the Secretariat asked the Treasurer of the Multilateral Fund

(UNEP) to release funds to the implementing agencies to cover the projects approved but not funded at the 19th ExCom meeting.

A coordination meeting between the implementing agencies and the Secretariat was convened in July, preceded by a teleconference. The Secretariat attended the 13th OEWG meeting and the 1st Meeting of the Bureau of the 7th Meeting of the Parties. The Secretariat was also represented at the meeting of the ODS Officers Network for Southeast Asia and the Pacific in Brunei Darussalam (see page 6). The Chief Officer addressed the First China National Conference on Ozone Layer Protection on the International Day for the Preservation of the Ozone Layer.

The Secretariat reviewed the database of the Inventory of Approved Projects and updated the *Policies, Procedures and Guidelines* document. The Secretariat's officers worked on policy papers on monitoring and evaluation, guidelines for the tobacco sector and phase out in small-scale industries. Preparations for the 20th Excom meeting Montreal are in progress.

Contact: Dr Omar El Arini, Secretariat of the Multilateral Fund, 1800 McGill College Avenue, 27th Floor, Montréal, Québec H3A 3J6, Canada
Tel: (1) 514 282 1122 Fax: (1) 514 282 0068
E-mail: mleyva@unmfs.org

**UNEP IE
OzonAction
Programme**

Technology workshops on ODS elimination were

held in Hanoi and Ho Chi Minh City and three follow-up workshops to the Train-the-Trainer workshops on Good Practices in Refrigeration were held in Louga, Kaolack and Dakar, Senegal (see page 7).

The annual workshop for the ODS Officers Network for Southeast Asia and the Pacific was hosted by Brunei Darussalam. Follow-up meetings of ODS Officers networks from English-speaking Africa and Latin America and the Caribbean (South and Central) were held in Accra, Ghana, and Cancun, Mexico, respectively (see page 6).

Eight country programmes (Bahrain, Croatia, Ethiopia, Honduras, Jamaica,

Lesotho, Pakistan and Tanzania) have been completed and submitted to the 20th ExCom meeting, including their institutional-strengthening projects (except for Pakistan which was approved at an earlier meeting).

A report on continued work on the overall approaches for LVCs including modalities to proceed and an Information Paper on the implementation of the training strategy are also being submitted for consideration by the 20th ExCom.

Contact: Mrs Jacqueline Aloisi de Lardere, UNEP IE, 39-43 quai A. Citroën, 75739 Paris Cedex 15, France
Tel: (33) 1 44 37 14 50 Fax: (33) 1 44 37 14 74
E-mail: ozonaction@unep.fr

**UNEP Ozone
Secretariat**

The Secretariat organized and serviced the 14th Meeting of the

Implementation Committee (27 August, see page 9), the 13th OEWG meeting (26-29 August, see page 1) and the First Meeting of the Bureau of the 7th Meeting of the Parties (30 August).

The fourth edition of *Handbook for the International Treaties for the Protection of the Ozone Layer, The Vienna Convention (1985), The Montreal Protocol (1987)* was released in Geneva during the OEWG. The June 1996 TEAP report was also distributed to the Parties.

The Secretariat invited all Parties to celebrate the International Day for the Preservation of the Ozone Layer which was held on 16 September.

Contact: Mr K. M. Sarma, UNEP Ozone Secretariat, PO Box 30552, Nairobi, Kenya
Tel: (254) 2 623 885 Fax: (254) 2 623 913
E-mail: madhava.sarma@unep.no
WWW—<http://une.unep.org/unep/secretar/ozone/home.htm>

**UNDP**

Several UNDP phase-out investment

projects have been completed this year. Completions in June included the Sunpra plant in India (20 ODP tonnes), the polyurethane Hate foam plant in Malaysia (10 tonnes), the Comanu aerosols plant in Mauritius (25 tonnes), and in Thailand the Packserv aerosols plant (155 tonnes) and the Fonsri foam plant (125 tonnes); in August the Galvamet foam plant in Mexico was completed (88.7 tonnes). September

completions included the Eagle Flask foam project in India (20 tonnes) and in the Philippines the Unimagna commercial refrigeration plant (30 tonnes) and the MEPCO refrigeration plant (47 tonnes).

Contact: Mr Frank Pinto, UNDP, 1 United Nations Plaza, New York, NY 10017, United States
Tel: (1) 212 906 5042 Fax: (1) 212 906 6947
E-mail: frank.pinto@undp.org

**UNIDO**

UNIDO has completed investment projects in Algeria and Cameroon.

The first phased out the use of CFC-113 as a solvent in the coating of razor blades in favour of iso-propyl alcohol. The project in Cameroon phased out the use of CFC-11 and -12 in the production of domestic refrigerators, freezers and cold room insulation foam (HFC-134a was used as the alternative refrigerant and cyclopentane as the alternative foam-blowing agent). Project preparation projects have been completed in Africa and Asia and by the end of 1996 UNIDO expects that 15 investment projects will have been completed, phasing out 2900 tonnes of ODS. UNIDO has taken the lead in preparing a report on methyl bromide, to be presented to the 20th ExCom meeting, together with demonstration project proposals for China and Tunisia.

Contact: Mrs A. Tcheknavorian, UNIDO, PO Box 300, A-1400 Vienna, Austria
Tel: (43) 1 211 31 3782 Fax: (43) 1 230 7449
E-mail: mwathie@unido.org

**World Bank**

The Bank has assisted Article 5 countries in phasing out about 3000 tonnes of ODS so far this year, bringing the

total ODS phase out under Bank support to more than 8000 tonnes, at a cost of US\$2.85/kg. This year 11 projects in Latin America, Asia and Europe have been completed in the foams, halons, refrigeration, solvents and aerosols sectors. The Bank has also made substantial progress on special initiatives including a sector approach to phase out in China, a production sector phase-out effort in Russia and a market-based approach to phase out in Chile.

Contact: Mr Ken Newcombe, World Bank, 1818 H. Street, N.W. Washington D.C. 20433, United States
Tel: (1) 202 477 1234 Fax: (1) 202 522 3256
E-mail: knewcombe@worldbank.org

Industry and technology updates

AEROSOLS

New metered dose inhaler from 3M

In the United States, 3M Pharmaceuticals has received approval from the Food and Drug Administration to market the first CFC-free metered dose inhaler (MDI) in the United States. 3M will manufacture the albuterol sulphate MDI and Schering-Plough Corporation will distribute it under the brand name Proventil® HFA. This drug has now been approved for use in more than a dozen countries.



ODS-free metered dose inhaler for asthma and other respiratory complaints has now been approved in more than a dozen countries.

The inhaler uses hydrofluoroalkane-134a (HFC-134a) as a propellant for the asthma medication. Some 11 million patients in the United States rely on medicines delivered by MDIs to treat asthma and other respiratory diseases. 3M Health Care introduced a similar inhaler in the United Kingdom last year, and the German company Hoechst has developed an MDI that uses HFC-227ea or heptafluoropropane as its propellant (see *OzonAction News 17*).

Contact: 3M, fax: (1) 818 709 3210

REFRIGERANTS

Tropicana converts to CFC-free refrigerated rail fleet

Tropicana plans to convert its 250 custom-built refrigerated rail cars to DuPont's Suva® HP62 (HFC125/HFC-134a/HFC-143a) refrigerant by December 1996 to become the first CFC-free refrigerated rail fleet in the United States. This refrigerant was chosen because it allows the most flexibility with the required range of medium- and low-temperature shipments.

The fleet transports chilled orange juice from Bradenton, Florida, along the Atlantic coast to the company's New Jersey distribution terminal. Chilled to 1°C before shipment, the juice is kept cool on the journey with a 35-kW refrigeration system powered either from land or from the train's diesel generators. Tropicana is retrofitting 139 units with Suva®.

Contact: DuPont, fax: (1) 302 774 2370;
Tropicana, fax: (1) 813 746 5896

Ice machines use R-404a

Servend International has introduced an advanced series of ice-making machines which operate without the use of CFC refrigerants. The G-Series ice cubers are available in capacities ranging from 90 to 1090 kg and use the zero-ODP refrigerant R-404A which is a blend of

Fire fighting

Back to water ... back to nature

Researchers at the Norwegian Fire Research Laboratory in Trondheim, Norway, have concluded that water is in many ways the best substitute for halons in fire-fighting applications. They have tested fine water sprays, with water droplets of 0.1–0.3 millimetre size. When such droplets vapourize in a fire they expand to 1700 times their original size, thus displacing the oxygen that is needed to continue the fire. The researchers conclude that such water mists are less effective than halons only in the case of small smouldering fires in electrical components or computers. Water mist systems are now being tested on British and Norwegian oil platforms.

Contact: NFRL, fax: (47) 73 59 10 44

UNEP IE welcomes information from industry and will mention as many new technologies and products as possible in this newsletter

HFC-125 (44 percent), -143a (52 percent) and -134a (4 percent).

Scottsman has introduced a new line of ice machines which are said to be more reliable, use less water, and are more efficient than other similar machines. The CM3 line features 40 percent fewer parts and also operates with the zero-ODP refrigerant R-404A.

Ice-O-Matic has introduced a new line of environmentally-friendly ice machines. The Genesis Series machines also operate on R-404A and feature double-wall plastic cabinets to eliminate rust, leaks and paint peeling.

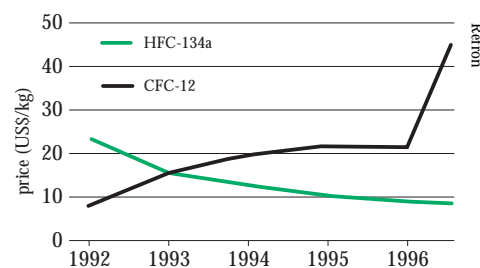
Contacts: Servend, fax: (1) 812 246 9922;
Scottsman, fax: (1) 847 913 9844;
Ico-Matic, fax: (1) 602 269 7686

New potential replacement for car air conditioning

In the United States, Texan-based Refrigerant Gases Inc. has obtained the license to distribute FreeZone (19 percent HCFC-142b, 79 percent HFC-134a and 2 percent lubricant), a refrigerant that can be used in mobile and stationary air conditioning. FreeZone has been accepted in the US EPA SNAP programme subject to fittings, labelling and no drop-in use conditions.

Contact: Refrigerant Gases, fax: (1) 817 545 3900

CFC prices rise sharply in United States



The price of CFC-12 has risen sharply in the United States over the past few months, and the trend is expected to continue: experts believe that the trade price could reach more than US\$50/kg or more by the year end.

Contact: US EPA, fax: (1) 202 233 9665
<http://epa.gov.ozone/title6/snap/buying.html>

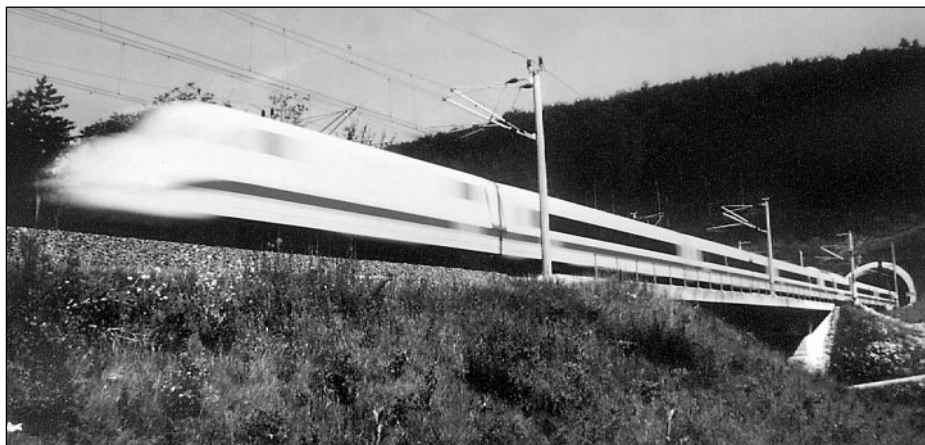
Breakthrough in passenger train air conditioning

A breakthrough in air-conditioning systems for trains that could lead to savings of 'tens of millions of dollars' over the next few years has been announced by the UK-based company Normalair-Garrett. Working with its German partner Hagenuk Faiveley GmbH, Normalair claims to have devised the first system to use air-cycle technology for air conditioning passenger trains.

less than for older types of air conditioning.

Deutsche Bahn, the German rail operator, has already ordered the first production units of the system in a contract worth US\$15.5 million. Other rail operator and equipment makers, from France, the United States and the United Kingdom, have expressed interest in the new equipment.

Contact: Normalair, fax: (44) 1935 27600
Hagenuk Faiveley, fax: (49) 431 800 1302



The German Deutsche Bahn ICE-1 train, air conditioned with compressed air as the refrigerant

Rather than using ozone-depleting refrigerants, the equipment uses air as a refrigerant in conjunction with a special high-power compressor to provide the compressed air needed for the cooling cycle.

Aircraft air conditioning already uses air-cycle systems, but the compressed air comes as a by-product of the compression taking place in the jet engine. No such source is available in a train. It is for this reason that Normalair has developed the high-power compressor based on a novel high-speed switched-reluctance drive motor. The price of the new systems is comparable to conventional equipment. However, lower maintenance costs mean that running expenses could be 15 percent

FOAMS

New water-blown foam has high insulation value

Demilec, the largest urethane foam resin producer in Canada, is producing a new water-blown open cell foam with a much lower density and with a heat conductivity of about half that of conventional urethane foam. The foam, called Sealection 500, is similar to a number of CO₂-blown foams that have been on the market for several years. However, the new foam is less expensive and may be easier to use. It is expected that the foam could find a substantial market in home insulation, particularly in wood-frame housing.

Contact: Demilec, fax: (1) 514 437 2338

New German/China cooperative venture

Insulation specialist Puren-Schaumstoff GmbH in Germany has established a joint venture in the People's Republic of China to produce rigid polyurethane foam insulation free of CFCs, using such alternatives as carbon dioxide with cyclopentane and/or partially halogenated compounds, according to a recent article in *Urethanes Technology* (June-July 1996).

The venture, Jinan-Puren Polyurethan Co. Ltd, is 60 percent owned by Puren

The second International Day for the Preservation of the Ozone Layer was celebrated on 16 September 1996.

The world community deserves congratulations for having taken action on ozone sufficiently promptly to avert a major environmental disaster.

More action is still needed.

which will supply machinery and production technology to the company which is being established in Jinan, a city of 5 million people in Shandong Province, about 350 km south of Beijing. The plant is expected to be operational by 1997.

Contact: Puren-Schaumstoff,
fax: (49) 75 51 80 99 20

METHYL BROMIDE

Methyl iodide recommended as methyl bromide replacement

Scientists at the University of California (Riverside) are recommending methyl iodide as a replacement for the ozone-depleting agricultural pesticide methyl bromide, following extensive testing against several types of weed, four fungi and one species of nematode (*Plant Diseases*, 1 July 1996).

Methyl iodide is preferable to methyl bromide because it is not an ODS, is safer for workers because it is applied in liquid rather than gaseous form, and is more effective, concludes plant pathologist Howard Ohr from the university. Methyl iodide kills the same pests using the same equipment as methyl bromide.

Methyl bromide may be responsible for 5-10 percent of ozone depletion. While methyl bromide lingers in the stratosphere, methyl iodide is broken down by ultraviolet light within eight days—before it can mix with the ozone layer.

There are, however, two big problems with methyl iodide. First, it costs about five times as much to produce as methyl bromide. Secondly, it is not registered for use in the United States or in some other countries. In the United States, it usually takes 5-10 years to obtain regulatory approval for a new chemical. But because methyl bromide is now thought to be such a major threat to the ozone layer, the US EPA is giving alternatives to methyl bromide priority.

Contact: US EPA, fax: (1) 202 233 9665

Have you developed training manuals or guides to help technicians, service engineers or others to phase out ODS? If so, UNEP IE would like to include them in a directory of such materials maintained by its OzonAction Programme. Please contact UNEP IE.

Another natural product to substitute for methyl bromide

A new alternative to methyl bromide for crop treatment, based on natural extracts from the seeds of the neem tree (*Azadirachta indica*, a member of the mahogany family), has been approved for use in California. The product, known as Trilogy 90EC, is manufactured by Thermo Trilogy Corporation (TT) and is the result of a five-year joint investigation with the US Department of Agriculture. It is said to

The neem tree, Azadirachta indica — a source of natural products that could substitute for methyl bromide



offer protection against insects, fungi and mites in crops such as tomatoes, strawberries, citrus and hops. The product is biodegradable. The US EPA has granted TT an exemption from performing residue tolerance studies on neem seed oil.

Contact: Thermo Trilogy, fax: (1) 617 622 1123

RECOVERY AND DESTRUCTION

New recovery unit in Australia

In Australia, Microclaim has released a new CFC recovery unit for use with apparatus ranging from small domestic

refrigerators to large industrial chillers. Known as the CFC3, the unit will handle all types of refrigerants including R-12, R-134a, R-22 and R-502. The company claims that the unit has a positive self-purging feature which ensures that refrigerant can be quickly recovered, and that the apparatus is mobile and light. It has a durable steel chassis for rough usage.

Contact: Microclaim, tel/fax: (61) 2 542 7154

SOLVENTS

Siloxanes for non-aqueous cleaning

Volatile methyl siloxanes (VMS), a class of linear permethylated siloxane molecules, are proving effective alternatives to ODS for the non-aqueous precision cleaning of metal parts. The chemicals were originally developed by Dow Corning and include disiloxane (OS-10), trisiloxane (OS-20) and tetrasiloxane (OS-30). Siloxanes have zero ODS and have thus obtained US EPA approval as CFC-113 replacements.

In tests at the Aerospace Guidance and Metrology Centre in Ohio, United States, siloxanes have proved superior to solvents such as CFC-113 and methyl chloroform. As a result the centre has cut its use of ODS by 99.7 percent.

Source: Dow Corning, fax: (1) 517 496 6824

New defluxer for precision cleaning

A powerful, quick-acting low-aroma defluxer which dries almost as fast as CFCs has been introduced by Micro Care Corporation in the United States. According to a recent report in *Appliance* (June 1996), VeriClean™ flux remover is an efficient precision defluxing compound based on the new siloxane solvent, OS-1201M. It removes inorganic residues and cleans fluxes and solder pastes. It also removes most silicon-based labels and adhesives, light oils and grease. It is said to

Correction

The fax number given for NOAA in *OzonAction News 19* was for the NOAA Aeronomy Laboratory which does not handle information on the stories involved. The correct NOAA fax numbers are:

'Levels of atmospheric ODS may be declining':

(1) 303 497 6290

'Reports confirm low ozone over Northern hemisphere':

(1) 301 763 8125

be an aggressive cleaner, while still safe to use on printed circuit board components, rubber and gaskets, connectors, all substrates, and metal parts. Rinsing is never required, the product is VOC-exempt and will not contribute to global warming.

Contact: Micro Care, fax: (1) 860 585 7378

Drop-in solvent replacement

An alternative, non-flammable drop-in replacement for CFC-113 and HCFC-141b is now available. Although originally designed as a drop-in replacement for CFC-113, HCFC-225ca/cb has now proved effective as a replacement for HCFC-141b, according to a recent article in *Circuits Assembly* (July 1996).

Listed as an acceptable substitute for CFC-113 under the US EPA SNAP programme (subject to certain restrictions), HCFC-225ca/cb has a 0.03 ozone-depletion potential (ODP), which is more than 25 times less harmful to stratospheric ozone than CFC-113 and three times less harmful than HCFC-141b. Commercially-available varieties of this solvent are AK-225 AMS and AK-225 AES.

Contact: Asahi Glass Company, fax: (8) 45 334 6187

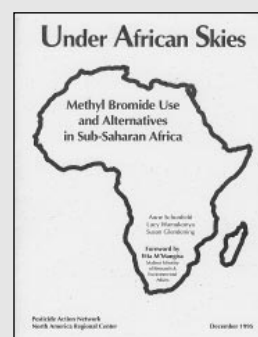
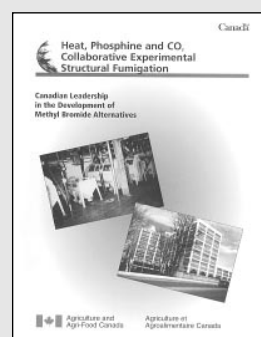
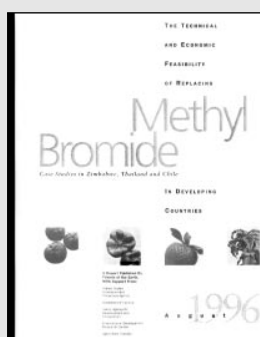
New publications on methyl bromide

New publications on methyl bromide have been published by Friends of the Earth, Agri Canada and the Pesticide Action Network North America Regional Center (PANNA).

Contacts: FOE, fax: (1) 202 783 0444

Agri Canada, fax: (1) 819 953 7253

PANNA, fax: (1) 415 541 9253



Network news

UNEP IE OzonAction Programme operates networks of ODS Officers in English- and French-speaking Africa, Southeast Asia and the Pacific, and in South and Central America to promote information and knowledge sharing. New networks are planned for the Caribbean and for West Asia later this year. All are funded from the Multilateral Fund except that for Southeast Asia which is funded by Sweden.

English-speaking Africa

The follow-up meeting of the UNEP ODS Officers Network for English-speaking African Countries was held in Accra, Ghana, during 15-23 June 1996, back to back with a one-day workshop on Mobile Air Conditioning (MAC) organized by UNEP jointly with USEPA and UNDP on 17 June 1996.

Network members expressed the need for a trainers' training course on refrigeration for LVCs and VLVCs, assistance to control ODS imports and regular and timely data reporting among members.

Contact: UNEP ROA, fax: (254) 2 623 928

Southeast Asia and the Pacific

The ODS Officers Network for Southeast Asia and the Pacific met in Bandar Seri Begawan, Brunei Darussalam, during 13-16 August 1996. The SEAP member countries recommended that assistance be extended to identify alternatives to HCFC and methyl bromide, that the Malaysian success in its MACs recovery and recycling programme be documented for use of other Article 5 countries, and that further studies be carried out on the establishment of a regional halon bank in cooperation with Australia.

Contact: UNEP ROAP, fax: (66) 2 280 3829

The UNEP IE OzonAction Programme welcomes Mr Steve Gorman, Network Manager, who joined the team on 9 September 1996

Latin America and the Caribbean

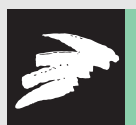
The follow-up meeting of the UNEP ODS Officers Network for Latin America and the Caribbean was held in Cancun, Mexico, during 13-14 June 1996. The network members recommended support for the proposal of the International Customs Council on monitoring exports and imports of controlled substances. They concluded that the strategies and techniques used by Venezuela in implementing its country programme was useful and should be replicated in other countries. They also recommended that the effectiveness of the other networks (Central America) be evaluated.

Contact: UNEP ROLAC, fax: (52) 5 202 0950

Phase-out successes

Water-based refrigeration system wins European award

This year's European Better Environment Awards for Industry, Cleaner Production Section, was given jointly to the Danish Technological Institute, LEGO System A/S and Sabroe Refrigeration A/S for the development of the first industrial refrigeration plant



DTI

to use only water as a refrigerant. The project started at the Danish Technological Institute at the end of 1991. In 1994 a 2-MW cooling plant was built and since August 1995 the plant has formed part of the production of LEGO bricks at LEGO System A/S in Billund, Denmark. Water is used as both the primary and the



secondary refrigerant. Evaporation and condensation take place without any physical heat exchanger which

means there is no temperature loss over the heat exchangers and no reduction in the compressor pressure rate. Energy consumption is 20-50 percent less than that of other similar cooling plants. At LEGO, the plant has been refrigerating process water for 600 injection moulding machines which produce bricks continuously. Sabroe Refrigeration is working with the Danish Technological Institute to develop the process and reduce costs. It is expected that this type of plant will be commercially available within five years. A water-based refrigeration unit for dairy products is expected to be in operation in 1997.

Contact: LEGO, fax: (45) 75 35 33 60
<http://www.enviroawards.ie>



All change at Changling, China

The Chinese refrigerator manufacturer Changling (Group) Ltd. of Babji City, Shanxi Province, China, has made substantial progress towards CFC phase out. Working closely with Bayer AG of Germany since 1985, Changling acquired state-of-the-art CFC-reduced and CFC-free insulation technology.

Following successful trials of 50 percent reduced CFC insulation in 1990, the company stopped production of fully-CFC-blown fridges and raised production of the CFC-reduced fridges: from 350 000 in 1993 to 730 000 in 1995. During 1996, Changling will adopt an HCFC-141b-blown system for insulation. The following year it will use cyclopentane-blown foam.

Changling has received support from the Multilateral Fund through the World Bank (project numbers CPR/REF/18/INV/146 and CPR/REF/13/INV/71), the China State Bureau of Environment Protection, the China Light Industry Association and the Xian Jintong University.

Contact: NEPA, fax: (86) 10 66151776

Questions and answers

Question: *Why is so much attention now being paid to the phase out of methyl bromide?*

Answer: A bromine molecule is some 50 times more damaging to the ozone layer than is a chlorine molecule from CFCs. In spite of this about 76 000 tonnes of methyl bromide are still used worldwide every year, nearly half of it in North America, to control insects, nematodes, weeds, pathogens and rodents. More than 90 percent of the chemical escapes into the atmosphere. There is no scientific doubt that bromine results in ozone depletion in the stratosphere. Indeed, scientists estimate that as much as 5–10 percent of all ozone depletion to date has been caused by methyl bromide.

Question: *What are the current plans for regulation under the Montreal Protocol?*

Answer: The Montreal Protocol has frozen the production and consumption of methyl bromide in developing countries at average 1995–98 levels and has banned it in the developed countries by 2010 (with a 25 percent reduction by 2001 and a 50 percent reduction by 2005). In the latter, at least, many



countries will phase out methyl bromide use before 2010.

In the United States, for example, methyl bromide is classified as a Class 1 ODS and methyl bromide production and import to the United States will therefore be banned by 1 January 2001. The Netherlands phased out the use of methyl bromide for soil fumigation in 1992 as a result of worries over groundwater pollution. Denmark is to ban all agricultural uses in 1998 and Sweden is expected to follow suit. The European Union and Canada will cut agricultural uses by 25 percent by 1998, and a number of other countries are planning to introduce regulations.

Question: *Are there proven alternatives for the major applications of methyl bromide?*

Answer: There are many but no one product can be used for all applications. For soil sterilization, chemical

alternatives include 1,3-dichloropropene, dazomet, chloropicrin and metam sodium. Non-chemical alternatives include crop rotation, steam, solar heating, biological control and plant breeding. Commodity treatment alternatives include phosphine, carbonyl sulphide, irradiation, inert atmospheres, and heat and cold. Alternatives in building fumigation include sulphuryl fluoride and phosphine, insecticides and rodenticides, inert atmospheres, and heat and cold.

UNEP IE OzonAction Programme can help answer technical queries such as this. Send your questions to: UNEP IE OzonAction Programme, fax (33) 1 44 37 14 74

Based on information contained in the US EPA Methyl Bromide Phase Out Web Site: <http://www.epa.gov/docs/ozone/mbr/mbrqa.html#q3>; or fax: (1) 301 614 3395

The US EPA has published *Alternatives to Methyl Bromide: ten case studies* and other methyl bromide publications are listed on page 5.

Technology workshops on ODS elimination held in Viet Nam

UNEP IE OzonAction Programme, through the UNEP Regional Office for Asia and the Pacific (ROAP) and the Hydrometeorological Service of Viet Nam, jointly organized technology cooperation workshops on ODS elimination in Hanoi during 4–5 July and in Ho Chi Minh City during 8–9 July.

Vietnamese government officials emphasized the importance of preventing Viet Nam, with its still low ODS consumption, from becoming a dumping ground for outdated ODS technologies. Some progress had already been made: national policies to minimize and then eliminate ODS in Viet Nam had been formulated, the use of outdated ODS technologies had been prohibited in all new investment projects, and new

regulatory measures to promote the early phase out of ODS, including tax incentives, a permit system to control ODS imports, and public outreach programmes, were being explored.

Thailand and Malaysia provided experts to the workshops to share their experiences of ODS phase out.

Contact: UNEP IE OzonAction Programme, fax (33) 1 44 37 14 74;
The Hydrometeorological Service, Viet Nam, fax: (84) 4 826 3847

Home pages

UNEP IE's home page can be found at <http://www.unepie.org>.

The OzonAction Programme is at <http://www.unepie.org/ozonaction.html>

Refrigeration training in Senegal

As a follow-up to the 'Train-the-Trainer' Course on Good Practices in Refrigeration organized by UNEP IE OzonAction Programme which was held in Senegal in November 1995, the National Ozone Unit of the Ministry of Environment and Nature Protection of Senegal, under the guidance of UNEP, organized three training workshops. These were held in Louga, Kaolack and Dakar during the period March to June 1996.

The workshops resulted in the training of 127 selected technicians and trainers in improved maintenance practices, including recovery and recycling in the field of domestic refrigeration.

Contact: UNEP IE OzonAction Programme, fax (33) 1 44 37 14 74;
Ministry of Environment, Senegal, fax: (221) 226 212

Ozone science news

New ozone hole begins again

Antarctic ozone levels continued their now usual rapid decline during September, falling to below 200 m atm cm in some areas, and reaching as low as 140 m atm cm (representing a 60 percent decline over normal values) at five Antarctic stations: Belgrano, Halley, Marambio, Neumayer and Nernadsky. Ozone depletion was most pronounced at altitudes of 17–21 km where 70–85 percent reductions have been recorded compared to pre-ozone hole values. These reductions have occurred in regions where the temperature is still below -80°C.

Contacts:

Dr R. D. Bojkov, fax: (41) 22 734 23 26
NOAA, fax: (1) 301 763 8125

New satellite to measure ozone levels

A new Total Ozone Mapping Spectrometer Earth Probe (TOMS-EP) satellite was launched on 29 June 1996. This is the first time that a satellite has been launched specifically to measure ozone levels—previous

TOMS instruments have been piggy-backed on satellites designed for other uses. The new satellite will fill a gap in existing ozone measurements, as the last satellite carrying a TOMS instrument—the Russian Meteor-3—completed its mission in December 1994. The new satellite, built for NASA by the TRW Space and Electronics Group, will measure total column ozone and sulphur dioxide levels.
Contact: TRW, fax: (1) 310 813 3331

Cancer in fish linked to ozone depletion

The South Australian Research and Development Institute has discovered a new fish, the murganda, a three-inch purple-spotted gudgeon species, but an astonishing number have sun-induced cancer, which the researchers link to ozone depletion.

Of 8000 murgandas studied, between 500 and 1000 have melanomas. 'All the evidence points at it being caused by this increased solar radiation,' says senior Institute researcher Bryan Pierce.

Contact: SARDI, fax: (61) 8 83 03 93 09

... continued from page 1

implementation issues. The outcome will be reported back to the 8th Meeting of the Parties in November 1996.

Essential use exemptions for Canada, the European Union, Japan, Poland, South Africa, Switzerland and the United States were discussed. These exemptions, mostly for health products such as medical aerosols, totalled 11 000 tonnes for 1998 (compared to nearly one million tonnes consumed by industrialized countries in 1986).

'Emissions of CFCs are declining as a result of the Montreal Protocol. However, our success to date can be reversed unless developing countries too adopt and develop ozone-friendly technologies.'

Elizabeth Dowdeswell, Executive Director UNEP, 13th OEWS meeting, Geneva, Switzerland

Other issues discussed included trade in methyl bromide with non-Parties and with Parties that have not ratified the 1992 Copenhagen Amendment, and the critical agricultural uses of methyl bromide to allow the Parties to permit exemptions from the phase out, if necessary.

The Ozone Secretariat circulated a note on illegal trade in ODS. A decision on provision of information on dumping, and illegal imports and exports of ODS, adopted by the 7th Meeting of the Parties requested the Secretariat to examine information on this issue and report to the 8th Meeting, taking into account the non-compliance procedure under the Montreal Protocol.

There was extensive discussion of the reorganization of TEAP which was being conducted by TEAP itself, with help from the Informal Advisory Group (IAG). One aim was to establish as a goal that 50 percent of the members of TEAP come from developing countries and from countries with economies in transition. There had been an increase to almost 50 percent for the TEAP but further progress on TEAP and on the Technical Options Committees would depend on the availability of experts and funds to cover their participation in assessment meetings. TEAP and the IAG believed that strengthening the TEAP code of conduct to include elements of disclosure and oversight would be sufficient to ensure the continued integrity of the Panel's work.

Contact: UNEP IE Ozone Secretariat
fax: (254) 2 623 913

<http://www.unep.org/secretar/ozone/home.htm>
and <http://www.unep.ch/ozone>

Completed investment projects (as of 31 August 1996)

	foams	refrig.	halons	aerosols	solvents	prod. sector	total number	total tonnes
World Bank	10	17	3	2	10	4	46	8171
UNDP	26	2	0	2	6	0	36	1955
UNIDO	1	3	0	0	1	0	5	614

Number of projects by country: Algeria, 1; Argentina, 2; Brazil, 1; Cameroon, 1; China, 16; Ecuador, 2; Egypt, 11; India, 3; Indonesia, 2; Malaysia, 22; Mexico, 5; Philippines, 2; Thailand, 14; Turkey, 2; Venezuela, 3.
Erratum: contrary to information in OAN 19, there are no completed projects in Iran or Tunisia.

Contact: Multilateral Fund Secretariat, fax: (1) 514 282 0068

Japan helps its Asian neighbours

Japan is making remarkable strides in technical cooperation with its Asian neighbours. Much of this success has been due to individual industrial initiatives and to the formation of trade associations which have enabled normally competitive companies to work successfully together.

The Japanese effort is led by the Ministry of International Trade and Industry (MITI) working jointly with two other key players: the Japan Electrical Manufacturers' Association (JEMA) and the Japan Industrial Conference for Ozone Layer Protection (JICOP).

JEMA has been active in ODS elimination since 1987. It has helped

organize several technical meetings with MITI, JICOP and the US EPA. The first was in 1992 in Thailand which led to the suspension of CFC use by a number of international corporations and to the Thai government's pledge to eliminate ODS by 1998. The following year a similar conference in Malaysia helped secure a guarantee from Japanese companies operating there that they would begin a complete phase out of all ODS. Further meetings were organized for Indonesia in 1994 and for Viet Nam in 1995.

Contact: JEMA, fax: (81) 3 3506 0475
JICOP, fax: (81) 3 5689 7983

Significant improvement in data reporting

The 14th Implementation Committee Meeting was held on 23 August 1996 in Geneva, Switzerland. Latvia, Lithuania and the Russian Federation provided detailed reports on the financial problems that had prevented them signing the London amendment. The Ozone Secretariat reported a significant improvement in the reporting of data, with the proportion of countries now meeting their data-reporting requirements having risen from 40 to 50 percent. UNEP presented a comprehensive report on the 65 countries currently being assisted

through country programmes, implementation strategies or networks.

A total of 101 countries reported for 1993, of which 64 were operating under Article 5 and 37 non-Article 5. In 1994, 102 countries reported, of which 67 were Article 5 and 35 were non-Article 5. For the year 1995, 50 countries had reported by 9 September, even before the deadline was due.

Contact: UNEP Ozone Secretariat,
fax: (254) 2 623 913

TEAP reports findings on phase out of CFC inhalers

UNEP's Technical and Economic Assessment Panel (TEAP) has published its findings for phasing out CFC-containing MDIs in compliance with the Montreal Protocol. The panel expects to be able to propose specific recommendations and detailed time scales for the phase out of CFC MDIs by 1997, but recommends that the signatories to the Protocol should act now to limit their availability. TEAP findings include:

- the possibility that a transition strategy could facilitate a major reduction in the use of CFCs in MDIs by the end of 2000;
- an virtual ban on the last remaining

use of CFCs in MDIs could be possible sometime after 2005;

- review of this date annually and acceleration of this schedule if possible;
- immediate discouragement of pharmaceutical companies from developing new CFC MDIs where a CFC-free alternative exists.

These and other findings, which may be adopted when the signatories to the Montreal Protocol meet later this year, will start the process to end one of the last remaining uses of CFCs, while ensuring patient health is not compromised.

Contact: UNEP Ozone Secretariat,
fax: (254) 2 623 913

Ozone Day celebrations in China and India

China celebrated Ozone Day by holding a National Conference on Ozone Layer Protection. Organized by the China National Environmental Protection Agency, the conference was attended by representatives from China's line ministries, sector and local governments, local environmental protection bureaux and industries, and the international organizations involved in the Montreal Protocol.

India, through the Ozone Cell in the Ministry of Environment and Forests, also observed Ozone Day with a national conference, and a poster-making contest

attended by the Union Minister of Environment and Forests. The Minister also presented prizes to the winners of the poster competition. The National Museum of Natural History in New Delhi also organized an exhibit on ozone. The highlight of the celebrations was the commissioning of an ODS project for Eagle Flask Enterprises, in Pune, India.



These children took part in India's Ozone Day celebrations at a poster-making contest organized by the National Museum of Natural History, New Delhi.

Contact: NEPA, fax: (86) 10 66151776;
Indian Ministry of Environment and Forests,
fax: (91) 11 436 0678

The next issue of OzonAction News will carry details of how other countries celebrated Ozone Day in 1996.

In brief ...

- Members of the Arab League are to establish a mechanism for cooperation in the implementation of the Montreal Protocol. Egypt's Ozone Unit has been asked to help set up the process.

Contact: Egyptian Environmental Affairs Agency, fax: (202) 3610 764

- The Dow Chemical Company has been awarded the 1996 Presidential Green Challenge award for its development of CO₂-blown foam technology, now estimated to be saving tonnes nearly 1600 tonnes of CFCs every year.

Contact: Dow Chemical,
fax: (1) 517 638 9752

- Ozone levels taken at the Mauna Loa Observatory in Hawaii by the US National Oceanic and Atmospheric Administration (NOAA) during the 1994-95 winter reached record lows, falling by 23 percent in October 1994 and to below 200 Dobson units in December 1994. Increased levels of ultraviolet radiation were also recorded.

Source: NOAA, fax: (1) 303 497 6975

- Eastman Kodak Company in the United States has won the York International Corporation's Environmental Leadership Award for its extensive programme to replace and retrofit large CFC chillers.

Contact: York, fax: (1) 708 541 9615

- The year 1995 has been confirmed as the hottest on record. Scientists at NASA's Goddard Institute for Space Studies in New York City conclude that global surface temperatures in 1995 were 0.39°C higher than the 1951-80 average and 0.01°C higher than the previous warmest year, 1990. Many scientists are now convinced that the cause is global warming.

Contact: Goddard, fax: (1) 212 6781 5622

Status of Ratification

(as at 19 September 1996)

The Vienna Convention

159 Parties; new Party, Azerbaijan

The Montreal Protocol

157 Parties; new Party, Azerbaijan

The London Amendment

110 Parties; new Parties, Azerbaijan and Belarus

The Copenhagen Amendment

58 Parties; new Parties, Azerbaijan, Cameroon and Switzerland

Reclassification

Kuwait: non-Article 5 country

Recent publications

The Proceedings of UTECH '96. Rapra Engineering, United Kingdom, 1996.

Handbook for the International Treaties for the Protection of the Ozone Layer: the Vienna Convention (1985), the Montreal Protocol (1987), 4th edition, UNEP, Nairobi, Kenya, 1996

Moving to Alternative Refrigerants: update—six case histories on comfort coolers and commercial refrigeration, US EPA, Washington, DC, 1996

Forthcoming meetings

Ozone in the Atmosphere, Conférence Scientifique Franco-Espagnole, Roses (Alt Ampurdà), Spain, 2–4 October 1996.

International Conference on Ozone Protection Technologies, Washington DC, United States, 21–23 October 1996.

The 1996 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions, Orlando, Florida, United States, 4–6 November 1996.

15th Meeting of the Implementation Committee, San José, Costa Rica, 18 November 1996.

Preparatory Meeting to the 8th Meeting of the Parties to the Montreal Protocol, San José, Costa Rica, 19–22 November 1996.

4th Conference of the Parties to the Vienna Convention and the 8th Meeting of the Parties to the Montreal Protocol, San José, Costa Rica, 25–27 November 1996.

World policy round-up

Fiji makes new laws to protect ozone layer

New laws will be introduced in Fiji within the next three years to protect the ozone layer. The laws will prevent the import and sale of substances known to be harmful to the ozone layer. Early this year, Fiji established an Ozone Depleting Substances (ODS) unit to enable the government to carry out its promise to phase out ODS from the country by the year 2000. The ODS unit has prepared a newsletter on ozone layer issue to be distributed to relevant industries.

Contact: Ministry of the Environment, fax: (679) 30 56 74

Burkina Faso drafts ODS regulations

The National Ozone Unit of Burkina Faso, in conjunction with the Trade and customs Office and industrial representatives, is drafting regulations on ODS control that will prohibit the import of old equipment using ODS and put in place a system for the control and inventory of ODS imports.

Contact: Burkina Faso NOU, fax: (226) 31 81 34

New Zealand passes new ODS legislation

New Zealand's new Ozone Layer Protection Act 1996 has passed through all its stages in Parliament, with the support of all political parties. The Act, which replaces the previous 1990 Act, changes the way in which ODS are regulated in New Zealand. Previously most of the controls were detailed in the body of the Act which meant that a full Parliamentary amendment was needed to make changes. The new Act contains few controls but instead provides a framework for making regulations.

The Act also introduces an important new policy for protecting the ozone layer: the Minister of the Environment can require those who handle ODS that might be released to the atmosphere to be accredited. Furthermore, workers will not be allowed to handle ODS unless they have passed an examination showing that they are aware of their obligations under the new legislation and that they have sufficient knowledge to comply with these obligations.

Contact: Ministry of the Environment, fax: (64) 4 473 4090

German CFC ban raises concern

The decision of the German parliament to require removal and replacement of CFCs

from large refrigeration equipment by July 1998 (see *OzonAction News No 19*) could lead to the export of up to 12 000 tonnes of CFC-12, according to ICI, thus undermining the transition to ozone-friendly alternatives. ICI has also queried whether the move could confuse efforts to detect illegal imports. Under existing law, German firms can export CFCs until mid-1998, after which date they would have to be destroyed in Germany.

Contact: German Federal Ministry for the Environment, fax: (49) 228 3053 524

Canada reviews new control measures

Environment Canada has released a discussion paper that considers a number of new controls such as banning the manufacture or import of new equipment containing CFCs, halons or other ODS. It also outlines new control measures being considered for HCFCs, CFCs, halons, methyl chloroform, carbon tetrachloride and HFCs. Canada is already committed to phasing out HCFCs by 2010, 10 years ahead of the Montreal Protocol schedule.

Contact: Environment Canada, fax: (1) 819 953 4936

Ecolabeling for European refrigerators

Following a report requested from Italy by the European Union, an action plan and a budget has been prepared for the allocation of an ecolabel for domestic refrigerators. Although ecologists advocated that such an ecolabel be awarded only to refrigerants with zero global warming potential and zero ODP, this suggestion was rejected in the report, which suggests that the award be given to refrigerators with zero ODP, such as those that use HFC-134a or hydrocarbons.

Contact: EC DGXI, fax (32) 2 29 69 559

OzonAction, a quarterly publication, is available in Arabic, Chinese, English, French, Portuguese and Spanish.

The contents of this newsletter are provided for information and do not necessarily represent the policy of UNEP.

Please send comments and material for publication to Mr Rajendra Shende, Coordinator, OzonAction Programme, UNEP IE.

This publication was designed and produced by Words and Publications. It is printed on recycled paper which is bleached without any damage to the environment.