



# 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

### Ten years since Vienna



Dr Martin Bartenstein,  
Minister, Federal  
Ministry of the  
Environment, Austria

The Montreal Protocol has become a model for the international handling of environmental problems and a paramount example of constructive cooperation between governments, industry and science. The 7th Meeting of the Parties to the

Montreal Protocol as well as the preparatory meeting will take place in Vienna, Austria, from 28 November to 7 December 1995.

We are also celebrating the 10th anniversary of the adoption of the 'mother convention' of the Montreal Protocol, the Vienna Convention for the Protection of the Ozone Layer. This instrument was adopted in Vienna on 22 March 1985. The Austrian government intends to honour this important date in the struggle to protect the environment by holding a commemoration event on the afternoon of 4 December 1995. This celebration will be preceded by a workshop on the lessons that can be drawn from experience with the Montreal Protocol for other environmental regimes.

For these reasons, it is an honour for Austria to host the 7th Meeting of the Parties, a meeting which will probably be of critical importance for the future of our

endeavour to protect the human environment from irreversible damage by the release of ozone-depleting substances (ODS) into the atmosphere.

Responsible negotiating by each Party is essential if we are to make real progress. There can be no justification for complacency. The questions we will face in Vienna are of crucial importance for the world community. Parties will have to address challenging issues such as how to extend and improve controls for ODS for all Parties while ensuring that this common undertaking does not hamper economic development, especially in developing countries.

In that context the performance and future development of the Multilateral Fund will be an important aspect of our discussions as real progress will depend on the continuation of a constructive partnership between developing and industrialized countries in the field of financial issues and technology transfer. I am convinced that each Party will do its best to ensure that the Multilateral Fund continues to be the useful and indispensable instrument which it has proved to be in past years.

Furthermore, the status of certain Parties vis-à-vis Article 5 will be under discussion. Here we also have to find acceptable solutions.

I really do hope that the cooperative spirit which we experienced in previous meetings will continue to prevail in Vienna. The Austrian government will do its utmost to contribute to the success of the meetings.

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*100 days to go for CFC phase-out in developed countries*

## 17th ExCom clears projects for US\$80 million

The 17th Meeting of the Executive Committee (ExCom), which was held during 24-27 July in Montreal, Canada, considered an unprecedented number of activities for funding. Of the US\$90 million worth of projects that were considered, projects with a value of about US\$80 million were cleared for approval. Activities

worth US\$37 million were actually funded at the meeting; the balance will be funded at the next ExCom, when further 1995 financial contributions will be available (see page 6 for details of the status of the Fund, as presented at the meeting).

The meeting successfully tested the new cost effectiveness threshold criteria for

project selection and finalized plans for the new system of project approval at the 18th and subsequent ExComs.

It also agreed on indicative investment targets for the implementing agencies: World Bank, 45 per cent; UNDP, 30 per cent; and

*... continued on page 5*

## News from international agencies



### Fund Secretariat

Following the decisions of the 17th ExCom meeting, the Secretariat reviewed the projects held over from the 17th meeting and those resubmitted by implementing agencies together with new project proposals, and prepared policy papers for submission to the 18th ExCom meeting (22–24 November).

It also updated the inventory of approved projects and the *Policies, Procedures and Guidelines* document. Reports of the 17th ExCom meeting were sent to all the Parties, together with information about ExCom decisions relevant to individual country programmes and funding requests. Reminders were sent to countries which had not reported on the implementation of their programmes.

The Chief Officer briefed the Bureau of the 6th Meeting of the Parties on the performance of the Fund since the Parties met in October 1994. The Secretariat also attended the 10th Implementation Committee meeting, the 12th Open-ended Working Group (OEWG) meeting and the meeting of the ODS Officers Network for Southeast Asia and the Pacific. It convened a meeting of experts to discuss ODS production phase out in Article 5 countries.

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### UNEP IE

UNEP IE organized the Meeting of the Consultants working under the Multilateral Fund (see page 9) and a National Training Course on Chillers and Refrigerant Management in Thailand (see page 7). A follow-up meeting of the ODS Officers Network for Latin America South was held in La Paz, Bolivia, during 10–11 August 1995, and the ODS Officers Network for Southeast Asia and the Pacific held their meeting in Manila, Philippines, during 14–18 August 1995 (see page 7).

The 17th ExCom meeting approved funding for the preparation of country programmes for Guyana, the Democratic People's Republic of Korea, Paraguay, Zaire and the Solomon Islands, Kiribati and

Vanuatu. The meeting also approved country programmes for Togo, Malta and St Lucia, and institution-strengthening projects for Congo, the Dominican Republic, Peru and Vietnam. Three sub-regional workshops on methyl bromide were also approved.

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### UNEP Ozone Secretariat

The Secretariat serviced the following meetings in Geneva: the 12th OEWG (see page 6), the

1st Meeting of the Bureau of the 6th Meeting of the Parties, the 10th and 11th Meetings of the Implementation Committee (see page 8) and the Meeting of the Review Sub-group of the Study of the Financial Mechanism. The 12th OEWG meeting was attended by 328 representatives from 89 countries, 15 NGOs and 32 industries, in addition to representatives from UN agencies, the Multilateral Fund, the Global Environment Facility and the three Technical Options Committees.

**Contact:** Mr K. M. Sarma, UNEP Ozone Secretariat, PO Box 30552, Nairobi, Kenya  
Tel: (254) 2 623 885 Fax: (254) 2 521 930  
E-mail: [madhava.sarma@unep.no](mailto:madhava.sarma@unep.no)



### UNDP

At the 17th ExCom meeting, UNDP reported that of its total approved budget of US\$78.2 million, it had disbursed US\$27.5 million (35 per cent) by the end of June 1995. Of 280 approved projects and activities, 97 had been completed, including 20 investment projects that had eliminated 1455 tonnes of ODS a year.

The meeting also approved the Venezuela Country Programme and US\$16.6 million in funds for UNDP to implement 43 new projects and activities, including 26 investment projects. The approved methyl bromide activities will be carried out jointly with UNEP, with UNDP responsible for three sub-regional data surveys and analysis. UNDP will start activities for the first time in Ethiopia, Malawi, Tanzania, Uganda and Zambia,

bringing the total number of countries with which UNDP is working to 37.

**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](mailto:frank.pinto@undp.org)



### UNIDO

UNIDO formulated investment projects in the refrigeration and foam sectors and expanded its activities in the solvent, aerosol and halon sectors, with particular reference to small and medium-sized industries. UNIDO is now fully engaged in implementing projects approved at the 13th and 15th ExCom meetings. Because both inter-agency and bilateral cooperation are important keys to the effectiveness of the Montreal Protocol, UNIDO continues to cooperate closely with UNDP, UNEP and the World Bank as well as with countries such as Australia, Austria, Canada and the United States.

UNIDO technical staff served as resource persons for the Meeting of Consultants Working under the Multilateral Fund and for a number of ODS Workshops (see page 9).

**Contact:** Mrs A. Tcheknavorian, UNIDO, PO Box 300, A-1400 Vienna, Austria  
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E-mail: not available



### World Bank

The Bank has now assisted developing countries to phase out at least 3300 ODP tonnes. This will reach 10,000 tonnes early next year when large aerosol-sector projects in China will be implemented. Annual disbursements to projects have grown from some US\$500 000 in 1992 to more than US\$22.5 million by mid-1995. The Bank is currently pursuing initiatives to achieve ODS phase out in efficient and cost-effective ways, including a sector-based programme in China, a market-based approach in Chile and a small project approval procedure that has been tested in India. The Bank is also continuing to streamline its procedures through use of umbrella grant agreements.

**Contact:** Mr Ken Newcombe, World Bank, 1818 H. Street, N.W. Washington D.C. 20433, United States  
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E-mail: [knewcombe@worldbank.org](mailto:knewcombe@worldbank.org)

## Industry and technology updates

### AEROSOLS

#### Finnish firm develops aerosol refill system

The Finnish firm Pentisol Ky has developed aerosol cans that can be refilled tens of times with products such as lubricating oils, hair conditioners and cleaning compounds. The fillers are housed inside the can in a plastic bag, which is then squeezed by a propellant such as compressed air. No propellant leaves the can and the package can be simply refilled using a hand pump. According to the inventor of the system, for which



patents are pending, customers who use 1000 aerosol cans a year will find it profitable to start filling cans for themselves. The cans are available on lease from Pentisol.

The company is also working on schemes that would enable individual customers to have their cans refilled at selected points such as supermarkets, hardware stores and petrol stations.

**Contact: Pentisol Ky, fax (358) 0291 0945**

### FIRE FIGHTING

#### Halotron 1 successfully tested

Buckeye Fire Equipment Co. and American Pacific Corporation have successfully tested four Halotron 1 portable fire extinguishers. Halotron, a subsidiary of American Pacific, manufactures Halotron 1, a Halon-1211 replacement that has been approved by the US Environmental Protection Agency (USEPA). Halotron 1 is based on HCFC-123.

Buckeye will add a line of Halotron 1 extinguishers to its catalogue immediately.

**Contact: American Pacific Corporation  
fax: (1) 702 735 4876**

### FOAMS

#### DuPont introduces new foam-blowing agent

DuPont has developed the FORMACEL Z-4 foam-blowing agent, based on HFC-134a, as a replacement for CFC- and HCFC-based products in thermoset and thermoplastic foam-blowing applications. The new product is said to have zero ozone-depletion potential (ODP) and not to contribute to smog formation. The company also claims that the product has low permeation, negligible photochemical reactivity, low vapour thermal conductivity, low toxicity and low molecular weight. Since it is gas volume that expands foam, less of the low

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

molecular weight product is needed to achieve the same gas volume as the heavier CFC and HCFC compounds.

**Contact: DuPont, fax: (1) 302 774 2370**

#### Way clear for acetone use

USEPA has removed acetone from its list of Volatile Organic Compounds (VOCs), recognizing that it has negligible photochemical activity and does not contribute to the formation of low-level smog. This opens the way for a more extensive use of acetone as a blowing agent in the manufacture of flexible polyurethane foams and other plastics. Acetone is already used in several plants in the United States and is under study for a number of Multilateral Fund projects in Argentina.

**Contact: Bert Veenendaal, RAPA  
fax: (1) 219 326 6047**

A booklet containing case studies based on a number of industrial development projects in Denmark, called *Polyurethane Foams without Ozone-Depleting Substances*, has been published by the Danish Environmental Protection Agency.

**Contact: Mr Per Henrik Pedersen, Danish EPA,  
fax: (45) 32 660479**

## China completes first phase-out investment project

China has completed its first ODS phase-out investment project, with UNDP as the implementing agency. The project was actually a combined demonstration and investment project, implemented under 'national execution', with UNDP assistance in the international procurement of goods and services. The certificate of completion was issued in April 1995 when 180 tonnes a year of CFC-11 were eliminated through conversion of the foam-blowing system for the production of polyurethane slabstock to methylene chloride. A rapid-cooling unit was installed to allow the use of alternative

#### Project summary

sector	polyurethane plastics
location	Tianjin, China
date of approval	June 1993
date of completion	May 1995
approved funding	US\$1.08 million
ODS involved	CFC-11
ODS phase out	180 tonnes a year
implementing agency	UNDP

blowing agents. The original plan of introducing the Dow long-range polyol was not implemented because this polyol was not available in Asia at that time. As an interim solution, the use of

methylene chloride has been successful. The plant will now serve as a technology demonstration centre for other enterprises interested in switching to ODS alternatives. The plant was officially commissioned on 18 May 1995, when the Hand-over Protocol was signed at a ceremony attended by more than 100 participants from government and industry. The Chinese National Environment Protection Agency (NEPA) is now planning to disseminate the outcome of this demonstration project with assistance from UNEP and UNDP.

**Contact: UNDP, fax: (1) 212 906 6947;  
NEPA, fax: (86) 1 832 8013**

## REFRIGERANTS

### Hydrofluoroethers for CFC replacement

Hydrofluoroether (HFE) is 3M's contribution to the CFC refrigerant replacement market. The US company has announced that toxicity testing of HFE is nearly complete. The HFEs concerned consist of a fluorinated 4-carbon chain with a methoxy or ethoxy group on one end. HFEs were designed and developed in less than two years, and, according to 3M, represent the beginning of a 'major growth phase' for the company in specialty chemicals.

**Contact: 3M, fax: (1) 302 887 7706**

### Chinese produce environment-friendly refrigerator

The Kelong Electrical Company in China has succeeded in producing a new domestic refrigerator, the Rongsheng, which uses isobutane as the refrigerant and cyclopentane as the foaming agent for the refrigerator's insulating plastics. According to tests carried out by the China Domestic Electrical Appliance Institute and the CFC Substitute Assessment Centre, the new machine is as efficient as similar foreign products, and has zero ODP and zero greenhouse warming potential (GWP). Energy efficiency is a 36 per cent improvement on China's previous best refrigerators and noise levels have also been reduced.

**Contact: National Environmental Protection Agency, fax: (86) 1 832 8013**

### Hitachi tests new refrigerant

Electronics manufacturer Hitachi Ltd is testing a patented mixture of coolants containing R407C, a substance with a reported ODP of zero. R407C is a mixture of HFC-134a, HFC-125 and HFC-32. Field tests of refrigerators and air conditioners using the coolant are set to run from next year, with commercialization of products set for the year 2000, according to the *GMI Report* (25 May 1995).

Like other major manufacturers, Hitachi has been incorporating HCFC-22 into new products as a replacement for CFCs as the phase-out date for developed countries of the end of 1995 draws near. But although the ODP of HCFC-22 is only one-twentieth that of CFC-12, it is also due for gradual phase out by developed countries under the Montreal Protocol during the period 1996 to 2010. Hitachi claims that the R407C in the

**UNEP IE's OzonAction Programme, in cooperation with the Stockholm Environment Institute, is collecting information on ODS legislation and regulations. The results will be published and distributed to all National Ozone Units and to anyone providing the requested information. Questionnaires are available from the OzonAction Programme, fax: (33) 1 44 37 14 74**

experimental coolant causes no more harm to the ozone layer than hydrocarbon coolants, and that it poses few problems in the areas of flammability and cooling ability. However, all the constituents of R-407C have some GWP. Furthermore, the new coolant will operate at roughly 10 per cent higher pressure than the substances it replaces, and this will involve strengthening some parts of the equipment and increased costs.

**Contact: Hitachi, fax: (81) 3 212 3067**



*The Super Efficient Refrigerator Program (SERP) and the Whirlpool Corporation have announced a range of three new domestic refrigerators which have a 38–41 per cent efficiency improvement over US Department of Energy standards. The refrigerator is HFC-134a but the new machines still use foam insulation blown with HCFC-141b. SERP was created by 24 US public and private utilities with help from the Natural Resources Defense Council and the USEPA to bring energy-efficient refrigerators ahead of normal market projections.*

**Contact: Whirlpool, fax: (1) 616 923 3785**

### Helium-based cooling system

Scientists at the Lawrence Livermore Laboratory in California have announced the development of a new helium-based cooling system that could substitute for conventional refrigeration systems in the home and in vehicles.

Helium is an inert gas that causes no environmental degradation. Developers claim that the new system could be more efficient and smaller in size than most others using CFC alternatives. A small helium-based refrigerator recently ran on 6 watts whereas a conventional system with the same cooling power would have needed 300–400 watts.

A compressor for the helium system is expected to cost at most US\$50–100. The designer claims that the system is very adaptable and easy to manufacture. Industrial partners are being sought.

**Contact: Lawrence Livermore Laboratory fax: (1) 510 423 2224**

### DynEco's vehicle air conditioner tested

The Oak Ridge National Laboratory (ORNL) in the United States has tested a new vehicle air conditioner based on compressors which incorporate the Orbital Vane™ technology (a compressor design featuring sliding vanes on the rotor which never touch the stator wall, thus reducing friction and increasing efficiency). Developed by DynEco Corporation, of Rockledge, Florida, in conjunction with Kurt Manufacturing Company, the new compressors are in the 4–18 kW range and it is said that they can be produced cheaply and rapidly. The new vehicle air conditioner uses HFC-134a as refrigerant and was described by ORNL as 'compact, lightweight, and more efficient than conventional automobile air conditioning compressors'.

DynEco is now investigating the production of vehicle air conditioners using carbon dioxide as refrigerant. Until now, the CO<sub>2</sub> cooling cycle has never been commercialized because it requires pressures five times as high as those of conventional refrigerants.

**Contact: DynEco, tel: (1) 407 639 0333**

**UNEP IE is updating a compendium of technical case studies on how to eliminate the use of ozone-depleting substances. Governments and industries which have case studies to contribute are asked to contact UNEP IE.**

## METHYL BROMIDE

### Carbonyl sulphide as a new fumigant

Australian scientists have patented a potential new replacement for methyl bromide called carbonyl sulphide. The new fumigant has been developed by scientists at the Stored Grain Research Laboratory of Australia's CSIRO Division of Entomology. According to an article in *Food Technology in New Zealand* (September 1994), the new fumigant is said to be biodegradable, readily available and does not deplete the ozone layer.

**Contact: CSIRO, fax: (61) 6 246 1202**

## RECOVERY AND DESTRUCTION

### Sound waves used to destroy CFCs

A team of Japanese scientists headed by Yoshio Nagata at the Research Institute for Advanced Science and Technology at Osaka University, Japan, have developed a technology for destroying CFCs at room temperature using sound waves. According to a report in *Chemistry Letters* (1995, p. 203), the scientists experimented with a solution of CFC-113 in water and bombarded the solution with pulses of ultrasound (high-frequency sound waves). They found that the CFC-113 reacted with the water to form CO<sub>2</sub>, carbon monoxide, hydrochloric acid and hydrofluoric acid. Within 30 minutes, 80 per cent of the dissolved CFC-113 was destroyed, while the water temperature rose from 22 to 30°C.

The researchers also repeated the experiment in an atmosphere of argon instead of air and found that the CFC destruction rate tripled. Excluding air apparently amplifies the effect of ultrasound in water, although the reason for this is unknown.

**Contact: Osaka University, tel: (81) 6 877 51 11**

## SOLVENTS

### Allied Signal and 3M to market replacement solvents

Allied Signal and 3M have announced that the two US companies are together to market specialty solvents used as replacements for CFCs and other ODS. Products will include a new family of hydrofluoroethers, under development by 3M; Allied Signal's HCFC Genesolv® product line and HCFC-141b; and 3M's current line of Performance Fluids. As a result of the alliance, Allied Signal will

**Celebrations of the 10th anniversary of the signing of the Vienna Convention will be held during the 7th Meeting of the Parties in Vienna on 4 December.**

suspend development of its next generation solvent HFC-356mcf, an HFC which would have replaced the Genesolv® and HCFC-141b product lines.

**Contact: Allied Signal, fax: (1) 201 455 3334**

**New cold solvent from French company**  
Chimie, Innovations et Technologies (CIT Diffusion) has announced a new cold solvent in France to act as a substitute for 1,1,1-trichloroethane (methyl chloroform). Called Biosane T212, the solvent is said to be just as fast as the ODS it replaces, to be compatible with most plastics and to have a high self-flammability point.

**Contact: CIT, fax: (33) 90 92 32 32**

### New solvent for precision cleaning

DuPont has announced commercial availability in the United States of Vertrel XF™, an HFC for use in precision cleaning. Developed to replace ozone-depleting CFCs in certain critical applications, the product has a low GWP. The chemical and its possible azeotropes can be used to replace CFC-113, HCFC-141b, 1,1,1-trichloroethane and perfluorocarbons in many precision applications, including the electronics industry.

DuPont expects to start market development in Europe in autumn 1995, with final commercial development to follow early in 1996.

**Contact: DuPont, fax: (1) 302 774 2370**

*The Secretary General of Malaysia's Ministry of Technology and Environment, Mr V. Danabalan, inspects an air conditioning recycling unit on May 12, when 50 operators were trained in its use. Some 200 of these units have been distributed under a project with the World Bank as implementing agency*



... continued from page 1

UNIDO, 25 per cent. At its 16th meeting, the ExCom agreed that UNEP's activities would be covered under a 'support activities' category (UNEP is not an implementing agency for investment projects).

The implementing agencies agreed on a new format for reporting, which merges the financial and physical progress reports into one document. The format for ExCom reports was also changed in order to make them clearer, more transparent and user friendly.

Other key points included:

- the meeting decided, in the light of technological advances, not to consider for funding any projects to convert ODS-based capacity installed after 25 July 1995;
- draft guidelines on monitoring and evaluation of programmes and projects were introduced; and
- the draft report to the 12th meeting of the OEWG on ExCom's response to the review of the Financial Mechanism was revised and approved.

### Finnish government funding for non-Party countries

The Finnish International Development Agency (FINNIDA) is providing funding for country studies and other technical assistance projects for developing countries that have not yet ratified the Protocol, including the Baltic countries. Such studies have been completed for Estonia, Latvia and Lithuania. Latvia and Lithuania have now ratified the Protocol.

## Financial status reviewed at 17th ExCom

The financial status of the Multilateral Fund was reviewed at the 17th ExCom meeting (see page 1). As at 28 July 1995, some US\$32.7 million was available for

### Income

Contributions received:	
cash payments	291 725
promissory notes	47 419
Bilateral cooperation	11 523
Interest earned	13 806
Miscellaneous income	2522

*Total \** 366 996

\* columns may not produce correct totals as a result of rounding

disbursement. The status of individual country contributions is shown in the table on the right. The overall status (in US\$1000) is shown below:

### Cash disbursed or earmarked

UNDP	88 972
UNEP	16 159
UNIDO	48 926
World Bank	156 582
Bilateral cooperation fund	11 523
Secretariat and ExCom	11 114
Programme support (1991-95)	509
Cash advance to Ozone Secretariat	450

*Total \** 334 236

**Balance available 32 760**

### Status of the financial contributions to the Multilateral Fund, 1991-95 (as at 28 July 1995)

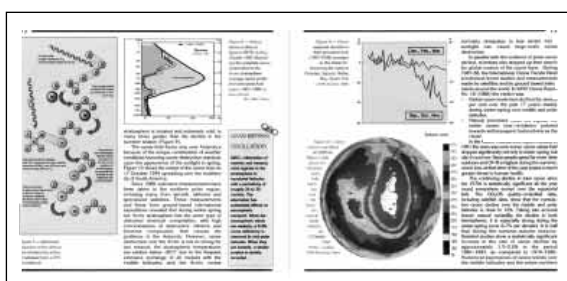
	<i>total agreed contributions 1991-95 (US\$1000)</i>	<i>total outstanding contributions 1991-95 (US\$1000)</i>
Australia	9592	128*
Austria	4706	1628
Belarus	2800	2800
Belgium	6834	0
Bulgaria	754	0
Canada	19,545	9976
Cyprus	96	35*
Czech Republic	2451	46*
Denmark	4150	210*
Finland	3499	0
France	38,132	2341*
Germany	56,838	15,577*
Greece	2277	(21)
Hungary	1177	403
Iceland	188	39*
Ireland	1133	314*
Israel	1109	200*
Italy	26,559	18,938
Japan	76,784	21,717*
Kuwait	1159	1159
Liechtenstein	63	0
Luxembourg	378	105*
Malta	28	0
Monaco	42	0
Netherlands	9662	2617*
New Zealand	1511	0
Norway	3462	0
Panama	17	0
Poland	2739	2266
Portugal	1229	1229
Russian Federation	47,063	47,063
Singapore	531	0
Slovakia	759	726
South Africa	2639	405*
Spain	12,418	3454*
Sweden	7134	2323
Switzerland	7009	1936*
Ukraine	10,857	10,071
United Arab Emirates	1292	733
United Kingdom	31,340	8757*
United States	135,835	27,946*
Uzbekistan	1123	1123
<b>TOTAL</b>	<b>536,913</b>	<b>186,245</b>

#### Notes:

total arrears 1991-94 (US\$1000) 65,516  
1995 contributions still to be paid (US\$1000) 120,727

\* These countries are fully paid up for 1991-94 but have not yet completed payment of their 1995 contributions. Any outstanding contributions on 1 January 1996 will be in arrears.

Source: Report of the 17th Meeting of the ExCom, UNEP/OxL.Pro/ExCom/17/60 Annex I, pages 3-4



WMO and UNEP have jointly produced an illustrated guide to the science of stratospheric ozone and the actions taken by WMO and UNEP to safeguard the ozone layer. The Changing Ozone Layer is available from WMO.

Contact: WMO, fax (41) 22 734 23 26

## 12th OEWG prepares amendments for Vienna

Representatives from 85 of the countries which have ratified the Montreal Protocol, along with observers from industry and non-governmental organizations, attended the 12th OEWG meeting in Geneva which began on 28 August. They considered the adjustments, amendments and decisions needed to strengthen, and speed the implementation of, the Protocol.

The meeting came at a time when several trends threaten to undo the achievements of the Protocol process: complacency on the part of some groups that success has already been achieved, scepticism on the part of a few others on environment issues in general and the rapid increase in the consumption of ODS by several developing countries. While 25 per cent of the world's population has nearly completed the phase out of ODS, the remaining 75 per cent in the developing world and in countries with economies in transition have still to begin making substantial reductions in their consumption.

The meeting asked the Technology and Economic Assessment Panel to carry out the financial and economic studies needed with regard to controls on methyl bromide

and HCFCs. It also considered the phase-out schedule of all ODS controlled by the Protocol for developing countries; the definition of 'feedstock' and 'basic domestic needs' as used in the Protocol; the definition of 'quarantine' and 'pre-shipment' applications as related to methyl bromide and the limitation of uses of chlorofluorocarbons (CFCs) as chemical process agents.

The meeting also considered a report on improving the Protocol's financial mechanism, the trade in used ODS, the status of recycled controlled substances under the Basel Convention on hazardous wastes, essential use exemptions, process agents, exports from developing countries, dumping and the illegal movement of ODS.

The meeting also requested the ExCom to provide to the 7th Meeting of the Parties an outline and framework for a three-year rolling business plan for the Fund for approval by the Parties; an indicative projection of demand for resources based on current scenarios for CFCs, halons, carbon tetrachloride and methyl chloroform; and details of projected cash flow for 1996.

## Questions and answers

**Question:** *What are hydrocarbon aerosol propellants?*

**Answer:** Hydrocarbon aerosol propellants, or HAPs, are comprised mainly of a mixture of two gases, propane and butane, which are by-products of the distillation of crude oil (the main products are petrol, paraffin, diesel, lubricating oil and tar).

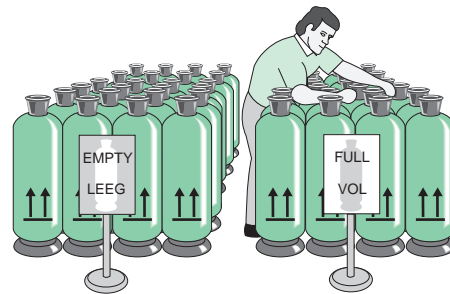
**Question:** *What are their advantages as aerosol propellants?*

**Answer:** They are cheap and efficient, and have zero ODP and GWP. Many blends of the chemicals involved are now commercially available. However, HAPs are highly flammable and they are volatile organic compounds (VOCs) that contribute to the formation of ground-level ozone and smog.

**Question:** *What can be done to reduce fire risks?*

**Answer:** Risks can be minimized by installing fire detection and extinguishing

systems, reinforcing buildings to reduce explosion damage and providing safety training. Transportable hydrocarbon filling rooms are available from manufacturers such as KP Aerofill in the United Kingdom, Terco in the United States,



PAMASOL in Switzerland and Coster in Italy. The open-air filling method, described in UNEP's *Aerosol Conversion Technology Manual*, also works well.

**Question:** *Are HAPs economic?*

**Answer:** Since HAPs cost only one-third to one-fifth as much as CFCs, the cost of

converting to HAPs and reducing consequent risk is usually quickly repaid.

**Question:** *How should cylinders of HAP be stored?*

**Answer:** HAP cylinders should, wherever possible, be stored in authorized storage areas. Cylinders must be stored upright in rows of no more than four deep, with access all round. The reason for this is that should a valve start to leak, the faulty cylinder can easily be reached and removed for repair.

**Sources:** *The Puregas HAP Training Guide and Protecting the Ozone Layer: volume 5, aerosols, sterilants, carbon tetrachloride and miscellaneous uses* (UNEP/IE, Paris, 1992).

UNEP IE's OzonAction Programme acts as a Clearinghouse for information on alternatives to ODS, and is available to answer queries of this kind.

**Contact:** UNEP IE OzonAction Programme, fax: (33) 1 44 37 14 74

## Network news

### Asia and the Pacific

*Meeting of the ODS Officers Network for Southeast Asia and the Pacific, Manila, Philippines, 14–18 August 1995.*

The meeting was attended by seven member countries, representatives of the Multilateral Fund, UNDP, UNIDO and UNEP, and China as an observer. The meeting discussed monitoring systems, the advantages of the permit system for use of ODS, and the possibility of an agreement among members of the network that details of exports from one country should be provided to the importing country.

Specific outcomes of the meeting included:

- network members will identify the ODS trade names used in their countries and UNEP's regional network coordinator was requested to compile a list for the region;
- a strategy to help eliminate ODS use among small and medium-sized enterprises; and
- a committee was set up to explore the possibilities of a regional halon bank ;

It was also agreed that Thailand would host the forthcoming meeting on methyl bromide, if asked to do so, and that an

Australian report would be prepared on how government chillers in Canberra had been converted to non-ODS with a payback period of only three years due to energy savings.

*National Training Course on Chillers and Refrigerant Management Planning, 18–19 July 1995, Bangkok, Thailand*

More than 120 participants from the chiller-using sector in Thailand participated in a training course that was held in Thailand during 18–19 July 1995. Organized by UNEP with the cooperation of the Department of Industrial Works, and the Air Conditioning Club of Thailand, the course aimed to assist technical decision makers draw up a phase-out strategy, design a refrigerant management plan, and make sound retrofitting decisions for the chiller sector. It was also designed to prepare national trainers to carry out follow-up training in the country in the future.

Follow-up activities resulting from the training course include planned industry-wide training, and the preparation of refrigerant management plans by users such as the Thai Hotel Association.

### Latin America

*Meeting of the ODS Officers Network for Latin America-South, La Paz, Bolivia, 10–11 August 1995*

Representatives from ten member countries of the ODSNET-LAS attended the meeting, which discussed, among other issues, the position of the Central Latin American region in relation to HCFC phase-out dates, with particular reference to Article 5 countries.

The meeting also discussed ways in which the network could help in the reporting of data on ODS production and consumption, and in the preparation of other reports related to country programmes and institutional-strengthening activities in the member countries, for monitoring purposes.

It was also decided at the meeting that the three major regional consumers of methyl bromide (Brazil, Chile and Colombia) should produce a consensus position on the methyl bromide issue for presentation at the 12th OEWSG and the forthcoming Meeting of the Parties, to be held in Vienna in December.

## Ozone science news

### Antarctic ozone hole larger than ever

The ozone decline over the Antarctic which started at the end of July and continued through early September was the most rapid depletion on record, according to the World Meteorological Organization (WMO). By then, the area of severely depleted ozone covered about 10 million km<sup>2</sup> (about the size of Europe) and was twice the size of that during the 1993 and 1994 austral springs in the same period, which were themselves records.

Ozone values in August were generally 25–30 per cent below the pre-ozone-hole averages and about 10 per cent lower than those in the same month last year, when record deficiencies were reported. During the second half of August and in the beginning of September, WMO monitoring stations observed several days of less than 200 m atm-cm total

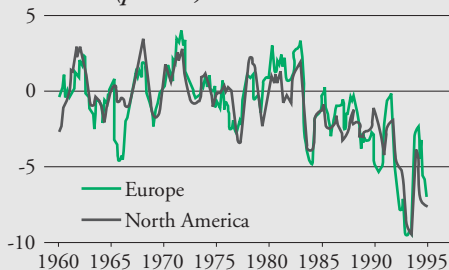
ozone values, an event commonly described as an 'ozone hole'. The event almost coincided with the first global observation of the International Day for the Preservation of the Ozone Layer on 16 September.

The ozone balloon soundings at Marambio, Neumayer and Syowa in the 15–18-km layer showed more than a 50 per cent ozone deficiency. The stratospheric temperatures at these altitudes were below –80°C, a condition that facilitates ozone destruction by compounds containing chlorine and bromine.

According to Dr Rumen Bojkov, WMO's special adviser on ozone, ozone levels were depleted by an average of 1 per cent a day during the period from the end of July to early September—faster than ever before.

**Contact: Dr R. D. Bojkov, WMO**  
**fax: (41) 22 734 23 26**

*Deviations (per cent)*



*Total ozone deviations from the 1964–80 averages for Europe and North America now show a major ozone decline since the 1970s.*

**Contact: Dr R. D. Bojkov, WMO**  
**fax: (41) 22 734 23 26**

### Arctic ozone depletion verified

The formation of a new ozone hole over the North Pole, like the one discovered over Antarctica 10 years ago, was the topic of debate between 300 scientists at a five-day ozone conference held in Greece in May.

Alarming data were presented by some speakers who said they were convinced that ODS were creating a smaller, but similar, hole to that discovered over the South Pole. Other scientists blamed the record low ozone measurements around the world on peculiar weather and said they doubted that this was a permanent feature.

John Pyle, an atmospheric scientist at the University of Cambridge in the United Kingdom, who headed a recent North Pole project, pointed out that between January and March this year ozone declined by about 50 per cent at heights of 15 to 20 km. 'It really does

show that chlorine compounds are capable of destroying the ozone in the northern hemisphere as they do in the south,' Mr Pyle said.

The cause of depletion is not natural but chemical, according to the experts who made the discovery in the Second European Stratospheric Arctic and Mid-latitude Experiment (SESAME). In the lower stratosphere, 10–22 km above the earth, CFCs are reported to be mostly responsible for the destruction of ozone. Balloon measurements above Kiruna, in Sweden, recorded exceptionally high concentrations of chlorine monoxide—the 'smoking gun' of ozone depletion—in February of this year.

While the scientists declined to call what was happening a 'hole', most acknowledged that there was at least a 'dent' in the Arctic ozone.

**Contact: Dr R. D. Bojkov, WMO**  
**fax: (41) 22 734 23 26**

## Internet used to find new technologies

Internet—the global electronic information highway—is being increasingly used as a source of information on technologies that do not deplete the ozone layer.

The German Appropriate Technology Exchange, a division of the German Agency for Technical Cooperation, has offered public access to its knowledge pool on hydrocarbon refrigeration technology, which includes publications, details of practical conversion in India and China, and lists of manufacturers and experts.

The US Government has also made information on alternative solvents available on Internet. Access is via the World Wide Web to the Solvent Substitute Data Systems home page at <http://wastenot.inel.gov/envirosense/ssds/ssds.html>

This site provides access to further sites and databases.

**Contact: GATE, Bulletin Board: (49) 6 196 79 73 96**  
**e-mail: gtz-gate-fckw@geod.geonet.de**

**USEPA, fax: (1) 202 233 9665**

## Chinese discuss sector strategies

An International Workshop on Sector Strategies for ODS Phase Out in China, held during 12–14 June in Xi'an, China, was attended by 68 participants. China's plans to phase out ODS by the year 2005 were examined for the following sectors: foams, refrigeration, tobacco, aerosols, solvents, vehicle air conditioning, halons and chemical production.

**Contact: National Environment Protection Agency,**  
**fax: (86) 1 832 8013**

## Implementation committee laments lack of data

The 10th Meeting of the Implementation Committee under the Non-compliance Procedure for the Montreal Protocol was held in Geneva on 25 August. The reporting of ODS data was discussed, and the meeting learned that nine countries—Fiji, Guatemala, Panama, Senegal, Seychelles, Sudan, Swaziland, Uganda and Zambia—had still failed to supply data for 1993, even though their country programmes and institutional-strengthening projects have been approved. However, it was observed that as a result of institutional strengthening,

things were improving: of the 28 Parties that had already reported for 1994, 18 were Article 5 Parties.

The data showed that there had been large reductions in the global production of CFCs (63 per cent) and halons (74 per cent) by non-Article 5 countries in 1993. However, there had also been an increase in the combined production of CFCs (89 per cent), halons (38 per cent) and HCFCs (185 per cent) in the eight Article 5 countries that reported production data for 1993.

**Contact: UNEP Ozone Secretariat**  
**fax: (254) 2 521 930**

## Fund consultants meet

The first large-scale meeting of consultants working under the Multilateral Fund was held in Paris during 5–7 July. The meeting was jointly organized by UNEP and the Multilateral Fund Secretariat, and was attended by 63 consultants and Implementing Agency representatives.

The main objective of the meeting was to improve ways of preparing and reviewing projects submitted to the ExCom. The participants discussed:

- possible means of standardizing project preparation and review by consultants of implementing agencies;
- available technological options by sector, and factors that influence their choice;
- available information and identification of the information resources that would facilitate a common approach to project preparation and review; and
- support activities such as the country programmes and institutional strengthening to identify ways of improving their facilitative roles in project preparation.

A summary of the outcome and recommendations was presented to the 17th ExCom meeting.

**Contact: UNEP IE OzonAction Programme,**  
**fax: (33) 1 44 37 14 74**

## In brief...

- DuPont is to stop production of CFC-11 and CFC-12 by the end of 1995. The company's plant in Antioch, California, will be the second of DuPont's CFC plants to close. The first, in Deepwater, New Jersey, closed in 1991.

**Contact: DuPont, fax: (1) 302 774 2370**

- Some 80 per cent of the centrifugal chillers used to cool commercial and institutional buildings in the United States will still be using CFC refrigerants at the beginning of 1996, according to a survey by the Air-Conditioning and Refrigeration Institute (ARI).

**Contact: ARI, fax: (1) 703 528 3816**

- A study by the National Institute of Public Health and Environmental Protection (RIVM) in the Netherlands suggests that using HFCs to replace CFCs and HCFCs could lead to a substantial increase in greenhouse gas emissions by the year 2035. The report examines the impact of a number of policy options on HFC emissions, including limiting HFCs to 'essential uses'.

**Contact: RIVM, fax: (31) 30 284388**

- The Nordic Council of Ministers has published a catalogue, *CFC-free Technology in the Plastic Foam Sector* for the Nordic countries. The technologies are described by sub-sector in a standardized format which includes information on who to contact for follow-up information.

**Contact: Nordic Council of Ministers,**  
**tel: (45) 33 114 711**

- The US Alliance for Responsible Atmospheric Policy and the Green Africa Society International held a refrigerant training course for African business representatives on 13 May in Nairobi. The course stressed emission minimization, and the selection of equipment that is CFC-free and highly efficient. It was attended by African business and community leaders.

**Contact: US Alliance, fax: (1) 703 243 2874**

## Quotes of the quarter

'A significant investment in research and development led to the innovative 'no clean' technology that helped eliminate our dependence on ozone-depleting substances. It also saved us money—four times the original investment over the three-year project.'

*Jean C. Monty, President and Chief Executive Officer, Nortel*

'We have eliminated CFC emissions 19 months ahead of target ... AT&T estimates that it has saved around US\$44 million in raw material costs in the past eight years by eliminating CFC usage.'

*Robert E. Allen, Chairman, AT&T*

'China is now the largest consumer of ODS but by June 1995 we had already phased out 6000 tonnes of ODS a year. We have a lot of work still to do but our commitment to the Montreal Protocol remains firm.'

*Wang Yangzu, Deputy Director, National Environmental Protection Agency, China*

**Contacts: Nortel, fax: (1) 905 566 3348; AT&T, fax: (1) 908 204 8218; NEPA, fax: (86) 1 832 8013**

## World Bank OORG meeting

The first meeting of the World Bank's Ozone Operations Resources Group Commercial Refrigeration Working Group was held in Paris in July to formulate recommendations to the ExCom on ODS alternative technologies in commercial refrigeration. The meeting reviewed:

- the situation in developing countries;
- the technical options available;
- alternative technologies for developing countries; and
- conversion practices in developed countries.

The Group concluded that the most important factor in selecting alternatives in commercial refrigeration was whether the appliance was factory- or field-charged. Since the former tend to be smaller and thus safer if inflammable materials such as hydrocarbons are used, the recommended zero-ODS alternatives for conversion of factory-charged commercial refrigeration units are the same as in domestic refrigeration—HFC-134a and isobutane.

**Contact: World Bank, fax: (1) 202 522 3256**

## Status of Ratification

(as at 31 July 1995)

### The Vienna Convention

151 Parties; no new Parties

### The Montreal Protocol

150 Parties; new Party, Federated States of Micronesia

### The London Amendment

103 Parties; new Party, Turkey

### The Copenhagen Amendment

48 Parties; new Parties, Spain and Jordan

## Recent publications

Karen T. Liftin, *Ozone Discourses: science and politics in global environmental cooperation*. Columbia University Press, New York, 1994.

*Methyl Bromide, Environmental Health Criteria No. 166*. WHO, Geneva, 1995.

K. B. Miller, C. W. Purcell, J. M. Matchett and M. H. Turner, *Strategies for Managing Ozone-Depleting Refrigerants: confronting the future*. Battelle Press, Columbus, Ohio, 1995.

*UTECH Asia '95 Conference Papers*. Rapra Technology Ltd., Shrewsbury, United Kingdom, 1995.

## Forthcoming meetings

International CFC and Halon Alternatives Conference, Washington DC, United States, 23–25 October 1995

Fire '95, Harrogate, United Kingdom, 17–19 October 1995

Workshop of the ODS Officers Network for Latin America Central (ODSNET LAC), Sto Domingo, Dominican Republic, 6–10 November 1995

National Training Course on Good Practices in Refrigeration, Dakar, Senegal, 15–17 November 1995

Preparatory Meeting for the 7th Meeting of the Parties and 7th Meeting of the Parties to the Montreal Protocol, Vienna, Austria, 28 November–7 December 1995

## World news

### Australian CFC consumption to zero by year end

Australia's Environment Protection Agency has announced that Australia's consumption of CFCs will drop to almost zero by the end of the year. Consumption of CFCs has already dropped by 80 per cent since 1989. The next challenge is to phase out the use of HCFCs.

**Contact: Australian EPA, fax: (61) 6 274 1640**

### Malaysia to complete phase out by 2000

The Malaysian government is confident that its phase out of CFCs and halons will be complete by the year 2000. According to the Secretary General of the Ministry of Science, Technology and Environment, V. Danabalan, Malaysia will reduce imports of CFCs and halons by 10 per cent in 1995, 20 per cent in 1996, 30 per cent in 1997, 50 per cent in 1998, 70 per cent in 1999 and complete phase out by 2000. The use of CFCs and halons in Malaysia decreased from 0.29 kg per capita in 1989 to 0.24 kg in 1994.

**Contact: Ministry of Science, Technology and Environment, fax: (60) 3 2931 480**

### New Zealand controls methyl bromide imports

The New Zealand Government has introduced controls on the import of methyl bromide. The controls came into force on 1 January 1995. They limit the import of methyl bromide, which is widely used to fumigate soils in New Zealand, to 1991 levels. Because consumption has risen since 1991, the controls effectively reduce imports by about 20 per cent. However, because of the small quantity involved, and its importance for New Zealand's trade, the amount of methyl bromide which can be imported for use in quarantine and pre-shipment fumigation is not limited.

The Montreal Protocol does not yet include a phase-out schedule for methyl bromide.

**Contact: Ministry of the Environment tel: (64) 4 4734090**

### EU seeks tighter HCFC limits

The European Union (EU) wants its own phase-out schedule for HCFCs to be considered at the next meeting of the Parties to be held in Vienna in December.

In particular, the EU wants the cap on HCFCs to be set at a level of 2.6 per cent of CFC use in 1989, rather than at the current limit of 3.1 per cent, with a complete phase

out by 2015 rather than 2030.

Several European countries want even tighter limits: a 1.5 per cent cap and a 2010 phase out. But many developing countries would prefer to retain the Copenhagen timetable and levels. Their argument is that a tighter timetable would hinder their efforts to phase out CFCs and encourage illegal CFC trade.

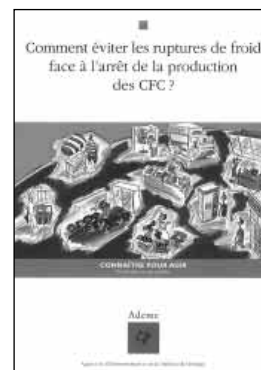
**Contact: EC DGXI, fax: (32) 2 29 69 559**

### Japan to create ozone panel

The Japanese Ministry of International Trade and Industry (MITI) is to create a panel of government, business and academia personnel to guide Japan's phase out of ODS and work out a timetable for compliance with the Montreal Protocol. MITI will also contract private consultants to advise on technological matters related to phase out.

**Contact: MITI, tel: (81) 3 3501 1511**

*'How to avoid a breakdown in your cooling systems as a result of CFC legislation' is the*



*title of an amusingly illustrated booklet intended for small-scale businesses such as bakers, florists and pharmacists. The booklet is produced by the*

*French Agence de l'Environnement et de la Maîtrise de l'Energie (Ademe).*

**Contact: Ademe, fax: (33) 41 87 23 50**

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.

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