



View point

Maintaining the vision



Ambassador
Richard Benedick,
USA

Ten years ago, when just 24 nations signed the Montreal Protocol, none of us could imagine what lay ahead. The ozone treaty was later described by the heads of WMO and UNEP as 'one of the great international

achievements of the century'. Given the danger to life on Earth and the level of international cooperation that was mobilized to save the ozone layer, few observers would challenge this assessment.

Because the science was uncertain, we designed the treaty to be modified as increased understanding was gained of what was occurring, as well as of the technological, economic and environmental implications. We required periodic assessments by independent experts—an innovation that made the Protocol a dynamic, evolving process rather than a static instrument. But no-one foresaw that new threats to the ozone layer would cause the treaty to be revised again and again, expanding the list of controlled chemicals from 8 to more than 90, and consistently advancing phase-out schedules. Against heavy odds, the protocol achieved its aim of virtual universality when more

than 160 nations became Parties.

The Protocol has become a paradigm for new approaches in other international accords. Its first-ever multilateral environment fund promoted earlier phase outs by developing countries than required. Its emphasis on market instruments unleashed a surge of technological innovation previously considered impossible. It stimulated unprecedented cooperation among governments, international agencies, private business and citizens organizations. Its sensitive non-compliance procedure encouraged Parties to live up to 'the spirit of the Protocol'.

In the realm of international relations, there will always be resistance to change and there are always uncertainties—scientific, political, economic, psychological. Perhaps the greatest significance of the Montreal Protocol is that it demonstrated that the international community of nations *is* capable of undertaking bold preventative actions in this real world of ambiguity and imperfect knowledge. We all share a responsibility to maintain this vision.

The author was chief US negotiator and an original signer of the Montreal Protocol in 1987. He is now with the World Wildlife Fund, USA. A new and enlarged version of his book Ozone Diplomacy (Harvard University Press) is to be released in January 1998.

THE 1999 FREEZE IN PRODUCTION AND CONSUMPTION OF CFCs IN DEVELOPING COUNTRIES

20 months to go

9th Meeting of the Parties strengthens controls on MeBr and illegal trade

The 9th Meeting of the Parties to the Montreal Protocol took place in Montreal, Canada, 15–17 September 1997. It was attended by some 800 participants including representatives of 119 governments who agreed a phase-out schedule for methyl bromide. It was also agreed that the parties shall set up a licensing system to help

governments track international trade in CFCs and other controlled substances and discourage illegal sales.

The Meeting was preceded by the 16th Open-ended Working Group (OEWG) which prepared for the Meeting from 9–12 September. The MOP also marked the tenth anniversary of the

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Montreal Protocol, which was signed on 16 September 1987; the ceremony included the bestowing of 23 ozone awards (see page 6) on individuals and organizations that have made outstanding contributions to ozone protection,

continued on page 8 ...

News from international agencies



Fund Secretariat

The Fund Secretariat completed business arising from the 22nd meeting of the Executive Committee (ExCom) and

held a coordination meeting with the implementing agencies 20–21 August 1997. It also organized meetings of the Sub-Group on the Production Sector, the Sub-Committee on Monitoring, Evaluation and Finance, and the Sub-Committee on Project Review, which were held back-to-back with the 9th Meeting of the Parties (see page 1). The meetings examined draft guidelines for compensating the closure of ODS-producing plants in Article 5 countries, the proposed monitoring and evaluation system for the Multilateral Fund and the proposed plan for halon phase out in China. The Secretariat contributed to the 10th Anniversary Colloquium, a workshop on hydrocarbon technologies, the round-table discussion on technology transfer and a workshop on guidelines for refrigerant management plans, all held over the same period.

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UNEP IE OzonAction Programme

The annual meeting of the ODS Officers

Network for Southeast Asia and the Pacific was held in Kuala Lumpur 4–8 August and a joint meeting of the French and English-speaking African network was held in Botswana, August 26–28 (see page 7).

The programme participated in the Technology Showcase for the 10th Anniversary Celebrations of the Montreal Protocol which coincided with the 9th Meeting of the Parties. A roundtable discussion was held on new industry initiatives to meet the 1999 freeze through technology cooperation. A number of publications were released to commemorate the anniversary (see page 9), including a joint publication with the Japan Industrial Conference for Ozone Layer Protection entitled *Technologies to Protect the Ozone Layer: case studies on the Japanese Experience*.

The Programme also awarded Certificates of Recognition to 12 outstanding National Ozone Units and

eight industry associations (see page 6). New posters and a video were disseminated to Article 5 countries for their celebrations of International Ozone Day.

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UNEP Ozone Secretariat

The Secretariat serviced the 15th and 16th Meetings of the OEWG,

and meetings of the Bureau of the Montreal Protocol (8 September), the Implementation Committee (8 and 10 September) and the Legal Drafting Group (8–17 September).

The Secretariat also finalized the Report of the 9th Meeting of the Parties which includes three decisions to adjust the Protocol and one decision to amend it to establish licensing systems to assist Governments in tracking international trade in controlled substances and discourage their illegal sales.

The Secretariat attended five workshops of ODS officers in Africa and one in Bahrain. It also attended the Steering Committee Meeting of the Network for the Detection of Stratosphere Change (NDSC), Norway 25–27 August; the Conference of International and Comparative Law, Côte d'Ivoire 4–7 September; and the Meeting of the Committee on Trade and Environment of the World Trade Organization, Geneva 22–23 September.

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UNDP

During 15 June–31 August, UNDP completed 17 investment projects/sub-projects in Brazil, India, Malaysia, Mexico and the Philippines which eliminated 733 ODP tonnes/annum in the foams and solvents sectors; among the completed projects was the first using liquid carbon dioxide as a replacement technology for CFC-11 (in Morocco). By the end of August 1997, UNDP had completed 99

investment projects/sub-projects eliminating 5247 ODP tonnes/annum. UNDP staff and consultants visited China in August to discuss updating the country programme and the solvents sector strategy. The UNDP booth at the 9th Meeting of the Parties featured an 'all-hydrocarbon' refrigerator manufactured by Guandong Kelon company in China under a UNDP project funded by the Multilateral Fund.

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

Of UNIDO's on-going projects, 10 companies have now phased out a total of 183 ODP

tonnes/annum in completed projects. In Barbados, recovery and recycling equipment has been delivered and training provided; in Egypt a refrigeration company has converted to HFC-134a as refrigerant and to cyclopentane as a foam-blowing agent; and in Tunisia another company has converted to water-blown systems for producing foams for furniture.

UNIDO participated in the Inter-agency Coordination Meeting held in Montreal in August and in the first joint workshop of anglophone and francophone ODS Officers in Africa. It also participated in the celebration of the 10th anniversary of the Montreal Protocol in Montreal.

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World Bank

By July 1997, World Bank investment projects funded by the Multilateral Fund had phased out nearly

15 000 tonnes/annum of controlled substances. This is about 8 percent of what developing countries consume as a whole. When completed, the Bank's total portfolio will have phased out 30 percent of developing country consumption.

(Note: report for the period July to October was not available at the time of going to press.)

Contact: Mr Ken Newcombe, World Bank, 1818 H. Street, N.W. Washington D.C. 20433, USA
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Phase-out successes under the Multilateral Fund

Morocco uses CO₂ to replace ODS in foam blowing

Approved in October 1996 and completed in June 1997, a UNDP project in Morocco (MOR/FOA/20/INV/04) has eliminated the use of 13 tonnes/annum of CFC-11 in the manufacture of integral skin and cold-cured moulded foam products at Maghreb Elastoplast. This is the first time liquid carbon dioxide has been used as a CFC-11 replacement in the foam industry in a project funded by the Multilateral Fund (US\$120 000).

Contact: UNDP, fax: +1 212 906 6947

Mexican project eliminates 306 tonnes/annum of CFC-11

A UNDP project in Mexico (MEX/FOA/19/INV/46) has eliminated 306 ODP tonnes/annum at the country's Multypanel company which manufactures insulated construction panels and doors. The project, which was funded by the Multilateral Fund (US\$428 000) uses HCFC-141b to replace CFC-11 as an interim solution; the company is to finance

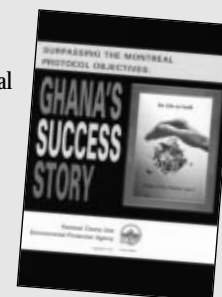
the final conversion to a non-ODS blowing agent itself. The project was approved in May 1996 and completed by August 1997. Contact: UNDP, fax: +1 212 906 6947

Ghana's success recorded in print

The ways in which Ghana has managed to meet the requirements of the Montreal Protocol ahead of time are described in a new publication called *Ghana's Success Story: surpassing the Montreal Protocol objectives*.

(National Ozone Unit, Environmental Protection Agency, Ghana, September 1997). Copies can be obtained from UNEP IE.

Contact: National Ozone Unit, Ghana, fax: +233 21 6626 90/6673 74 E-mail: epainfo@incs.com.gh



Completed Investment Projects under the Multilateral Fund (as of 31 December 1996)

	foams	refrigeration	halons	aerosols	solvents	multi-sector	production sector	total number	total ODP tonnes
World Bank	20	24	1	2	17	1	5	70	13 168
UNDP	44	6	0	3	8	0	0	61	3560
UNIDO	3	9	1	0	5	0	0	18	3517

Number of projects by country: Algeria, 2; Argentina, 7; Bolivia, 1; Brazil, 2; Cambodia, 11; Cameroon, 1; Central Africa, 1; Chile, 6; China, 4; Colombia, 1; Costa Rica, 2; Congo, 1; Cuba, 1; Dominican Republic, 1; Egypt, 14; Ghana, 1; Guatemala, 1; India, 9; Indonesia, 5; Iran, 1 (partially completed); Jamaica, 1; Malaysia, 24; Malawi, 1; Mauritius, 3; Mexico, 9; Nigeria, 1; Pakistan, 1; Panama, 1; Philippines, 7; Romania, 1; Syria, 2; Thailand, 5; Turkey, 3; Uganda, 1; Uruguay, 9; Venezuela, 7; Vietnam, 1; Zambia, 2; Zimbabwe, 2

Industry and technology updates

AEROSOLS AND MISCELLANEOUS USES

New asthma medication approved

The US Food and Drug Administration (FDA) has approved Astra's new anti-inflammatory asthma medication Pulmicort Turbuhaler. The inhaler, the first corticosteroid dry powder inhaler to be approved in the United States, is based on budesonide and is an alternative to MDIs using CFCs as propellant. Pulmicort has been used in Europe, Australia and Canada for some time.

Contact: Astra, tel: +1 617 756 5392

FOAMS

HFC-365mfc shows promise

Research by Elf Atochem in France and a number of other companies worldwide suggests that HFC-365mfc may be a promising substitute for HCFC-141b (itself a substitute for CFC-11). The liquid has been used for blowing polyurethane foams and, because of its high boiling

Polyurethane foam characteristics

	blowing agent	
	HCFC-141b	HFC-365mfc
density (kg/m ³)	34.9	36.4
compressive strength (kPa)	227	238
closed cells (%)	80.5	78.9
burning rate (cm/min)	5.3	5.6
thermal conductivity (mW/m.K)	20.7	23.5

point (40°C), may also find uses as a substitute for the solvent HCFC-141b. Foams blown with HFC-365mfc have broadly comparable characteristics to those blown with HCFC-141b (see table). Further tests are being carried out on the compound's toxicity and environmental impact. HFC-365mfc is 1,1,1,3,3-pentafluorobutane (CF₃CH₂CF₂CH₃).

Under the Montreal Protocol HCFC-141b is to be phased by 2020 in developed countries and by 2040 in

developing countries; the European Union (EU) has elected for 2015 and the United States for 2003.

Contact: Elf Atochem, fax: +33 1 47 59 14 63

REFRIGERANTS

Cooling tractor drivers without refrigerant

Climatop 2, produced by the French firm AEREL, is a new system for cooling the cabins of agricultural equipment and



Hot work made cooler without CFCs or HFCs—agricultural and public service vehicles can be cooled without ODS.

public service vehicles. It relies on a system which draws in hot, dry air from the atmosphere, and purifies and humidifies it. Evaporation then produces a cooling effect. Tests carried out by the French energy agency Ademe showed that the cabin temperature of a combine harvester equipped with the system was at least 8°C cooler than that of an uncooled cabin and humidity was much higher. The energy efficiency of the system is estimated to be three times higher than a conventional air-conditioning system using refrigerants. *(Note: such systems are already in use to cool enclosed spaces in hot and dry climates.)*

Contact: AEREL, fax: +33 2 43 35 59 37

German firm installs propylene system

The German firm Linde AG, based in Cologne, has installed a refrigeration system using the propylene (R-1270) in a supermarket in Bad Freienwalde. The plant supplies the display space in the supermarket via heat exchangers and secondary pumped circuits using glycol as the heat transfer medium. The total refrigerant charge was only 17 kg, compared to the 400 kg of R-404a (a blend of R-125, R-143a and R-134a) that would have been needed for a direct expansion system. As with ammonia and propane systems, safety regulations required mechanical ventilation of the plant room and the use of leak detectors. Linde is planning the installation of more propylene-based systems.

Contact: Linde, fax: +49 611 770 269

Swedish supermarket giant switches to hydrocarbon refrigerant

The 3000 m² AGs Favor supermarket in Helsingborg, Sweden, uses only 35 kg of hydrocarbon refrigerants to cool its entire range of 140-kW freezers and 240-kW coolers. Seven units using semi-hermetic



One of the coolers in the 3000 m² AGs Favor supermarket in Helsingborg, Sweden, now dependent on hydrocarbon refrigerants.

compressors and plate heat exchangers supply the plant, which cools two kinds of secondary refrigerant: carbon dioxide for the freezers and propylene glycol for the coolers. The CARE™ refrigerants were supplied by Calor Gas Refrigeration.

The system was installed by ABB Stal-Litzell AB which has also installed hydrocarbon-based systems in supermarkets in Lund and in Landskrona. In the Lund supermarket, 14 kg of hydrocarbon refrigerant were used to replace R-404a; at the same time cooling capacity was increased by 30 kW and freezing capacity by 10 kW.

Contact: Calor, fax: +44 1926 318706
e-mail: care@calorgas.co.uk

METHYL BROMIDE

Patent awarded for dessiccant system

The US Patent Office has awarded Engelhard/ICC a patent for its dessiccant climate control system for killing airborne bacteria. The system works by drawing air through a dessiccant rotor which removes its moisture, causing a drop in vapour pressure and a rapid rise in temperature. The company claims that this occurs over a period of about 0.1 seconds, killing an average of 64 and 72 percent of airborne

ARI releases data and testing results

The Air-conditioning and Refrigeration Institute (ARI) in the United States has released a set of 97 reports and briefing packets accumulated as a result of testing, reporting and data sharing in the Alternative Refrigerants Evaluation Program (AREP). AREP is an international cooperative effort involving companies from North America, Europe and Asia. Initially focused on the alternatives HCFC-22 and R-502, the programme also covered practical experiences with new refrigerants and lubricants, data on optimized compressors and systems, and performance and reliability tests with immiscible lubricants and future refrigerants. The materials released also include thermophysical and other data. The material now available covers all the information collected from participants over the past two years.

Contact: ARI, fax: +1 703 528 3816
Internet: <http://www.ari.org>

UNEP IE OzonAction Programme needs more information on technical innovations in Article 5 countries. Please send suitable material for Industry and Technology Updates to the UNEP IE OzonAction Programme for inclusion in OAN 25.

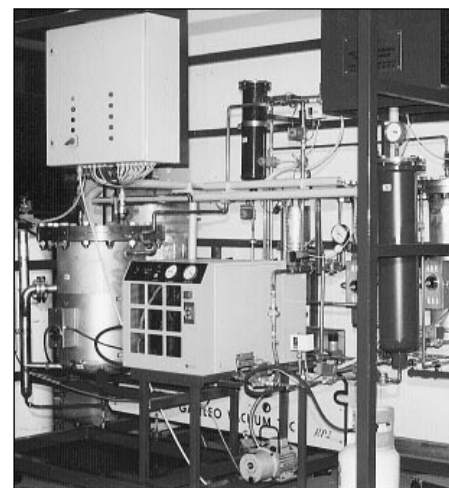
bacteria and fungi, respectively. The system is already commercially available and can act as an effective substitute for methyl bromide fumigation in critical applications in hospitals, laboratories and clean rooms.

Contact: ICC Technologies, tel: +1 215 682 6600

RECOVERY AND DESTRUCTION

New machines for recycling refrigerants

Hotar International Trading in Vienna, Austria, has announced the availability of two new recycling machines for small and medium-scale applications. The FRPDU-M-RU65 is a small machine for manual recycling and can handle 12–20 kg of refrigerants per hour. The FRPDU-A-RP.2 is a larger and automatic machine capable of separating up to 60 kg/hour. Both machines can handle a wide range of



Hotar's new FRPDU-A-RP.2 machine is capable of separating up to 60 kg/hour.

refrigerants and halons, including R-11, -12, -22 and -502. Minor modifications enable the machines to cope with R-134a, -404a and -407. Hotar is working on a new generation of machines capable of separating mixtures of different refrigerants and oil, which it hopes to be able to market in 1998.

Contact: Hotar, fax: +43 1 330 85 00

Firms pledge to help developing countries comply with the Montreal Protocol

As part of the 10th anniversary celebrations of the Montreal Protocol, the UNEP IE OzonAction Programme invited companies in the developed countries to pledge their support for the efforts of developing countries to meet the 1999 freeze. Despite the successes celebrated during the anniversary, there are still issues that threaten the Protocol, particularly the transfer of CFC-using technologies and equipment to developing countries. The pledge reads:

'Our company has phased out the production and consumption of CFCs to the greatest extent feasible in its global operations. We have encouraged our subsidiaries and joint partnerships to likewise phase out these substances.

Our company will not manufacture or sell any new CFC-using equipment or technology in developing countries or countries with economies in transition except CFCs produced under the Montreal Protocol essential use exemption.

We will endeavour to promote environmentally-friendly technologies in developing countries to assist them in meeting the 1999 freeze on CFCs.'

So far 19 companies have signed the pledge:

Bard Heating & Cooling Products	MagicAire (division of United Electric Company, L.P.)
Calmac Manufacturing Corporation	Manitowoc Ice, Inc
Carrier Corporation	McQuay International
Copeland	Nordyne
Crispaire Corporation	Outokumpu Copper Franklin, Inc
DuPont Fluoroproducts	Superior Valve Company
Emerson Electric Co	The Trane Company
Goettl Air Conditioning, Inc	Tyler Refrigeration Corporation
International Comfort Products Corporation	York International Corporation
Johnson Controls, Inc	

Other companies are invited to sign the pledge. Those wishing to do so should contact:

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UNEP IE, 39-43 quai André Citroën, 75739 Paris Cedex 15, France

tel: +33 1 44 37 14 59 fax: +33 1 44 37 14 74

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

Plasma used to destroy ODS

Refrigerants that are too contaminated to be recycled are being destroyed at a destruction facility in Ichikawa City, near Tokyo, with an induction-coupled plasma torch. Exhaust gases from the plant include carbon dioxide (which is vented to the air) and hydrochloric and hydrofluoric acids which are neutralized with sodium hydroxide to yield calcium chloride and fluoride. The method was developed by researchers at Japan's Clean Japan Centre and has been used to destroy more than 70 tonnes of CFCs and HCFCs since December 1994.

Ichikawa Kankyou Engineering, Japan

SOLVENTS

New solvent from Japan

The Japanese firm Nippon Zeon, with assistance from the Ministry of International Trade and Industry (MITI), has developed a new solvent based on octafluorocyclopentane (OFCPA). It is claimed that the new solvent will have an ODP of zero, an atmospheric half-life of 4.7 years and a low GWP. OFCPA's five-ring structure distinguishes it from other CFC solvent substitutes. With a boiling point of 79°C, recycling losses are claimed to be low. The product is expected to find both cleaning and drying applications.

Contact: Nippon Zeus, fax: +81 33 216 0503

In brief ...

○ The Anti-fraud Unit of the European Commission has uncovered an illegal multi-million dollar scheme to import 1000 tonnes of CFCs from China to the EU and the United States. The Commission is now looking at ways of tightening up import regulations and is considering a ban on the sale and use of all CFCs in the EU.

Contact: EC DGXI, fax: +32 2 29 69 559

○ UNEP has named Jan Van Der Leun of the Netherlands to the Global 500 Rôle of Honour for his analysis of the impact of ozone depletion on human and animal health.

Contact: UNEP Ozone Secretariat, fax: +254 2 623 913; e-mail: madhava.sarma@unep.org

○ A new survey shows that the rate of increase of melanoma has levelled off among women in New South Wales, Australia, indicating that the battle to contain the epidemic of skin cancer is beginning to be won in that region. No similar trend was observed for men.

4th World Conference on Melanoma

○ ICI and DuPont claim that they will not market HFC-134a to the manufacturers of self-chilled drinks (see OAN 23, p. 4). The European Fluorocarbon Technical Committee is urging the European Union to support a voluntary agreement banning the use of HFCs in self-chilling drink cans.

Contact: EFTC, fax: +32 2 676 7301
EC DGXI, fax: +32 2 29 69 559

○ AlliedSignals Fluorine Products Division has opened a new Web site devoted to fluorine-based refrigerants and foam-blowing agents.

Contact: <http://www.genetron.com>

10th anniversary celebrations in Montreal

The anniversary celebrations

An atmosphere of celebration and optimism was sustained throughout the activities held to celebrate the 10th anniversary of the Montreal Protocol in Montreal during 9–17 September. One of the main events was a Technology Exhibition that featured some of the



The 9th Meeting of the Parties in progress (lower left); boys choir (immediately left); and 10-year-old Genevieve Paré reading a poem about the ozone layer (right).



available alternative non-ODS technologies in the different sectors. Prominent among these were alternatives to methyl bromide, some of which were demonstrated *in situ*.

The ceremony held on 16 September to mark the actual day when the Protocol was originally signed by the first signatories was marked for its simplicity but included some touching moments. A boys' choir sang environmental songs, a young girl born in 1987 read a poem about the ozone

layer and a teenager expressed his personal views about the Protocol.

The photographs on this page feature some of the events that marked the 10th anniversary in Montreal. The awards given to individuals, industry associations and outstanding National Ozone Units are detailed below.

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Award winners

Global Ozone Award winners

For the 10th anniversary of the Montreal Protocol, UNEP has announced new Global Ozone Awards. The winners are:

Individuals and organizations

- James G. Andersen
- Jonathan Banks
- R. Benedick
- John Carstensen
- Suely M. Carvalho
- Ralph J. Cicerone
- Elizabeth Cook
- Edward C. De Fabo
- Paul Horwitz
- W. Kakebeeke
- Barbara Kucnerowicz-Polak
- Lambert Kuijpers
- Melanie Miller
- Ilkka Ristimäki
- S. Seebaluck
- Susan Solomon
- Richard Stolarski
- Robert C. Worrest
- Christos Zerefos
- Alliance for Responsible CFC Policy
- Department of Environment, Malaysia
- Greenpeace, Netherlands
- Northern Telecom

NOU Awards

Outstanding National Ozone Units

Awards were also given to those NOUs that have performed particularly well in their duties in relation to the Montreal Protocol:

- Burkina Faso
- Egypt
- Ghana
- Iran
- Malaysia
- Peru
- Philippines
- Singapore
- Tunisia
- Turkey
- Uruguay
- Venezuela

Special Certificates

Certificate of Recognition

awarded as a token of UNEP's appreciation for continuous support and assistance to the OzonAction Programme:

- Conseil Européen d'Industrie Chimique (CEFIC)
- Japan Industrial Conference for Ozone Protection (JICOP)
- Japan Electrical Manufacturers' Association (JEMA)
- The International Institute of Refrigeration (IIR)
- Halon Alternatives Research Corporation (HARC)
- International Cooperative for Environmental Leadership (ICEL)
- Air-conditioning and Refrigeration Institute (ARI)
- Alliance for Responsible Atmospheric Policy (ARAP)

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

UNEP IE OzonAction Programme, fax: +33 1 44 37 14 74
Internet: <http://www.unepie.org/ozonaction.html>

US EPA awards best-of-the-best in Montreal

The United States Environmental Protection Agency (US EPA) awarded Best-of-the-Best Stratospheric Ozone Protection Awards, for leadership, motivation, and technical innovation to individuals, industry associations, governments, corporations and military organizations.

Associations

Air Conditioning and Refrigeration Institute (ARI)
 Alliance for Responsible Atmospheric Policy (ARAP)
 Association of Fluorocarbon Consumers and Manufacturers (AFCAM)
 Halons Alternatives Research Corporation (HARC)
 International Cooperative for Ozone Layer Protection (ICOLP)/International Cooperative for Environmental Leadership (ICEL)
 IPC Electronics Cleaning Solvents Benchmarking Team
 Japan Electrical Manufacturers' Association (JEMA)
 Japan Industrial Conference for Ozone Layer Protection (JICOP)
 Mobile Air Conditioning Society Worldwide (MACS)

Individuals

Ward J. Atkinson • James A. Baker • Jay D. Baker • Jonathan Banks • Walter Brunner • Suely Machado Carvalho • David V. Catchpole • David Chittick • Jorge Corona de la Vega • Philip J. DiNenno • Stephen P. Evanoff • Kevin Fay • Joe R. Felty • Arthur FitzGerald • Yuichi Fujimoto • Kaichi Hasegawa • Andrea L. Hinwood • Michael Jeffs • Margaret G. Kerr • Joel Krinsky •

Lambert Kuijpers • Colin Lea • Eduardo E. Lopez Perez • Mohinder Malik • Melanie Miller • John H. Minsker • Mario Molina • E. Thomas Morehouse, Jr. • David K. Mueller • Tsuneya Nakamura • Richard Nusbaum • Simon Oulouhojian • Jose Pons Pons • F. Sherwood Rowland • Ronald W. Sibley • Gary Taylor • Daniel P. Verdonik • Gary D. Vest • Masaaki Yamabe • Hideaki Yasukawa

Corporations, governments and military organizations

Asahi Glass Company • The Coca-Cola Company • DuPont Company • Hitachi • IBM Corporation • ICI • Lockheed Martin Corporation • Lufthansa German Airlines/Technik • Department of Environment, Malaysia • Minebea Group Companies • Mitsubishi Electric Corporation • Nissan • Nortel • Raytheon TI Systems • Seiko Epson Corporation • Thiokol • National Aeronautics and Space Administration (NASA) • 3M Corporation • US Air Force Space Launch Programs • US Army Acquisition Pollution Prevention Support Office (AAPPSO) • US Department of Defense (DoD) • US Naval Research Laboratory • US Naval Surface Warfare Center

Contact: US EPA, fax +1 202 233 9665 Internet: <http://www.epa.gov.ozone>

UNEP IE organizes round table on meeting the 1999 freeze in Montreal

As part of the Technology Showcase presentation, UNEP IE invited industries from developed and developing countries, government representatives and NGOs to a round table on how industries can work together to meet the 1999 freeze for CFCs in developing countries.

The round table evoked an overwhelming response from the invitees. The panel discussion identified barriers to meeting the freeze and suggested innovative mechanisms such as voluntary pledges, and discussed the increasing role of larger companies to assist their

suppliers and buyers, among others. The round table discussion was moderated by Ms Angie Shurig from Raytheon.

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Network news

French- and English-speaking Africa

The first joint meeting of these two networks was held in Botswana, August 26–28. It was attended by 34 ODS officers from the two regions and by representatives from France, Germany, Switzerland, the United States, UNDP, UNEP, UNIDO and the Ozone Secretariat.

The meeting discussed issues relevant to the region especially on data reporting, ODS monitoring and control and on the use of hydrocarbons in refrigeration. The ODS Officers took advantage of the presence of the representatives of the implementing agencies and of other experts to discuss these issues.

Following a presentation by the representative of France on EU legislation relating to ODS monitoring and control, the

ODS officers agreed that a similar approach can be taken for the African region in the context of the Refrigerant Management Plan.

The meeting also provided an important forum to review the proposals being put forward to the Meeting of the Parties on methyl bromide and HCFCs.

A site visit was organized to the Botswana Meat Corporation, a large meat company exporting its produce to the EU. It demonstrated first-hand a phase-out project which had critical economic applications for the country. The company has moved to ammonia for refrigeration purposes.

Southeast Asia and the Pacific

A meeting of ODS Officers for the Southeast Asia and the Pacific Region was held in Kuala Lumpur, Malaysia, 4–8

August. The meeting was hosted by the Honourable Datuk Law Hieng Ding, Minister of Science, Technology and Environment. Participation included member countries of the region as well as the Chief Officer of the Multilateral Fund Secretariat, Dr Lambert Kuijpers, Co-chair of the TEAP and Dr Johnathan Banks, Co-chair of the Methyl Bromide Technical Options Committee. Key areas of discussion included non-ODS technologies in the refrigeration sector. The roundtable discussion on methyl bromide noted that Malaysia was the only country in the region using methyl bromide in soil fumigation for golf courses.

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including scientists, decision makers, technology experts, and environmentalists.

'We have succeeded in maintaining the Montreal Protocol's momentum by adding important new protections for the ozone layer', said the Meeting's President, Dr Won-Hwa Park of the Republic of Korea. 'We need to follow up now with strong enforcement of these new commitments.'

Under the methyl bromide agreement, the phase out by developed countries has been moved from 2010 to 2005 (with exemptions for emergency and critical uses, and quarantine and pre-shipment) and interim reductions of 25 percent by 1999, 50 percent by 2001, and 70 percent by 2003 have been introduced. Developing countries, previously committed only to a freeze by 2002, have agreed to a 20 percent reduction by 2005 and a phase out by 2015. They will use a four-year average of 1995-98 as the base year for calculating the phase out; the interim reduction schedule will be reviewed in 2003.

In addition to the US\$10 million agreed last year for funding demonstration projects testing the feasibility of methyl bromide alternatives, the Multilateral Fund will make US\$25 million per year available in both 1998 and 1999 for activities to phase out methyl bromide in developing countries.

Starting one year after the agreement

enters into force, Parties will ban trade in methyl bromide with non-Parties.

The new licensing system for controlling trade will be based on licenses issued by Parties for import and export and on regular information exchange between Parties. This will enable customs and police officials to track trade in CFCs and to detect unlicensed trade. The system will become effective at the start of the year 2000.

Another decision adopted by the Meeting requests developed countries to consider banning the sale of virgin CFCs anywhere in the world, except for meeting the 'basic domestic needs' of developing countries or for exempted 'essential uses'. This is important for preventing use of smuggled CFCs.

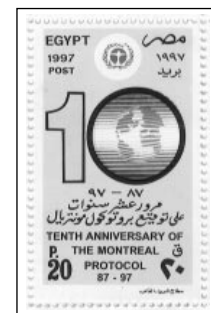
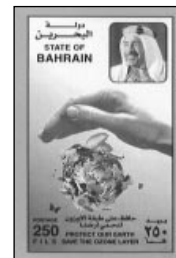
Proposals by the European Community and Switzerland to accelerate the phase out of the consumption of HCFCs and to introduce production control were not accepted. These countries made a declaration urging that the issue be revisited at a future meeting.

The meeting recommended the publication *Monitoring Imports of Ozone-Depleting Substances: a guidebook* (UNEP IE OzonAction Programme and SEI) to all Parties and asked UNEP IE to prepare a handbook on data reporting.

Contact: UNEP Ozone Secretariat, fax: +254 2 623 913; e-mail: madhava.sarma@unep.org; Internet: <http://www.unep.org/unep/secretar/ozone/home.htm>

New stamps mark 10th anniversary

The following countries have issued stamps to commemorate the 10th anniversary of the Montreal Protocol: Bahrain, the Czech Republic, Egypt and the Islamic Republic of Iran. Other countries wanting to issue



their own stamps may contact the Ozone Secretariat for design ideas. The new stamps result from cooperation between the Ozone Secretariat and the Universal Postal Union (UPU).

UNEP Ozone Secretariat, fax: +254 2 623 913 e-mail: madhava.sarma@unep.org

Ozone science news

Ozone thins again over Antarctic

The reduction of total ozone and the development of the ozone hole over the Antarctic, which started in August, accelerated in mid-September, when the surface covered by values less than 220-200 m atm-cm (30-35 percent deficiency) exceeded 20 million km², similar to the events of the past six Antarctic springs. The August monthly mean ozone level over the southern polar latitudes declined by 15-25 percent relative to pre-ozone-hole averages.

Over the mid-latitudinal belt (35-60°S) of the southern hemisphere, estimates from satellite data showed an August average of about 325 m atm-cm, the second lowest average since the early 1980s. In the first half of September the values were still relatively low. These low values were probably influenced by the strong ENSO observed in the tropics, as was the case in 1985 and

during 1992/1993.

During the second half of September values of much less than 160 m atm-cm (-50 percent deficiency) were regularly reported by Belgrano, Arrival Heights, Neumayer and South Pole stations. The ozone soundings at the last two stations showed severe depletion at 14-20 km altitudes and, in the second half of September, there were many days with complete ozone annihilation in this layer.

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Internet: <http://www.wmo.ch/web/arep/ozobull.html>

Oceans remove more methyl bromide than thought

New research by scientists from the US National Oceanic and Atmospheric Administration (NOAA) Climate Monitoring and Diagnostics Laboratory suggests that the average lifetime of methyl

bromide in the atmosphere may be nearer 0.7 years than the 1992 estimate of 2.0 years.

The research suggests that the oceans remove more methyl bromide from the atmosphere than had previously been estimated, possibly as a result of biological mechanisms that degrade the chemical in seawater.

Contact: NOAA, fax: +1 303 497 6290

ODS may cause mercury 'rain'

Research by scientists at Environment Canada (*New Scientist*, 21 June 1997) has shown that concentrations of gaseous mercury in the atmosphere show similar fluctuations to ozone concentrations in the stratosphere during the Arctic spring. They suspect that ODS may be responsible for transforming mercury gas into a solid, which then falls on the soil at just the time when plants are undergoing their springtime flush of activity.

Contact: Environment Canada, fax: +1 819 953 7253

Retrofitting with hydrocarbons

The UNEP IE OzonAction Programme, along with Switzerland, The Netherlands and Canada, organized a workshop on the use of hydrocarbon blends for retrofitting small refrigeration equipment on 8 September in Montreal, Canada. The workshop was one of the three elements included in an overall study of hydrocarbon retrofitting; the other two elements are a survey of the available literature and the presentation of case studies.

The workshop was attended by 80 participants and included presentations of the survey and the case studies. The participants then split into three separate working groups to discuss technical, safety and market-related issues. The workshop's main conclusions were that retrofitting must maintain product quality with specific regional components, be safe and be affordable by consumers in developing countries. The workshop recommended that:

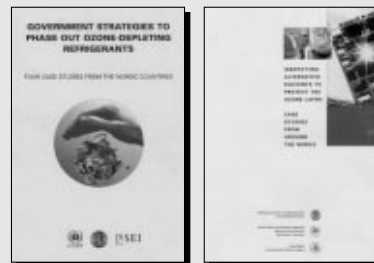
- further work be carried out on refrigerant/lubricant interactions;
- different types of products be tested by different organizations;
- training manuals should be developed on handling, which products to fit, and how to retrofit without losing product quality.

An overall synthesis report is due to be published by the end of 1997, which will include the main topics of the workshop.

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New publications from the OzonAction Programme

Government Strategies to Phase out Ozone-depleting Refrigerants: four case studies from the Nordic countries



Identifying Alternative Solvents to Protect the Ozone Layer: case studies from around the world

Stratospheric Ozone Protection Publications

Making Good Decisions: how to use the OzonAction Clearinghouse



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

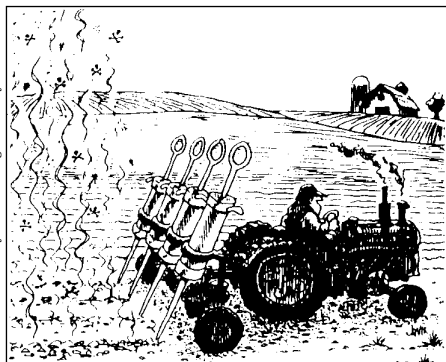
News from NGOs

Friends of the Earth calls for early phase out for methyl bromide

The Friends of the Earth delegation to the first International Workshop on Alternatives to Methyl Bromide for Southern European Countries presented a letter to the European Commission, signed by more than 35 NGOs worldwide, calling for Europe to take the lead in the rapid phase out of methyl bromide.

The workshop was held in Tenerife, an island where efficient cropping systems that do not depend on methyl bromide or other pesticides have already been developed. Delegates were given a tour of local farms where integrated pest management schemes have been successful.

Contact: FoE, fax: +1 202 783 0444



FoE cartoonist depicts methyl bromide use as a lethal injection to the land

First ODS-free refrigerator for Brazil

Electrolux has launched the first CFC-free refrigerator in Brazil. The R260, a 260-litre refrigerator, uses HFC-134a as the refrigerant and insulation foam blown with cyclopentane. Average production of the refrigerator is about 70 000 units a month, saving an estimated 123 tonnes/year of CFC-12. The cost of production has increased by about 5 percent but this increase has not been passed on to the consumer.

Contact: Electrolux, fax: +55 41 270 2636

Vietnam workshops discuss SMEs and methyl bromide

More than 80 participants from Vietnamese government agencies and SMEs attended a workshop held in Hanoi, Vietnam, on 14 August 1997. Experts from the UNEP Regional Office for Asia and the Pacific, the Multilateral Fund, Sweden and Malaysia were invited as the key speakers.

Participants agreed on the importance of the SME sector to successful ODS phase out but emphasized that the sector would need assistance in framing policies, finding and adapting technologies, and financing projects from both national and international agencies. There was a need to

raise awareness of the ozone issue and of the country's Action Plan among Vietnamese SMEs, and to classify the country's SMEs by sector, with details of ODS usage, to attract funding from the Multilateral Fund for investment projects. A similar workshop is to be held for companies in the south of Vietnam in 1998.

The Vietnam National Ozone Unit, in collaboration with the Ministry of Agriculture and Rural Development, also held a workshop on methyl bromide in Ho Chi Minh City on 26 August 1997. The workshop will lead to recommendations on methyl bromide policies and strategies for the Vietnam Country Programme; in Vietnam some 95 percent of methyl bromide use is in quarantine and pre-shipment applications.

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fax: +84 4 826 3847
e-mail: dao.d.Tuan@bdvn.vnd.net

Zambia to ban second-hand fridge imports

William Harrington, Zambia's Minister of the Environment and Natural Resources, announced on the eve of the International Day for the Preservation of the Ozone Layer, that his country is preparing regulations to outlaw the import of second-hand equipment containing ODS.

Contact: MOE, fax: 260 1 23 84 27

Status of Ratification

(as at August 1997)

The Vienna Convention

165 Parties; no new Parties

The Montreal Protocol

162 Parties; no new Parties

The London Amendment

116 Parties; new Party: Islamic Republic of Iran

The Copenhagen Amendment

70 Parties; new Parties: Belgium, Islamic Republic of Iran, Sri Lanka, Uruguay

Reclassification:

Non-Article 5 to Article 5: South Africa, Brunei

Forthcoming meetings

Fourth Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reduction, San Diego, California, 3–5 November 1997

International Conference on Ozone Protection Technologies, Baltimore, Maryland, United States, 12–13 November 1997

Emerging Trends in Refrigeration and Air Conditioning, New Delhi, India, 18–20 March 1998

Recent publications

Zéro fuites: limitation des émissions de fluides frigorigènes. Denis Clodic, PYC Éditions Livres, 1997. (This publication will shortly be available in English.)



Production and Consumption of Ozone-depleting Substances 1986–95: the Data Reporting System under the Montreal Protocol. Sebastian Oberthur, GTZ GmbH, 1997

Technologies to Protect the Ozone Layer: case studies on the Japanese Experience. (This publication includes 19 case studies from Japan and was launched during the 10th Anniversary of the Montreal Protocol.) JICOP, 1997

World policy round-up

Brazil bans purchase of products containing ODS

The State of São Paulo government in Brazil has implemented legislation that prohibits all government departments and companies from purchasing products and equipment containing ODS. The legislation also requires all public institutions to implement CFC recovery and recycling systems in order to reduce CFC emissions during maintenance and repair operations of refrigeration and air-conditioning equipment.

Contact: CETESB, fax: +55 11 3030 6402

China bans CFCs in aerosols

The Chinese government has announced that the use of CFCs in aerosols is to be discontinued with effect from 31 December 1997. The announcement, which is the first industry-wide ban on the use of ODS in China, was issued jointly by nine government departments, including the State Bureau of Environmental Protection and the Ministry of Chemical Industries. From the beginning of 1998, the government will register neither aerosol products that use CFCs nor factories producing them.

Contact: NEPA, fax: +86 10 66151776

Japan requires refrigerators to be recycled

Japan's Ministry of International Trade and Industry (MITI) has announced plans that will require manufacturers of appliances such as refrigerators and televisions to recycle their products. The decision follows recommendations made by the Industrial Structural Council and will ask manufacturers to create recycling mechanisms with their retailers. Consumers will bear some of the estimated US\$30–90 cost per machine. Of the 3.2 million refrigerators collected by local governments in 1995, less than one-quarter were recycled.

Contact: MITI, fax: +8 3 3501 1511

Canada develops new regulations

Environment Canada is developing new regulations on ODS and their alternatives to be in place by the end of the year.

Although 9 provinces and 1 territory have ODS pollution prevention regulations, a regulatory gap exists in that the federal house and systems on federal lands are not bound by the same

Newsletter for Central African Republic

The National Ozone Unit of the Central African Republic has produced the first number of its new ozone newsletter called *Ozone Plus*. The newsletter is intended to alert the public to the dangers of stratospheric ozone destruction and to provide alternatives to the use of ODS.

Contact: Ministère des Eaux, Forêts, Chasses, Pêche et Tourisme, fax: +236 61 49 18

environmental standards This is significant given that the Government of Canada houses some 10 percent of the country's ODS stock.

The new Federal Halocarbon Regulations will apply to ODS either owned by the Government of Canada or located on federal lands. The regulations will cover HFCs and PFCs as well as ODS.

Contact: National Office of Pollution Prevention, fax: +1 819 953 5595
e-mail: resa.st-lewis@ec.gc.ca

Senegal to eliminate ODS by 2001

Senegal is preparing regulations that will forbid the import of ODS without special authorization. The aim is to eliminate 85 percent of ODS from the country by 1998 and to achieve phase out in 2001. Imports of products used to repair second-hand refrigerators will be banned from 1999, according to the country's Environment Board.

Contact: Ministère de l'Environnement et de la Protection de la Nature, fax: +221 22 62 12;
e-mail: direnvir@enda.sn

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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