The 1999 Freeze in Production and Consumption of CFCs in Developing Countries:
27 months to go!

21st ExCom meets in Montreal

The 21st Meeting of the Executive Committee (ExCom) of the Multilateral Fund was held in Montreal, 18–20 February 1997. The status of the Fund was reviewed (see page 8) and the report of the Subcommittee on Project Review was considered. The 1997 work programmes of the implementing agencies and project proposals worth US$14.9 million were approved, which will eliminate 1021 tonnes of ODS.

Other important decisions included:

- the US$74 million carried over from 1996 would be allocated to the 1997 budget for planning purposes to help developing countries meet the 1999 freeze;
- better means of evaluating performance would be developed so that the relative performance of the agencies could be evaluated before their 1998 business plans were considered;
- a summary status report would be developed for each Article 5 country showing their progress towards phase
Fund Secretariat
The Fund Secretariat prepared for and organized the 21st Meeting of the Executive Committee held in Montreal, 18–20 February 1997. It also convened a coordination meeting of the implementing agencies (UNIDO, UNEP, UNDP, and World Bank) at which resource allocations for the purpose of business planning was agreed. It reviewed for the 21st Meeting the 1997 Business Plans and work programmes of the implementing agencies, four country programmes and 15 project proposals, including those for bilateral cooperation. The Secretariat also prepared several policy papers including the Financial Planning of the Multilateral Fund for the Triennium (1997–99); the Three-Year (1997–99) Business Plan of the Multilateral Fund; and report on actions to improve the functioning of the Financial Mechanism. It organized meetings of the Production Sector Expert Group and the Executive Committee’s Sub-Group on Production Sector.

The Secretariat notified relevant governments of project approvals and decisions of the 21st Meeting of the Executive Committee relating to their countries, and distributed the report of the Meeting to the Parties of the Montreal Protocol. It began preparation towards the 22nd Meeting of the Executive Committee to be held in Nairobi, Kenya, 28–30 May 1997.

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

UNEPIE Ozone Secretariat
The Secretariat prepared the documentation for the 15th Open-ended Working Group (O EWG) to be held in Nairobi, 3–6 June 1997. Six Parties (Australia, Canada, the European Community, India, Switzerland and the United States) have submitted proposals for amendments of the Montreal Protocol at the next meeting of the Parties in September 1997.

Six Parties (Australia, the European Community, Hungary, the Russian Federation, South Africa and the United States) have submitted proposals for amendments of the M ontreal Protocol at the next meeting of the Parties in September 1997.

Contact: Mr K. M. Sarma, UNEP Ozone Secretariat, PO Box 30552, Nairobi, Kenya. Tel: +254 2 623 885 Fax: +254 2 623 913 E-mail: madhava.sarma@unept.org Internet: http://www.unep.org/unept/secretariat/ozone/home.html

UNEP Ozone Secretariat
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Contact: Mrs Jacqueline Aloisi de Larderel, UNEP IE, 39–43 quai André Citroën, 75739 Paris Cedex 15, France. Tel: +33 1 44 37 14 50 Fax: +33 1 44 37 14 74 E-mail: ozonation@unept.org Internet: http://www.unepie.org/ ozonation.html

UNDP
UNDP presented its draft 1997 Business Plan at the 21st ExCom meeting. It included 134 investment projects in 34 countries to eliminate 5720 ODP tonnes at a cost of US$43 million. Half of the funding is for ODS phase out in the three largest countries (Brazil, China, India) to help them meet the 1999 freeze. Low-volume ODS-consuming countries are also covered, and account for 32 of the 51 countries where UNDP is active.

UNDP completed 70 projects in 1996, raising the number of projects completed during 1991–96 to 173. Total ODP elimination in 1996 was 1212 tonnes.

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

UNIDO
At the 21st ExCom Meeting, four investment projects were approved for UNIDO execution, as carry-overs from last year’s allocation, amounting to US$533 000.

UNIDO’S Work Programme for 1997 covering 18 countries and amounting to US$760 000 was approved at the same meeting. Work on formulating further investment projects and projects in the methyl bromide sector continues.

Contact: Angelo D’Ambrosio, UNIDO, PO Box 300, A-1400 Vienna, Austria. Tel: +39 1 21131 5085 Fax: +39 1 21131 6853 E-mail: adambrsio@unido.org

World Bank
The 21st ExCom Meeting approved additional funding of US$4.35 million to support five new projects in Indonesia and Thailand. With this new approval, the total allocation that the World Bank received in 1996 was US$43.5 million. The Bank now has 318 investment projects with a value of more than US$200 million in its portfolio. When completed, these projects will phase out more than 47 000 tonnes of ODS. By the end of 1996, more than US$71 million had already been disbursed to enterprises, and more than 13 600 tonnes of ODS had been eliminated.

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

News from international agencies
Industry and technology updates

AEROSOLS AND MISCELLANEOUS USES

Dry cleaning without CFCs
A study gathering the experiences of the Nordic dry cleaning establishments where dry cleaning methods alternative to the one using CFCs have been investigated showed two promising and widespread alternatives: hydrocarbon dry cleaning and wet cleaning.

Two hydrocarbon technologies were tested: Satec's transfer system and Swiss Clean's dry-to-dry system. The wet cleaning systems used were by Miele/Kreussler, Electrolux/Wascator and Ipso. The conclusions gathered show that dry cleaning with hydrocarbons has a potential to replace CFC cleaning totally. Wet cleaning, on the other hand, also shows some promise; however, observations show that it should only be a supplement to cleaning with perchloroethylene.

Contact: Nordic Council of Ministers, Copenhagen
Fax: +45 33 96 02 02

Refining raw LPG for propellants
In the United States, Petro Project Engineering, of Houston, Texas, has designed the AERO® process—Advanced Extraction and Removal of Olefins—for refining raw liquid petroleum gas (LPG) to produce what the company describes as a high-quality propellant. The process converts olefins to alkanes, mercaptans to hydrogen sulphide, and removes odour-causing chemicals. The result is a product that is claimed to be suitable for use in hair sprays, deodorants and air fresheners.

Petro has recently completed the design of an 11 000 tonnes/year plant to be built later this year in China. Smaller plants are also available, as is a process to manufacture dimethyl ether as a propellant.

Contact: Petro, fax: +1 281 470 0732

REFRIGERANTS

Eliminating refrigerants from telecom switching centres
British Telecom is eliminating the refrigerants previously used to cool its switching centres by converting to air-cooled systems. The move has eliminated large volumes of CFCs and HCFCs, halved the energy consumption of the centres and resulted in substantial reductions in annual CO₂ emissions, according to the Global Environmental Change Report (28 February 1997).

More than 100 centres have now been converted and BT claims to be the first telecommunications company in the world to convert to the new but simple technology which, in effect, replaces complicated cooling systems with a simple fan.

The conversion has been made with the help of the US fluid dynamics software and service company Flomerics Ltd, of Marlborough, Massachusetts.

BT has received the Premier Prize in the UK’s 1997 Business Commitment to the Environment awards for the innovation.

Contacts: BT, fax: +44 171 405 6875
Flomerics, fax: +1 508 624 0559

New chillers use non-ODS substitutes
The US company Carrier Corporation has announced that its new line of Ecologic chillers uses HFC-134a refrigerant, has higher operating efficiencies, lower sound levels and smaller footprints than previous models. The 30HX range is water cooled and the 30GX range is air cooled. The company claims that the new range meets its requirements for refrigerant, efficiency, quieter operation, and product size and material reduction.

Contact: Carrier, fax: +1 315 432 3503

New alternative for R-503
Dehon Service announced that it has recently added Forane 508B to its product line as a suitable replacement for R-503 for lower temperature refrigeration used in laboratories. Forane 508B, from Elf-Atochem, is a refrigerant blend of HFC-23 and FC-116.

Compared to R-503 (a blend of HFC-23 and CFC-13) this alternative has higher condensation pressure, evaporation pressure and rate of compression.

Contact: Dehon, tel: +331 43 98 75 00

FIRE FIGHTING

Four new alternatives for halons
DuPont has introduced four new fire extinguishants as halon replacements: FE-13™ (CHF₃) is used as a total flooding agent for normally occupied areas; FE-25™ (CF₃CHF₂) is a total flooding agent for normally unoccupied areas; FE-241™ (CF₃CHCIF) is a total flooding agent for unoccupied areas and can be used as a streaming agent in portable fire extinguishers (with some hardware modifications); and FE-36™ (CF₃CH₂CF₃) is available for testing and evaluation as a streaming and flooding agent.

Contact: DuPont, fax: +44 1442 218575
FOAMS

HFC-245fa gets comparative approval

A study by AlliedSignal gives HFC-245fa high marks as a foam-blowing agent. The study compared three such agents: HFC-245fa (CF3CH2CH2F), HFC-141b (CCl3F), and CFC-11 (CCl3F). The main conclusions of the study are that:

- HFC-245fa performs well as a blowing agent in an appliance foam;
- aged k-factors of the HFC-245fa foam are lower than those of the aged HFC-141b foam;
- foam properties of the HFC-245fa exceed those of the HFC-141b foam;
- dimensional stability of the HFC-245fa foam is excellent;
- some consideration must be given to techniques for processing HFC-245fa.

Contacts: AlliedSignal, fax: (1) 201 455 6395

US EPA approves foam-blowing HFC alternatives

The US Environmental Protection Agency (US EPA) officially approved the use of saturated light hydrocarbons as alternatives to HFCs in the manufacture of polysiloxane and polyurethane rigid boardstock foams on 10 March 1997. The agency also approved the use of HFC-134a, saturated light hydrocarbons, and carbon dioxide in the manufacture of polyurethane rigid appliance foam.

US EPA noted that any manufacturer that switched to hydrocarbons would probably have to make additional investments to ensure safety during handling, use and shipping because of the flammability of hydrocarbons. In the United States, they must also be controlled in accordance with the Clean Air Act because they are volatile organic compounds.

Contact: US EPA, fax: (1) 202 233 9665
Internet: http://epa.gov/ozone

METHYL BROMIDE

Fungal extract promises good nematode control

Extensive tests at the US Abbott Laboratories in Long Grove, Illinois, are confirming that the use of DiTera®, a natural product made from the M yogurticus fungus, is an effective way of controlling nematode infestations. Tests over the past nine years have shown that the product can be used to protect carrots, cauliflower, egg plant and squashes; tests on grapes and citrus fruits are under way. Field evaluations on carrots have resulted in 53 percent marketable carrots, compared to the 55 percent obtained when the crop was treated with methyl bromide.

DiTera® was discovered at the Abbott Laboratories, which holds several patents on the material, ten years ago. The product has now been approved for use in several US states, including California, Florida and Texas, and has been registered for use in Chile. It is available as a spray-dried powder or a liquid, and a granular product is being developed.

Contact: Abbott Laboratories,
fax: +1 847 367 2913

Significant improvements to diatomaceous earth

Diatomaceous earth products are registered for use as structural, grain, house and garden pest control insecticides. ‘Protect-It’ is a natural, non-toxic and environmentally safe alternative to methyl bromide.

Produced by Hedley-Pacific Ventures, this product is a significantly improved diatomaceous earth which is effective in controlling pests in stored grain at 75–100 ppm. Collaborative research between Hedley-Pacific Ventures and Agriculture and Agri-Food Canada (Winnipeg Research Centre) led to the development of this product. It has been field tested and is registered with Health Canada for use in the control of the rusty grain beetle.

Contact: Hedley Pacific Ventures,
fax: +1 604 685 6039

Physical and environmental properties of CFC-11, HCFC-141b and HFC-245fa

<table>
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<tr>
<th></th>
<th>molecular weight</th>
<th>boiling point (°C)</th>
<th>conduct. (mW/mK)</th>
<th>flammable</th>
<th>TLV or OEL (ppm)</th>
<th>GWP</th>
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<td>32</td>
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<td>14</td>
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</table>

Notes:
1. 100 years
2. in air
3. gas conductivity in air measured at 10 °C
4. gas conductivity in air measured at 40 °C

Source:
Sourcebook of Technologies for Protecting the Ozone Layer: flexible and rigid foams (UNEP IE, 1996)

Five countries and the EC table Protocol amendments

Several changes to the Montreal Protocol are proposed for the 9th Meeting of the Parties and will be discussed at the 15th Meeting of the OEWG during 3–6 June 1997. The full text of the proposed adjustments and amendments to the Montreal Protocol was distributed to all the Parties by the Ozone Secretariat at the Ozone Secretariat Home Page. The adjustments and amendments are from six Parties: Australia, Canada, the European Community, India, Switzerland and the United States. They relate to a licensing system for imports and exports of ODS, control of trade by Parties not in compliance with the Protocol, trade restrictions on used, recycled and reclaimed substances, further interim reductions steps for carbon tetrachloride and HFCs operating under Article 5, accelerating the phase out of methyl bromide and HFCs, reduction of the HFC cap, control of trade in methyl bromide with non-Parties, the production baseline for Parties operating under Article 5, and control of production of HFCs.

Contact: UNEP Ozone Secretariat, fax: +254 2 623 913

The US EPA has also approved the use of HFC-236fa as an alternative to CFC-114 in industrial process heat pumps.

Contact: US EPA, fax: (1) 202 233 9665
Internet: http://epa.gov/ozone
Ozone community to be studied

Two sociologists at the University of Denver (Colorado, United States) are studying the make-up and structure of the global ozone community. This spring Drs Penelope Canan and Nancy Reichman will be contacting the experts around the world who served on the UNEP Technology and Economic Assessment Panel and their Technical Options Committees since 1988. The purpose is to understand how these committees have contributed to the implementation process. The sociologists will then conduct interviews with TEP/TTOC members. It is hoped that this work will provide lessons on organization that will speed ODS phase out and perhaps inform procedures on how to address other global environmental problems. Summaries of the results will be reported in OAN.

Contact: fax: +1 303 871 2090
e-mail: pcanan@du.edu

RECOVERY AND DESTRUCTION

CFC separation techniques improve

The US firm Davco CFC Processing has developed a technique for separating R-12 from a mixture of R-12 and R-22 in quantities of up to 400 kg a day. The technique is effective on all mixtures containing no more than 20 percent R-22 and no more than 10 percent refrigerant oil. The recovered R-22 is claimed to be of a quality that exceeds the 99.5 percent purity standard.

A similar development is announced in the United States by Liberty Technology International which has completed construction of a facility dedicated to CFC separation which is claimed to be able to recover all components in the mix. Any previous techniques used destructive separation and recovered only the principal ingredient.

Contacts: Davco, fax: +1 610 559 1401
Liberty Technology, tel: +1 908 686 4099

SOLVENTS

Substitute for CFC-113

In the United States, the Occidental Chemical Corporation is marketing a range of cleaners based on the parachlorobenzotrifluoride (PCBTF) molecule. Marketed as the OXSOL® range, the cleaners are volatile organic solvents that are claimed not to harm the ozone layer or cause global warming. In the United States, they are VOC exempt and are not classified as HAZARDOUS AIR Pollutants. The cleaners are suitable for use in vapour degreasing systems, as cold cleaning solvents for wipe cleaning or precision cleaning, and as drop-in replacements for CFC-113.

Contact: Occidental Chemical Corporation, tel: +1 972 404 3301

New precision vapour degreasing agent

Borothene is being marketed by the US firm Advanced Chemical Design as a drop-in replacement for 1,1,1 trichloroethane and CFC-113. The active ingredient is stabilized mono-chloro-mono-bromoethane, and the firm claims that the product has low toxicity and outstanding cleaning power at a low cost. A patent is pending. The agent is said not to affect aluminum, magnesium, ferrous metals and most plastics and elastomers. The agent is recommended in vapour degreasers and ultrasonic cleaners, and is claimed to be as strong or stronger than any of the chlorinated solvents. It can be used to dissolve all the greases, fats, oils, waxes, resins, gums and rosin fluxes generally encountered in any metal-working, electronic or precision-cleaning application.

Contact: Advanced Chemical Design, fax: +1 216 291 5949

New aqueous cleaner

The US firm ETUS, Inc. has developed a range of ODS-free degreasers and cleaners. RB D degreaser/cleaner is an aqueous concentrate, said to be non-toxic, non-caustic, non-flammable and biodegradable, yet can be used to remove oils, greases and other deposits from metals, glass, plastics, fabrics, rubber, concrete and other hard and soft surfaces. It can be applied by soaking, dipping, wiping, brushing and spraying; and is used in soak tanks, dip tanks, parts washers, electro-cleaners, ultrasonic cleaners, vapour degreasers, floor scrubbers, pressure washers, steam cleaners and tumblers. Proprietary inhibitors protect metal surfaces from corrosion during cleaning operations and provide temporary rust protection. A ‘demulsifier’ feature separates the oils and grease from solution. The cleaners and degreasers are on the US EPA’s SNAP list of acceptable alternatives to ODS.

Contact: ETUS, Inc., fax: +1 407 321 3098
e-mail: etus@env-sol.com

In brief...

- **Poland** has earmarked US$3.5 million to decrease its use of CFC-12 by 20 percent annually. The project is being financed by the EkoFund, an independent Polish agency financed by fines imposed on the country’s heavy industrial polluters and a debt-for-equity swap of part of the Polish state debt to foreign countries.

Contact: Ministry of Industry and Trade, fax: +48 22 6212550

- **The Aeropres Corporation** claims that its new hydrocarbon propellants are at least four times cheaper than any other substitute. Aeropres, a US company, stresses that its propellants can be used in both medical and food applications.

Contact: Aeropres, fax: +1 316 429 6739

- **Refron**, Inc. in the United States provides information on the Internet for wholesalers seeking information about supplies of recycled or recovered CFCs.

Contact: http://www.refron.com

TEAP opens its Internet site

The UNEP Technical and Economic Assessment Panel opened its Home Page on the Internet (http://www.teap.org) on 24 March 1997. The site provides the public with current information on TEAP activities and membership, and serves as a source for downloading full versions of final and draft reports, technical notes, etc.

Files will be made available in Adobe Acrobat format which enables viewing by cross-platform users (DOS, Windows, Macintosh and UNIX).

Readers with questions regarding this service should contact Mr Gary Taylor, Co-Chair of the Halons Technical Options Committee.

Contact: G. Taylor, e-mail: G.Taylor@mail.taylorwagner.com
Network news

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

Southeast Asia and the Pacific
The follow-up meeting was held during 28 February-1 March 1997 in Melbourne, Australia, back-to-back with the ‘Life after Halons’ conference, and was hosted by the Australian government. ODS Officers discussed progress as well as common problems related to ODS phase out, the development of a regional approach to halons and heard a presentation on Malaysia’s success in MAC recovery and recycling. Other discussions included revision of the present format on data reporting, recent developments in the Montreal Protocol, possible agenda items for the next OEWG, highlights of the recent ExCom meetings, and a review of the recently approved UNEP work programme including the refrigeration management plan.

Key points to emerge from the meeting to improve and strengthen ODS phase-out programmes in the SEAP region included:

- Malaysia and Indonesia are the only countries in the network consuming more than 100 tonnes of halons, meaning they would be eligible for assistance in establishing Halon Banks under the Multilateral Fund;
- a paper would be prepared on the halon situation in the region that would include Australia’s capabilities in recovery, recycling and destruction, and Malaysia’s and Indonesia’s capabilities in halon banking;
- Australia and UNIDO would present case studies on alternatives to methyl bromide at the next meeting;
- all countries will be able to meet the 1999 freeze;
- at the next meeting, an expert would be identified to discuss alternatives to HFCs in the air-conditioning sector, focusing on the efficiency and use of HFC-134A in tropical countries;
- the next meeting would also review results from the chiller training courses in Thailand, Philippines and Indonesia.

Contact: UNEP IE ozoneAction Programme, fax: +33 1 44 37 14 74
Internet: http://www.unepie.org/ozoneaction.html


Preparations for the 10th anniversary of the Montreal Protocol are well under way. Plans are being drawn up jointly with Environment Canada for a series of events to be held in Montreal, Canada. These include:

- a Technology Showcase with the theme A Decade of Technology Transfer under the Montreal Protocol: Lessons Learned, including an exhibition of technologies and a series of presentations (9-17 September);
- a Science Colloquium (September 12-13) to provide an opportunity for the scientific community to share its views with participants through presentations and discussions;
- TEAP Industry Celebration Dinner, including the ‘Best-of-the-Best’ awards (14 September);
- a video on the 10th anniversary;
- UNEP Industry Reports, a list of forthcoming meetings, the list of publications of the Secretariat and the Agenda of the 15th Open-ended Working Group (OEWG).

Commemorative postal stamps for the 10th anniversary

The International Postal Union (IPU), as a result of cooperation with the UNEP Ozone Secretariat in Nairobi, is inviting its members to issue postage stamps to mark the Tenth Anniversary of the Montreal Protocol. In response to Circular No. 428 issued by the IPU, ten countries—Argentina, Belarus, Brunei Darussalam, Czech Republic, Islamic Republic of Iran, Kazakhstan, Pakistan, Peru, Poland and Zambia—will be issuing postage stamps by September 1997.

Countries are encouraged to commemorate this event by responding positively to this invitation. Those who wish to do so may contact the Ozone Secretariat for design ideas. Samples of these commemorative stamps will also be published as an insert in the October issue of OAN.

Contacts:
The Secretariat, 10th Anniversary of the Montreal Protocol, Environment Canada, fax: +1 819 953 0550; e-mail: ozone97@marbek.ca
UNEP Ozone Secretariat, fax: +254 2 623 913 e-mail: madhava.sarma@unep.no
Internet: http://www.unep.org/unep/secretar/ozone/home.htm
UNEP IE, OzoneAction Programme, fax: +33 1 44 37 14 74 e-mail: ozonaction@unep.fr
Internet: http://www.unepie.org/ozoneaction.html
Phase-out successes under the Multilateral Fund

Malaysia replaces CFCs in pipe insulation manufacture
The Malaysian firm Allied Foam Insulation has replaced CFC-11 in the manufacture of its pipe insulation products as a result of an investment project funded by the Multilateral Fund and implemented by UNDP (M AL/ FOA/13/IN V/043). The project was approved in July 1994 and completed in December 1996, eliminating 25 000 tonnes through conversion to HCFC-141b technology.
Contact: UNDP, fax: +1 212 906 6947

Reusing methyl bromide in Chile
Environment Canada and the Chilean Exporters’ Association have completed a project involving the transfer of a Canadian technology that will help reduce methyl bromide use in Chile. The technology, the Bromosorb unit, offers a means of reducing methyl bromide consumption during fumigation. The unit is attached to the chamber where the commodity (such as fruit or cut flowers) is to be fumigated. The unit recaptures and recycles the methyl bromide used in the fumigation. The methyl bromide is then reused during the next fumigation cycle instead of being vented to the atmosphere. The Bromosorb unit reduces consumption of methyl bromide by 75 percent and reduces emissions to the atmosphere by 95 percent.
Environment Canada, through a bilateral project under the Multilateral Fund of the Montreal Protocol, donated a Bromosorb unit to the Chilean Government. In December 1996, the unit was installed at the David del Curto Plant in Kalinca. During commissioning, Chilean workers received hands-on training from Canadian technicians. Initial tests with the unit have produced promising results.
Contact: Environment Canada, fax: +1 819 953 7253

Thai firm eliminates CFCs in foam manufacture
Thai Union has eliminated CFCs in the manufacture of rigid foam, cold-cure and integral skin foams as a result of another UNDP project (THA/FOA/15/INV/041). This project was approved in December 1994 and completed in December 1996, eliminating 45 000 tonnes through conversion to H CFC-141b for rigid and integral skin foams, and a water-based system for flexible moulded foam.
Contact: UNDP, fax: +1 212 906 6947

Guatemalan firm eliminates CFCs
The Guatemalan firm Refrigua now produces refrigerators containing neither CFC-12 as a refrigerant nor CFC-11 as a means of blowing the insulation panels, thanks to a UNDP-implemented project (GUA/94/G62) which received funding of US$195 000 from the Multilateral Fund. The project is phasing out the use of 24.4 ODP tonnes a year. Refrigua produces 18 000 refrigerators a year.
Contact: UNDP, fax: +1 212 906 6947

NASA converts wind tunnel to R-134a
The NASA Langley Research Center’s Transonic Dynamics wind tunnel, in Hampton, Virginia, is converting its testing system from R-12 to R-134a. The system is the largest of its kind in the world using refrigerant gas. The new refrigerant charge, nearly 160 tonnes, will be HFC-134a supplied by ICI Klea, through Refron, Inc.

The wind tunnel, which is used for the testing of both commercial and military aircraft, has a volume of more than 28 000 m$^3$. NASA uses refrigerant gas as the test medium because it is heavier than air and thus beneficial for aerelastic testing.

The R-134a is delivered from a liquid storage vessel, through a steam-fed vapourizer, and into the wind tunnel. A 22 500-kW fan blows the vapour through the tunnel at speeds ranging from Mach 0.1 to 1.2. Approximately 45 tonnes of R-134a are vaporized into the tunnel during a typical test run. Following a test sequence, the R-134a is recovered from the tunnel using a powerful compressor and a low-temperature condensation system.

Refron, Inc., converted the storage tank from R-12 to R-134a, and recovered nearly 100 tonnes of R-12 refrigerant.
Contact: ICI Klea, fax: +1 302 887 7706; Internet: www.icklea.co.uk/ klea

New Policy Guidebooks available

Saving the Ozone Layer: Guidelines for United Nations Offices, Practical Steps to Phase Out the Use of Ozone-depleting Substances on UN Premises. UNEP IE OzonAction Programme, 1997


Contact: UNEP IE OzonAction Programme
Fax: +33 1 44 37 14 74
e-mail: ozonaction@unep.fr
Internet: http://www.unepie.org/ ozonaction.html
out and the difficulties they might face in meeting the 1999 freeze in consumption of annex A CFCs;

- a study would be made of ways in which the administrative costs of the implementing agencies could be reduced;
- a standing Sub-committee on Monitoring, Evaluation and Finance was created to replace the previous Sub-committee on Financial Matters;
- the country programmes of the Democratic People’s Republic of Korea, Paraguay, and Saint Kitts and Nevis were approved;
- the ExCom also provided initial guidance on the sectoral plan being developed by China and the World Bank to phase out ODS use in the halon sector—a new sector approach promising economies over the project-by-project approach;
- the World Bank to prepare a study on concessional lending to finance phase-out projects and ways of raising private-sector finance.

**Contact:** Multilateral Fund Secretariat, fax: (1) 514 282 0068 e-mail: mleyva@unmfs.org

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### Indonesian training course on chillers and refrigerant management

UNEP organized the last of a series of training courses on chillers and refrigerant management in Jakarta, Indonesia, during 26-27 February 1997. The course was completed in cooperation with the Ozone Unit in the State Ministry for the Environment of Indonesia; 60 people from industry and government participated. Three lecturers from the Air-conditioning and Refrigeration Institute (ARI) in the United States provided the technical expertise for the training.

**Contact:** UNEP IE OzonAction Programme fax: +33 1 44 37 14 74; e-mail: ozonaction@unep.fr Internet: http://www.unep.org/ozonaction.html

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### Ozone on Internet

OzonAction News is now available on the Internet, in English, French and Spanish.

**Point your Web browser to:** http://www.unepie.org/ozat/oan.html

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### Ozone science news

#### Melanoma on the rise

The incidence of malignant melanoma is rising at an alarming rate in the United States. Americans now have a 1 in 84 risk of developing melanoma in their lifetime, an 1800 percent increase since 1930, according to Dr Darrell S. Rigel of the New York University School of Medicine.

The United States is not alone in this respect. Australia, Austria, Canada, Germany, Italy and Scotland have all experienced a significant increase over the past decades. However, public awareness efforts have proven helpful because patients are now coming to their doctors earlier with suspicious lesions. This has led to an increased survival rate for patients with stage 1 melanoma from approximately 50 percent in the 1950s to approximately 90 percent today.

**Contact:** fax +1 212 689 5748 e-mail: dsrigel@prodigy.com

#### Ozone hole report

Although the strength and longevity of the ozone hole during the southern spring of 1996 was comparable with the events of the past four years, a few new records were set. The hole disappeared only in the first half of December 1996. The area exceeding 10 million km² lasted for about 85 days compared with about 70 for the previous four years and less than 30 days in the early 1980s. The hole covered an area larger than 15 million km² for about 70 days which has happened only once before, in 1995. A record low monthly mean ozone of 152 m atm cm was reported by the Halley station for September, by Syowa (156 m atm cm) for October and by Vernadsky (211, 225 and 270 m atm cm) for August, November and December respectively.

In the northern mid- and polar latitudes, ozone levels at the end of November and early December were 5-8 percent below the 1957-70 averages, with a deficiency of more than 20 percent over the north Atlantic, northern Europe and western Siberia. However, later in December until the end of February there was no spectacular decrease. T he deviations were 5-10 percent below the averages expected from extrapolating the long-term ozone trend.

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#### Do aircraft destroy the ozone layer?

In the 1960s, before CFCs were suspected of destroying the ozone layer, there were fears that large fleets of supersonic aircraft could have serious effects on the ozone layer. Now, almost 30 years later, the same fears have re-emerged as a result of research by the US National Oceanic and Atmosphere Administration at Boulder, Colorado. A research plane chasing Concorde has found that it produces an exhaust containing much sulphuric acid in the form of a very fine aerosol. The chloride pollutants that destroy ozone do so on the surface of such particles.

A large fleet of supersonic aircraft could therefore have a serious effect on the ozone layer. So too, claim the researchers, might subsonic aircraft but the research has not yet been done.

**Contact:** NOAA, fax: +1 303 497 5126

#### First evidence that ozone hole harms Antarctic fish

Researchers from Northeastern University and the University of Texas in the United States have shown that increased ultraviolet light (UV-B) damages DNA in the eggs and larvae of Antarctic icefish. In Proceedings of the National Academy of Sciences (17 February 1996), the scientists report that icefish eggs accumulate significant levels of DNA lesions called cyclobutane pyrimidine dimers.

‘We were surprised at the extent of the DNA damage we found,’ said lead author Kirk M. alloy, biologist at Northeastern, ‘although we still need to know what happens during the rest of the year when the ozone hole closes up.’

‘Ozone depletion has previously been shown to harm one-celled marine plants in Antarctica. We’ve now documented significant damage at a higher level of the food chain,’ said William D. etrich, a Northeastern biologist who coauthored the paper. ‘It is striking how closely the damage to the fish eggs tracked with the increased intensity of ultraviolet light.’

**Contact:** Northeastern Biology Department, fax +1 617 373 3724
Questions and answers:

**Question:** why is the 1999 freeze important for developing countries?

**Answer:** It is the first of a number of reductions and phase outs under the Montreal Protocol, including its London and Copenhagen amendments, that affect Article 5 countries (broadly, the developing countries). It will require these countries to freeze their consumption of the 10 CFCs listed in annex A of the Protocol at their average consumption levels during 1995–97.

**Question:** will this be followed by further restrictions?

**Answer:** Yes— as the table on the right shows, most subsequent restrictions will affect Article 5 countries; consumption of halons will be frozen in the year 2002, annex B CFCs and methyl chlorofluorocarbon consumption will be affected the following year, and so on.

**Question:** how can Article 5 countries meet these deadlines in time?

**Answer:** By preparing and implementing their country programmes which will outline the steps needed to meet all the requirements of the Montreal Protocol. Most countries have developed or are developing these programmes. Those that have not yet done so should immediately contact the OzoneAction Programme.

**Ozone leadership organizations announce climate protection**


Perfluorocarbons (PFCs) are often used to replace ODS in the manufacture of semiconductors and other electronic devices, and are among the most potent greenhouse gases. At present, no substitutes are known for this chemical which is especially useful in the semiconductor industry.

This plan is regarded as comparable to the voluntary measures taken by the US EPA and some semiconductor industry partners to reduce other emissions. It is expected that the Framework Convention on Climate Change will use industry leadership to achieve its aims, as did the Montreal Protocol for the Protection of the Ozone Layer. It is anticipated that this action will encourage other European and Asian semiconductor industries to support similar voluntary actions to reduce PFC emissions in ways that are less expensive, quicker and potentially environmentally more friendly than traditional regulatory approaches.

This workshop was sponsored by the Japan Industrial Conference for Ozone Layer Protection (JICOP), Japan Electrical Makers Association (JEMA), EIAJ, Japan Automobile Makers’ Associations (JAMA), Japan Refrigeration and Air-Conditioning Industry Association (JRAIA), Japan Fluorocarbon Makers’ Association (JFMA), Federation of Electric Power Companies (FEPC), The International Cooperative for Environmental Leadership (ICEL), and the University of Maryland. It was supported by the Japan Ministry of International Trade (MITI), the US EPA, and UNEP.
World policy round-up

Cameroon bans imports of refrigerators and freezers that use CFCs

Cameroon’s Ministry of Industry and Trade is banning importation of all refrigerators and freezers that use CFCs. The Ozone Office said the ban was necessary because the stockpiles of equipment that uses CFCs that cannot be sold in developed countries were being dumped in Africa.

Cameroon also plans to introduce regulatory initiatives to protect the ozone layer and is already working to increase public awareness of the ozone issue. For example, the National Ozone Office of the Ministry of Environment and Forests is giving away free vehicle stickers that state “I Love Life, So I Protect the Ozone Layer.”

Contact: Ministère de l’Environnement et des Forêts, fax: +237 21 53 61

EU ecolabels for environment-friendly refrigerators and freezers

The European Commission has announced that refrigerator and freezer manufacturers which produce energy-efficient machines, and refrain from using ODS and only apply low GWP chemicals, may receive EU ecolabels on their products.

The logo, a stylized letter “E” surrounded by a flower with the EU’s 12 stars as petals, may be used only after the EU verifies that a product meets specified energy efficiency and environmental requirements. Refrigerators using ODS as refrigerants or in the manufacture of the insulation will not be permitted to display the label.

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

India: incentives for ODS phase out projects

The Government of India has, with effect from 1 March 1997, exempted companies making new investments in non-ODS technologies from paying Customs and Excise duties.

Contact: Ministry of Environment and Forests, India

China and United States agree on standards

The US Air Conditioning and Refrigeration Institute (ARI) and the China Refrigeration and Air Conditioning Industry Association (CRAA) have concluded a Memorandum of Understanding which allows CRAA to use ARI standards to develop similar standards in the People’s Republic of China. The agreement is intended to encourage harmonization of US and Chinese standards for heating, ventilation, air conditioning and refrigeration equipment. CRAA has already indicated that it will use ARI rating conditions as it develops standards for the Chinese market.

Contact: ARI, fax: (1) 703 528 3816
Internet: http://www.ari.org

Recent publications

GTZ, Hydrocarbon Technology II (GTZ Yearbook 1996). Eschborn, 1996, Germany


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

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

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