



View point

The meaning of sharing



Dr Delfin J. Ganapin Jr, Department of Environment and Natural Resources, Philippines

There is a definition of sustainable development that is simplistic yet captures the essence of what must be done: 'sustainable development is sharing for the environment'. This one statement contains several

truths. One is that we all share one environment. The actions of any one country, such as the use of ozone-depleting substances (ODS), has an impact on the whole Earth and affects us all. Another truth is that there are disparities between countries in the resources and technological capabilities available. Closing these gaps is the best way to foster joint action at the global level.

While these truths are easy to understand, there are differing interpretations between developed and developing countries when talk of 'sharing'

arises. Some countries will share but only if their political and economic dominance is maintained. This leads to frustratingly long debates on conditions related to the transfer of funds and technology.

The Multilateral Fund of the Montreal Protocol is one example where there is a commitment to a full sharing of both benefits and responsibilities. There is a Fund to share and there are commitments to ensure implementation. The initial years of the Fund can be seen as an experiment—a successful one.

But this effort must be continued. Even though problems may arise in the working mechanisms of the Fund, there is every reason to resolve these issues and improve the Financial Mechanism. This thought should be foremost in the minds of all Parties as we proceed with discussions on replenishment.

Now we have to go further, beyond simple recycling, retrofits and replacements. Increased importance should be given to the transfer of technology and know-how. But we should not proceed in such a way that countries at the receiving end of the sharing partnership feel they are being paid simply to perform a service. Replenishment must occur because it is to the benefit of us all.

***PHASE OUT UNDER THE MULTILATERAL FUND:
9842 tonnes of ozone-depleting substances
had been phased out as of 31 May 1996***

Phase-out success under the Multilateral Fund: first Indian project completed

Camphor & Allied Products Ltd. of Gujarat, a leading Indian private sector manufacturer of extruded low-density polyethylene foam sheet for packaging and insulation, has successfully completed the first project in India under the Multilateral Fund with the assistance of UNDP (project number IND/FOA/12/INV/16). The company has converted its production technology to non-ODS by substituting liquid petroleum gas and iso-butane for

CFCs, resulting in the elimination of 120 tonnes of ODS.

Contact: UNDP, fax: (1) 212 906 6947

Additional information on alternative technologies in the foam sector is available in UNEP IE's *Technology Sourcebook on Flexible and Rigid Foams*.

Chinese participants play the role of 'safety inspector' in a foam factory as part of a UNEP/NEPA safety workshop—see page 7

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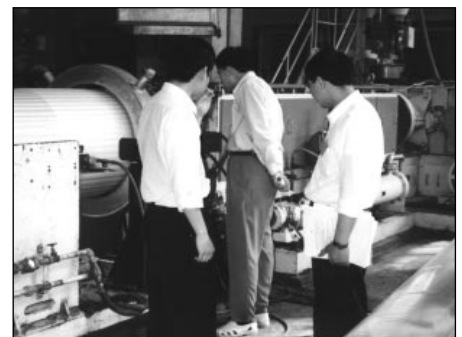
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News from international agencies

**Fund Secretariat**

The Secretariat organized the 19th Meeting of the Executive Committee (ExCom) and its Project Review Sub-committee in Montreal, Canada, during 6–10 May 1996.

It reviewed 7 country programmes and more than 100 projects and activities worth US\$40 million, the UNEP work programme, and the work programme amendments of the implementing agencies. It prepared policy and guideline documents on renewal of institutional-strengthening projects, umbrella projects and the three-year rolling business plan for the Multilateral Fund, and terms of reference for the study on technology transfer and the duration of transition periods for incremental operating costs and savings.

The Secretariat held a two-day coordination meeting with the implementing agencies before the ExCom meeting. The report of the 19th ExCom Meeting (see page 6) was then distributed to the Parties. Preparations have been begun for the 20th ExCom meeting to be held during 14–18 October 1996 in Montreal, Canada.

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

**UNEP Ozone Secretariat**

The Secretariat prepared background documents for the 13th Open-ended Working Group Meeting

and the 14th Meeting of the Implementation Committee. The new versions of the *Handbook for the Ozone Protection Treaties: Vienna Convention (1985), Montreal Protocol (1987) and Action on Ozone* are being prepared. Reports of the 1st Meeting of the Bureau of the 3rd Conference of the Parties to the Vienna Convention, the 13th Meeting of the Implementation Committee and the UNEP Technology and Economic Assessment Panel report of March 1996 were distributed. Preparations were begun for the celebration of the next International Day for the Preservation of the Ozone Layer (16 September 1996). A mission was made to Costa Rica in preparation for the 4th Conference of the Parties to the

Vienna Convention and the 8th Meeting of the Parties to the Montreal Protocol.

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
WWW—http://une.unep.org/unep/secretar/ozone/home.htm

**UNEP IE OzonAction Programme**

The Programme organized three Training Workshops on Good

Practices in Refrigeration in Colombia during 14–24 May and a Training Workshop on the Safety Aspects of CFC Substitution in China during 22–24 May (see page 7).

The ODS Officers Network for French-speaking Africa held its follow-up meeting in Brazzaville, Congo, and the annual workshop for the ODS Officers Network for Latin America was held in Cartagena, Colombia (see page 6).

The 1996 Work Programme totalling US\$3.63 million was approved at the 19th ExCom. Six country programmes for Bahamas, Gambia, Lebanon, Morocco, Papua New Guinea and Viet Nam were also approved at this meeting, including their respective institutional-strengthening projects (except for Viet Nam, which was approved at an earlier meeting). A training strategy and a paper submitted by UNEP on countries consuming low volumes of ODS (LVCs) were endorsed. Comments were invited on a paper prepared jointly by UNEP and UNDP on small and medium-sized enterprises (SMEs).

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

**UNDP**

Fifty-one UNDP projects in 17 countries were

approved at the 19th ExCom meeting, to a value of US\$16.46 million. Of these, 47 are investment projects that will eliminate 2029 ODP tonnes and 4 are institutional-strengthening project renewals. Investment projects were approved for the first time in Central African Republic, Malawi and Zambia. UNDP also recently

completed its first investment projects in Mexico and Uruguay. UNDP now has 449 approved activities in 41 countries (including 254 investment projects) with a total budget of US\$126.6. Some 138 activities have been completed, including 41 investment projects and sub-projects that have eliminated 2032 ODS tonnes. By 15 March 1996 US\$45.1 million had been disbursed.

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**

The 19th ExCom approved funding for a number of previously cleared projects in the

foams sector (2 in Algeria, 1 in Syria), in the solvents sector (2 in Egypt) and in the refrigeration sector (4 in China, 2 in Pakistan and 1 in Tunisia). It also cleared a further 16 projects for later funding. Project preparation activities have been completed in Algeria, Cameroon, China, Egypt, Lebanon, Syria and Tanzania. One investment project in Egypt (elimination of CFC-12) was completed, as was the Celpack investment project for ODS phase out in Argentina.

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

**World Bank**

The 19th ExCom meeting approved funding for US\$7.5 million for Bank projects in Argentina, Brazil,

China, India, Malaysia and Thailand which had been cleared but not funded at the 18th meeting. New projects presented to the 19th meeting, amounting to US\$9.4 million, were approved for Argentina, Brazil, China, Chile, India, Malaysia, Pakistan, Philippines, Turkey and Uruguay and will be funded when sufficient resources become available. An important outcome of the meeting was the European Commission's decision to fund a first tranche of the Chile ODS II project which will use competitive bidding to allocate grant funds to enterprises.

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

Industry and technology updates

AEROSOLS

New equipment for purifying hydrocarbon propellants

The Mexican firm Propysol S. A. De C. V. has announced the availability of a new line of equipment for purifying hydrocarbons for use as aerosol propellants. The line includes equipment for molecular sieve purification, hydrogenation and fractionation. The lack of high-quality hydrocarbons is one of the major impediments to phase out in the aerosol sector in Central and Southern America, and in other regions of the world.

Contact: Propysol, fax: (52) 5 264 0128

More safe filling rooms available

In the United States Terco Inc. has announced that it now has four standard sizes of safe filling room available for use with flammable propellants such as hydrocarbons and dimethyl ether. Specially designed units of any size can also be supplied. Terco is now also providing engineering service support for CFC/hydrocarbon conversions.

Contact: Terco, fax: (1) 708 894 8846

REFRIGERANTS

New home air conditioner uses R-410a

Carrier Corporation in the United States has introduced its new Weathermaker™ 38TXA home air conditioner. This latest model in the Weathermaker™ series uses



Carrier's new Weathermaker™ 38TXA is a new home air conditioner, using R-410A as refrigerant, which claims to reduce cooling costs by 40–60 percent

R-410a (a blend of HFC-32 and HFC-125) as refrigerant and is claimed to be highly efficient, reducing cooling costs by 40–60 percent. The unit has a Seasonal Energy Efficiency Ratio (SEER) of 13.0 and will be available in six capacities ranging from about 7 to 17 kW.

The unit's heat exchanger and compressor have been designed to accommodate the higher operating pressure of R-410a. This refrigerant provides improved heat transfer which has made it possible to reduce the coil surface, resulting in a more compact and efficient unit. Carrier has also paid considerable attention to noise levels, reducing the unit's sound output to 71 decibels, comparable to that of a refrigerator.

Contact: Carrier, fax: (1) 315 432 3503

DuPont reformulates HCFC substitute

DuPont has changed the formulation of its Suva® 9100 refrigerant (R-410a) from the original 45/55 percent mixture of HFC-32 and HFC-125 to a 50/50 mixture. The move is intended to simplify HCFC replacement (HCFCs are due to be phased out by 2020 in developed countries and by 2040 in developing countries). Suva® 9100 is intended as a replacement for HCFC-22 in air conditioning.

Contact: DuPont International, fax: (41) 22 717 60 77

Hydrofluoroethers introduced to replace ODS

The US company 3M has introduced a range of hydrofluoroethers (HFEs) to replace ODS in specialized industrial and commercial applications (see *OzonAction 16*). The new products are said to have zero ODP, short atmospheric lifetimes, low global warming potential and do not contribute to smog formation. In addition they are claimed to have low toxicity, to be non-flammable and non-corrosive, and compatible with materials such as plastics, metals and elastomers. Applications include secondary loop refrigeration in equipment such as supermarket freezers and a range of applications in precision cleaning.

The names of the first two products, which became commercially available in June 1996, are 3M HFE-7100 (1-methoxy-nonafluorobutane) and 3M HFE-71DE (an azeotrope of HFE-7100 and trans-1,2-dichloroethylene).

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

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

Report claims hydrocarbons unsafe for vehicle air conditioning

Hydrocarbons are dangerous and unsuitable for use in air conditioners in motor vehicles, according to a report produced by the Australian Motor Vehicle Repair Industry Council (MVRIC). The report was produced in response to public concern surrounding the use of these refrigerants. It compares safety, environmental, costing and service issues for HFC-134a and hydrocarbon refrigerants. The report states that electrical components inside the passenger compartment of the vehicle can create a spark sufficient to produce an explosion with hydrocarbons, and vehicle crashes can damage air-conditioning systems, causing a leak which can lead to a fire or possible explosion with hydrocarbons. On the other hand, HFC-134 is non-flammable and therefore safe to use in current motor vehicle air-conditioning systems.

Contact: MVRIC, tel: (61) 2 712 2200

Fire fighting



HARC reviews halon alternatives

The Halon Alternatives Research Corporation in the United States

devoted the May 1996 issue of its newsletter to a summary of the types of halon alternatives that currently exist—traditional fire protection agents such as water and foams, halocarbon agents (HCFCs, HFCs, perfluorocarbons and fluoroiodocarbons), inert gases, water mists and powdered aerosols. The review includes a list of manufacturers of halon alternatives and of system hardware. It also summarizes the US EPA's Significant New Alternatives Policy (SNAP) rulings on alternative fire protection agents.

Contact: HARC, fax: (1) 703 243 2874

Canadian bank saves with water and natural gas

The Canadian Imperial Bank of Commerce has installed a 3500-kW absorption chiller manufactured by Carrier in its head office building. The unit is powered by high-pressure steam supplied from Toronto's district energy system, which is fired by natural gas. The chiller uses water and lithium bromide as refrigerant and is said to be reducing running costs and electrical demand as well as eliminating the use of CFCs.

Contact: Carrier, fax: (1) 315 432 3503



The Canadian Imperial Bank of Commerce (centre skyscraper) has installed a 3500-kW non-ODS chiller which reduces running costs and electrical demand.

New range of compressors and condensers for R-404a

Danfoss has created a new range of compressors and condensers for use with R-404a, a common replacement for R-502 and HCFC-22, in commercial refrigeration. For low temperature applications, the range of compressor models available is from 155 to 1380 watts and for condensers it is from 170 to 1520 watts; for medium temperature applications, the compressor range is from 525 to 4170 watts and for condensers it is from 530 to 4000 watts.

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



New range of Danfoss compressors and condensers designed specifically for use with R-404a.

R-404a is a blend of HFC-143a (52 percent), HFC-125 (44 percent) and HFC134a (4 percent).

Contact: Danfoss, fax: (49) 461 4941 630

FOAMS

Foams blown with castor oil in Brazil

Poly-Urethane Industria e Comercio Ltda., based in Belo Horizonte, Brazil, has chosen the local medical centre for a pilot demonstration of its new foam production technology based on castor oil as the blowing agent. The medical centre was chosen because it is used by some 400 people daily and is in urgent need of insulation. Therm-Jet Insolamento Termicos Ltda of Belo Horizonte, one of Brazil's major users of foam insulation, will perform the installation. The project is expected to cost about US\$34 000, all of which is being financed by Poly-Urethane. The company received US\$370 000 for a Multilateral Fund project to develop the technology, with assistance from UNDP (Project No. BRA/ FOA/12/INV/13).

In addition to reducing CFC use, the the company hopes that creating new uses for castor oil will encourage increased domestic production. Although Brazil was exporting the oil as recently as 1989, it now has to be imported from India. The castor bean plant, also known as *mamona*, grows wild even in the cities of Brazil.

Contact: Poly-Urethane, fax: (55) 31 373 1684

New high quality cyclopentane formulation from Germany

Haltermann GmbH of Germany claims to have developed a high-quality cyclopentane formulation specifically for use in

The fourth version of the OzonAction Information Clearinghouse diskette (OAIC-DV) is now available.

This reference tool is intended to promote the transfer of successful ozone-friendly techniques to organizations in developing countries.

Contact UNEP IE to obtain a copy, or download it from US EPA at <http://www.epa.gov/docs/ozone/intpol/oaic.html>.

the production of rigid foams for the refrigeration industry. The new product, called Cyclopentane PU, is said to be soluble in polyol and isocyanate, insoluble in a foam matrix and non-toxic.

Contact: Haltermann, fax: (49) 40 333 18214

METHYL BROMIDE

Fumigating a flour mill without methyl bromide

A Canadian multistakeholder project designed to demonstrate how flour mills can be fumigated in just over two days without resorting to methyl bromide use

OzonAction Programme publishes trade names list

UNEP IE's OzonAction Programme, in cooperation with experts from industry and government, has published the first version of an information paper entitled *Preliminary List of Trade Names of Chemical Products Containing Substances Controlled Under the Montreal Protocol and Trade Names of HFC Alternatives*.

The list is designed to help both National Ozone Units and customs agencies to identify imports containing controlled ODS and HFCs. It will also be of assistance to customs officials monitoring ODS imports and to other government agencies considering control measures. The publication can be obtained from UNEP IE or downloaded from the US Navy CFC & Halon Clearinghouse's Internet home page.

Contact: UNEP IE OzonAction Programme, fax: (33) 1 44 37 14 74
WWW—<http://home.navisoft.com/navyzone/tradenam.htm>

has been successfully completed. The project was originally suggested by Friends of the Earth Canada and was coordinated by the Environment Bureau of Agriculture and Agri-Food in Canada. The project involved some 50 people from different regulatory agencies, several Canadian fumigation companies and the Indianapolis-based Fumigation Service and Supply, Inc.

The project showed how a combination of heat (about 345°C), CO₂ (about 5 percent) and low levels of magnesium phosphide (about 30 ppm) can be a cost-



Flour mills are a natural home for insect pests but they can be fumigated without using methyl bromide.

effective means of fumigation. After fumigation no insect activity could be observed, even in 3-metre plastic tubes that had been filled with oat flour. Final results showed that there had been a 98 percent kill rate of insect eggs and a 100 percent elimination of adult insects

Contact: Environment Canada,
fax: (1) 819 953 7253

RECOVERY AND DESTRUCTION

Spare refrigerators bought and recycled

Southern California Edison, an electricity utility in the United States, has announced that more than 100 000 old refrigerators and freezers have been recycled locally under programmes operated by Edison and other electricity utilities in conjunction with Appliance Recycling Centers of America (ARCA). Under the programme, spare old refrigerators and freezers are collected for recycling and their owners are paid US\$25—but they save much more in electricity bills. Edison estimates that customers can save up to US\$144 a year simply by getting rid of a spare fridge used for additional food storage. The typical spare refrigerator in the United States is 14-years-old and uses twice as much electricity as a 1994 model. Under the recycling scheme, old models are picked up free of charge and taken to an ARCA recycling centre. Refrigerants and metals are then recovered and recycled, and any dangerous chemicals are disposed of. To date, the programme has recycled an estimated 8471 tonnes of scrap metal and more than 17 tonnes of CFCs and HCFCs.

Contact: Southern Edison California,
tel: (1) 612 930 9000

HCFCs and HFCs for CFCs

The US company Refron Incorporated is exchanging used CFCs for HCFCs and HFCs, for no charge. It is also buying back any amount of used CFC between about 90 kg and 45 tonnes. Refron is also running an information database on CFC alternatives.

Contact: Refron, fax: (1) 718 392 8006

Recovery unit for high-pressure refrigerants

The US company Robinair has introduced its portable 25200A recovery unit which is designed for use with any air-conditioning or refrigeration equipment using medium or high pressure. The unit uses an optical sensor to shorten recovery times, and is said to be able to handle loads 3.5 times heavier than a normal compressor of the same size. The unit's compressor is oil-less, eliminating the risk of contaminating recovered refrigerant with oil.

Contact: Robinair, tel: (1) 419 485 5561 ext 348

SOLVENTS

New cleaning process recycles water

In the United States Kyzen Corporation has helped a manufacturer of lithium batteries develop a new cleaning process which does not use CFCs for its production line. The process is water based and uses one of Kyzen's cleaning solutions in conjunction with a water re-use machine that uses reverse osmosis to separate contaminants from the water, recovering up to 95 percent of the water for re-use.

Contact: Kyzen, tel: (1) 603 622 2900

US Navy cleaning system

The US Navy has developed a non-foaming inorganic spray cleaner said to be particularly effective for cleaning tubing and passages in complex assemblies. The cleaner can be recycled many times and the water that is used with it is also pure enough to be re-used. Known as the Navy Oxygen Cleaner, it consists of an aqueous solution of sodium silicate, sodium molybdate and sodium fluoroborate. Component cleaning takes 5–15 minutes at a temperature of 60–70°C. The cleaner is described in detail in *Precision Cleaning* (May 1996).

Contact: Precision Cleaning,
fax: (1) 508 663 9570

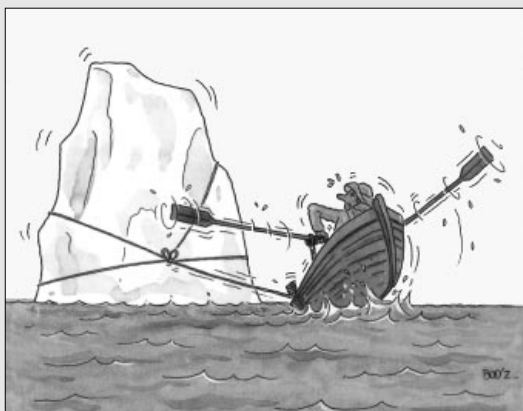
US Navy CFC & Halon Clearinghouse,
fax: (1) 703 769 1885

WWW—<http://home.navisoft.com/navyzone/navdef.hfm>

'Don't panic in 1996!'

— is the caption to an original advertisement now being used to promote conversion to non-ODS refrigerants (towing icebergs is not considered a realistic alternative!)

Source: Elf Atochem,
fax: (33) 1 49 00 75 67



Highlights from the 19th ExCom meeting

The 19th Meeting of the Executive Committee (ExCom) was held in Montreal, Canada, 8–10 May 1996, preceded by the meeting of the Projects Review Sub-Committee. The total value of projects and activities either funded or approved as eligible for funding was US\$44.6 million. The ExCom funded all the projects carried over from the 18th Meeting, UNEP's 1996 work programme and extensions to institutional strengthening. Because deposits were expected relatively soon, the release of funds was authorized simultaneously for all other approved activities and projects, when sufficient funds were received. Other decisions of the meeting included:

- approval of bilateral cooperation projects worth US\$1.97 million;
- approval of country programmes and institutional-strengthening projects for the Bahamas, Gambia, Lebanon, Morocco and Papua New Guinea; and country programmes for Tunisia and Viet Nam;
- adoption of guidelines for the renewal of institutional-strengthening projects;
- endorsement of the methodology for institutional strengthening and country

- programme formulation in LVCs and VLVCs developed by UNEP and its implementation on a trial basis;
- ExCom members to provide comments on the paper on SMEs prepared jointly by UNDP and UNEP for a new document for the 20th meeting;
- trial implementation of guidelines for umbrella projects for 18 months;
- adoption of guidelines on change of ownership of approved projects;
- adoption of the option of enhanced coordination and making better use of existing training infrastructures as the training strategy;
- from 1997 implementing agencies to set aside 10–15 percent of their project preparation funds for unforeseen activities;
- decision not to fund any activities additional to 1996 business plans except country programme preparation and institutional-strengthening projects;
- adoption of a revised format for progress and financial reporting by the implementing agencies with twice-yearly reporting.

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

Network news

UNEP IE OzonAction Programme operates networks of ODS Officers in English- and French-speaking Africa, Southeast Asia and the Pacific, and in South and Central America to promote information and knowledge sharing.

French-speaking Africa

Fourteen network members attended the follow-up meeting of the ODS Officers network for French-speaking Africa held in Brazzaville, Congo, during 18–19 April 1996. Participants discussed the status of reporting data under Article 7 and a representative from the Ozone Secretariat clarified the different data-reporting requirements and formats. The meeting noted the marked improvement in the reporting of data that had occurred. Ten countries had reported data since the last meeting and six African countries reported 1995 data in advance of the deadline.

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

Southeast Asia and the Pacific

The ODS Officers Network for Southeast Asia and the Pacific held a follow-up meeting in Bangkok, Thailand, during 21–22 March 1996. ODS Officers from eight countries participated. Participants discussed national strategies for controlling the use of methyl bromide, World Bank assistance to Indonesia in relation to hydrocarbon production, the monitoring of ODS imports by the Philippines and Thailand, and problems associated with low-cost CFCs in the region.

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

South America

The 1996 Workshop for the South American Network of ODS Officers was held in Cartagena, Colombia, during 22–26 April 1996. The workshop was held back-to-back with the US EPA/UNDP MACs workshop and a UNIDO meeting.

Progress in implementing projects under the Multilateral Fund and related problems were discussed. Participants decided to prepare a plan of action for establishing a halon bank based on Venezuela's experience and bilateral initiatives of US EPA and Environment Canada, and that the regional network could serve as a clearinghouse for halon bank management. The network newsletter services led by Venezuela had been appreciated. The decision was taken to carry out an in-depth survey of the results of network activities.

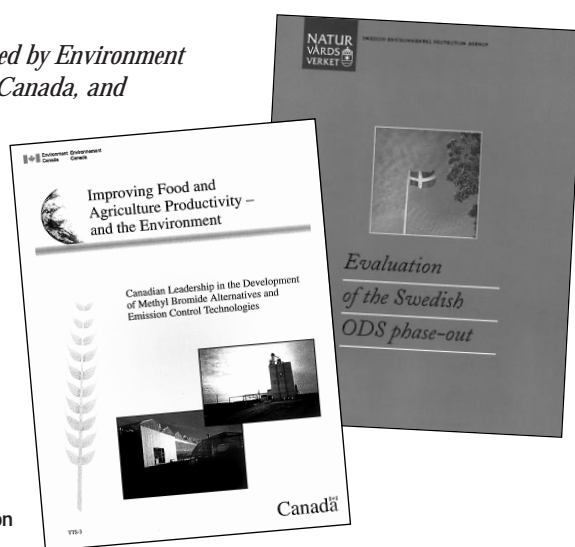
Contact: UNEP ROLAC, fax: (52) 5 202 0950

A publication on alternatives to methyl bromide has been produced by Environment Canada, Agriculture and Agri-food Canada, and Marcotte Consulting. It examines alternatives for greenhouse operations and in the grains, cereals and milling sector.

Contact: Environment Canada, fax: (1) 819 953 7253

Evaluation of the Swedish ODS Phase Out describes the phase-out process in Sweden and includes a sector-by-sector description.

Contact: Swedish Environmental Protection Agency, fax: (46) 8698 1602



World Bank studies HC refrigeration

The World Bank has commissioned Deloitte and Touche Consulting Group to assess the barriers to the use of hydrocarbons (HC) in domestic refrigeration. The study is being conducted with the Swiss

Development Corporation, its consultant INFRAS and the German technical cooperation agency GTZ. A workshop to discuss the findings was held in Switzerland for participants from developed and developing countries during June 5–7 (see 'Recent publications' on page 10).

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

Questions and answers: carbon tetrachloride and PCBs

Question: *As industrial waste disposal experts, we have been using carbon tetrachloride (CCl₄) to clean up the floors of buildings such as transforming stations where polychlorinated biphenyls (PCBs) have been used. Can you suggest a good substitute that does not affect the ozone layer?*

Answer: CCl₄ is not only an ODS but is also quite toxic, with a threshold-limit value (TLV) of 5 ppm, and could present a health hazard. An excellent solvent for PCBs is trichloroethylene, which is not an ODS, has a TLV ten times greater than CCl₄ and is up to 25 percent cheaper. A very efficient clean-up method could be

devised using a suction collecting system for the PCB/trichloroethylene solution. Such a system could have other applications, such as cleaning cutting oils from machine shop floors. These oils are potential groundwater contaminants because they can diffuse through the floor of the machine shop and eventually enter groundwater resources.

Alternatively, a safer but much slower option would be to use an aqueous cleaner and a floor-scrubbing machine.

Solvation with trichloroethylene is an ambient temperature process in which the solution can be easily collected. The solvent can then be allowed to evaporate

and the PCB-contaminated solid residue disposed of by injection into the calcining furnaces of a cement works, where it would be totally decomposed. The traces of residual chlorine in the cement clinker are also beneficial to the product.

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

Contact:

Mr B. H. Baxter, member of the UNEP Solvent Technical Options Committee, fax: (44) 1462 456775

Conference round-up

Ozone research managers call for increased monitoring

At the Third Meeting of the Ozone Research Managers, held in Geneva, Switzerland, during 19–21 March 1996, international ozone experts issued an urgent appeal for more funds for additional UV radiation monitoring sites. Participants said that new sites are acutely needed in the equatorial zone to close what the World Meteorological Organization called 'a very serious gap in our global monitoring system'. Participants called on the Global Environment Facility (GEF) to provide the funds to ensure that stations were put in place as quickly as possible.

It was also decided to:

- develop monitoring and archiving of ozone including vertical profiles and other trace species and aerosols;
- develop new observational capabilities such as aircraft- and satellite-based measurements;
- increase investigation and quantification of stratospheric and tropospheric processes through routine monitoring and experimental campaigns to understand current changes, and to develop predictions of stratospheric change for both the short and the long term;
- give priority to research on the interactions between ozone and climate, and the impact of aircraft emissions;
- increase research on the effects of ultraviolet radiation; and
- pursue ways of improving training and baseline monitoring of ozone, UV-B radiation and research in developing

countries through international funding mechanisms such as the GEF.

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

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

Refrigeration training in Colombia

Three training workshops on Good Practices in Refrigeration were held in Bogota, Colombia, during 16–17, 21–22 and 23–24 May 1996. They were the start of a year-long programme that will train about 8000 technicians and create a National Refrigeration Council to help the Government define a phase-out strategy for the refrigeration sector, establish regulatory measures to support the programme, and monitor the results of the programme. The programme is being organized by UNEP and UNDP jointly with the National Programme for Recovery and Recycling of CFC Refrigerants.

A total of 83 participants were trained in good refrigeration practices and recovery and recycling in the May workshops. These participants will now train other technicians.
Contact: UNEP IE OzonAction Programme, fax (33) 1 44 37 14 74

Chinese workshop on hydrocarbon safety

Twenty-one participants representing the Ministries of Public Security, Chemical Industry, the National Council of Light Industry and the National Environmental Protection Agency (NEPA), 14 participants

from local government organizations and 90 representatives from 41 enterprises met in Hangzhou, China, during 22–24 May 1996 to discuss safety issues related to CFC substitution.

The Training Workshop on Safety Aspects of CFC Substitution was jointly organized by NEPA and UNEP IE's OzonAction Programme. Technical support was provided by national experts as well as members of UNEP's Technical Options Committees.

China is now the largest producer and consumer of ODS in the world. Out of some 100 Chinese investment projects already approved by ExCom, 31 will use hydrocarbons (which are flammable) as a substitute for ODS, and 33 will use methylene chloride (which is toxic).

The objectives were to help local organizations and NEPA handle safety issues by providing information and training on:

- the importance of safety measures, regulations and training;
- key issues related to human health and the environment in relation to ODS alternatives;
- safety standards and regulations on use of ODS substitutes; and
- methods by which enterprises can develop internal safety measures and training programmes for safe management.

A shop-floor 'mock' exercise was carried out in Zhejiang Huajiang Plastic Factory which is using butane for blowing polystyrene foam (*see photograph on page 1*).

Contact: UNEP IE OzonAction Programme, fax: (33) 1 44 37 14 74; and NEPA, fax: (86) 10 66151776

Ozone science news

Levels of atmospheric ODS may be declining

Measurements taken at seven sites by scientists from NOAA suggest that levels of ODS at ground level may be beginning to fall, according to a recent lecture given by NOAA's Stephen Montzka. His report claimed that while bromine levels are not yet declining, those of chlorine are, resulting in an overall reduction of ODS levels. These findings were confirmed by a paper published in *Science* (30 May 1996).

Contact: NOAA, fax: (1) 303 497 5340

Latest ozone assessment on Internet

The Executive Summary of the recent WMO/UNEP Scientific Assessment of Ozone Depletion (1994) is now available on the World Wide Web. It contains the most up-to-date understanding of ozone depletion and reflects the thinking of 295 international scientific experts who contributed to its preparation and review. WWW—<http://www.al.noaa.gov/WWWHD/pubdocs/WMOUNEP94.html>

Reports confirm low ozone over Northern hemisphere

The low ozone values reported over the

Northern hemisphere in *OzonAction News* 18 have been confirmed in a report from the US National Oceanic and Atmospheric Administration (NOAA). The report, *Northern Hemisphere Winter Summary*, claims that average ozone measurements for the period December 1995 to March 1996 were 10–25 percent lower than in the base period of 1979–86. The report attributes these exceptionally low levels to extremely cold temperatures in the stratosphere during the first three months of 1996.

Contact: NOAA, fax: (1) 303 497 5340

Research and development

ARTI tests HFC-245ca

The Air-Conditioning and Refrigeration Technology Institute (ARTI) continues to research the use of HFC-245ca as a possible alternative to CFC-11 and HCFC-123 in low-pressure centrifugal compressor chillers. Initial testing with a retrofit in a 1981 CFC-11 chiller showed that HFC-245ca would be unacceptable without the use of a larger impeller. This presents a problem, since many compressor casings are not large enough for this. It was concluded that HFC-245ca will not perform satisfactorily as a substitute in many direct-drive chillers without extensive and expensive hardware modifications. However, compressors designed specifically for use with HFC-245ca should be about as efficient as CFC-11 and HCFC-123 chillers. More work needs to be

done since HFC-245ca is slightly flammable and its toxicity is still uncertain. Production costs are also expected to be high.

Contact: ARTI, fax (1) 703 528 3816

DuPont develops fluorinated hydrocarbons

DuPont is developing a range of fluorinated hydrocarbons for use as possible fire extinguishants, cleaning agents, foam blowing chemicals, aerosol propellants and refrigerants. While it is not yet clear how the new compounds could affect stratospheric ozone, US Patent 5 484 546 describes formulations that include mixtures of hexafluorodimethyl ether and cyclopentane, dimethyl ether or propylene; bis(difluoromethyl) ether and 2,2,3,4,4-pentafluorooxetane; and fluoromethyl trifluoromethyl ether and 2,2,4,4,5,5-hexfluoro-1,3-dioxolane, 1-trifluoromethoxy-

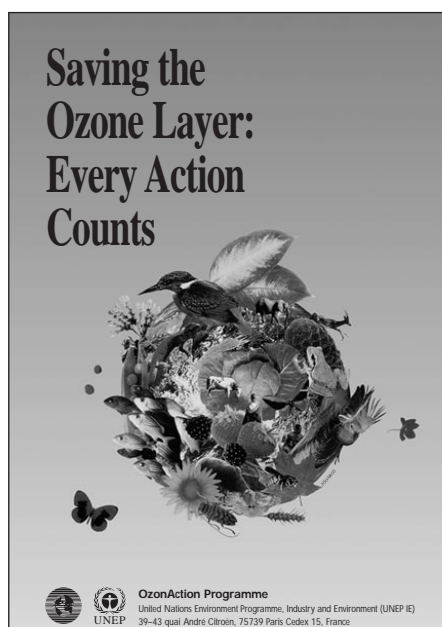
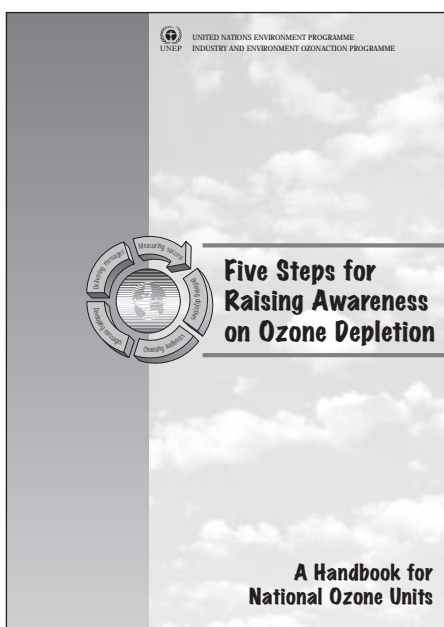
1,2,2,2-tetrafluoroethane, dimethylether or trifluoromethyl amine.

Contact: DuPont International, fax: (41) 22 717 60 77

Linear compressor for cryosurgery

The US company Medis El Ltd has filed for patents for a piston apparatus to be used in a revolutionary linear compressor which could be used with ODS alternatives. The compressor includes a piston which moves on air bearings under the influence of an electromagnetic field in one direction and a spring in the other. The compressor has only clearance seals and no moving parts. It is said to be highly efficient and may give tens of thousands of hours of maintenance-free use. Major applications are expected to be in the generation of the low temperatures need in cryosurgery and military infrared systems.

Contact: Medis, tel: (1) 212 935 8484



New public awareness publications available from UNEP IE

Five Steps for Raising Public Awareness on Ozone Depletion: a handbook for National Ozone Units (far left) guides readers through a sequence for creating public awareness on ozone issues: defining objectives, choosing audiences, developing and delivering messages, and measuring success. An illustrated booklet, it contains examples of successful case histories and includes a guide to resources.

Saving the Ozone Layer: Every Action Counts is designed to accompany the OzonAction video of the same name. It answers common questions on the ozone layer and includes a complete script of the video.

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

News from NGOs

ALDI, the fourth largest German supermarket group, has agreed to use hydrocarbon 'Greenfreeze' technology in all its new grocery sites. This is a major success for Greenpeace which has been conducting a campaign in 50 German cities aimed at ensuring that supermarkets adopt refrigeration systems based on hydrocarbons. The campaign includes advertisements in supermarket windows



that describe 'ozone holes, UV, skin cancer and climate change'. It is estimated that some 3500 tonnes of CFCs and HCFCs are still used in more than 50 000 German supermarkets. Leakage has been estimated at 20–30 percent a year, resulting in the release of 700 tonnes of ODS a year.

Contact: Greenpeace Germany, tel: (49) 40 30 18 60

World Bank to target CFC use in Russia

The World Bank is planning an ambitious aid scheme to help reduce CFC consumption in aerosols in the Russian Federation. According to the World Bank report *Facing the Global Environmental Challenge*, shutting down the Federation's ODS-producing factories would be one of the most cost-effective investments in ODS phase out that could be made.

CFCs continue to be heavily used as aerosol propellants in countries such as the Russian Federation and China. It is estimated that in the Russian Federation such use has fallen only from 12 000 tonnes a year in 1993 to 11 300 tonnes now. CFCs are still used in 80–85 percent of the Federation's aerosols. Of the eight aerosol enterprises in the Federation, only

one routinely produces hydrocarbon aerosol products. The Russian government has recently announced ODS production quotas of 52 700 tonnes for 1996, of which half will be exported, according to a recent article in the *Global Environmental Change Report* (10 May 1996)

Under the new scheme, the Bank hopes to raise US\$40–50 million from bilateral donors, most of which would be allocated to the seven Russian companies currently producing ODS which would be encouraged to invest in other business ventures. The scheme is still in its early stages and the idea will be presented to donors at a meeting later this year.

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

In brief...

○ The Zhejiang Chemical Industry Research Institute (CIRI) in China and the Shanghai Institute of Organofluorine Materials are conducting research on CFC alternatives. CIRI, where the ODS Alternative Engineering and Technology Center has been established, is developing technologies for HFC-32, 23, 152a, 125, 134a, 143a, and 227. The Shanghai Institute is implementing a project on evaluation of the quality of alternatives. Contact: NEPA, fax: (86) 10 832 8013

○ The International Cooperative for Environmental Leadership (ICEL) has produced a home page on Internet which contains information on ODS alternatives as well as on other global environmental issues. Contact: ICEL, fax: (1) 202 296 7442 WWW—<http://www.icel.org>

○ Mario Molina of the Massachusetts Institute of Technology, joint winner of last year's Nobel Prize for chemistry, has donated US\$200 000 of his prize money to start a fund for training environmental scientists from developing countries at MIT.

○ The swimming pools to be used at this year's Olympics in Georgia, Atlanta, United States, will be cooled by four HCFC-22 chillers. Olympic swimming records are not valid at temperatures of more than 78°F (25.6°C).

○ US Customs officials seized more than 450 tonnes of illegally imported CFCs in 1995. The US EPA is implementing a system which requires importers to obtain permission from the EPA before importing used or recovered CFCs.

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

○ Daily ultraviolet levels for many different locations in the United States, compiled by Sunzor Inc., are now available on the Internet.

Contact: Sunzor, fax: (1) 412 492 9309 WWW—<http://ourworld.compuserve.com/homepages/sunzor>

Completed investment projects (as of 31 May 1996)

	foams	refrigeration	halons	aerosols	solvents	total ODS* phased out
World Bank	15	12	3	4	8	7172
UNDP	26	2	-	2	6	1955
UNIDO	3	1	-	-	-	715

* tonnes; **Number of projects by country:** Argentina, 2; China, 15; Ecuador, 2; Egypt, 10; India, 2; Indonesia, 3; Iran, 1; Malaysia, 23; Mexico, 4; Philippines, 7; Thailand, 7; Tunisia, 1; Turkey, 4; Venezuela, 1

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

Status of Ratification

(as at 31 May 1996)

The Vienna Convention

158 Parties; new Party, Tajikistan

The Montreal Protocol

156 Parties; no new Parties

The London Amendment

109 Parties; no new Parties

The Copenhagen Amendment

55 Parties; new Party, Ireland

Reclassification

Brunei Darussalam: non-Article 5 country; Cyprus and United Arab Emirates: Article 5 countries

Recent publications

Natural Fluid-based Refrigeration.

INFRAS AG for SDC and BMZ/GTZ, Zurich, Switzerland, 1996.

ECOFRIG Phasing out CFC in India: A New Venture in North-South

Collaboration, Indian Ministry of the Environment and Forests, SDA and GTZ, February 1996

Proceedings of the Conference on

Hydrocarbon in Domestic and Commercial Refrigeration Appliances, New Delhi, India, 13–14 February 1996.

Forthcoming meetings

2nd International Conference on the Use of Non-Artificial Substances: Applications for Natural Refrigerants, International Institute of Refrigeration B1, B2, E1 and E2 Commission Meetings, Aarhus, Denmark, 3–6 September 1996.

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

International Polyurethane Exhibition and Conference, Beijing, China, 8–11 November 1996.

8th Meeting of the Parties to the Montreal Protocol, Costa Rica, 25–29 November 1996.

World policy round-up

Germany to outlaw CFC use by mid-1998

The German government is to ban all CFC use in existing refrigerating and air-conditioning equipment containing more than 1 kg of refrigerant with effect from July 1998. By then equipment owners must either replace their CFC refrigerants with non-ODS refrigerants or install new equipment. Heat pumps are exempt from the ruling, as is equipment for use in industrial applications. The government has recommended HCFC-22 and HFC-134a as suitable replacements, although propane or butane may also be used if allowed by the regulations affecting the use of flammable refrigerants.

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

Malaysia launches five new projects

Having signed the Grant Umbrella Agreement on ODS Phase-out Projects with the World Bank in November 1995, the first projects were officially launched on 10 June 1996 by the Honourable Datuk Law Hieng Ding, Minister of Science, Technology and the Environment. The Minister presented cheques to the first five recipient companies for a total of US\$4.15 million. So far 35 projects and activities have been carried out in Malaysia, phasing out 1900 tonnes of CFCs.

Contact: Office for Project Management under the Montreal Protocol, Department of the Environment, Malaysia, fax: (60) 3 2931 480

Japan sets deadlines for HCFC phase out

Japan's Ministry of International Trade and Industry (MITI) has announced deadlines for phasing out the consumption and production of HCFCs and methyl bromide in order to implement recent changes to the Montreal Protocol. HCFC-22 in new refrigeration equipment will be phased out by 2010, and HCFC-22 used to service existing equipment will be phased out by 2020. HCFC-141b used for foam production will be phased out by 2004, while its use as a solvent will be reduced gradually from 2000. HCFC-142b used for foam production will be phased out by 2010, and HCFC-225 used as a refrigerant will be reduced gradually from 2010. Japan produced 47 700 tonnes of HCFCs in 1995. Methyl bromide use will be reduced gradually.

MITI has also proposed a new plan to

cooperate with developing countries in order to help reduce their consumption and production of CFCs, to strengthen the system of CFC collection and reuse in Japan, and to reduce Japanese consumption and emissions of HFCs.

Contact: MITI, tel: (8) 3 3501 1511

New Zealand speeds up methyl bromide reductions

New Zealand plans to reduce methyl bromide use more quickly than required by the Montreal Protocol. Use of the chemical will be cut by 25 percent from 2000, one year earlier than the Montreal Protocol schedule, and consumption will be reduced to 80 percent of the 1991 base year by the year 2005 rather than the 50 percent required by the Protocol.

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



The 'no CFCs' logo is being rapidly adopted in many countries as the industry standard for use on ODS-free aerosol cans, in advertisements and even on the sides of lorries. It can be downloaded from:

WWW—<http://www.pe.net/~waib> or
<http://members.aol.com/spraytec/index.htm>

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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