



View point

So far, so good



*Anna Lindh is
Sweden's Minister
of the Environment*

Sweden has played a key role in bringing nations together to solve the problem of ozone depletion. A ban on the use of chlorofluorocarbons (CFCs) in sprays was adopted in Sweden in 1979. Sweden then

began to foster international cooperation, organizing the 'Toronto' working group, with representatives from the Nordic countries, the United States and Canada. This group was to become the engine for the phase out of ozone-depleting substances (ODS). In 1988 the Swedish parliament approved a ban on the use of CFCs from 1 January 1995. One of the goals of this plan was to demonstrate that a phase out was technically and politically possible.

Many doubts were expressed by industry and there were fears that Swedish companies would move production abroad. However, in January 1995 we reached an important milestone: 93 per cent of our ODS use had been phased out. Most companies now regard the phase out as a success.

The next step is to limit and phase out other ODS such as hydrochlorofluorocarbons (HCFCs). These chemicals were important during a transitional phase but their use must now be restricted and eventually phased out.

Phase-out efforts have come a long way in industrialized countries and it is important to achieve ODS phase out in developing countries. Industrialized countries should continue their efforts to transfer technology and experience. Priority should be given to practical cooperation with developing countries. I understand the problems facing developing countries but it is essential that they build up their own capacity to meet the challenge.

The benefits of our efforts must not be reduced by illegal trade in CFCs. We must use both the stick and the carrot—the stick to combat this form of criminality and the carrot to help countries with large stocks of CFCs to destroy them.

The world's response to the first global environmental threat has been encouraging. In a short time more than 150 countries have agreed to phase out a whole group of chemicals. Together we have built a means of dealing with a common problem that may be useful when tackling other environmental threats. It is now most important to consolidate and strengthen the Montreal Protocol. Commitments must be maintained and attempts to undermine the Protocol stopped.

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***PHASE OUT UNDER THE MULTILATERAL FUND:
7500 tonnes of ODS a year already eliminated and approved
projects will eliminate 63 000 tonnes a year in developing countries***

Parties agree to implement 21-point Action Plan on Financial Mechanism

Following the successes under the Multilateral Fund, the 7th Meeting of the Parties to the Montreal Protocol, which took place in Vienna during 5-7 December 1995, agreed to implement a 21-point Action Plan to further improve the Financial Mechanism of the Montreal Protocol. This Mechanism was originally established at the 2nd Meeting

of the Parties to enable Article 5 countries to comply with the control measures of the Montreal Protocol. The Mechanism provides for financial and technical cooperation between Parties, including the transfer of technology to Article 5 Parties. At the 7th Meeting of the Parties, the Parties reviewed an independent consultant's report on the

operation of the Mechanism and, in an effort to improve the functioning of the Financial Mechanism, agreed to the 21-point Action Plan. These actions cover almost all areas of the Fund's operation. They call for specific activities in such areas as:

... continued on page 5

News from international agencies



Fund Secretariat

The Secretariat distributed the report of the 18th Executive Committee (ExCom) meeting and informed

all Article 5 countries for which projects were approved at the meeting. It updated the *Inventory of Approved Projects* and the *Policies, Procedures, Guidelines and Criteria* documents which are being made more user-friendly. The Secretariat began preparations for the 19th ExCom to be held 8–10 May in Montreal, Canada. Work was continued on a number of papers, including those on monitoring guidelines, renewal of institutional strengthening and issues referred to the ExCom by the 7th Meeting of the Parties related to the Financial Mechanism, financial planning, technology transfer and support for countries using low volumes of ODS. The Secretariat also organized the 2nd Meeting of the Expert Group of Production of Substitutes in Montreal, 4–5 March 1996.

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

After the 7th Meeting of the Parties, the Secretariat distributed

the reports of all meetings as well as the proceedings of the International Workshop held by the Government of Austria in connection with the celebrations of the 10th anniversary of the Vienna Convention. It prepared the background documents for the 13th Meeting of the Implementation Committee, 18–19 March 1996, the 1st Bureau of the 3rd Conference of the Parties to the Vienna Convention, 22 March 1996, and the 3rd Meeting of the Ozone Research Managers, 19–21 March 1996.

The meeting of the Informal Advisory Group for the restructuring of the Technology and Economic Assessment Panel was held on 22 March 1996 in Geneva. The Symposium on Global Atmospheric Effects of Aviation, co-sponsored by the Ozone Secretariat with

NASA, NOAA, ICAO, WMO, AEREA and the European Union, will take place during 15–19 April 1996, in Virginia, United States.

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



UNEP IE

The OzonAction programme held its 5th Informal Advisory Group meeting to review UNEP's

1996 work programme back-to-back with a Training Strategy Advisory Group Meeting in Paris during 15–16 February 1996.

Meetings of the implementing agencies and of the Regional Network Coordinators were held on 14 February 1996. The former discussed the implementing agencies' needs for support activities and future cooperation with UNEP, while the latter focused on increased coordination and integration of networking activities with country programme preparation and institutional-strengthening projects, as well as with clearinghouse functions.

As part of its training programme on Good Practices in Refrigeration, UNEP organized a Train-the-Trainers workshop in Burkina Faso during 22–25 January 1996 (see page 7). A workshop on Technology Cooperation for French-speaking African countries was held during 27–29 February in Douala, Cameroon (see page 4).

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Tel: (33) 1 44 37 14 50 Fax: (33) 1 44 37 14 74
E-mail: ozonaction@unep.fr



UNDP

UNDP's cumulative work programme is now US\$110

million comprising 398 projects (including 207 investment projects). This portfolio will eliminate 14 128 ODP tonnes. More than 120 activities have been completed to date. The first ODS phase-out investment project in the Philippines (see page 7) was commissioned in September 1995 and the first such project in India was commissioned in December 1995. In addition, the 15th completed UNDP investment project in Malaysia was

commissioned in February 1996. UNDP has now completed 33 investment projects that have eliminated 1882 ODP tonnes. For the 19th ExCom meeting, UNDP is submitting projects for the first time in the Central African Republic, Malawi and Zambia. UNDP's 1996 Business Plan anticipates around US\$30 million in project approvals in 1996, which would meet about half of the project requests received by UNDP.

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 conversion process in several plants is underway for the investment projects approved and

funded at the 18th ExCom meeting. Projects related to institutional strengthening and country programme preparation are also progressing. The formulation and submission of new projects for the 19th ExCom meeting has been completed. The UNIDO Business Plan for 1996 served as the guide for the new submissions. UNIDO also attended the 5th Informal Advisory Group meeting which was held back-to-back with an Advisory Group Meeting on Training Strategy.

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Tel: (43) 1 211 31 3782 Fax: (43) 1 230 7449
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World Bank

The World Bank submitted a total of US\$54.4 million in funding requests to the

18th ExCom meeting. Of this, US\$30 million was funded and an additional US\$7 million was cleared for approval and will be funded at the 19th meeting. The rest of the projects were deferred and will be reconsidered at the 19th meeting. The present pipeline of World Bank projects is expected to phase out a total of 15 000 tonnes of ODP, resulting in an average cost-effectiveness of US\$3.5–4.5/kg.

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

FIRE FIGHTING

Substitute for halon-1301

PemAll Fire Extinguisher Corporation in the United States has received approval for its PC 410 fire-extinguishing systems from the US Underwriters Laboratories. The systems have also been approved for use in the states of New York and California.

The PemAll systems use 3M Clean Extinguishing Agent CEA-410, a replacement for halons that is claimed to be practically non-toxic in flooding applications. CEA-410 has been recognized by the US National Fire Protection Association Standard 2001.

PemAll's fire-suppression systems are intended for use in commercial and industrial settings including telecommunications installations, electronics control facilities, flammable-liquid storage units, process-control centres, health-care facilities and medical imaging installations.

CEA-410 is a perfluorocarbon and, although it has an ODP of zero, concerns have been raised about its extremely long lifetime. As a result, it was listed as acceptable for use in the Significant New Alternatives Policy (SNAP) programme of the US Environmental Protection Agency (US EPA) only if no other agent is technically feasible for protection against the fire or explosion risk concerned.

Contact: PemAll, fax: (1) 908 276 8074

New research on fighting aircraft engine fires

Newly released information from the US National Institute of Standards and Technology (NIST) confirms the effectiveness of CF_3I in fighting aircraft engine fires. The information is published in *Fire Suppression System Performance of Alternative Agents in Aircraft Engine and Dry Bay*, by Richard G. Gann, NIST SP 890, US Government Printing Office, 1995.

Data from research supported by the US Department of Defense shows that CF_3I , available commercially as Triodide™, can be successfully used to replace halon-1301 in aircraft engine applications. Material compatibility, stability, fire fighting ability and flow characteristics were all examined, and the report concludes that ' CF_3I can be used as a direct replacement of halon-1301.'

The new data come from two



Fires in aircraft engines can be more effectively suppressed with CF_3I and CF_3Br than with HFC-227 or HFC-125.

experiments, one designed to simulate air flow in an engine nacelle, the other designed to test effectiveness of agents in preventing re-ignition. The second test showed that ' CF_3I and CF_3Br are highly effective ignition suppressants, whereas HFC-227 and HFC-125 were very poor ignition suppressants and were found to slightly promote methane/air ignition in some instances.'

Contact: NIST, fax: (1) 301 975 6866

WWW— <http://www.bfr1.nist.gov>

FOAMS

CFC-free flexible foams from Pakistan

Razi Sons, a Pakistani company that manufactures foams for the vehicle industry, is now supplying CFC-free flexible polyurethane foams. CFC-free systems were introduced in Pakistan in 1994 as a result of cooperation between the company and ICI.

Razi, which is based in Karachi, currently supplies products using MDI-based flexible polyurethane foam to Pak-Suzuki and Toyota for conventional applications.

Contact: Razi, fax (92) 21 51 36 12

A new way to produce aerogels

In the United States, Nanopore Inc. is commercializing a new technique for producing aerogels—CFC-free solid insulating materials containing more than 95 per cent air with heat conductances

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

even lower than those of polyurethane foams. The new technique was developed by scientists at Sandia National Laboratories and involves the production of aerogels at room temperature and pressure using a water-based process. Nanopore hopes to bring the cost of aerogels down to a level that will make them more competitive with other insulating foams which use CFCs or HCFCs.

Contact: Nanopore, fax: (1) 505 247 4046

Using algae to help blow foams

In Austria, the Graz Verpackungszentrum (Packaging Centre) and the Institute of Process Technology at Graz Technical University are testing the 'alginate process' for blowing foams using a powdered air-releasing material derived from common marine algae called soda alginate. The process is said not to produce any hazardous emissions and the materials used can be simply disposed of by composting. It is being investigated as a means of replacing ODS such as CFCs previously used in foam blowing.

Contact: Graz Verpackungszentrum, fax: (31) 6 27 25 68 75

REFRIGERANTS

Hydrocarbons substitute for CFCs



Elstar Manufacturing in the United Kingdom has converted its refrigeration equipment to CARE 30, a hydrocarbon refrigerant

manufactured by Calor Gas Refrigeration. CARE 30 is a purified blend of propane and iso-butane developed as a replacement for CFC-12 and HCFC-134a.

Elstar manufactures drink-cooling equipment including wine coolers. The company claims that the conversion has improved energy efficiency by 10–15 per cent and reduced the weight of refrigerant needed. The switch to CARE 30 follows

extensive research and comparison with the performance of HFC-134a.

The company's chillers use insulation foams that are blown with compressed air and water and not with ODS.

Elstar's conversion follows the 'green light' for hydrocarbon refrigeration given

designed to be a drop-in replacement for R-502 in food display and storage equipment, cold storage rooms, ice machines, transportation and process refrigeration.

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



Wine cooler using hydrocarbon refrigerant being opened by John Gummer, Secretary of State for the UK Department of the Environment.

by publication of a revised British Standard, BS4434, which lays down guidelines for the safe use of hydrocarbons in a range of commercial, domestic and industrial locations.

Contact: Calor Gas, fax: (44) 1753 588905
Elstar, fax: (44) 1332 810685

HFC/HCFC blend shown superior in tests

A refrigerant performance test has shown that Forane 408A, developed by Elf Atochem as a CFC substitute, has a 5–8 per cent improved energy efficiency over R-502 in medium- and low-temperature refrigeration systems.

The test was performed by VACOM Technologies and ASW Engineering for Energy Services Inc. in a simulated supermarket environment using a typical freezer display layout. Forane 408A, a blend of 46 per cent HCFC-22, 7 per cent HFC-125 and 47 per cent HFC-143a, was

Cooling commercial property using ice

Unicom Thermal Technologies in the United States is planning to build an ice-based commercial cooling system in Boston similar to one that operates in Chicago. The 25 000-tonne Chicago unit cools three office buildings, using cheaper night rates for electricity to freeze water that is then used to cool the

structure during the day, when rates are higher. The process avoids the use of CFCs and HCFCs.

Contact: Unicom, tel: (1) 617 424 2460

Farm milk chiller retrofitted

The UK dairy producers' association ADAS has successfully retrofitted a chilled milk tank at its research station near Winchester, United Kingdom, as part of

Technology Cooperation Workshop for French-speaking African countries

Forty participants from 20 countries in French-speaking Africa attended the workshop for Technology Cooperation for the Implementation of the Montreal Protocol held in Douala, Cameroon, during 27–29 February 1996. This workshop was organized jointly by the Government of Cameroon and UNEP IE with bilateral assistance from the French government through the Caisse Française de Développement—Fonds Française pour l'environnement mondial.

The main objective of the workshop was to provide the practical information and case studies on recent technical options needed to reduce ODS use in the refrigeration, aerosols and foam sectors. The workshop also provided opportunities for a discussion of the difficulties associated with the transfer of technology to French-speaking African countries, and recommended solutions.

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

An updated and expanded version of the OzonAction Information Clearinghouse database reference tool (OAIC-DV version 4) will soon be available on diskette from UNEP IE

its effort to replace the CFC-12 and HCFC-22 used in most of the UK's 30 000 bulk milk tanks. The HCFC-22 refrigerant was replaced with KLEA 66 from ICI Klea, which is a mixture of HFC-32, HFC-125 and HFC-134a. Of two tanks at the farm, only one was retrofitted, in March 1993, to provide a comparison with the performance of HCFC-22. The retrofitted system, which has been running ever since, achieved faster pull-down time to target temperatures and has performed well compared to the system running on HCFC-22.

Contact: ICI Klea, fax: (44) 1928 511418

Carrier to use Genetron 410A

The Carrier Corporation had selected AlliedSignal's Genetron 410A (AZ-20) for use in its new residential air conditioners. It will replace HCFC-22 which has been used for residential air conditioning for many years. AZ-20 is an azeotropic mixture of HFC-32 and HFC-125 and has a higher energy efficiency and capacity than HCFC-22, according to AlliedSignal. Carrier's new unit, the 38TXA, employs Copeland Compliant Scroll compressor technology. Carrier is planning eventually to convert its entire product line to R-410A.

Contact: AlliedSignal Fluorine Products, fax: (1) 201-455-6395.

US Navy reduces CFC consumption

A survey by the US Navy has shown that the per ship consumption of CFC-12 and CFC-114 dropped by 31 and 27 per cent respectively between 1994 and 1995. This equates to an annual reduction of more than 45 tonnes of refrigerant, valued at US\$1 million. The main substitute refrigerant used by the US Navy so far is HFC-134a. The isomers HFC-236ea and HFC-236fa are considered by the Navy to be potential replacements for CFC-114 in the future.

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

WWW— <http://home.navisoft.com/navyozone/index.htm>

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. Please contact us.

METHYL BROMIDE

CO₂ as an alternative to methyl bromide

Carbon dioxide (CO₂) may be an acceptable substitute for methyl bromide for grain fumigation, according to the results of a recent experiment in which scientists from the Kenyan Agricultural Research Institute and the British Natural Resources Institute treated a silo full of maize with CO₂ extracted from an underground source in Kenya. A separate silo was used as a control in the experiment. Cotton bags containing maize infected with the adult corn weevil were placed throughout both silos. After the experimental silo was fumigated, the researchers analysed the bags for live and dead weevils, and incubated the grain to see if new weevils hatched; they did so only in the silo not fumigated with CO₂. The fumigation also killed most of the insects.



*Adult corn weevil:
susceptible to CO₂ fumigation*

In contrast to methyl bromide, the researchers claim that the CO₂ would need to be applied only once, using the same ducting system that is used for methyl bromide. Providing the silos are properly sealed and a CO₂-rich atmosphere is maintained, the insects will not return.

Erratum

We published an incorrect address in the insert to *OzonAction News 17*. The correct address is:

Aquaquick 2000 (degreasing agent)
Protea Industrial Chemicals
South Africa
Fax: (27) 11 827 4612

Furthermore, if the CO₂ used is extracted from natural existing sources, it will not add to the greenhouse effect.

Contact: Kenyan Agricultural Research Institute,
fax: (254) 2 444144

SOLVENTS

New solvent based on citrus fruits

The Florida Chemical Company Inc. in the United States is promoting the citrus by-product d-limonene as an alternative to chlorinated solvents such as CFCs. The substance has previously been used to enhance flavour in foods and fragrance in perfume and soap; it has also been used by the adhesives industry in the manufacture of resins.

D-limonene is a fairly strong solvent with a Kauri-Butanol value of 62.7. The substance evaporates rapidly and leaves little residue, has a freezing point of -97 °C and a boiling point of 155 °C. Worldwide production of d-limonene is currently more than 450 000 tonnes a year.

Free samples of two orange-based and one lemon/lime-based products are available from the Florida company.

Contact: Florida, fax: (1) 813 956 1503

Cleaning TV tube components with aqueous solutions

In the United States, the Zenith Electronic Corporation has announced that it is to use CFC-free aqueous solutions to clean the electronic components needed for the production of its colour television tubes. The solutions to be used are based on non-linear alcohols derived from vegetable wastes, and are manufactured by the Kyzen Corporation. The decision to use these solvents was taken after a lengthy evaluation by Zenith of non-ODS cleaning alternatives.

Contact: Kyzen, tel: (1) 615 831 0888

Hollow thread film recovers ODS-based solvents

Toray Industries of Japan has recently developed a technology for separating and recovering the vapour from chlorine-based solvents by means of a composite hollow thread film which consists of a thin silicon film of 0.2 µm thickness and a porous polyacrylic nitrile support film. This film is not degraded by chlorine-based solvents and absorbs them selectively, with a high recovery rate, according to a report in *Vatis*, October–November 1995.

Contact: Toray, fax: (81) 3 32 45 54 59

... continued from page 1

- the development of operational guidelines;
- the dissemination of policy information;
- a review of institutional-strengthening experiences;
- the preparation of reports on:
 - impediments to project implementation;
 - mobilization of non-Fund resources;
 - steps to improve technology transfer;
 - the development of loan programmes; and
- the evaluation of bilateral utilization and the cost effectiveness regime adopted for 1995.

Full details of the 21 items are available through the Ozone Secretariat as Annex V of the Report of the 7th Meeting of the Parties.

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

WWW— http://www.unep.org/unesp/secretar/ozone/prod_ser.htm

New SNAP approvals

On 19 December 1995, the US EPA signed a notice under the Significant New Alternatives Policy (SNAP) programme that approves:

- Intermagnetics' FRIGC blend for a wide range of stationary refrigeration applications;
- a powdered aerosol blend as a halon replacement for use in normally unoccupied areas;
- a blend of HFC-23 and perfluorethane for use in retrofitted and new very low temperature refrigeration applications;
- a list of acceptable substitutes, including three HFC blends and HFC-134a, for HCFC-22 in certain refrigeration applications; and
- HFC-236fa as a substitute for CFC-114 in centrifugal chillers, providing it is not manufactured by any process that converts perfluoroisobutylene (PFIB) directly to HFC-236fa in a single step.

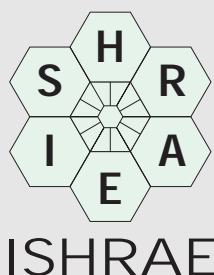
Contact: US EPA, fax: (1) 202 233 9665

WWW— <http://www.epa.gov/docs/ozone/title6/snap/snap.html>

Conference round-up

Indian seminar on safe refrigeration

A seminar held in New Delhi, India, during 12–13 January 1996 brought together more than 150 participants for wide-ranging discussions of ozone-safe refrigeration. The meeting was jointly sponsored by the Indian



Society of Heating, Refrigeration and Air-conditioning Engineers, the UN Asian and Pacific Centre for Transfer of Technology and the American Society of Heating Refrigerating and Air-conditioning Engineers, India Chapter. The output from the seminar was an information note for industry which included the following points:

- HFC-134a is the replacement of choice for CFC-12;
- phase-out dates for HCFCs agreed within the Montreal Protocol may be brought forward but are currently fixed for 2020,

- with complete elimination by 2040;
- mixtures and blends of refrigerants are commercially available as replacements for CFCs, HCFCs and R-502;
- long-term alternatives include hydrocarbons to replace CFC-12 and HCFC-22;
- ammonia-based technology can be used for chilled water air conditioning;
- absorption chillers using lithium bromide and water can be effective options for industry and commerce;
- central evaporative cooling has excellent potential in the drier parts of India and should be used wherever possible;
- all sectors of the industry require technology transfer and financial assistance;
- there is a need for better coordinated research and increased public awareness of the issues involved.

Contact: ISHRAE, fax: (91) 11 647 094
APCTI, fax: (91) 11 685 6274

Canada sponsors workshop on ODS phase out

A workshop on ODS phase out, held in Bombay, India, 22–23 February 1996, and sponsored by the Canadian government, was attended by some 60 participants from

industry, industry associations and consultancies. The workshop reviewed the Montreal Protocol, heard presentations from the implementing agencies and reviewed case studies from Canadian companies. On the second day there were parallel group discussions on aerosols, foams, refrigeration and air conditioning.

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

Hydrocarbons in refrigeration

ECO-REFRIGERATION—an international conference on the use of hydrocarbon fluids in domestic and commercial refrigeration—was held in New Delhi during 13–14 February 1996. The conference brought together 220 industry leaders, government officials, scientists and refrigeration experts from Europe, India and other Asian countries. The conference, which focussed on recent trends in using hydrocarbon refrigerants and related safety standards, was organized by the Indian Ministry of Environment and Forests, the Swiss Development Corporation and the German Technical Cooperation Agency GTZ. Detailed results are available from:

Contact: Tata Energy Research Institute,
fax: (91) 11 462 17 70;
INFRAS, fax: (41) 1 202 33 65

Refrigerant identifiers to detect illegal imports

Six infrared refrigerant identifiers have been donated to the US Customs Service by the Alliance for Responsible Atmospheric Policy to help in the detection of illegal imports of CFCs.

The identifiers detect several common refrigerants and contaminants at 98 per cent purity levels through non-dispersive infrared and multiple sensor detectors, and use micro-processor technology to display the purity. They are portable and can be easily attached to the vapour ports of a refrigerant container or system.

The Alliance is concerned that illegal imports and the avoidance of the US excise tax on CFCs reduce the incentive for users to shift to alternatives and, at the same time, penalize companies which comply with US laws.

The US Attorneys Office in Miami has convicted and sentenced nearly one dozen individuals for illegal CFC

importation or diversion, or non-payment of excise taxes on the imported CFCs. A government task force, consisting of Customs, the Internal Revenue Service, the US EPA and the

Department of Commerce, is investigating more reports of illegal imports of CFC-12.

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

Air conditioning record

According to a survey by the Air-Conditioning and Refrigeration Institute (ARI), US shipments of air conditioners to building owners around the world jumped 32 per cent in 1995 to a record 9444 units, of which about 40 percent were used in the United States to replace CFC air conditioners. The US EPA estimates that 44 per cent of US air conditioners will be replaced by 1 January 1999, reducing energy consumption by almost 7000 million kWh a year, producing annual savings of US\$480 million and cutting emissions of CO₂ by 4 million tonnes and of SO₂ by 34 000 tonnes.

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

UV index forecasting comes to France

A new service will open on 1 May 1996 in France to enable subscribers to the nation's Minitel system to dial a number (3615 COUP DE SOLEIL) to receive forecasts of the ultraviolet index, answers to questions on solar radiation, advice on how to protect the skin and determine skin sensitivity, and news about expected trends in solar radiation.

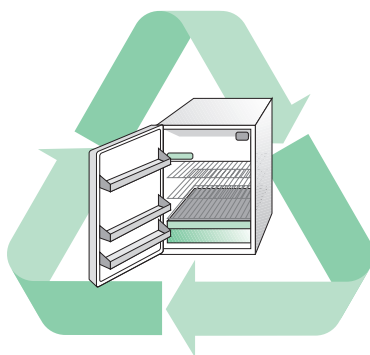
The service will be operated by Sécurité Solaire which last year produced the first solar radiation forecasts on French television.

Contact: Sécurité Solaire
fax: (33) 1 48 97 07 10

Questions and answers: reprocessing, reclamation and recycling

Question: *We are interested in building a reprocessing, reclamation or recycling facility for CFC-11 and CFC-12. Can you provide information on how these activities differ and what plants already exist?*

Answer: Several countries now have experience in operating centralized plants to increase the purity of recovered CFCs. This operation is usually called 'reclamation', as opposed to recovery, which is simply the capture of used CFCs, and recycling, which involves limited purification to an adequate but not high level of purity. In the United States, for example, private companies



such as National Refrigerants and Omega have been operating reclamation facilities as well as the extensive transportation and infrastructure

networks necessary for their success for many years. In France, companies such as Dehon perform a similar service for used CFCs. One of the keys to ensuring acceptance within industry is the existence of an industry standard for acceptable levels of refrigerant purity. In the United States, the standard is called ARI-700-88.

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

Contacts:

National Refrigerants, fax: (1) 215 698 7466

Omega, fax: (1) 318 367 6463

Dehon, fax: (33) 43 98 21 51

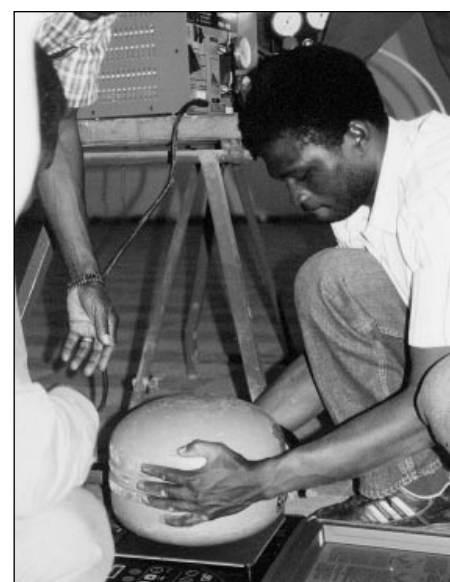
Training the trainers

UNEP IE held Train-the-Trainers workshops, run jointly with the International Institute of Refrigeration in Paris, in two French-speaking countries:

- Ouagadougou, Burkina Faso, 22–25 January 1996, for 17 trainees; and
- Dakar, Senegal, 14–17 November 1995, for 28 trainees.

The workshops are designed to promote good practices in the refrigeration sector, improve maintenance procedures, encourage refrigerant recovery in the workplace, integrate these practices in the curricula of technical institutes and train future trainers for national programmes.

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



Hands on experience for a future trainer in Senegal.

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

The Philippines first project under the Montreal Protocol was completed under the auspices of UNDP on 6 September 1995. The project (PHI/94/G61/A/2G/31) successfully phased out the use of CFCs in the manufacture of rigid polyurethane foam for thermoware in the Nikon Industrial Corporation.

Nikon is 100 per cent Filipino owned and is a member of the Pollution Control Association of the Philippines. The new technology put in use by the project is based on the use of chemically-generated carbon dioxide, supplemented for an

interim period with HCFC-141b.

The project was supported with funds of US\$315 000 and succeeded in phasing out 15 tonnes of CFCs annually. Project inputs included procurement of high-pressure foam-dispensing units.

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

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

Phase-out success: shipping line eliminates CFCs

The Los Angeles shipping company Princess Cruises has retrofitted all the air conditioners on its ships with HFC-134a. The work was completed during the summer of 1995 when the shipping company's boats were on cruises off Alaska.

The conversion was carried out by the Italian company Termomeccanica S.p.A of La Spezia, Italy. In all 11 plants were converted, each with a capacity of 6500 kW. A total of some 2000 kg of CFC-12 were replaced.

The work was actually performed during scheduled sailings, without inconvenience to the passengers. The conversion thus had to be carried out quickly, without undue loss of

cooling capacity. No inconvenience was caused to the passengers and at the end of the summer Alaska sailing season the air conditioners were tested at full capacity when the ships moved to the Caribbean.

Total cost of the project was US\$2.5 million. Princess Cruises is believed to be the first of the world's major cruise lines to have converted its air conditioners to non-ODS materials.

Contact: Termomeccanica
fax: (39) 187 552 506

Ozone science news

Serious ozone loss over Arctic

According to the World Meteorological Organization, for a few days early this year, ozone values fell to unprecedented lows for the northern latitudes—45 per cent ozone deficiencies were reported over the sub-polar region from Greenland to Scandinavia to the western part of the Russian Arctic. Ozone values of below 250 m atm cm were recorded for many days. This caused the monthly mean ozone deficiency to exceed 20 per cent. The lowest ozone values ever reported in this region were on isolated occasions a few units below 200 m atm cm.

In contrast with Antarctica the extremely low ozone values in the Arctic lasted for weeks but not months. During the Antarctic spring of 1995 the surface covered by the ozone hole exceeded 20 million km² for more than 40 days, and from its appearance in August to its last days in early December was the longest on record.

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

Melanoma an 'epidemic'

The US National Cancer Institute has reported that the incidence of melanoma skin cancer increased more rapidly during 1973–92 than any other form of cancer among US Caucasians, now accounting for some three per cent of all cancers diagnosed.

According to the American Academy of Dermatology, the disease has become 'an undeclared epidemic'. The Academy regards skin blocks as essential, and says that a sun protection factor of at least 15 should be used.

Contact: National Cancer Institute,
fax: (1) 301 402 0555

Ozone environment news

Research by Professor Pamela Hallock and colleagues of the University of South Florida, United States, suggests that ultraviolet radiation may be damaging populations of the protozoa called foraminifera that live in coral reefs around tropical islands. Populations of some of these micro-organisms have declined markedly, raising worries about what effects this may have on rates of coastal sedimentation since their shells produce up to 90 per cent of the sand-sized sediments found on many tropical islands.

In Canada, David Schindler, a biologist at the University of Alberta in Edmonton, and colleagues have found disturbing effects that result from a combination of global warming, acid rain and ozone depletion. Normally, carbon in freshwater lakes protects aquatic plants and animals from ultraviolet radiation. The researchers claim that global warming and acid rain are now reducing carbon levels in lakes, thus exposing aquatic life to ultraviolet

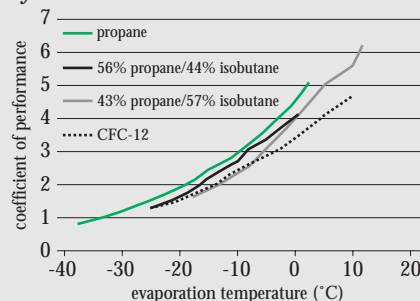
radiation. Measurements at several lakes in northwest Ontario over 20 years show that carbon levels in them fell by 15–20 per cent, allowing radiation to penetrate 22–63 per cent deeper. In one lake, ultraviolet radiation penetration has increased from 30 to 275 cm.

Contact: University of Alberta,
fax: (1) 403 492 3111

Hydrocarbons perform better

Scientists at the Institute for Cryogenics and Energy Research, University of Southampton, United Kingdom, have shown that hydrocarbons have a higher coefficient of performance than CFCs in tests on domestic refrigerators with CFC-12, propane and propane/isobutane mixtures.

Coefficient of performance: hydrocarbons and CFCs



Contact: Institute for Cryogenics and Energy Research, fax: (44) 1703 592059



I help protect the Ozone Layer!

This issue of the OzonAction Newsletter brings advice on how best to make a personal contribution to ozone layer protection.

● Be an active citizen: spread the word.

Talk to others in your community about ozone depletion and let them know how they can help. Make sure to let your family and friends know the importance of protecting our ozone layer. The more people are aware of how and why we should protect the ozone layer, the quicker it will recover.

● **Look at the labels** on products you buy. If they contain or were manufactured with ODS, consider buying alternatives. Pay particular attention to aerosols: CFC-

free aerosols are now available nearly everywhere for nearly all applications.

● **Get students to take action.** Students can write to school councils, local newspapers, radio and TV stations suggesting actions that everyone can take to save the ozone layer.

● **If your home or car air conditioner** is leaking refrigerant, have the leak repaired as soon as possible, by a competent technician.

● **If your car air conditioner** requires major repairs, ask your garage if there is an approved retrofit procedure for converting to an alternative refrigerant that doesn't destroy ozone.

● **Make sure old appliances** containing an ozone-depleting refrigerant are disposed of properly, wherever possible. Ask your local government office if there are means of recovering refrigerant before disposing of the appliance. Your local electric power company may also have appliance reuse/recycling programmes.

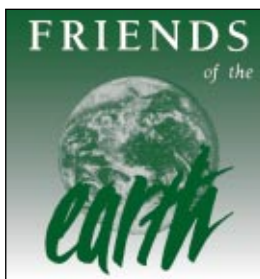
● **Don't discharge** halon extinguishers needlessly. Don't buy small extinguishers containing CFCs.

● **Contact your country's focal point** for ozone protection, information and assistance (a list of national focal points is available from UNEP IE).

Based on *Our Ozone Layer*, published by the US Navy CFC & Halon Clearinghouse, fax: (1) 703 769 1885; WWW— <http://home.navisoft.com/navyozone/navdef.htm>; and information from the UK Department of the Environment, fax: (44) 171 276 8285

News from NGOs

In the United States Friends of the Earth (FOE) is implementing a Halon Recovery Campaign, sponsored by the US EPA, throughout the mid-Atlantic region. The campaign has so far enlisted the participation of 15 fire equipment companies and halon recyclers that are redirecting collected halons to critical users approved by the programme. The campaign is



being focused primarily on Fortune 1000 companies and municipal governments in Maryland and Jersey. FOE hopes that its experience with the campaign can provide a model for other countries wishing to accelerate ODS phase out through halon recovery.

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

Halon bank news

Australian update

From July 1996, the Australian halon bank DASCEM is to use a pyrolysis technique to breakdown excess halons and CFCs into a benign mixture of sodium salts. The technique, known as Plasma Conversion (PLASCON) has been developed by the Australian Commonwealth Scientific and Industrial Research Organization and commercialized in conjunction with Siddons Ramset Ltd.

DASCEM maintains a stock of halons for essential uses in Australia and offers an international disposal service for excess halons and CFCs which includes transfer of ownership of materials to DASCEM, coordination of import and export permits, preparation for transport to Australia, customs clearance, secure storage, conversion by PLASCON, return of or recycling of storage vessels, and the issue of a certificate of responsible disposal.

Contact: DASCEM, fax: (61) 3 9649 4895

HRC includes recycled halon-1211 in its transfer programme

The US Halon Recycling Corporation (HRC) has expanded its information exchange programme for recycled halons to include halon 1211. HRC will now facilitate transfers of recycled halon 1211, as it does for halon 1301, by matching companies that have excess halon with those companies that need the fire-fighting agents for critical uses. HRC recently received approval from the US Justice Department to add halon 1211 to its programme.

HRC is a not-for-profit, industry-sponsored association that acts as an information clearinghouse and facilitating organization for the recycling of halons. HRC is a focal point for industry/government interaction on issues related to halon recycling and banking. The organization operates with the endorsement of US EPA, which supported

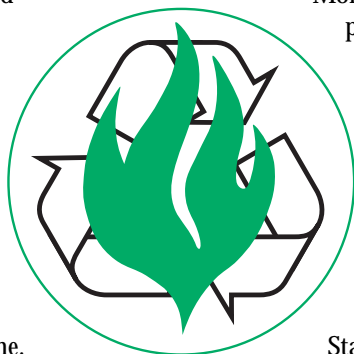
HRC's halon 1211 proposal.

Halon 1211 is a liquid streaming agent used mainly in hand-held extinguishers and Halon 1301 is a gaseous agent used mainly in total flooding systems. Under the 1992 Copenhagen amendments to the Montreal Protocol, the production of halons was banned in developed countries on 1 January 1994.

Although alternatives exist for most halon uses, some highly critical applications still require the use of halons. In the United

States, these include military applications, commercial aviation, oil and gas production, and electric power generation. Although the Montreal Protocol allows additional halon production for essential uses, these critical needs can be met through recovery and recycling.

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



In brief ...

○ The German companies BASF AG and Dow Deutschland Inc are to phase out the use of HCFCs as blowing agents in their polystyrene foam production by 1998. The companies will use CO₂ instead.

Contact: BASF, fax: (49) 621 60 99053
Dow, fax: (31) 20 69 16 412

○ A White Paper prepared by York International in the United States claims that conversion of the world's chillers to non-ODS materials will result in major energy savings, worth up to US\$2 million per chiller over a 25-year period.

Contact: York, fax: (1) 708 541 9615;
WWW— <http://www.york.com>

○ Hospital managers in the Canadian province of Manitoba have made plans to phase out the use of the sterilant 12/88 ethylene oxide, a gas mixture that contains CFC-12 used to destroy bacteria on medical equipment. The plan was made under the auspices of the Manitoba Ozone Protection Industry Association (MOPIA).

Contact: MOPIA, tel: (1) 204 338 0804

○ By the end of 1995, CFC and halon consumption in Malaysia had been reduced to 0.15 kg/capita (compared to 0.29 kg/capita in 1989). This translates into a reduction in consumption of CFC-113, 1,1,1-trichloroethane and CFC-11 by 90 per cent compared with 1989. Thirty-two projects and activities have been completed in Malaysia, phasing out 1700 tonnes of CFCs.

Contact: Department of Environment,
fax: (603) 293 1480

○ In the United States, Sandia National Laboratories has issued a report called *Evaluation of Low Residue Soldering for Military and Commercial Applications* which reports on task force tests carried out at four electronics manufacturing sites.

Contact: Sandia, fax: (1) 505 844 3321

Status of Ratification

(as at 31 March 1996)

The Vienna Convention

156 Parties; new Parties, Yemen, Mongolia

The Montreal Protocol

155 Parties; new Parties, Yemen, Mongolia

The London Amendment

106 Parties; new Parties, Mongolia

The Copenhagen Amendment

57 Parties; new Parties, Mongolia

Recent publications

Banks, H. J. (ed). *Agriculture Production without Methyl Bromide—Four Case Studies*. CSIRO Division of Entomology, Australia, 1995.

Nordic Council of Ministers. *Dry Cleaning without CFCs*. TEMANORD, Copenhagen 1995.

Proceedings of the Workshop on Ozone Depletion and Management of ODS Phase out in SMEs for the Asian region. Centre for Science and Technology of Non-aligned and other Developing Countries, New Delhi, India, 1995.

International Status Report on Compression Systems with Natural Working Fluids. SINTEF, Norway, 1996.

Forthcoming meetings

Halon Options Technical Working Conference, Albuquerque, New Mexico, United States, 7–9 May 1996.

Thirteenth Meeting of the Open-Ended Working Group of the Parties to the Montreal Protocol, Geneva, Switzerland, 26–29 August 1996.

Fire International 96. GMEX Centre, Manchester, United Kingdom, 3–5 September 1996.

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

World policy round-up

Bulgaria to reduce CFC emissions

Bulgaria—which currently emits some 74 500 m³ of CFCs annually—has become the first East European state to adopt an aggressive CFC emissions abatement strategy. The country has signed a protocol with the World Bank involving the transfer of US\$10.5 million. The money will be used to help Bulgaria reduce CFC emissions by a target of 86 per cent using newer technologies that do not depend on CFC use.

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

Egypt warns of dangers of importing trucks that use ODS

The National Ozone Panel (NOP) of the Egyptian Environmental Affairs Agency (EEAA) has warned national authorities of the dangers of importing refrigerated trucks that use ODS. The NOP has recommended that the Ministry of Foreign Affairs prohibit the importation of these units which are not subject to the decree forbidding the importation of refrigerators using ODS.

Local refrigeration manufacturers report that Egypt has adequate refrigerated truck production capacity of units which do not use CFCs, in compliance with the country's commitments under the Montreal Protocol. EEAA recommended that the importers of refrigerated trucks be obliged to submit an official guarantee from the exporting nation certifying that the refrigerators involved do not contain environmentally-harmful substances.

Contact: EEAA, fax: (202) 3610 764

EU lowers cap on HCFCs

EU Environment Ministers have agreed a further reduction of the existing HCFC cap. The current cap, which is tighter than the limits agreed under the Montreal Protocol, allows a country to consume an amount of HCFC equal to its 1989 use, plus 2.6 per cent of its CFC use in that year. An amendment that will lower this figure to 2.0 per cent is being prepared. HCFC use will be phased out completely by 2015.

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

Methyl bromide exemptions recommended in the United States

A report from the US General Accounting Office has urged the US EPA to seek changes to the Clean Air Act to allow essential-use exemptions to the ban on methyl bromide

use due to take place on 1 January 2001.

The report concludes that though alternatives are available 'none is as economical and effective as methyl bromide'. Six older pesticides have been identified by the US Department of Agriculture as potential alternatives to methyl bromide—1,3-dichloropropene, dazomet, metam sodium, chloropicrin, phosphine, and dichlorvos—but the US EPA has found 'potentially serious environmental and/or health and safety concerns' for each, the report claims. Methyl bromide is also a restricted use pesticide in the United States, where its use is subject to specific safety-related conditions.

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

Singapore halts CFC imports

Singapore has decided to halt the importation of CFCs as part of its 1993 pledge to phase out CFC use. Singapore adopted the Montreal Protocol in 1989 and has already reduced CFC consumption to 20 per cent of its 1986 level. Since 1995 cars imported into Singapore must have air-conditioning units that do not require the use of CFCs.

Contact: Ministry of Environment
fax: (65) 731 956

Manitoba leads on regulating halons

The province of Manitoba has some of the most comprehensive regulations in Canada governing the halon industry, including restrictions on the sale of fire extinguishers, comprehensive guidelines on halon recovery and an environmental code of practice. The Manitoba Ozone Protection Industry Association (MOPIA) has been developing a service technician certification training course on halons, which was scheduled to be delivered to the province's technicians by the end of March 1996.

Contact: MOPIA, tel: (1) 204 338 0804

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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