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September 1997

EPA

Stratospheric Update

An Update on Ozone Protection Progress

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Montreal Protocol Turns 10

The Montreal Protocol is a landmark international agreement, originally signed in 1987, that was designed to protect the stratospheric ozone layer. This fall, the Parties to the Protocol will observe the 10th anniversary of the agreement. The Parties will celebrate past successes, as well as make decisions about important issues affecting the future of the Protocol, at a meeting held in Montreal, Quebec, from September 15 to 17, 1997.

In June, several of these issues were discussed at an initial negotiation session in Nairobi, Kenya. The Parties discussed potential adjustments and amendments to the Protocol, including strengthening controls for methyl bromide, hydrochlorofluorocarbons, and carbon tetrachloride; considering requirements relating to the licensing of imports and exports of controlled substances; banning trade with nonparties in methyl bromide; and considering changes to the Protocol's compliance regime.

Special events planned for the Montreal meeting include a 1-day colloquium on the roles of policy, natural and social sciences, and technology in shaping the successful development and implementation of the Protocol; a showcase of innovative technologies developed in the past 10 years to meet the challenge of phasing out ozone-depleting substances; and an awards dinner sponsored by the Montreal Protocol's Technology and Economic Assessment Panel, Environment Canada, the United Nations Environment Programme, and industry associations.

In honor of the Protocol's 10th anniversary, this issue of *Stratospheric Update* highlights some of the major U.S. and international successes to date in implementing the Protocol. See page 4 for a summary of key milestones reached on the road to phaseout of ozone-depleting substances.

A Helping Hand

The U.S. EPA is doing its part to bring about global phaseout of ozone-depleting substances (ODSs) by assisting developing nations in meeting their commitments under the Montreal Protocol. In the past 7 years, EPA has provided over $10 million of bilateral technical assistance, training, and equipment through the Protocol's multinational fund to industry and government partners in Africa, Asia, the Caribbean, and Latin America.

EPA's current projects address significant sectors of ODS use in many developing countries.

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Science & Research

North Pole Experiences Drop in Ozone Levels

In late March 1997, satellite-based instruments measured unusually low levels of ozone over the North Pole. Scientists at the National Aeronautics and Space Administration (NASA) attribute the low levels to the presence of stratospheric halogens, which destroy the ozone layer, as well as unusual meteorological conditions. These levels indicate that ozone depletion may be more widespread than previously thought.

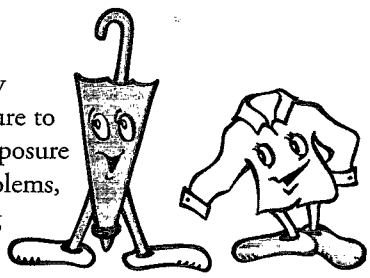
The values measured were the lowest levels measured over the North Pole during late March. According to NASA, measurements of total column ozone fell to a low of 219 Dobson units on March 24. Total column ozone measures the level of ozone in a column extending from the ground to the top of the atmosphere. Dobson units describe the physical thickness of the ozone layer. The low ozone values were measured inside the Arctic polar vortex, a part of the stratospheric circumpolar jet stream that surrounds the North Pole.

The Arctic vortex witnessed particularly strong and persistent cold temperatures well into March. Temperatures were apparently low enough to form polar stratospheric clouds during late March, which helped convert certain forms of stratospheric chlorine into forms that are highly reactive with ozone. When combined with sunlight at polar latitudes, the reactive chlorine destroys ozone. Further research will examine the causes of March's low ozone values.

For more information, contact Paul Newman of NASA at 301 286-3806.

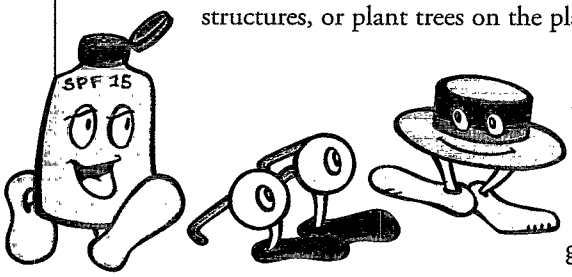
Education

Sun Sense for Schools



Did you know that the American Academy of Dermatology (AAD) estimates that we receive 80 percent of our exposure to the sun's ultraviolet (UV) rays before we turn 18? Overexposure to damaging UV light can lead to a variety of health problems, including skin cancer, cataracts, and immune suppression. According to the AAD, skin cancer kills one American each hour. As a result, teaching sun safety practices to our children can literally mean the difference between life and death.

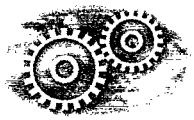
To help educate children about the need to protect themselves from the sun, EPA is launching a partnership program with the nation's schools. The Sunwise School program will encourage elementary schools to adopt goals to reduce children's exposure to the sun. Sunwise schools will set goals that make sense for them and share their progress with EPA and other schools. For example, schools can post the UV index every day, change recess times so children are not outdoors during the peak UV exposure hours, incorporate a lesson on the UV index in science or math classes, build shade structures, or plant trees on the playground.



EPA is currently developing this program with input from educators, national medical experts, and others interested in improving children's awareness of the risks of overexposure to the sun.

For more information about the Sunwise School program, contact Kevin Rosseel of EPA at 202 233-9731.

In Search of Safer Substitutes



Implementation

Identifying safer substitutes for ozone-depleting substances (ODSs) is crucial to ending the world's reliance on them. Yet, when the Montreal Protocol was signed 10 years ago, many feared that substitutes did not exist or would be too ineffective to use. Through its Significant New Alternatives Policy (SNAP) program, EPA has proven these fears to be unfounded.

EPA is required to evaluate alternatives for lower overall impact on the environment and human health, and to publish lists of acceptable and unacceptable substitutes. EPA does not review alternatives for technical feasibility. On March 18, 1994, EPA issued the final rule establishing the SNAP program and issued its initial list of acceptable (including restrictions where applicable) and unacceptable alternatives.

The SNAP program categorizes alternatives by eight industry sectors: refrigerants; fire suppression; solvents; foams; adhesives, coatings, and inks; aerosols; sterilants; and tobacco expansion. Within each sector, alternatives are further classified by their end use. Refrigerants, for example, are categorized according to their use in motor vehicle air conditioning, retail food refrigeration, etc. EPA publishes periodic updates to the list of acceptable and unacceptable alternatives.

Results of the SNAP program have been impressive. As of June 1997, EPA has listed safer alternatives in each of the 8 industry sectors, including more than 160 acceptable substitutes for ODSs in dozens of end uses. The SNAP program has gained widespread acceptance among industry as well. Manufacturers and vendors of alternatives frequently use the acceptance of their products by the SNAP program as a promotional point.

The search for safer substitutes continues. Although alternatives exist for the vast majority of ODS uses, more substitutes are needed, such as for niche uses in precision cleaning, fire suppression, and explosion inertion.

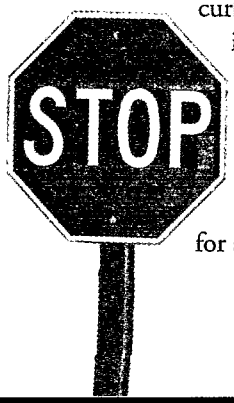
For more information about the SNAP program, contact the Stratospheric Protection Hotline at 800 296-1996 or 301 614-3396.

SNAP at a Glance

- SNAP acceptability of a substitute may be restricted or limited:
  - To use in narrowly defined circumstances.
  - Where no other acceptable substitute is technically feasible for performance or worker safety.
- Users should insist on full copies of EPA restrictions.
- Users of SNAP-listed substitutes must comply with all other U.S. health, environmental, and safety regulations.

Curbing Illegal Imports

Since the Clean Air Act passed in 1990, many individuals have tried to circumvent restrictions on importing ozone-depleting substances (ODSs) into the United States. Now that the phaseout is complete for many ODSs, they are in scarce supply, and buyers are willing to pay top dollar for them. As a result, illegal import is a lucrative business. Even under these circumstances, U.S. efforts to curb illegal imports are strikingly successful. In fact, attempts to illegally import ODSs led to the first criminal conviction under the Clean Air Act, and the first extradition of an individual for an environmental crime.



The success of the U.S. efforts to halt illegal imports is largely due to an effective partnership among U.S. government agencies including EPA, the Department of Justice, the Internal Revenue Service, the Customs Service, and the State Department. Together, these agencies have convicted more than 30 people and seized more than 1.6 million pounds of illegally imported ODSs.

Importers attempt to bring ODSs, in most cases chlorofluorocarbons (CFCs), into the United States from a variety of places, including Europe, Asia, and Latin America. They often disguise the ODSs as other substances or falsify claims of export. They also claim that imported CFCs are "used." (Used CFCs are allowed to be imported under the Clean Air Act; the Act only prohibits the production or import of new CFCs.) In order to verify claims that CFCs are in fact used, EPA established a petition system,

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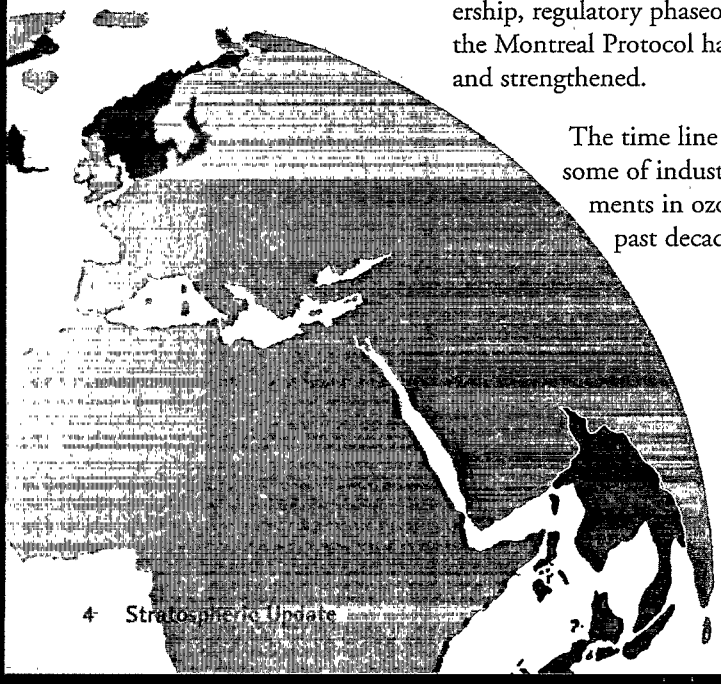
International

Corporate Leadership Milestones of the Montreal Protocol

by Stephen O. Andersen, Co-Chair, Montreal Protocol Technology and Economic Assessment Panel

When the Montreal Protocol was signed in 1987, all but a handful of global industry representatives contended that scientists had not yet proven chlorofluorocarbons (CFCs) destroyed stratospheric ozone, that no safe substitutes existed, and that products made with or containing CFCs were absolutely vital to society. The control provisions of the Montreal Protocol, however, have motivated industry to commercialize numerous alternatives to ozone-depleting substances (ODSs). As a result of corporate leadership, regulatory phaseout targets established by the Montreal Protocol have been easily achieved and strengthened.

The time line on these pages presents some of industry's key accomplishments in ozone protection in the past decade.



1987

The Montreal Protocol on Substances That Deplete the Ozone Layer is signed.

1989 continued

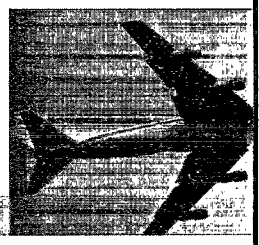
Woolworth's Australia sets a goal of halting its use of CFC refrigerants.

The Institute of Interconnecting and Packaging Electronic Circuits publishes the solvent test plan, which is accepted by the U.S. Department of Defense as the technical basis for eliminating CFCs from electronics manufacturing.

The Industry Cooperative for Ozone Layer Protection (ICOLP) is founded by AT&T, The Boeing Company, Digital Equipment Corporation, Ford,

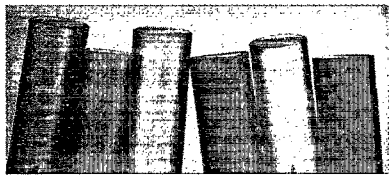
1991 continued

Camara Nacional de la Industria de la Transformacion, Nortel/Northern Telecom, ICOLP, and EPA form a partnership to eliminate CFC solvents in Mexico by 2000; this inspires other developing countries to consider rapid phaseout.



1994

Developed countries halt halon production.



1988

AT&T announces a new solvent made from oranges to replace CFC-113.

The Foodservice and Packaging Institute and nongovernmental organizations announce the world's first voluntary national CFC phaseout.

Nortel/Northern Telecom and Seiko Epson announce their corporate CFC-113 phase-out goals.

The United Nations Environment Programme organizes the Technology and Economic Assessment Panel.

1989

The Mobile Air Conditioning Society, the Society of Automobile Engineers, EPA, and industry develop CFC recycling standards. Chrysler, Ford, General Motors, Mercedes-Benz, Nissan, and Toyota require franchised dealers to recycle CFCs.

Nissan commits to phase out all CFC uses.

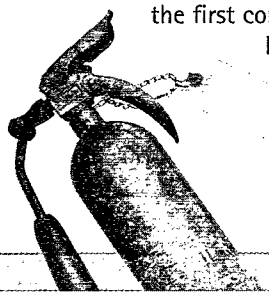
General Electric, Honeywell, Motorola, Nortel/Northern Telecom, and Texas Instruments.

The Halon Alternatives Research Corporation is founded to search for alternatives to halons.

The Australian Government and the Association of Fluorocarbon Consumers and Manufacturers of Australia agree to phase out halon production and imports by 1996.

The National Fire Protection Association eliminates halon testing requirements, clarifies that training with halon is not required, and accelerates the acceptance of alternatives.

Digital Equipment Corporation donates patented aqueous cleaning technology to the public domain—probably the first donation for global environmental protection.



1991

Daikin, DuPont, ICI, and Showa Denko are the first companies to commercialize HFC-134a, and Asahi Glass builds the first HCFC-225 production facility.

1992

The North Atlantic Treaty Organization supports an accelerated phaseout and endorses technology cooperation.

Lockheed Martin is the first company to eliminate virtually all ozone-depleting solvents from aircraft manufacture (specifically the F-16 fighter), and Lufthansa is the first company to eliminate them from aircraft maintenance.

The U.S. Under Secretary of Defense directs the military to rapidly eliminate the use of ODSs from all weapons acquisition programs.

The Coca-Cola Company halts the purchase of CFC-based refrigeration equipment, and other beverage companies soon follow. Coca-Cola, with its market clout, rapidly mobilizes manufacturers in developed and developing countries to supply ozone-safe technology.

1993

Minebea, the company previously consuming the largest quantities of ODSs in Thailand, completely phases out its use of ODSs.

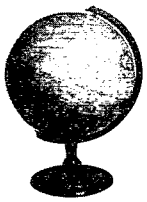
1995

The European Union halts CFC production for all but export, essential uses, feedstocks, and process agents.

Forty multinational companies from seven countries help the government of Vietnam protect the ozone layer by pledging to invest only in modern, environmentally acceptable technology in their Vietnam projects.

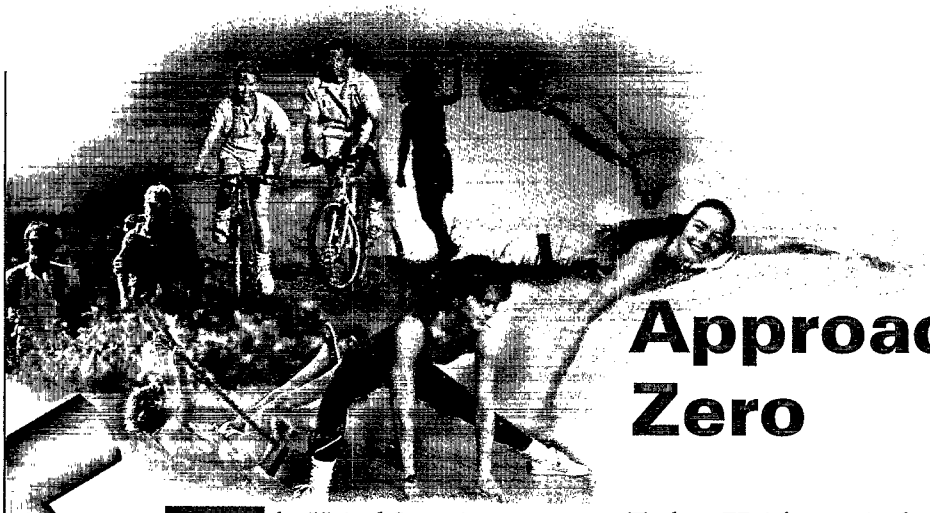
1996

Developed countries halt production of all ODSs except methyl bromide (with exceptions for exports to Article 5(1) Parties and for essential uses, feedstocks, and process agents).



1997

Hitachi, Matsushita Electric Industrial, Mitsubishi Electric, Sanyo Electric, Sharp, and Toshiba, with a total of seven Thai joint ventures, complete the first developing country phaseout of CFC refrigerators. Thailand subsequently prohibits the manufacture and import of new refrigerators containing CFCs and becomes the first developing country to use trade controls to protect the global environment.



Approaching Zero

The United States is approaching final phase-out of all products manufactured with chlorofluorocarbons (CFCs). Only one set of products made with CFCs currently remains exempt from the Montreal Protocol, under an "essential use" designation. Metered-dose inhalers (MDIs), which use CFCs as a propellant for asthma and chronic obstructive pulmonary disease medication, were given a medical exemption to the ban on CFC products until CFC-free MDIs were feasible and available. Now, things are falling into place to remove the remaining CFC MDIs from the list of exemptions. Two recent events are facilitating the transition away from CFC MDIs: (1) the development of the first CFC-free MDI, which has been approved for use as a drug by the U.S. Food and Drug Administration (FDA), and (2) the FDA's proposal for a system to remove essential use products, such as CFC-based MDIs.

FDA issued its *Advance Notice of Proposed Rulemaking* to comply with the provisions of the Montreal Protocol. The Parties to the Protocol had never intended the essential-use exemptions to be permanent; they anticipated that alternative products would become available. Generally, the proposed rule states that CFC-containing medical products would be considered for phase-out once acceptable treatment alternatives and adequate production capacity exist. In addition, alternatives must be marketed for at least 1 year, must serve all significant subpopulations (e.g., children and pregnant women), and must be deemed acceptable by patients. Finally, the supply of alternative products must be sufficient to ensure there will be no drug shortages.

To date, FDA has received several thousand comments on this advanced notice, and the agency anticipates publishing a proposed rulemaking by the end of 1997. Meanwhile, EPA is continuing to work with pharmaceutical companies on facilitating the transition to CFC-free MDIs.

The key to a smooth transition is educating health care providers and patients about the new medication, as well as about the global environmental and public health reasons for the change. EPA joins several other organizations involved in this effort in an outreach campaign to inform patients and doctors about the Montreal Protocol and the imminent changes in medication it will bring. In addition, educational materials will assure patients that the medicine they depend on will continue to be available.

For more information, call Chris O'Donnell of EPA at 202 233-9079.

Did You Know?

The Montreal Protocol was among the first international environmental treaties to:

- Attain agreement by developed and developing nations alike to bring about reductions in certain chemicals.
- Establish a regime to deal with noncompliance.
- Create a fund to assist developing nations in meeting their commitments.
- Allow parties to take additional actions to reduce newly identified substances that pose threats to the ozone layer.

Curbing Illegal Imports

(Continued From Page 3)

whereby individuals wishing to import used CFCs must notify EPA 15 days before the shipment leaves for the United States. EPA then independently verifies information about the equipment from which the substance was removed and reviews information about how the substance will be used once it arrives stateside.

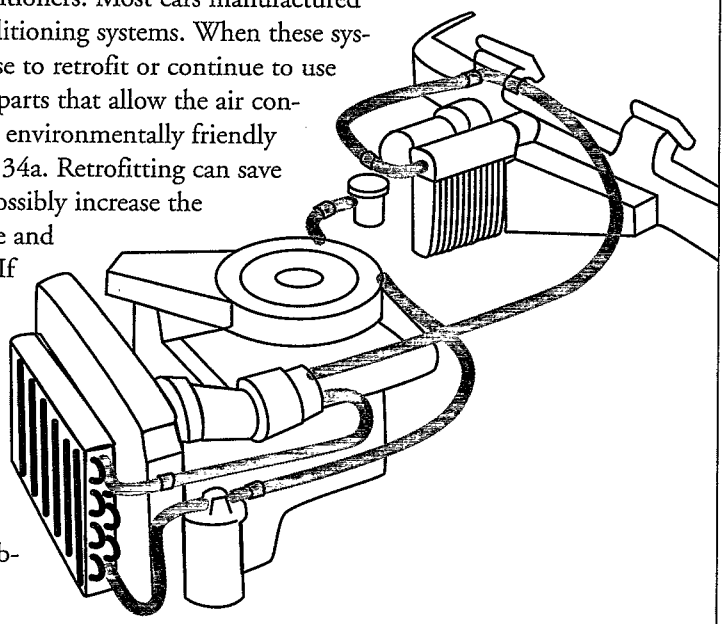
Individuals accused of illegally importing ODSs can be prosecuted civilly (and be subject to fines of as much as $25,000 per kilogram of ODS) or charged criminally (and face potential prison terms). For more information about EPA's efforts to curb illegal imports, contact Tom Land of EPA at 202 233-9185.

The Fate of R-12

On December 31, 1995, U.S. manufacturers stopped producing CFC-12, an ozone-depleting refrigerant also known as R-12. Since the phaseout of this widely used chemical, which is still in use in many automobile air conditioning systems, the national supply has decreased and the price has risen. Vehicle owners and others who continue to use R-12 have been depending on stockpiles of the chemical purchased before the phaseout, R-12 reclaimed from existing air conditioners and refrigeration equipment, and illegal imports.

Most of the remaining R-12 is held by relatively few companies. EPA predicts that the current U.S. supply, either for sale now or banked for future sales, should serve national demand through this year and much of next year. EPA believes, however, that significant shortages may begin to appear in 1998.

As supplies dwindle and prices increase, consumers increasingly will face the decision of whether to retrofit their motor vehicle air conditioners. Most cars manufactured before 1995 use R-12 in their air conditioning systems. When these systems need repair, consumers can choose to retrofit or continue to use R-12. Retrofits involve installing new parts that allow the air conditioning system to operate with more environmentally friendly alternative refrigerants, such as HFC-134a. Retrofitting can save consumers money on future repairs, possibly increase the value of a vehicle, and save the expense and inconvenience of trying to find R-12. If consumers are not planning to keep their vehicle for very long, however, it may not be worth the money to retrofit.



For more information about the supply of R-12 and retrofitting vehicle air conditioners, see the resources section on page 8, or call Christine Dibble of EPA at 202 233-9147.

A Helping Hand

(Continued From Page 1)

In automotive service shops in Argentina, China, Mexico, the Philippines, and Venezuela, EPA has provided training and refrigerant recovery/recycle machines and other equipment to service technicians to reduce ODS emissions associated with the maintenance and operation of mobile air conditioning systems. In the Dominican Republic, EPA is introducing refrigerant recycling systems to refrigeration service shops to reduce ODS emissions associated with the operation, servicing, and maintenance of equipment, such as large freezers and display cabinets, used to refrigerate food.

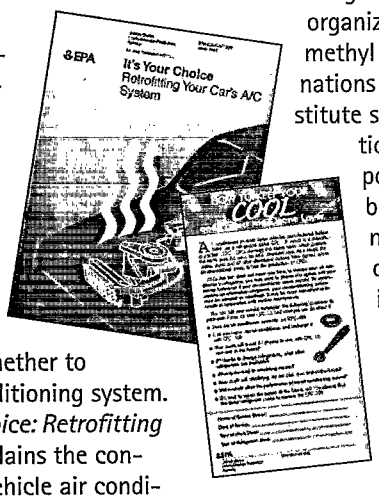
These and other projects would not have been possible without the assistance and continued cooperation of partner implementing agencies, particularly the Montreal Protocol Unit of the United Nations Development Programme and the United Nations Office for Project Services. Most recently, EPA is also pleased to be working with the World Bank in partnership with the government of Thailand to implement a program to reduce ODS emissions in the mobile air conditioning service sector. For more information about EPA's work in developing nations, contact Gary McNeil of EPA at 202 233-9173.

International

Resources

Champions of the World

Since 1990, more than 300 individuals, associations, and corporations have received Stratospheric Ozone Protection Awards for their efforts to reduce ozone-depleting substances (ODSs). A new EPA document, *Champions of the World*, highlights the varied accomplishments of the award winners from 1990 to 1996. The document presents a summary of each award winner, a time line detailing corporate leadership "firsts," and essays covering industry sectors that were successful in eliminating ODSs. In addition to an overview of corporate and military accomplishments, specific chapters address the following industry sectors: foams, halons, refrigeration and air conditioning, and solvents. To request a copy of *Champions of the World* (EPA430-R-97-023), contact the Stratospheric Protection Hotline at 800 296-1996.



It's Your Choice

EPA has developed two new publications to help consumers decide whether to retrofit their car's air conditioning system. The brochure *It's Your Choice: Retrofitting Your Car's A/C System* explains the connection between motor vehicle air conditioners and the environment and presents options for retrofitting motor vehicles with air conditioning systems that use chlorofluorocarbons. It outlines retrofitting methods available and discusses the advantages and disadvantages for each retrofitting method. A companion piece, *How to Keep Your Cool and Protect the Ozone Layer*, presents questions consumers can ask their service technicians to determine whether to retrofit their air conditioners. To request a copy of *It's Your Choice: Retrofitting Your Car's A/C System* (EPA430-F-97-052) or *How to Keep your Cool and Protect the Ozone Layer* (EPA430-F-97-005), call the Stratospheric Protection Hotline at 800 296-1996.

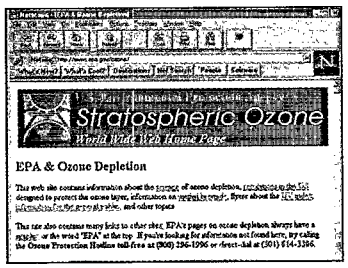
A Closer Look at Methyl Bromide

A recent study funded by EPA, Environment and Agriculture Canada, and other organizations examines the use of methyl bromide in developing nations and the potential to substitute safer alternatives. Production of methyl bromide, a powerful ozone depleter, will be frozen in developing nations by 2002, and phase-out of the product by 2010 in developed nations is being reconsidered this year. *The Technical and Economic Feasibility of Replacing Methyl Bromide in Developing Countries* presents case studies on methyl bromide use in Zimbabwe, Thailand, and Chile. It assesses opportunities and barriers to introducing substitutes for methyl bromide and identifies feasible alternatives. To receive a copy of the study, contact the Stratospheric Protection Hotline at 800 296-1996.

Web Site Watch

What's Hot on the Ozone Depletion Web Site

http://www.epa.gov/ozone/



The Ozone Depletion home page receives an average of 80,000 visits per month and features information about the science of ozone depletion, the ultraviolet index, regulatory programs, and methyl bromide. With up-to-date information and fact sheets, the Motor Vehicle Air Conditioning section is one of the most popular on the site. Numerous fact sheets explain the effects of chlorofluorocarbons on the ozone layer, how to handle refrigerants, and the substitute refrigerants available to replace CFC-12. For example, *Choosing and Using Alternative Refrigerants for Motor Vehicle Air Conditioning*, which explains alternative refrigerants considered acceptable by EPA and conditions placed on their use, was read 2,500 times during the month of June. Visit the Motor Vehicle Air Conditioning section directly (**http://www.epa.gov/ozone/title6/609**) or as a link from the Ozone Depletion home page.

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