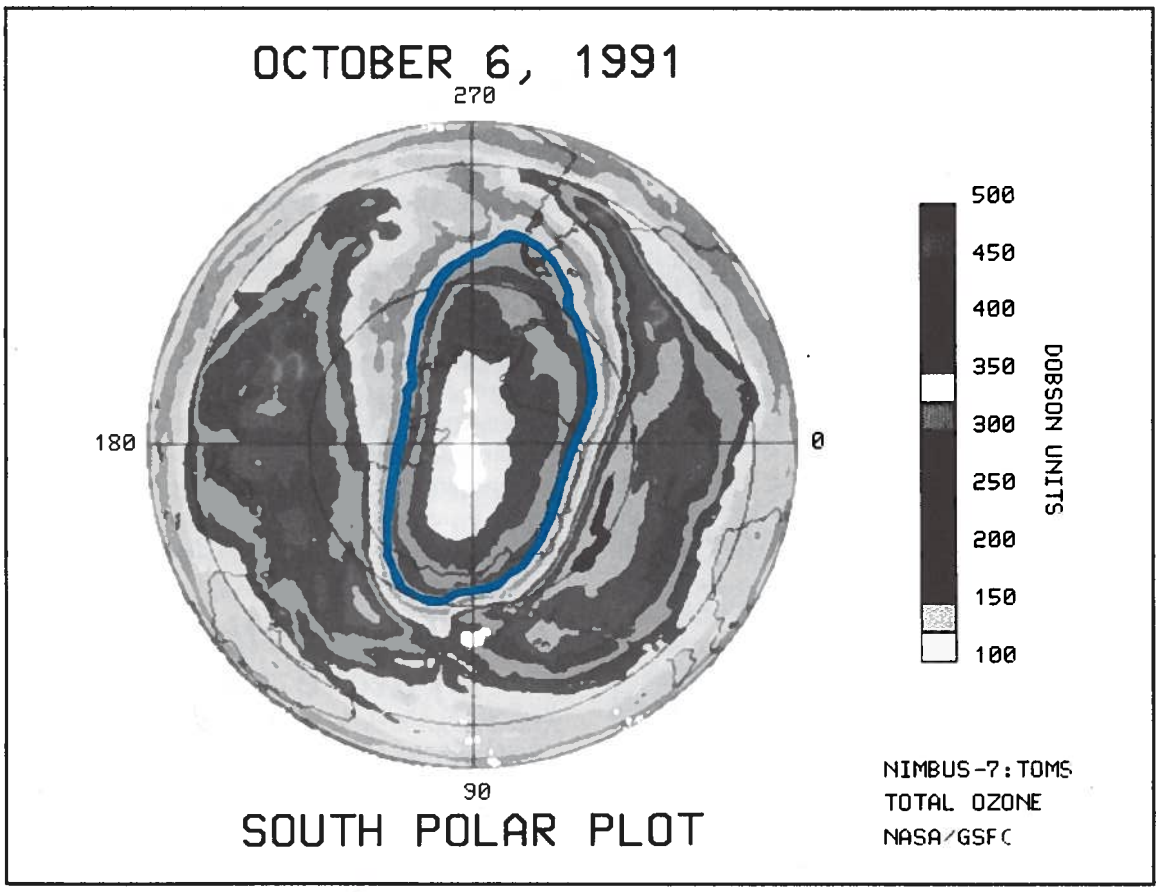
An NRDC
EarthAction *guide:*

Saving the Ozone Layer



Revised edition

The global emergency

High above our heads, an invisible layer of ozone shields the earth's surface against dangerous ultraviolet radiation. The ozone layer has been there for eons; without it, life here simply could not have gotten started, nor could it continue for very long.

But now mankind is destroying this fragile shield. Chlorofluorocarbons (CFCs) and other man-made chemicals are wafting up to the stratosphere, 6 to 30 miles above us. There they break down, releasing chlorine, bromine, and other compounds that destroy ozone, converting it to ordinary oxygen, which cannot screen out ultraviolet radiation. As ozone is depleted, more ultraviolet radiation reaches the earth's surface, with dangerous health and environmental consequences.

Ozone depletion is no mere theory. "Holes" have been torn in the ozone layer over Antarctica and the Arctic. As much as half of the ozone over the south pole is lost each year during the southern hemisphere's springtime.The National Aeronautics and Space Administration (NASA) reported in January 1992 that broad areas of the northern hemisphere, from the Arctic to the Caribbean, are primed for rapid ozone losses through the same chemistry that causes the Antarctic ozone hole.

The latest international scientific assessment shows that the ozone layer is undergoing much more rapid and widespread deterioration than anyone had feared. Serious depletion is no longer confined to polar areas. It is happening right overhead. It is no longer limited to the winter months. It is occurring well into spring and summer, when people are outside and heavily exposed to the sun's rays.

Over the U.S., annual average ozone levels have dropped 3.5 to 5.5% since 1979—about 3.5% during the summer months (May to August). Depletion of 5% or more is now measured at northern mid-latitudes until June. Depletion gets even more severe in countries farther north, such as Canada, Great Britain, and Scandinavia, and in the far south, such as Chile, Australia, and New Zealand. And scientists expect *twice* as much depletion by the turn of the century—up to 10% loss of ozone in June over the U.S.—if the current schedule for phasing out ozone-depleting chemicals is not speeded up.

If a 10% loss of ozone were sustained over a long period, it would mean a worldwide increase of 300,000 new skin cancer cases each year, according to the scientific assessment. One million more people would be blinded by cataracts each year. There could also be a large increase in cases of various infectious diseases, because ultraviolet radiation has been shown to weaken the immune system.

Future ozone depletion will also do enormous damage to the natural environment, ranging from billions of dollars in reduced crop yields to the potential collapse of the marine food chain. New studies of the southern oceans under the ozone hole show a 2 to 4% decline in growth of phytoplankton, which are at the base of the food chain. Even the earth's climate will be altered.

A phase-out—but not fast enough

The only solution is to end the production and use of ozone-depleting chemicals as quickly as possible—faster than is currently planned.

Back in 1986, NRDC was the first to propose a global phase-out of CFCs and related chemicals. In 1987, more than two dozen nations adopted a treaty, known as the "Montreal Protocol," but this agreement provided for only a 50% cut in CFCs over 10 years. With amendments to the Protocol adopted in London in June 1990, and with passage of the new Clean Air Act in November 1990, we succeeded in winning a total phase-out of CFCs and other key chemicals in the U.S. and other industrialized nations by the year 2000, and in the rest of the world by 2010.

But even under that timetable, *20 billion* more pounds of the most potent ozone-depleting chemicals are still permitted to enter Earth's atmosphere. In light of the new scientific data, there now is widespread agreement that neither the London amendments to the Montreal Protocol nor the new Clean Air Act goes far or fast enough. There is still much to do, in the United States and abroad, to protect the ozone layer.

The "Hole Earth Catalog" of ozone depleters

Asked about the causes of ozone depletion, most people will think of CFCs. To be sure, CFCs are the most important ozone-depleters. But there is a long list of man-made chemicals that are destroying the ozone layer.

Chlorofluorocarbons: First synthesized in the 1930s, CFCs came into widespread use after World War II. By the 1970s, hundreds of millions of pounds were being used worldwide each year, mostly in aerosol sprays, but also as the cooling fluid in refrigerators and air conditioners. In 1974, Drs. F. Sherwood Rowland and Mario Molina made the shocking discovery that these supposedly inert chemicals could deplete the ozone layer. Millions of Americans spontaneously stopped using CFC aerosol sprays. Responding to a petition by NRDC, EPA banned these chemicals from most aerosols in 1978.

CFC production declined temporarily after the aerosol ban. But soon it started growing again as CFC markets expanded in refrigeration, air conditioning, foam insulation and packaging, cleaning solvents, and other products.

EPA took no action against these other applications, and only a few other countries followed the U.S. lead on aerosols. By the late 1980s, global CFC production had reached about *2 billion* pounds per year and was growing by 5 to 10% annually.

The Montreal Protocol, as amended in 1990, now provides for a total phase-out of CFCs by the year 2000 in industrial nations (2010 in developing countries). The U.S. Clean Air Act also sets a 2000 deadline. But billions more pounds of these chemicals will still escape into the atmosphere before the phase-out is complete. Once released, they will persist in the atmosphere for 100 years or longer.

Halons: These are bromine-containing chemicals closely related to CFCs that are used in certain kinds of fire-extinguishing systems. Though far less halons are produced than CFCs, halons are as much as 10 times more damaging to the ozone layer, pound for pound. The Montreal Protocol and the Clean Air Act set a year 2000 phase-out deadline for halons. (As with CFCs, developing countries are allowed 10 years extra.)

Carbon tetrachloride: Many people will remember "carbon tet" as a common industrial and household solvent. Although now considered too toxic for such uses in the U.S., it is still employed as a feedstock for making other chemicals, and it remains in wide use as a solvent in other parts of the world. Schedule for phase-out under the Montreal Protocol and the Clean Air Act: 2000 in industrial countries, 2010 in developing nations.

Methyl chloroform: More methyl chloroform is produced than all CFCs combined—more than 750 million pounds were made in the U.S. in 1988. One of the most heavily used industrial solvents, it is also found in hundreds of aerosols, cleaning products, and other consumer goods (where it goes by the name "1,1,1-trichloroethane"). Because of its high volume, methyl chloroform has contributed more to current ozone depletion than *six of the eight CFCs and halons taken together.* The Montreal Protocol slates methyl chloroform for elimination by 2005 (2015 in developing countries). Under the Clean Air Act, however, the phase-out deadline in the U.S. is 2002.

What you can do: CONSUMER ACTION

There are several things that individual consumers can do to protect the ozone layer. Back in the 1970s, long before the government banned most CFC aerosol sprays, consumers simply stopped buying them when they learned about the damage those aerosols caused to the ozone layer. Here are things that consumers can do today:

Leaky auto air conditioners are now the single largest source of CFC emissions to the atmosphere in the United States.

- When your car air conditioner breaks, don't just refill it. Get it fixed properly. Don't buy CFC refills that are sold in 14-ounce cans at auto supply stores. If you don't fix the air conditioner's leak, the CFCs you put in it today will head toward the stratosphere next week.
- Find a repair shop with equipment that recycles CFCs. A broken auto air conditioner still holds most of its CFC charge. Most repair shops let it loose into the air and refill the unit with new CFCs. But inexpensive machines are now available to capture, clean, and recycle the used CFCs. Beginning in 1992, all repair shops will have to have such equipment, under terms of the new Clean Air Act.
- Don't have unnecessary service done on your car's air conditioner. The CFCs inside will only be released into the air. Wait until the air conditioner breaks, and then have it fixed at a repair shop that will recycle the CFCs.

Some foam plastic packaging materials are made with CFCs or other ozone-depleting chemicals.

- Avoid foam packaging. Not only does some of it contain ozone-depleting chemicals, but it's also a solid waste problem, since only a tiny fraction of it is recycled.

Foam plastic building insulation is made with CFCs that eventually leak into the air. Energy-efficient foams made with other blowing agents are still several years away.

- Consider using fiberglass, cellulose, or other materials. These other materials often must be thicker to get the same insulation value. But if you have the space, you can use them without losing energy efficiency.

Halon fire extinguishers are being marketed for home and auto use. Their ozone-depleting contents eventually leak into the air even if you never have a fire.

- Don't buy halon fire extinguishers for ordinary home or auto use. Traditional types of fire extinguishers will do the job. Methyl chloroform (called "1,1,1-trichloroethane" on most labels) is contained in hundreds of consumer products, including bug sprays, fabric protectors, waterproofings, cleaners and spot removers, shoe care sprays, and other aerosols and liquid products.
- Read the contents of these products, and don't buy the ones that contain 1,1,1-trichloroethane.

Some CFC aerosols are still on the market, even though EPA banned "non-essential" uses of CFCs as aerosol propellant in 1978.

- Check the contents of aerosols such as photographers' dust removers; boat horns; and cleaning sprays for sewing machines, VCRs, and electronic equipment. Although many have switched to HCFCs. using these chemicals in aerosols still destroys the ozone layer. Look for alternative products that don't contain *any* ozone-depleters. Better still, avoid aerosols whenever possible; even those that don't use ozone-depleting chemicals contain other chemicals that contribute to smog.

Unfortunately, with many products consumers don't have much choice right now. You can't buy a refrigerator without CFCs in it yet, for example. But more products made with safe alternatives will be coming on the market over the next few years.

Cover: A 1991 NASA satellite computer image showing the most serious ozone depletion ever recorded. The area within the blue line is the ozone hole.

Hydrochlorofluorocarbons: HCFCs are "second generation" relatives of CFCs, with 2 to 15% of their ozone-destroying power. While HCFCs are widely viewed as interim substitutes for some CFC uses for which better alternatives are not yet available, they too must eventually be eliminated if the ozone layer is to be healed. The Montreal Protocol, as amended in 1990, contains only a non-binding resolution to eliminate them, and not until the middle of the next century. In the U.S., the Clean Air Act begins a phase-out of HCFCs in 2015, with a final deadline of 2030. That's still too long a time.

Nitrous oxide: Known to dental patients as "laughing gas," nitrous oxide levels in the atmosphere are rising quickly. As much as 10% of the annual increase in nitrous oxide levels is coming from *nylon manufacturing* plants, which release an estimated 1.5 billion pounds worldwide each year. Dupont, the world's largest nylon maker, has promised to "virtually eliminate" nitrous oxide emissions within five years. But there are no limits on nitrous oxide emissions in either the Montreal Protocol or the U.S. Clean Air Act.

Methyl bromide: The latest scientific assessment identified a potent but previously overlooked ozone-depleter. Methyl bromide is produced industrially as a pesticide. It is highly toxic and possibly cancer-causing. There are no controls on its emission under the Montreal Protocol or the Clean Air Act.

Jets and rockets: Seeking to explain higher-than-expected ozone losses, especially over the northern mid-latitudes, some scientists are looking at emissions of sulfur oxides and nitrogen oxides into the upper atmosphere by jet aircraft. Nitrogen oxides are ozone depleters. Sulfur compounds may catalyze faster ozone depletion by chlorine from CFCs. Possible control measures include removing sulfur from jet fuel and changing jet engine designs.

There is also strong reason for concern about proposals to build a new generation of commercial supersonic aircraft. A fleet of new SSTs would fly higher than today's planes, injecting large amounts of ozone-destroying nitrogen oxides directly into the stratosphere.

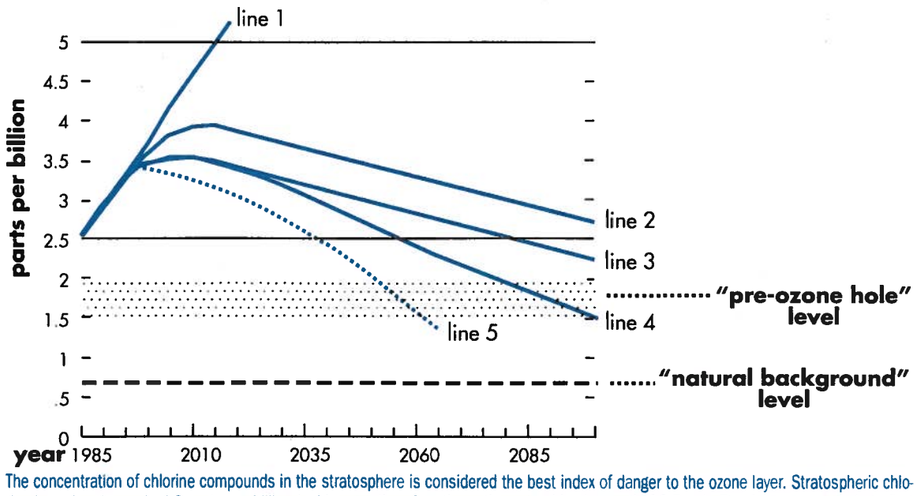
Concerns have also been expressed about chlorine emissions from the exhaust of the space shuttle and other rockets, which fly through the ozone layer on their way to outer space. The Montreal Protocol requires an international scientific assessment of the risk from aircraft, rockets, and shuttles, which should be completed by the end of 1991.

The greenhouse connection

To make matters worse, CFCs and many other ozone-depleting chemicals are also contributors to the "greenhouse effect." Man-made pollutants are trapping heat from the earth's surface, making the global temperature rise. The decade of the 1980s included six of the ten hottest years since record-keeping began a century ago.

While carbon dioxide from fossil fuels is the single most significant greenhouse gas, CFCs are also important players. Scientists have previously attributed up to 10 to 20% of the greenhouse effect to CFCs and other ozone-depleting gases, although the latest science assessment suggests that ozone depletion caused by CFCs has had a partially offsetting cooling effect. Phasing these chemicals out is imperative not only to preserve the ozone layer, but to stabilize the earth's climate as well.

Ozone eaters
CHLORINE IN THE STRATOSPHERE—1985-2100



The concentration of chlorine compounds in the stratosphere is considered the best index of danger to the ozone layer. Stratospheric chlorine has already reached 3 parts per billion (ppb), more than four times the natural background of 0.7 ppb. The Antarctic ozone hole first appeared when chlorine levels reached 1.5 to 2 ppb. If the Montreal Protocol had not been strengthened in 1990, chlorine levels would have reached 12 ppb by 2100 (line 1). Chlorine levels would be reduced by phasing out CFCs and carbon tetrachloride (line 2) and methyl chloroform (line 3), but not enough to reach "pre-ozone hole" levels before 2100. Phasing out HCFCs in two stages, as the 1990 Clean Air Act will do in the U.S., achieves "pre-ozone hole" levels by about 2075 (line 4). Needed in 1992—a faster phase-out of all these chemicals (line 5). [Bromine from halons, nitrous oxide are not shown.]

Source: Adapted from U.S. EPA

Can the ozone layer be saved?

It is now beyond question that the 1990 amendments to the Montreal Protocol do not go far enough to protect the ozone layer. The concentration of chlorine in the stratosphere, now considered the best index of danger to the ozone layer, is already four times the natural background level. Even if all countries observe the Protocol as amended in 1990, chlorine concentrations—and ozone depletion—will continue to grow for at least another 15 years, before beginning to fall slowly. The Antarctic ozone hole will not disappear until 2060, at the earliest. There will be severe effects on health and the environment.

To stop damage to the ozone layer we need to accelerate the Protocol's timetables for phasing out the "first generation" of ozone-depleting chemicals (CFCs, halons, carbon tetrachloride, and methyl chloroform) in both industrial and developing countries. We also need restrictions on the HCFCs, especially those with longer lifetimes. HCFC-22, the only one already produced in large amounts, must be rapidly eliminated. Other longer-lifetime chemicals (e.g., HCFC-141b) must be prevented from coming into heavy use. Even the short-lifetime HCFCs must have a global phase-out schedule so that better replacements will be developed. A firm deadline must also be set for eliminating industrial emissions of nitrous oxide, and for curbing aircraft and rocket emissions if concerns about them persist.

If all these steps are taken, the worst damage to the ozone layer could be avoided. Most of the skin cancers, other illnesses, and environmental effects now forecasted could be prevented.

Citizen action to stop ozone depletion

All of us can take credit for the victories won so far in the fight to save the ozone layer. Citizen action—through NRDC and other environmental organizations—has forced governments and corporations to respond. In 1986, NRDC itself was first to propose a total global phase-out of ozone-depleting chemicals. NRDC played a key role in persuading the Reagan and Bush Administrations and the Congress to accept phase-out schedules both in the Montreal Protocol and the U.S. Clean Air Act, and to contribute to a $240 million fund to help developing nations eliminate their use of these chemicals.

But much remains for all of us to do, as citizens and consumers. We can work for stronger laws and regulations to accelerate the elimination of these chemicals at the local, national, and international levels. We can put direct pressure on industries to stop using ozone-depleting chemicals quickly, without waiting for new laws. And we can be smarter consumers, avoiding these chemicals where possible.

Emergency action for a faster phase-out

NRDC has filed an emergency petition with the EPA to cut the current phase-out schedule for all ozone-depleting chemicals in half or less. We're seeking action under the Clean Air Act to—

- stop production of CFCs by January 1, 1995;
- stop production of halons and carbon tetrachloride *immediately*, and production of methyl chloroform and methyl bromide by January 1, 1993; and
- phase out the use of HCFC-22 and other long-lived HCFCs in newly manufactured products by 2000, with an end to all production of those chemicals by 2005.

EPA must grant or deny our petition by June 1, 1992. Copies of the petition (prepared together with Friends of the Earth and the Environmental Defense Fund) are available for $10 each from NRDC's New York office.

Around the world...

On the international front, diplomatic negotiations are planned to strengthen the Montreal Protocol yet again in 1992. Goals for a new agreement should include:

- *A faster phase-out of CFCs, halons, carbon tetrachloride, and methyl chloroform in industrial countries.* Most ozone-depleting chemicals are made and used in the industrial world. The leading industrial countries have set deadlines well before the turn of the century. Germany intends to stop CFC production in 1994. Sweden and Norway are close behind, with CFC use reductions of at least 95% required by 1995. The entire 12-nation European Community will complete their phase-out in 1995 or earlier. The U.S. and other industrial nations must be required to match these timetables.
- *A faster timetable and more assistance for developing countries.* The ozone layer is so badly wounded that even the fraction of these chemicals used in developing countries is causing serious harm. Every developing country—especially India and China—must agree to the phase-out. The current treaty allows these nations 10 extra years to comply. It also provides funding—$240 million for the first three years—

to help developing countries pay for phase-out measures. Many developing countries—especially those that export electronics, air conditioners or other products—are anxious for competitive reasons to end their use of these chemicals.

Mexico, in fact, recently announced the goal, with assistance from the international fund, of phasing out CFCs by 2000, the schedule that now applies to industrial nations. The 1992 amendments should increase the funding available to assist developing countries, while also accelerating their phase-out deadlines.

• *Tight curbs on troublesome substitutes.* Early phase-out deadlines must be set for longer-lifetime substitutes such as HCFC-22, and production of all other HCFCs must be eliminated in turn. Germany has already adopted a ban on using HCFC-22 in new products starting in 2000. Deadlines must be set for replacing all ozone-depleting chemicals with alternatives that are safe for human health and do not contribute to global warming.

• *Protection from other threats to the ozone layer.* The treaty must be amended to curb all industrial sources of methyl bromide and nitrous oxide. Development of new supersonic transports should be dropped and other aviation sources of ozone-depleting chemicals may also have to be limited.

...here at home...

Here in the U.S., the EPA is charged with implementing the new Clean Air Act's ozone protection provisions. President Bush announced in January 1992 that EPA will move up the current phase-out deadline for CFCs and some other chemicals to the end of 1995. But that is not fast enough. Given the EPA's own findings about the increased severity of ozone depletion, the Agency has a legal duty under the Clean Air Act to speed up the phase-out of ozone-depleting chemicals in the face of new scientific evidence.

The EPA can do that in a number of ways:

• Follow the German schedule for phasing out halons, CFC-113, and methyl chloroform *immediately,* and the remaining CFCs no later than January 1, 1995.

• Issue stringent regulations for the recycling of CFCs from automobile air conditioners, refrigerators, and air conditioning equipment in commercial, industrial, and residential applications. Under the Clean Air Act, mandatory recycling during service of auto air conditioners starts in January 1992, and recycling during service and disposal of other kinds of refrigerators and air conditioners is required starting in mid-1992.

• Prohibit "non-essential uses" of ozone depleting chemicals in electronics and all other processes where alternatives exist.

What you can do: WRITE YOUR ELECTED LEADERS

Demand action from President Bush.

With strong leadership from the President of the United States, the fight to save the ozone layer could be greatly accelerated. As the EPA moves toward implementation of the Clean Air Act, and as negotiations proceed to strengthen the Montreal Protocol again in 1992, the Bush Administration must be pressed to support the strongest possible action.

Write President Bush.

• Urge him to support an ozone protection treaty that will accelerate the phase-out of CFCs, halons, carbon tetrachloride, and methyl chloroform by 1995. Tell him to support strong restrictions on HCFCs, especially the longer-lifetime ones. Urge him to support expanded funding of developing country phase-out programs.

• Urge him to support the accelerated phase-out schedule under the Clean Air Act requested in NRDC's petition described on page 5.

Write the President at:

1600 Pennsylvania Ave., NW
Washington, D.C. 20500

Write to your Senators and Representatives.

Demand the strongest possible enforcement of the new Clean Air Act, to stop ozone-depleting emissions in the U.S. in advance of treaty requirements.

• Urge their support for strong implementation of the Clean Air Act and a higher tax on ozone-depleting chemicals.

• Urge the termination of programs to develop the high speed commercial transport (HSCT) and the national aerospace plane (NASP), whose fuel emissions will pump ozone-depleting oxides directly into the ozone layer itself.

Here are the addresses:

Sen. ____
U.S. Senate
Washington, D.C. 20510

Rep. ____
U.S. House of Representatives
Washington, D.C. 20515

Write your state and local leaders.

State and local legislation can help end the use of the chemicals that deplete the ozone layer. Bills are pending in many states and cities.

• Aggressively and quickly enforce requirements to reduce existing use of ozone-depleting chemicals to the "lowest achievable emission rates."

• Use its authority to assure the safety of alternative chemicals to restrict the use of HCFCs and other second-generation ozone-depleters. Germany is eliminating use of HCFC-22 in new products by 2000.

Congress can take further action too. Congress has *already* taken two positive steps towards protecting the ozone layer: placing a stiff tax on ozone-depleting chemicals and passing the Clean Air Act.

In 1989, NRDC and other environmental organizations won passage of a tax on CFC and halon production. The tax took effect in 1990 at $1.37 per pound and will escalate each year. In 1990, Congress expanded the tax to cover carbon

What you can do: PUT PRESSURE ON THE OZONE-DEPLETING INDUSTRY

Just over a dozen major companies manufacture ozone-depleting chemicals in the United States. Write them. Tell them you want an end to CFCs, halons, carbon tetrachloride, and methyl chloroform as soon as possible. If Germany can eliminate them by 1995, so can the United States.

The producers and their chief executives are:

Mr. Conrad Kent, President
Akzo Chemicals, Inc.
300 South Riverside Plaza
Chicago, IL 60606
(carbon tetrachloride)

Mr. Edward L. Hennessey, President
Allied-Signal, Inc.
P.O. Box 1057
Morristown, NJ 07960
(CFCs)

Mr. Seymour S. Preston, III, President
Atochem North America, Inc.
Three Parkway
Philadelphia, PA 19102
(CFCs)

Mr. Frank Popoff, Chief Executive Officer
Dow Chemical Company
2030 Williard Dow Center
Midland, MI 48686-0994
(methyl chloroform, carbon tetrachloride)

Mr. Edgar S. Woolard, Jr., President
E.I. du Pont de Nemours & Co., Inc.
1007 Market Street
Wilmington, DE 19898
(CFCs, halons)

Mr. Emerson Kampen, President
Great Lakes Chemical Corporation
P.O. Box 2200
West Lafayette, IN 47906
(halons)

Mr. Bernard Lochtenberg, Chairman
ICI Americas, Inc.
Rollings Building, 10th Floor
Wilmington, DE 19897
(halons)

Mr. Robert Jeansonne, President
LaRoche Chemical, Inc.
P.O. Box 1031
Baton Rouge, LA 70821
(CFCs)

Mr. Christian Hansen, President
LCP Chemicals and Plastics
Raritan Plaza II, Raritan Center
Edison, NJ 08837
(carbon tetrachloride)

Mr. Roger Hirl, President
Occidental Chemical Corp.
P.O. Box 809050
Dallas, TX 75380
(carbon tetrachloride)

Mr. V.A. Sarni, Chairman
PPG Industries, Inc.
One PPG Place
Pittsburgh, PA 15272
(methyl chloroform)

Mr. Edward Kuder, Executive Vice President
Racon, Inc.
c/o Atochem North America, Inc.
P.O. Box 607
Glen Rock, NJ 07452
(CFCs)

Mr. Michael Ferris, Division President
Vulcan Chemicals
One Metroplex Drive
Birmingham, AL 35209
(methyl chloroform, carbon tetrachloride)

The many industries that use these chemicals also share the responsibility for phasing them out. The chemicals are contained in, or used in the manufacture of, a wide variety of products: refrigerators and air conditioners, automobiles, computers and electronics, foam insulation and packaging, fire extinguishers, waterproofing and cleaning products, bug sprays, and many others.

• Write these trade associations and urge them to support the phase-out of chemicals that deplete the ozone layer by 1995.

Mr. Peter Likes, President
Alliance for Responsible CFC Policy
1901 Fort Myer Drive
Rosslyn, VA 22209

Dr. Paul Cammer, President
Halogenated Solvents Industry Association
1225 19th St., NW, Suite #300
Washington, DC 20036

tetrachloride and methyl chloroform as well. By making these chemicals more expensive, the tax is encouraging user companies to cut their consumption and switch more rapidly to safer alternatives. The tax also prevents the producers of these chemicals from extracting multi-billion dollar windfall profits as prices rise to reflect diminishing supply during the phase-out.

Congress should now increase the tax on CFCs and halons, and extend it to HCFCs, which are not now taxed.

Congress can also head-off the new ozone threat posed by supersonic transport planes. It

NRDC's "stratospheric distress card"

Carry this card in your wallet or purse. Use it to check labels at the store to know which products to avoid.

CFC-11 ..... Trichlorofluoromethane
CFC-12 ..... Dichlorodifluoromethane
CFC-113 ..... Trichlorotrifluoroethane
CFC-114 ..... Dichlorotetrafluoroethane
CFC-115 ..... (Mono)chloropentafluoroethane
Halon-1211 ..... Bromochlorodifluoromethane
Halon-1301 ..... Bromotrifluoromethane
Halon-2402 ..... Dibromotetrafluoroethane
Methyl chloroform 1,1,1-trichloroethane
Carbon tetrachloride
Methyl bromide
HCFC-22 ..... Chlorodifluoromethane
(Other HCFCs are not yet in wide use.)

can terminate development of the high speed commercial transport (HSCT) and the national aerospace plane (NASP).

. . . and in our own backyards

Many state and local governments have taken the initiative to curb ozone-depleting chemicals.

- At least thirteen states (e.g., Colorado, Connecticut, Hawaii, Illinois, Iowa, Maine, Missouri, Montana, New Jersey, New York, Oregon, Rhode Island, and Vermont) and several cities (e.g., Irvine, CA; Newark, NJ) have enacted laws that include one or more of the following measures: recycling of CFCs from car air conditioners and other refrigeration equipment, banning of foam food packaging made with CFCs, or registration of major CFC sales. New bills are pending in many state legislatures.

How is industry responding?

For almost 15 years after the threat to the ozone layer was discovered in 1974, the producers and users of CFCs and other ozone-depleting chemicals denied responsibility, insisting on concrete proof of harm to the ozone layer. In 1980, DuPont (the largest CFC producer) even stopped work on developing substitute chemicals, picking it up again in earnest only after the Antarctic ozone hole burst upon the public consciousness in 1986.

But finally the industry concluded it could no longer avoid the new scientific realities. In 1988 CFC producers acquiesced in the need for a total phase-out. They now express support for the amended Montreal Protocol, with the phase-out deadline of 2000. The producers of methyl chloroform have taken longer to come around—only after NRDC and other environmentalists persuaded Congress to phase-out this chemical by 2002.

Many users of these chemicals, however, are not content to wait that long. A growing number of companies have committed to eliminate CFC use in the early and mid-1990s. Some of the most notable phase-out commitments are in the electronics field: Northern Telecom was the first to complete its phase-out, in 1991. Other leaders include Motorola, Digital, IBM, and AT&T. Many leading firms making refrigeration and air conditioning equipment and insulating foams are also planning to phase out by the mid-1990s. 3M has promised to eliminate methyl chloroform (called 1,1,1-trichloroethane on product labels) from its consumer products by the end of 1992. Dupont recently announced that it will stop making CFCs in 1997—an improvement but not good enough.

The fact is that substitutes exist, or can be found, for all uses of ozone-depleting chemicals. All producers and users of these chemicals must act now for their earliest possible elimination.

Keeping the pressure on

The progress reported here must not be overstated. There is still much that must be done if we are to stop the deterioration of the ozone layer and allow it to recover.

The CFCs and other ozone-depleting chemicals released into the stratosphere during the next 10-15 years will continue to destroy the ozone layer for almost another century. The world is committed to at least 100 years of ozone depletion; to millions of cases of skin cancer and other disease; to untold damage to the environment and the earth's climate. But the depletion and the damage will be even worse unless we act now to accelerate the phase-out. Industry and government have waited far too long to end the use of these chemicals. It's up to us to keep up the pressure.

David Doniger, Director
Ozone Layer Protection Project
NRDC, 40 West 20th St., New York, NY 10011