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OA/ID Number: 2613
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Folder Title:
Back-up Information: Ozone Depletion, CFCs [Cholorfluorocarbons], Halons

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OFFICE OF ENVIRONMENTAL POLICY
KATIE MCGINTY

11 BOXES OF FILES RECEIVED IN ORM 72 FROM 360 OEOB ON JUNE 16, 1994

BOX 1 - RELIGIOUS LEADERS AND THE ENVIRONMENT; THEOLOGY AND ENVIRONMENT-SUMMIT MEETING MATERIALS; RUDY DORNBUSCH; BOB RUBIN; NED POTTER; IRA MAGAZINER; E.O. WILSON; LARRY SUMMERS; JIM SPOTILA; SCHEDULING PROPOSALS - JOHN SHAFER; MISCELLANEOUS; MAKING THE ENVIRONMENT COUNT 9-16-91; MISSION TO PLANET EARTH; MITCHELL RESOLUTION; NAS-HRNG GENERAL INFO; NATIONAL ACADEMY STUDY; NATIONAL GLOBAL RESEARCH ACT; SPEECHES - OVERSIZE ATTACHMENT # 2610

BOX 2- NUCLEAR ENVIRONMENTAL DEGRADATION IN TIBET; TREY - PHONE LISTS; OCTOBER CHRON 1992; FEBRUARY 1994 BACKUP; FEBRUARY 1 - 7 (94); APRIL 93 REGRETS; MARCH 93 REGRETS; FEB 93 REGRETS; JUNE 93 REGRETS; JULY 93 REGRETS - OVERSIZE ATTACHMENTS # 2611

BOX 3- WHALING; UN (CLIMATE); TONGASS NATIONAL FOREST; TIMBER; POPULATION; TRANSITION PAPERS; NACE-OSTP; OMB LANGUAGE ON NEPA 2-23-93; CEQ BIODIVERSITY CONSIDERATIONS UNDER NEPA; NEPA; FOREST NEWSCLIPS; FOREST CONFERENCE V; FORESTS; FOREST CONFERENCE III - OVERSIZE ATTACHMENTS # 2612

BOX 4 - BACK-UP INFO: OZONE DEPLETION, CFCS, HALONS; OZONE HEARINGS 11-15-91; OZONE DEPLETION HEARING WRITTEN TESTIMONY 11-15-91; OZONE DEPLETION HEARING TRANSCRIPT (PART 1); (PART 2); OZONE DEPLETION HEARING 11-15-91-UN ENVIRONMENT PROGRAMME; OZONE DEPLETION HEARING 11-15-91 AL'S (GORE) OPENING STATEMENT; AL'S STATEMENTS AND PRESS RELEASES; CFC BILL'S SUMMARIES; OZONE PHASEOUT SCHEDULES; OZONE HEARING - DONIGER 4-16-94; FULL OZONE HEARINGS TESTIMONY; OZONE HEARING 4-16-91; 1989 AL (GORE) OZONE BILLS MONTREAL PROTOCOL; OZONE AND PHYTOPLANKTON; 3-16-91 OZONE HEARING ROWLAND; OZONE 1989 SCIENTIFIC ASSESSMENT; OZONE II / LETTER TO PRES; CFC ALTERNATIVES; OZONE LETTER - ENVIRONMENT COMMITTEE; OZONE VOLCANIC ERUPTIONS; ERIC STOLARSKI - OZONE; OZONE HEARING- GENERAL INFO 4-16; 3/16 OZONE HEARING ALBRITTON; 3/16 OZONE HEARING - INDUSTRY; OZONE TRENDS PPANEL; GE AGREEMENT LETTER; 3/16 OZONE HEARING - STOLARSKI / WATSON; OZONE FUND / SENSE OF SENATE; TECUMSEH CORP; CFC PHASE OUT PRESS; AHAM / EPA / DOE CFC CONSORTIUM; EPW - OZONE BILL - MARKUP 7-12-89; HEARING - CFCS STR. OZONE 2-23-89; EPW 03/CFC HEARING 5-19-89; OZONE PRESS RELEASES 4-29-92; THATCHER / LONDON 03 CONFERENCE; NIGHTLINE / CFC BACKGROUND; 3 NASA PUBLICATIONS OZONE HEARING - KATIE'S NOTES; JIM ANDERSON OZONE - BOX 4 FILED OVERSIZE ATTACHMENT # 2613

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Part 1

~~██████████~~ TO TITLE VII - OZONE DEPLETING CHEMICALS

An amendment to phaseout HCFC's

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On page 532, line 4, strike "Feasibility Report On"

On page 532, lines 5 through 11, strike "Not later than January 1, 1995, the Administrator shall submit a report to the Congress that includes recommendations concerning the development of a legislative or administrative regulatory program which provides that, except as provided in paragraph (1) of this subsection or in regulations promulgated to establish earlier" and insert: "In the absence of regulations promulgated in accordance with subsection (b) of section 504 establishing earlier dates"

On page 532, line 5 through 11, strike the text beginning with "Not later than" through "earlier --" and insert in lieu thereof "Except as provided in paragraph (1) of this subsection or in regulations promulgated to establish earlier dates --".

1954

and the economic feasibility
of such action
being determined by the

PART #3 TO TITLE VII - OZONE DEPLETING CHEMICALS

An amendment to prohibit export of CFC equipment and technology and investment in facilities capable of producing CFC's in any nation not in compliance with the Montreal Protocol.

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On page 544, line 6, ^{and 7)} strike "Within one year after enactment of this section" and insert "~~Effective ~~II~~~~ immediately upon enactment of this ~~Act~~"

(Section 1.1)

PART **4** TO TITLE VII - OZONE DEPLETING CHEMICALS

An amendment to strike provisions in the Clean Air Act preempting states' efforts to control ozone depleting chemicals:

On page 557 line 10, strike "except as otherwise provided in subsection (c)".

On page 557, strike lines 11 through 25.

On page 558, strike lines 1 through 6.

Stratospheric Ozone Depletion

David E. Gushee and John R. Justus

Recent evidence confirming that certain chemicals threaten the earth's atmosphere indicates a greater threat than originally thought. There is pressure for a phase-out rather than a phase-down of CFCs, but the availability of adequate substitutes is uncertain.

Ever since the mid-1970s, scientists have been warning that chlorofluorocarbons (CFCs) and brominated hydrocarbons used as fire-fighting agents (halons) may deplete the stratospheric ozone shield that regulates the amount of the sun's ultraviolet rays reaching the earth's surface. Depleted ozone concentrations would mean increased ultraviolet radiation at the surface, which could result in a major increase in skin cancers, suppression of the immune systems in some people, and decreased productivity of terrestrial and aquatic organisms, including some commercially important crops and some essential links in the environment's food chain.

Recent scientific evidence resulting from research on the ozone hole above Antarctica has strengthened the scientists' case. Measurements from airplanes flying through the ozone hole, corroborated by ground-based and satellite remote sensing, have demonstrated the role of chlorine compounds in scavenging ozone in the polar atmosphere when sunlight returns in the Antarctic spring season. Other measurements taken in the Arctic show the same chemistry at work; however, Arctic ozone is not as heavily depleted as that over the Antarctic because conditions over the poles differ. In the Arctic the cloud formations conducive to ozone depletion (polar stratospheric clouds) are not as common; also, meteorological and geographic conditions do not favor the formation and maintenance of a tight, closed, circumpolar vortex such as the one characteristic of the Antarctic atmospheric circulation in winter and spring.

Still other measurements have detected declines in ozone concentrations throughout the stratosphere in the temperate zones.

The Montreal Protocol

As this scientific evidence has accumulated, political leaders have created, through multilateral negotiations under United Nations auspices, an international treaty to stop growth in CFC and halon use around the world. The agreement, called the Montreal Protocol on Substances that Deplete the Ozone Layer, went into effect on January 1, 1989. It will cap 1990 production of CFCs at 1986 levels and reduce production by 20 percent by 1993 and by 50 percent by 1999. Halon production would be capped but not reduced.

When the Protocol was consummated in 1987, it was viewed as a stunning achievement, bringing together four dozen countries that accepted a mandate to reshape a major industrial sector. Now, less than two years later, these same signatories appear to be preparing to go even further in response to the most recent data.

CFCs are also "greenhouse gases." Pound for pound, they are about 10,000 times more potent than carbon dioxide in their ability to trap heat and prevent it from reradiating back into space. Scientists estimate that, in the absence of the Protocol's phase-down, over the next 50 years the impact of CFCs on the global heat balance would increase to about 40 percent that of CO₂ itself. Even with the Protocol-driven reduction in usage, CFC concentrations in the stratosphere will continue to increase and their impact on the heat balance will remain large.

Spurred by the increasing evidence of ozone depletion throughout the stratosphere plus the recent heightened awareness of the possible imminence of global warming, political leaders in much of the industrialized world are calling for an acceleration of the phase-down schedule in the Protocol and, if possible, for the complete phase-out of CFCs by the end of the century. This interest, expressed

David E. Gushee is a CRS senior specialist in environmental policy; John R. Justus is a specialist in earth and ocean sciences with the CRS Science Policy Research Division.

in part through international meetings in Canada and Europe, crystallized in May 1989 in Helsinki, Finland, when the parties to the Protocol, at their first official meeting since the treaty went into effect, activated the treaty's mechanism for accelerating the phase-down. A formal vote on a new phase-down schedule will be taken in April 1990.

Phasing out CFCs and halons implies that substitute chemicals and technologies be available. Halons are uniquely effective fire-fighting agents. They act rapidly, are nontoxic, and do no damage to equipment and buildings when they are used. CFCs are widely used as refrigerants, solvents, foam blowing agents, and (outside the United States) as propellants for aerosols. About one million tons per year are used. They are inexpensive, nontoxic, and have physical properties well suited to their uses. Air conditioners and refrigerators are designed specifically to take advantage of their properties. In foamed insulation, the CFCs themselves not only make foamed products of consistent structure, but when trapped in the foam bubbles they also are the best insulators available.

The Search for Substitutes

Research and development on substitutes is proceeding rapidly. The world's major CFC producers have all stated their commitment to making substitutes available as soon as possible and to phasing out the CFCs rapidly thereafter. At this stage of development, most candidate substitutes would cost two to four times as much as the CFCs they replace and do not work as well in existing equipment. Further, they must be screened for their environmental, health, and safety characteristics and

for their performance in the uses for which they are being developed. The environment, health, and safety screening tests take up to five years, about two of which have already been used for the candidates selected when the Protocol's creation became certain.

Although the CFC producers have carried out a large number of use tests on the substitutes, the CFC-using industries have been somewhat slower to start full-scale testing and equipment redesign. There are two reasons: the amounts of substitutes available for testing are limited because the producers have only pilot plant quantities available; and the users are reluctant to commit fully to candidates before they successfully pass the environmental, health, and safety screening tests.

The search for substitutes for halons is not proceeding as rapidly; halons are uniquely effective products, the equipment they protect is critical for many military, communications, and health activities, and releases are limited to testing and actual fire-fighting. Initially halon-using industries are reducing emissions by changing their test methods to use simulations or chemicals that behave similarly except for their fire-fighting properties.

Calls for accelerated phase-out of CFCs assume that the candidate substitutes will successfully pass the environment, health, and safety screening tests and that they will perform adequately in the marketplace. Should these assumptions be proven wrong, political leaders will face tough decisions: shut down significant parts of modern society's infrastructure or accept a more moderate pace of substitution and the attendant injurious increase of CFCs in the stratosphere. ■

The Global Environment: CRS Audio Briefs and Programs on Channel 6

The global environment. A discussion with a wide range of experts on problems and solutions to various global concerns, such as natural resources issues in Third World countries and global warming in developed countries. 35 minutes.

► **Audio Brief 50063**

Acid rain: scientific progress and outlook. Representatives from the National Acid Precipitation Assessment Program review initial findings of their research on effects of acid rain on water and land resources. Also included is research on emissions surveys, atmospheric processes, and control technologies. 90 minutes.

► **Audio Brief 50128**

Global climate change. A panel of CRS experts looks at a range of alternatives for coping with possible global climate changes including fuels conservation, renewable energy, forestation, and the nuclear power option. 51 minutes. (On September 4, 6, and 8, at 12:00 noon and 4:00 p.m., channel 6 of the Congressional Cable TV system will present the same program.)

► **Audio Brief 50189**

To order Audio Briefs, phone the CRS Product Line, 707-7132. For more information on the channel 6 programs, phone 707-7547.

Astronomers home in on the Great Attractor

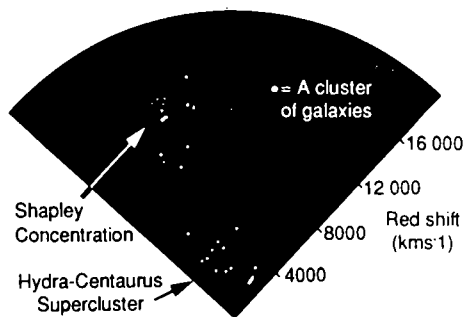
EVERYTHING in our part of the Universe—including our own Milky Way—is being tugged by a huge concentration of matter far out in space. Although astronomers have known this for several years, so far, no one has been able to identify the precise nature of this "Great Attractor". Now an astronomer at the Institute of Astronomy in Cambridge has at least ruled out one candidate.

Somak Raychaudhury has shown that the Great Attractor cannot be associated with a distant concentration of galaxies known as the Shapley Concentration, as some astronomers had suggested. Instead, it must be a much closer concentration of matter, perhaps associated with the Hydra-Centaurus Supercluster, another large collection of galaxies (*Nature*, vol 342, p 251).

Raychaudhury bases his conclusion on a study of about 17 000 galaxies in the direction of the constellation Hydra-Centaurus, where the Great Attractor lies. Astronomers at Cambridge mapped this part of the sky using the Automatic Photographic Measuring Facility. This instrument allows them to digitise the information on photographic plates—in this case, plates from sky survey plates obtained by the UK Schmidt Telescope in Australia—and

then process the information on a fast computer.

The distances to Raychaudhury's galaxies, like all galaxies, are measured in terms of their red shifts—the stretching of the wavelength of their light due to the



Astronomers now believe that the Shapley Concentration cannot be the Great Attractor which is tugging our Galaxy. That leaves the Hydra-Centaurus Supercluster

expansion of the Universe. Astronomers measure these red shifts in kilometres per second, with a red shift of 75 kilometres per second corresponding roughly to a distance of one megaparsec, or about 3.25

million light years.

Raychaudhury's survey shows that there are very few clusters of galaxies between 5000 and 10 000 km/sec in the direction of the Great Attractor, but two great concentrations of galaxies. These are the Shapley Concentration, at an average red shift of 13 620 km/sec, and the Hydra-Centaurus Supercluster, at red shifts below 5000 km/sec. Although the Shapley Concentration contains more than 3000 individual galaxies, this is not sufficient to account for the pull of the Great Attractor across such a vast distance.

Raychaudhury points out also that if the Shapley Concentration was the source of the tug, then galaxies closer to the concentration should be affected more strongly than we are. This is not what he sees. Galaxies beyond a red shift of 4000 km/sec are tugged less strongly than galaxies that are closer to Earth.

He concludes that the Shapley Concentration can be responsible for no more than 10 per cent of the tug towards that part of the sky being felt by the Local Group of galaxies, which includes the Milky Way. The nearer galaxy concentration, he says, therefore, "retains its status as the principal 'Great Attractor' as far as the Local Group is concerned".

Ultraviolet from Sun could reduce photosynthesis in plants

IF MORE ultraviolet radiation reaches the surface of the Earth as a result of the ozone layer getting thinner, it will damage one of the proteins involved in photosynthesis. Autar Mattoo, a scientist at the US Department of Agriculture, says that excessive ultraviolet light "could have an impact on plant efficiency that could eventually affect crop yields worldwide".

The plant protein at risk, known as 32kDA, is one of four proteins involved in a stage of photosynthesis in plants, known as "photo system 2". Under normal light, says Mattoo, plants make the protein continually. They then destroy it during the chemical reactions of photosynthesis.

Mattoo and his colleague, Marvin Edelman of the Weizmann Institute in

Israel, studied 32kDA in duckweed, an aquatic plant. They chose duckweed because they could raise it in pure water. This meant that the plant was not affected by minerals in the soil.

Mattoo and Edelman exposed the plant to light at wavelengths ranging from 280 to 730 nanometres. Visible light spans the range from 450 to 650 nanometres. "We found that the protein was degraded at all the wavelengths we tested," says Mattoo, "but degradation was highest in the ultraviolet range, at about 300 nanometres."

Mattoo and Edelman found that plants exposed to the ultraviolet light for several hours could not make enough 32kDA to replace the protein that was destroyed. As a result, their growth was slowed down.

Mattoo says that if their "model" plant had been a food crop, it would have lost some of its nutritional value.

Mattoo intends to continue the study of 32kDA in the hope of understanding the basic mechanisms by which it is created and destroyed. At the same time, he will study the response of soya beans to ultraviolet stress. "Some cultivated strains of soya beans are resistant to ultraviolet radiation," he says. "Do they prevent degradation of their protein, or do they compensate by producing more? No one knows."

Mattoo believes that if scientists can understand precisely the chemistry of photo system 2, they might be able to transfer ultraviolet resistance to sensitive crops.

Jonathan Beard, New York

► Bob, she could use their individual linear polarisations to transmit a message in binary code, using "horizontal" to mean "zero" and "vertical" to mean "one". Bob could measure the linear polarisation (by passing the photons through a vertical polaroid filter and using a photomultiplier to detect which have passed through) and thus read the message. But this method of communication is insecure. There is nothing to prevent Eve from measuring the polarisations herself and transmitting appropriately polarised photons on to Bob so that the eavesdropping will remain undetected.

Similarly, the circular polarisations of the photons could be used to send insecure messages, by using "left-handed" to mean "zero" and "right-handed" to mean "one". But now suppose that Alice sends a message using these conventions but choosing randomly whether to use the linear or the circular polarisation code. Eve cannot intercept such a message and pass it on un-

changed. Because of the quantum uncertainty principle she cannot measure both the linear and the circular polarisation. And if, for a particular photon, she chooses wrongly and measures the polarisation variable that was not used to encode the message, the bit that was stored in that photon will be irretrievably randomised. This is the effect that makes the QPKD system work.

When Bob receives each photon, he chooses randomly which of its polarisation variable to measure. In this way, he randomises about half the bits. But the other half, provided that they were not measured or tampered with en route, will have the values that they had when transmitted by Alice. When Bob has received a large number of bits, he publicly exchanges information with Alice about some proportion of them. Bob says which variable he measured and Alice tells him, in about half the cases, what result he should have got.

Then they do a statistical test to find out whether there was any eavesdropping. If there was none they compare notes, again publicly, about the remaining photons. The photons for which they happened to choose the same variable contain secret information that cannot be known by any eavesdropper.

The prototype QPKD machine is capable of transmitting its secret keys over a distance of some 50 centimetres. Plans are in hand for an improved model using optical fibres that would have a range of tens or perhaps hundreds of metres. Relay stations cannot be used because they would have to measure the photons, lose quantum coherence, and so be vulnerable to eavesdropping. So it may be some time before quantum cryptographic technology becomes widely useful in real applications.

The lasting significance of QPKD will be for the foundations of computer science. The Turing Machine is no longer a universal model for practical computations.

SCIENCE

Quantum communication thwarts eavesdroppers

RESEARCHERS at IBM's Thomas J. Watson Laboratory in Yorktown Heights, New York, have built a device for sending information between two parties with absolute security from eavesdropping. The device uses a form of coding called "Quantum Public Key Distribution (QPKD), which exploits quantum effects. It cannot be implemented on any existing computer because of the intrinsic limitations of classical (that is, non-quantum) information processing.

The device, built by Charles Bennett and John Smolin at IBM, uses very faint flashes of light to transmit messages over an unprotected communication channel. It allows the sender and receiver to agree on a code without ever meeting in person. If an eavesdropper tries to monitor the signal in transit, the uncertainty principle, an inescapable property of the quantum world, ensures that the signal is disturbed in such a way that the sender and receiver are alerted.

In building the device, which uses the polarisation of photons to encode information, Bennett and Smolin have created the first information processing device with capabilities that exceed those of the Universal Turing Machine. This is a theoretical model proposed by the English mathematician Alan Turing in 1936. All existing computers are, in effect, based on the Turing Machine.

Although both quantum theory and the modern theory of computation are more than 50 years old, it is only recently that scientists have studied in detail the implications of one for the other. Quantum computers should be faster at some tasks and also able to tackle tasks that classical computers cannot.

Building general-purpose quantum computers, however, is far beyond the reach of present technology. The main problem is maintaining "quantum coherence" during the intricate self-interactions of a typical computation. Loosely, a coherent quantum system is one that is "isolated" from the outside world. Coherence is destroyed by any interaction in which the environment, or any variable not participating in the computation, effectively "measures" or acquires any information about the system.

At present, physicists are able to maintain coherence only in very simple systems, such as photons or electrons travelling from a diffraction grating to a detector. Bennett and Smolin have nevertheless managed to use such a system to carry out a new type of computation.

Suppose that Alice and Bob want to exchange messages in such a way that an eavesdropper, Eve, who might be listening, cannot understand what they are saying. If Alice and Bob already have some secret information in common, they can use this as a "key" in a so-called "cryptographic

David Deutsch

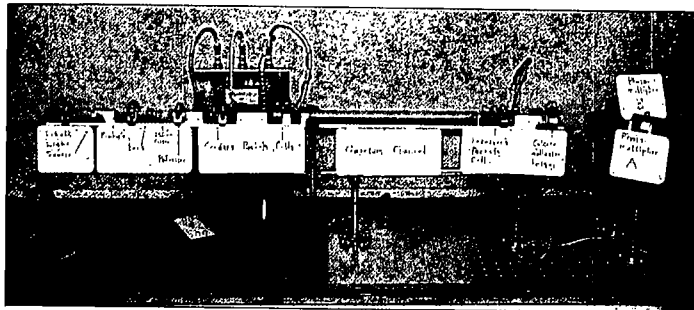
algorithm". This will scramble their messages so that Eve, who may know the algorithm but does not know the key, cannot decipher it in a reasonable time.

The larger the amount of shared secret

to scramble her messages. To unscramble them, one need only undo all these operations. Bob may have a secret quick way of doing this, but that is the only advantage he can possibly have over Eve. Given enough time, Eve will be able to read whatever Bob can in Alice's messages.

Bennett's idea, invented with Gilles Brassard of the University of Montreal, is to use the quantum uncertainty principle to prevent any eavesdropper from reading a message without being detected. The uncertainty principle says that if certain physical variables are prepared or measured precisely, then certain other variables become multi-valued or "fuzzy". In particular, the values that those other variables used to have can become inaccessible to any measurement, however careful.

This applies to the linear polarisation of a photon (whether its polarisation is horizontal or vertical, say) and its circular polarisation (whether it is spinning in a right- or left-handed sense about its direction of travel). It is not difficult to prepare photons in states of pure linear or circular polarisation, but never both simultaneously. It is also possible to measure precisely either the linear or the circular polarisation. But any measurement of the linear polarisation makes the former value of the circular polarisation, whatever it may



Charles Bennett and John Smolin can send information absolutely securely across 50 centimetres. As yet, applications are limited

information that Alice and Bob start with, the harder they can make Eve's task. In fact, if the messages they send are shorter in total than their secret key, they can make eavesdropping impossible. But if they have no shared secret information to begin with, they will not be able to agree on a key without letting Eve know it, too. Can they still communicate securely? This is where "public key" cryptography comes in.

Classical public key cryptography was first proposed in 1976 by Diffie and Hellman, and shortly afterwards Rivest, Shamir and Adelman published the first practical version. Each participant secretly chooses a private key, which is never transmitted to anyone else, and calculates from it a public key.

Using Bob's public key, Alice, or anyone else, can transmit messages which only Bob can easily decipher in normal circumstances. Obviously, the private and public keys are related mathematically, and in principle the "private" key could be deduced from the public one. The trick is to make computing the public key from the private key relatively simple, but the reverse computation prohibitively time-consuming.

No classical public-key cryptographic system has yet been proved to be secure. There is the danger that some ingenious mathematician will come up with a quick way of calculating the function in both directions. Another problem is the increasing speed of computers. A computation that would occupy a present-day computer for a million years might be done in an hour on a home computer in 20 years' time.

Using classical information technology, it is impossible to design a public-key cryptographic system that is not vulnerable to advances in pure mathematics or computer technology.

Eve can simply copy all the messages that Alice and Bob send each other. Then, if Alice and Bob had no secret information in common, Eve can find out just as well as Bob can exactly what operation Alice uses



Alan Turing: his theoretical model is the basis of all computers. Now, for the first time, its capabilities have been exceeded

have been, inaccessible; measuring it will give a random result. Similarly, measuring the circular polarisation randomises any subsequent measurement of the linear.

If Alice sends a stream of photons to ►

11 / Al - Some Deers

An Act to protect the stratospheric ozone layer by eliminating unnecessary emissions of ozone-depleting chemicals.

A. Mobile air-conditioning

1) After January 1, 1991, no business establishment shall perform service on automobile air conditioners, unless such establishment has purchased and uses equipment, which has been approved by Underwriters Laboratory or a similar institution, for recovery and recycling of chlorofluorocarbon (CFC) coolant.

The Department of Environmental Quality Engineering (DEQE) shall establish a phased schedule for the acquisition of such equipment by such establishments. The schedule should provide for early acquisition by high volume establishments and subsequent acquisition by lower volume establishments, providing that all establishments have recycling equipment in place and in use by January 1, 1991.

The DEQE should be given authority to inspect establishments and develop suitable penalties for those which do not comply.

2) After January 1, 1991, no establishment shall sell or offer for sale CFC coolant suitable for use in mobile air conditioners in containers smaller than 15 pounds. The DEQE shall issue regulations providing for a phaseout of CFCs in such containers in the period between enactment and January 1, 1991.

Within three months of the date of enactment, no person shall sell any CFC coolant in containers smaller than 15 pounds unless it bears a warning label indicating the product's danger to ozone in the stratosphere.

B. Halon fire extinguishers.

After July 1, 1989, no person shall sell or offer to sell fire extinguishers for consumer applications which contain halons or other ozone-depleting substances.

C. Unessential ozone-depleting products.

After July 1, 1989 no person shall sell or offer to sell CFC propelled plastic party streamers, CFC noise horns, and CFC cleaning sprays for electronic and photographic equipment. (Specific brands include Masquerade Crazy Strings, Sound Off, and Dust-Off respectively.)

D. Hospital sterilization.

After January 1, 1991, no institution or establishment shall use sterilants containing ozone-depleting chlorofluorocarbons.

F. Additional recycling and recovery

The DEQE should be given the authority to require recovery and recycling of ozone-depleting chemicals from other products as technically feasible.



For release Friday A.M.,
January 27, 1989

Contact: David Doniger
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NRDC SUPPORTS PLAN TO PROTECT OZONE LAYER FROM LEAKY AUTO AIR CONDITIONERS

The Natural Resources Defense Council expressed its support for a program announced today by the automobile service industry to cut the emission of ozone-destroying chlorofluoro-carbons (CFCs) during the service and repair of leaky auto air conditioners. NRDC senior attorney David Doniger called the industry agreement on voluntary standards for CFC recycling, announced in San Diego by the Mobile Air Conditioning Society and the Environmental Protection Agency, "an important first step toward ending the release of ozone-destroying CFCs from the automobile."

"Leaky auto air conditioners are the single largest source of CFC losses to the atmosphere in the United States," Doniger added, citing EPA data showing that auto air conditioning accounts for one fourth of all U.S. emissions of CFCs. "By recycling the CFCs now lost to the environment during normal repair procedures, the auto service industry can cut this source of leakage by more than half almost immediately."

Doniger emphasized that the equipment and procedures unveiled today will not be effective unless they are deployed and used by thousands of service shops across the country. "NRDC looks forward to working with equipment manufacturers, the service industry, and the auto makers on the steps necessary to put this program into practice," he added. Legislators in several states, including California, New York, Maryland, Massachusetts, Wisconsin, and Vermont, are already working on legislation to put this consensus program into effect. In addition, NRDC is pressing the EPA to make CFC recycling in auto air conditioner service a national requirement.

CFC-12 (commonly known as "R-12") is used in automobile air conditioners as the coolant. Auto air conditioners, however, are notoriously leaky. CFC coolant escapes into the atmosphere through leaky fittings and hoses. The average auto air conditioner needs to be repaired and refilled every several years.

But most air conditioners still contain more than half their coolant charge even after they stop working. Currently, service shops simply vent the contents of the air conditioner into the air as the first step in service. Then a second charge of fresh CFCs is used to clean the unit, and it also is vented to the air. Finally, the unit is charged with fresh CFCs as the final repair step.

Equipment is now available to recapture, clean and reuse the coolant remaining in the air conditioners when they are first brought into the shop. The equipment (a self-contained unit about the size of an office file cabinet) costs as little as \$1000-\$2500 and will pay for itself by reducing the need to buy new CFCs.

The program unveiled today establishes an acceptable standard of purity for recycled CFC coolant. The Underwriters Laboratory (UL) will certify equipment that is capable of cleaning up used CFCs to this standard. The Motor Vehicle Manufacturers Association and several individual auto makers have agreed that CFC recycling with UL-certified equipment is consistent with their warranties. They have also agreed to rewrite training and service manuals, relied on by the service industry, to promote these new practices in lieu of current ones.

The task now is to get the new equipment into use. "NRDC urges all of the auto makers, both domestic and foreign, to join in this program. We also urge the auto makers to take the lead by assuring that their dealers are the first to acquire and use the new recycling equipment," Doniger said.

NRDC also called for a ban on the sale of 14-ounce cans of R-12 coolant at auto supply shops and other retail outlets. These cans are used primarily by "do-it-yourselfers" who top off their leaky air conditioners without repairing them. "If you refill the air conditioner yourself without fixing the leak, you're just pouring CFCs into the air," Doniger said. "That's losing money and hurting the ozone layer at the same time."

Mobile Air Conditioning Recycling Equipment Manufacturers
Who Participated in Industry-EPA Activities to
Develop a Recycled Refrigerant Standard

Wayne C. Davison
Van Steenburgh Engineering
Laboratories Inc.
1900 South Quince St., Unit G
Denver, CO 80231

Mr. Carl Gettleman
High Frequency Products
880 N.E. 69th Street
Suite 11N
Miami, FL 33138

Mr. David C.H. Grant
Quadrex
1940 NW 67th Place
Geinsville, FL 32606

Mr. Shelton Taylor
Refrigerant Recovery Systems, Inc.
P.O. Box 360298
Tampa, FL 33673

Mr. Roger Dumais
Regional Sales Manager
ThermaFlo
3640 Main Street
Springfield, MA 01107

Mr. Jeffrey Sachs
Draf Tool Co., Inc.
333 Adams Street
Bedford Hill, NY 10507

Mr. Ken Manz
Robinair Division
Sealed Power Corporation
Robinair Way
Montpelier, OH 43543-0193

John Hancock
White Industries
9210 Castlegate Drive
Indianapolis, IN 46256

Mr. Arthur Hobbs
Murray Corporation
Cockeysville, MD 21030

January 24, 1989

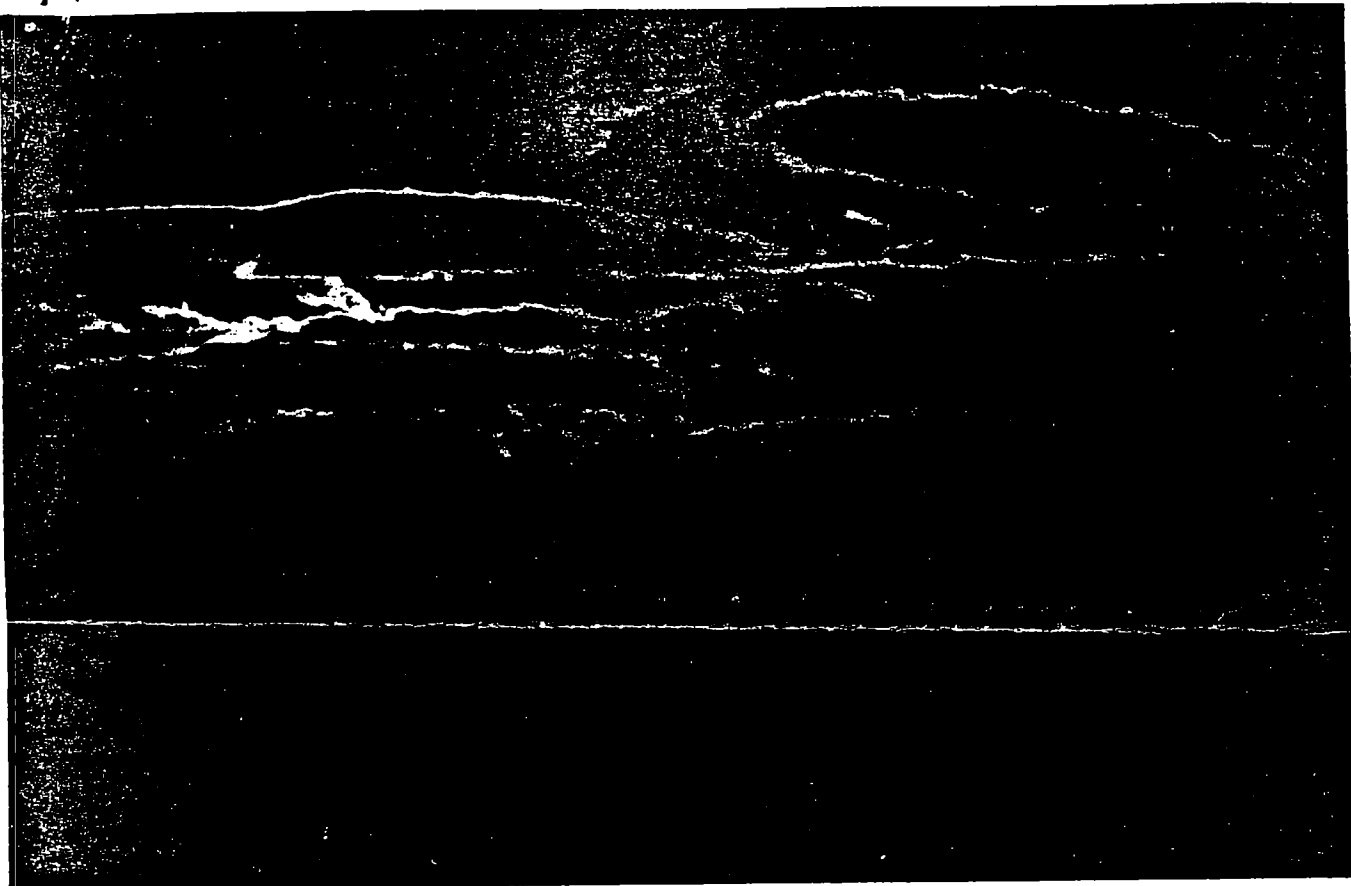
Mr. L.A. Goddard
Applied Ecological Systems
P.O. Box 697
Hazelhurst, GA 31539

James C. Lawless
President
Davco Manufacturing Company
Post Office Box 1299
169 Ridgedale Avenue
Morristown, NJ 07960

Harold J. See
President
Corporate Consultants
209 South Danville
Building C, Box #6
Abilene, TX 79605

Roy McGriff
Custom Auto Air & Sound
5711 Phillips Highway
Jacksonville, FL 32216

January 24, 1989



Service Shops Caught Up in Planetary Threat of Ozone Depletion

The well-known automotive refrigerant R-12 (Freon) is one of a group of CFCs which has been identified as contributing to a serious health threat. A substitute replacement is necessary, but is not yet ready. Meanwhile, we may have to capture and recycle refrigerant now used in A/C systems in cars and trucks.

By STAN STEPHENSON,
Editor-in-Chief

IT HAS BEEN 22 years since the start of ground-based monitoring of the upper atmosphere. And eight years since the start of ongoing Earth-orbiting satellite study. The evidence is now believed to be overwhelming. Planet Earth's protective O₃ (ozone) shield in the stratosphere is being eaten away

by chlorine and bromine atoms which have risen to stratospheric levels. These damaging atoms are the breakdown result of random and excessive release to the air of CFCs (chloro-fluoro-carbons) from an identified group of man-made chemicals such as Freon (source of chlorine) and Halon (source of chlorine & bromine) used in a variety of industrial applications.

Public Health Threats

Our planet's ozone depletion has caused an increase in the amounts of UV (ultra-violet) rays from the sun which hit Earth's surface. This, it is now believed, over the past few years, has led to significant increases in human skin cancers. The Skin Cancer Foundation believes the incidence of skin cancer has gone up by at least 30% in the last 10 years alone. That group also estimates the lifetime risk of contracting melanoma (a type of skin cancer) is up by 1000% since the '30s. Other health threats caused by excess exposure to UV rays include cataracts and reduction of the body's immune system to resist infection.

The OAR (Office of Air & Radiation) in the EPA (Environmental Protection Agency) has come to this uncontrolled release of CFCs as a

problem which must be addressed. Some 31 other nations, including all in the European Common Market, believe we must stop the uncontrolled release of CFCs by putting restraints on their manufacture. And so, in September 1987, 24 nations including the USA signed an agreement now known as the Montreal Protocol. Since then seven other nations including the USSR have also signed the agreement.

Cutbacks Coming

The signing of this agreement has set in motion a series of stepped cutbacks in the production of certain types of CFCs and Halons which have been found to be most effective in depleting our planet's ozone. Under the terms of the Montreal agreement two groups of CFCs have been identified as the principal culprits in O₃ depletion, and actions proposed to curtail their production have been stipulated. These are:

Group 1:

CFC R-11, R-12, R-113, R-115.

Freeze at 1986 production levels 7 months beginning about July 1, 1989.

20% reduction as of July '93. Another 30% reduction as of July '98.

MACS Convention Special Report

Group 2:

CFC (Halon) 1211, 1301, 2402.

Freeze at 1986 production levels on or about Jan. 1992.

This means that all CFCs (in Group 1) will see a 50% reduction in their manufacture by the late '90s. When this happens there is sure to be an economic impact and the price of virgin R-12 (hereafter referred to as CFC-12) may well go up as its supply becomes restricted. The EPA believes price may go up by a factor of at least three.

MACS & EPA Cooperation

So, you may ask, of what interest is all this to an automotive service dealer? Among CFCs in Group 1, CFC-12 refrigerant, almost exclusively used in automotive and truck A/C systems, is estimated by OAR/EPA to be responsible for about 25% of all leakage of CFCs to the atmosphere. One trade association and an *ad hoc* group of companies which is now working with OAR/EPA to further analyze the impact of CFC release, and assist limiting future hazard, is MACS, the Mobile Air Conditioning Society.

At the January 1988 MACS annual convention, held in Orlando, FL, Dr. Stephen Andersen, senior economist of OAR/EPA, explained to the almost 800 convention attendees the seriousness of the situation. "This particular pollution threat could be immense in its impact. Quite literally it could affect the human race if we allow the future destruction of the Earth's protective ozone envelope."

Despite the environmental threats he detailed for MACS conventioners, in a private interview with *motor/age* Andersen was more optimistic. "We can and must control this problem if we are to protect public health."

"There is also a threat to livestock and agriculture, since excessive exposure to ultra-violet radiation from the sun can cause genetic alterations to living organisms. We are convinced, given the evidence, that control is possible. What we do not know at this time is just how quickly the ozone envelope might regenerate itself if we are able to control the random release of CFCs."

The reality is that some CFCs have an atmospheric lifetime of as long as 120 years. Since they do not breakdown in the lower atmosphere they migrate slowly to the upper stratosphere at which levels these CFCs release chlorine and bromine atoms.

R&D Work Progresses

Scientists are not standing idly by.



EPA estimates the effects of a 50% reduction in the manufacture in CFCs and Halon to be quite significant (blue line). When compared to the projection of no restrictions on manufacture of these chemicals thru the year 2085 (red line), the estimated data shows potentially serious levels of ozone depletion. When O₃ depletion is related to the public health risk it can be seen that an ounce of prevention today may well effect several pounds of cure tomorrow!

DuPont Co., Allied Chemical and ICI Americas research groups are actively seeking an equivalent substitute for CFC-12. They believe they may have come up with it. It is known as FC-134A. But while its performance characteristics appear to be equal to CFC-12, FC-134A may need a new, specially-formulated refrigerant oil for satisfactory performance within an automotive A/C system. Also, the question of whether or not FC-134A will be able to be used in a system designed originally for CFC-12 is not yet clear. However the R&D work continues, but it will be a few years yet before we can expect to see any acceptable substitute. FC-134A contains no chlorine.

Since much of the escape of CFC-12 to the open air is believed to be due to leaking A/C hoses and fittings, car makers and hose manufacturers are now being encouraged to redesign these units and adopt improved materials which will make the entire system more leakproof.

No More 1-lb Cans?

One other major way in which CFCs are believed to escape is thru dispensation from 1-lb cans bought and used by DIYers. Industry sources tell *motor/age* that 45-million such cans were shipped during 1986, mostly for retail sale thru mass market distribution.

During its Orlando deliberations the MACS board unanimously adopted a resolution which has been forwarded to OAR/EPA calling for the elimination of 1-lb cans of CFC-12 refrigerant from retail sale. Simon Oulouhojian, executive director of MACS, told *motor/age*: "We know that most of these small cans are used in the non-professional servicing of automotive A/C systems, and that many users either fail to use the cans' valves properly or fail to hook up a can correctly. This allows escape of the CFC-12. Plus, putting a fresh charge of any quantity into a leaking system only means that the refrigerant added will eventually leak out if no repair is done!"

A/C Leak Checks in I&M?

There is another wrinkle to this matter of CFC leakage from automotive A/C systems, however. The basic interest of EPA's Mobile Source Enforcement group continues to be centered on securing cleaner air thru I&M checks of vehicles for excessive exhaust emissions. Putting this reality together with the need to control CFC leakage, it is not difficult to see that one day the automotive A/C system may come under an I&M inspection procedure. After all, if the car is being checked for emission of health-threatening exhaust gases, it is entirely logical that

(Continued on page 42)

CFC leakage also might become part of that I&M check procedure.

With the possibility that CFC leaks may one day come under an I&M provision, it follows that the EPA just may have found the strongest reason it may ever have to push for a mandatory national I&M program in all states. Especially since O₃ depletion is now understood to be a threat to the entire planet's population.

As a first step in its work with the OAR/EPA, MACS will soon begin taking samples of CFC-12 in use from some 500 passenger cars and light trucks. The intent of this exercise is to determine the level of contamination present in CFC-12 used in an automotive A/C system. Car makers are not exactly overjoyed to find out that a well-known and long-used product may become severely restricted in its future use. And the fact that FC-134A may not become the replacement for CFC-12 until the mid-'90s is far overshadowed by the other fact that FC-134A may be at least three times more expensive than the refrigerant it is being designed to replace.

Recycle Existing Stock

Certainly when reductions on the manufacture of CFC-12 come into being it is expected by most people *motor/age* has talked to who are involved in this topic that the price of virgin CFC-12 may rise considerably. And already we have begun to see the arrival of refrigerant recapture/recycle systems in the automotive A/C shop. Several of these were on display at the January MACS trade show, and we have included a roundup of some of them on the following pages.

While manufacturer claims for the performance of their units range from the modest to the extreme—including some which say their units will recycle captured refrigerant to be 100% as new—car makers have not yet accepted any of these statements as fact. MACS executives we have spoken with believe the 500-test-sampling program might establish some basis for agreement that any automotive A/C system will probably run OK with a moderate degree of refrigerant contamination. The phrase "80% clean" has been heard. Car makers, however, are silent on what they think would be an acceptable level of clean-up to return to use in a system.

What We Know

What is known is that:

a) random escape of some CFCs is causing an environmental public



A: Estimated leakage quantity from A/C systems on vehicles

B: Estimated disposal quantity of R-12 from junked vehicles

C*: Estimated R-12 escape quantity from accidental causes

D*: Estimated quantity lost due to A/C system failure

E*: Estimated quantity lost due to service venting

* - refill wastes distributed by accident, failure and venting data

** - assumes introduction of FC-134A in 1995

Since Freon R-12 is the refrigerant of choice in the automotive field, EPA has projected the methods of escape of this particular type of CFC into the atmosphere. This chart shows estimated R-12 emission release from 1989 thru 2015. Since it is expected that some capture and recycling of R-12 may be implemented by 1989/1990, this data also shows projected emission escape of both recycled and non-recycled refrigerant.



Dr. Stephen Andersen, chief economist of the OAR/EPA (left) has appointed Simon Oulouhojian, exec. director MACS (center) and Bob Bishop, chief product engineer, Harrison Div. GM (right) as co-chairmen of the EPA's ad hoc committee to conduct a feasibility study on capturing, recycling and returning refrigerant R-12 for re-use in automotive A/C systems. The committee held its second meeting during the MACS annual convention & trade show held at The Gjenelefe Resort, Orlando, FL. It was at this meeting that MACS' resolution calling for a ban on the production and sale of 1-lb cans of refrigerant was forwarded to Andersen.

health threat of not only international but planetary proportions;

b) the automotive/truck A/C system is responsible for a significant share of the estimated loss of CFCs to the atmosphere;

c) future production of these CFCs,

including CFC-12 now widely used in the automotive A/C system, is going to mean the need for either a substitute equivalent product, or the capture and recycling to some level of purity of the existing refrigerant stock now in use;

(Continued on page 44)

- d) or some combination of new material and/or recycling of CFC-12;
- e) refrigerant prices are headed for an upward climb, given the economic facts we now know;
- f) automotive A/C shops, as well as general service shops, may one day be jointly involved in I&M emission checks to see that automotive A/C systems do not leak and are no longer contributory to random CFC escape to the open air;
- g) newer materials and better sealing componentry may be introduced in future A/C systems so as to better control the problem of random escape of CFCs from automotive systems.

A/C System Service Need

There is little for any service dealer to do right now, except be aware of the fact that the automotive A/C system has now been found to be an emitter of health-threatening chemicals on a scale never before realized. It also would be a good idea for all shops which offer A/C services to perform a

refrigerant leak test on *every vehicle* which comes in for service. The idea is to identify those vehicles which have leaking systems, and to then take steps to sell the customer on the value of having the vehicle's A/C refrigeration system made tight again as it was when new. And to get into the habit of pulling an A/C leak check on all vehicles, every time you do any cooling system or A/C service work which comes to your shop.

- Readers who may wish to read more detailed and scientific information on the ozone depletion problem and its cause by the random release of CFCs to the atmosphere may get same from the OAR/EPA by using the April Reader Service Card in this issue, and by circling the reader service number shown here. **Circle No. 101**

EDITOR'S NOTE: Freon is a registered trademark of the DuPont Company. The reference CFC-12 used in this article applies to the automotive A/C refrigerant now commonly referred to as R-12.

Refrigerant/Recycling Equipment Buyer's Guide

Several equipment manufacturers displayed near-market-ready pieces of gear at the MACS Trade Show in Odo. All of these items will capture and recycle automotive A/C refrigerant right in the shop. While no government or industry standards have yet been established for this kind of equipment, manufacturers we talked to at the January 1988 MACS Trade Show indicated they were confident they could meet or exceed any such standards once they became known. So while there is today no requirement that automotive A/C refrigerant be captured, recycled and returned to use, it is likely that once the effect of the Montreal Protocol becomes realized, there will be a market for this kind of shop equipment... and there will be manufacturers to provide it. All prices shown are tentative and subject to change, depending on the impact of yet-to-be-established government and industry standards.

(Continued on page 46)

"Tomco Carburetors? I Wouldn't Use Anything Else."

- **Complete Units:**
I don't have to transfer used parts from the old carburetor.
 - **Excellent Quality:**
Tomco bench tests EVERY carburetor which means "No Returns" because of defective units.
 - **More Profit:**
I save time on labor.
 - **Satisfied Customers:**
Tomco carburetors meet or exceed O.E.M. standards, resulting in top performance and ensuring easy smog certification.
 - **When I Need Support:**
Tomco "Help Lines" have trained ASE carburetor specialists to consult with.
- Why buy anything else, when Tomco sells the best...**



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California (800) 972-2020

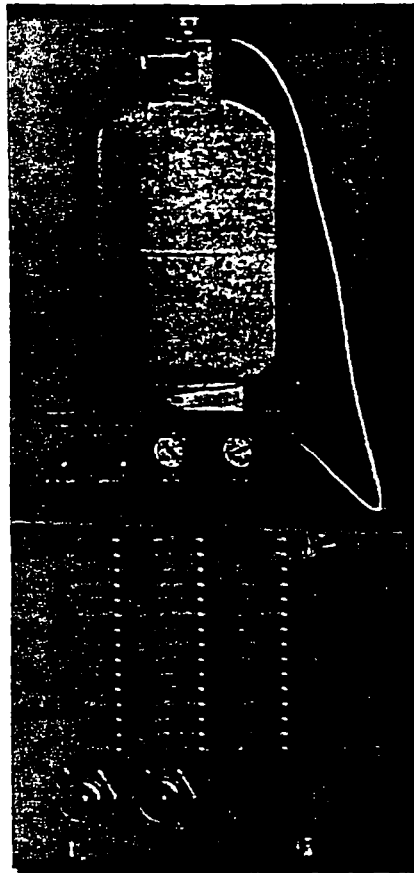
Alaska (800) 626-0963

4330 E. 26th Street, Los Angeles, CA 90023

See us at the PAS—Big I Show, booth #1413

(CIRCLE NO. 022)

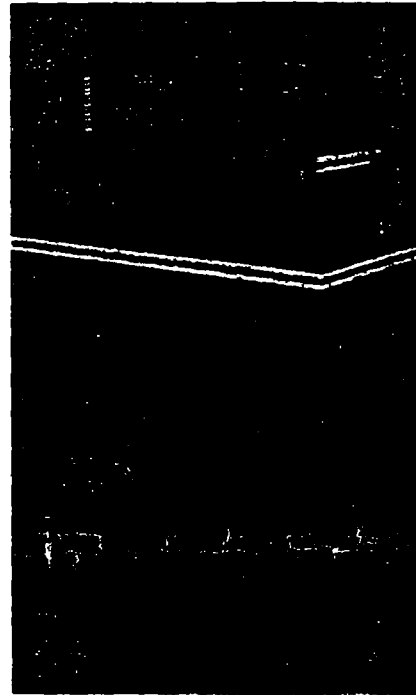
MOTOR/AGE • APRIL 1



THE REJUVENATOR

Two models are available of The Rejuvenator from Refrigerant Recovery Systems, Inc. The ST-1000 recovers used refrigerant at a rate of 2-4 lbs/min.; ST-500 functions at a rate of 1-2 lbs/min. Both units remove, recycle and return refrigerant to vehicle system. Manufacturer claims EPA Lab tests show The Rejuvenator to remove over 99% of all contaminants. Both units are completely mobile. ST-1000 weighs 125 lbs; ST-500, 60 lbs. Both feature completely automatic-pressure switch, on-&-off operation. Model ST-500 (illustrated) is priced at \$4995.

Refrigerant Recovery Systems.
Circle No. 102



MURRAY's ATC 5000

One connection of the ATC 5000 makes it ready for use. All operational sequences are automatic. Captured refrigerant is recycled and returned to vehicle system for use. Any difference in refrigerant from prescribed level is automatically added by the ATC 5000 from virgin refrigerant in storage. Contaminant liquids and solids are completely extracted and any oil quantity lost is visually checkable. Recaptured refrigerant is passed through dessicant for drying. Oil charge and refrigerant charge operations are programmable. Machine design includes feature to allow replacement of a single microprocessor circuit in the event of future vehicle A/C system upgrades or new spec standards. Under \$8000.

Murray Corp.

Circle No. 103

OZONE PROTECTOR

This portable unit is one of the smallest available, maker claims. Uses quick disconnects for virtually no refrigerant loss during hookup. Comes with accessory to chill storage bottle so that liquid as well as gas can be extracted. Uses replaceable core filters. We have tried several times since the MACS Trade Show display of this unit to contact the company, with no success. The address and phone number given apparently are not active at this time. Price was reported to be under \$500. We have not allocated a Reader Service number to this listing in view of our inability to contact them.

High Frequency Products.



ROBINAIR's 17200

This fully mobile refrigerant recovery and recycling station from Robi does the total job of capturing, cleaning and returning refrigerant to any vehicle's A/C system. Operates at approximately 2 lbs/min. Recycle time depends on moisture content in recaptured refrigerant, but manufacturer advises an average 2 lbs/min. recycle rate. Moisture indicator shows yellow on start, green when recycle stage is complete and all moisture removed. Simple one-connection hookup n it easy to use, Robinair engineers claim. \$3295.

Robinair Div., Sealed Power Corp.
Circle No. 104



MOBILE AIR CONDITIONING SOCIETY

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January 27, 1989

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STATEMENT TO THE MEDIA

LANSDALE, PA . . . Government regulators, environmentalists, and industry groups have forged an unusual alliance to combat atmospheric ozone depletion, and it seems to be paying off.

Focus of the effort is mobile air conditioning, which uses a chlorofluorocarbon compound -- CFC-12 -- as refrigerant. Odorless, non-toxic, and otherwise relatively benign at sea level, CFC-12, when vented through system leaks or by other means, migrates to the upper atmosphere and contributes to a chemical reaction that destroys ozone. The ozone layer shields the earth from the sun's potentially harmful ultraviolet rays.

Spurred to action by alarming new data from the scientific community, the U.S. Environmental Protection Agency has adopted an accelerated program to substantially curtail CFC use and emissions in the near-term, and completely phase out their use within the next decade.

(more)

Mobile air conditioning is a prime target for attention because, by some estimates, it contributes up to 19% of CFCs vented to the atmosphere annually.

"Forty years' experience in the automotive service business have conditioned me to expect factions to be butting heads over an issue like this, but that hasn't been the case this time," said Simon Oulouhojian, executive director of the Mobile Air Conditioning Society, a trade group that represents mobile air conditioning system manufacturers, distributors, and service installations.

Last year, Oulouhojian was named to co-chair an ad hoc committee assembled by the E.P.A. to implement refrigerant recycling, seen as a necessary interim step to the introduction of alternative refrigerant by the early to mid-1990s.

"Quite frankly, I was reluctant to get involved because I expected the same old trench warfare. The E.P.A. would say, 'Just do it. We don't know or care how -- that's your problem.' The environmentalists would take a similar position. And our industry would have the whole mess dumped in our laps and be made to look like villains," Oulouhojian remarked.

"That hasn't happened, though. Instead, the E.P.A. has said, 'We've got a problem. How do we solve it?' The environmentalists have said 'How can we help?' Industry has responded in kind, and it seems to be paying off for everyone," Oulouhojian said.

(more)

Oulchojian explained that manufacturers have equipment on line to recycle refrigerant. The domestic auto manufacturers and some importers have cooperated fully.

"We've seen a lot of progress in a relatively short time because, so far at least, no one has thrown up roadblocks just to watch the confusion," he added.

Oulouhojian credits Dr. Stephen Andersen, senior economist for the Global Change Division of the E.P.A., with creating the positive attitude which has prevailed among those contributing to the effort.

#

Fire extinguishers

You'll need different types for different locations in your home.

If a fire breaks out in your house, don't try to be a hero. Get the family to safety and call the fire department. If the blaze is small, you can try to put it out before the engines arrive—provided you have the right kind of fire extinguisher.

A fire extinguisher well suited for dousing a grease fire in the kitchen may not be effective against blazing wood shavings in the workshop or a smoldering mattress in the bedroom. To know which types of fire extinguisher to buy, you first have to know something about fires.

Underwriters Laboratories has put common household fires into three categories. Class A fires are fueled by ordinary combustibles such as paper, wood, tiles, plastic, and rubber. Class B fires in-

volve gasoline, paint solvents, cooking oils, and other flammable liquids. Class C fires involve devices that are electrically live.

Most fire extinguishers on the market carry a UL rating, a set of numbers and letters that tell you which of the three classes of fire the unit can handle, and how big a blaze the unit can fight.

An extinguisher with a 1A rating must, among other things, be able to put out a blazing stack of 50 pieces of 20-inch-long wood 2x2s. A 2A model must put out a fire twice that size, and so on. A 1B rating means a model can snuff 3 1/4 gallons of liquid fuel burning in a 2 1/2-square-foot pan. A C rating (that letter is never preceded by a number) means the extinguishing agent is nonconductive and therefore

safe to use on electrical fires.

A number of fire extinguishers are called "all-purpose" or "multipurpose" models. They use a fine powder of ammonium phosphate that's effective against all three types of fire. Their versatility makes them a logical choice—but not necessarily the best choice.

For the kitchen, an extinguisher that uses powdered sodium bicarbonate is a better bet. That chemical smothers burning grease much faster and more certainly than ammonium phosphate does. Sodium-bicarbonate extinguishers carry a B and C classification.

Ammonium-phosphate and sodium-bicarbonate fire extinguishers have been around for decades, and their fire-fighting capabilities have been thoroughly proven. But these dry-chemical models leave behind a messy, corrosive residue—not the sort of stuff you want to scrape off hi-fi gear or a computer's disk drive.

A halon fire extinguisher, which uses halon gases to choke off a fire, is a cleaner alternative: Halon gases leave no messy residue. Halons are nonconductive and therefore suitable for a class C electrical fire, as well as class B fires. Larger models work on class A fires, too.

These fire extinguishers have one major drawback, however. The halon gases used in them threaten the earth's stratospheric ozone layer. Although the amount of halons used each year is quite small, these gases are roughly 3 to 10 times as effective at depleting ozone as the more familiar chlorofluorocarbons. Last fall, representatives of many nations, including the U.S., agreed to freeze halon production at 1986 levels as a way of limiting future environmental damage. Still, some people may choose to avoid the halon fire extinguishers altogether.

Most halon extinguishers use a gas known as Halon 1211, pressurized with nitrogen; other halon models use Halon 1301, pressurized with Halon 1301. Some manufacturers claim that the dual-halon formulation provides more effective fire-fighting, but the UL classification scheme doesn't bear that out. Either variety of extinguisher, single-halon or dual, can earn the same UL listing.

The halon extinguisher is no newcomer to industry, but it's comparatively new to the consumer market. It's being vigorously promoted as a versatile fire-fighter in a small, easy-to-use package. Black & Decker, for example, has been pushing its little *Flamebuster* in magazine ads showing a kitchen that's gleaming white everywhere except over the range, where soot streaks up the wall. The headline says, "Muriel Mercer thought a fire extinguisher on her wall would make her kitchen look ugly."

Text continued on page 104

The basic types

All-purpose models like Sears 58044 (left) are best for garage or workshop. A sodium-bicarbonate model like American La France is

best for the kitchen. Both types leave messy residue but are better for those areas than widely promoted—and expensive—halon models. Nonetheless, you may want a halon model (here, the S.A.F.E. 200) to protect your electronic or computer gear, since it won't damage what you're trying to save.

The Little Blaze Out is touted for all kinds of fires—but it just couldn't do the job.



The *Flamebuster*, says the ad, "looks as good as it works." Handsome though it may be, the halon-filled *Flamebuster* won't be as effective as a sodium-bicarbonate fire extinguisher for fighting a kitchen grease fire.

Some halon models claim to put out fires not covered by their UL rating. Two small models—the *Blaze Out* and the *Flam X*—have no UL classification at all. They claim to be "multipurpose" models "for the home, automobile, office or industry," but their labels don't give a clear picture of their capabilities. One features a large drawing that shows the extinguisher snuffing a wastebasket fire; a smaller, more stylized drawing indicates the extinguisher isn't meant for that kind of fire.

The two small S.A.F.E. halon extinguishers don't have a UL rating but bear a 1B:C rating from Applied Research Laboratories of Miami, which cites conformity to the UL standard. We list them along with the UL-rated models.

On the firing line

With most extinguishers—dry-chemical or halon—the UL rating is a reliable guide to performance. We therefore felt no need to test the fire-fighting ability of every model. But we did take a closer look at the four halon models without a UL rating—the *Blaze Out*, the *Flam X*, and the S.A.F.E. extinguishers.

We decided not to duplicate the UL tests for a Class A solid-fuel fire precisely; that would have been pointless, for the four halon models are too small to hold the nine pounds of gas needed to earn UL's 1A rating. Instead, we tested them against a smaller fire—a wastebasket filled with burning paper.

Three of the four temporarily stifled the fire, producing thick smoke. But a minute or so later, the blaze came whooshing back as the halon gas thinned. Only the S.A.F.E. 200 stopped the fire for good.

We tested the four on a liquid-fuel fire in a 2½-square-foot pan—a standard UL test for a 1B fire. Both S.A.F.E. models squelched the fire. But the *Blaze Out* and the *Flam X* didn't perform consistently; after testing several samples, we concluded that those two couldn't satisfactorily fight a small liquid-fuel fire.

How easy to use?

Effective fire-fighting and personal safety require a fire extinguisher to be virtually foolproof to maintain and operate. We examined each model closely for several key points of design and construction—points that, we think, separate the good from the bad.

Mounting. Some sort of wall mount is standard equipment with most fire extinguishers. The heavier ones hang from a hook, the lighter ones are strapped to a plate that's screwed to the wall. We found a few that are meant to be held in place with self-adhesive Velcro strips—an interesting but poorly executed idea. The adhesive didn't hold except on very smooth surfaces.

Most of the mounting brackets we examined held their fire extinguisher securely; just as important, they released it quickly and easily. The exceptions were some *Halonite* and *American La France* halon models; pulling them off the wall required a vigorous tug.

Pressure indicator. Because a fire extinguisher can go unused for years, you should check it monthly to be sure it re-

mains properly pressurized. The best pressure indicator, we think, is the common dial-and-pointer type gauge; a glance at the dial tells you if the unit is pressurized. A few units have a plastic push-pin indicator. If the pin pops up after you push it, pressure is adequate. That's slightly less convenient than a dial.

Nearly all the dual-halon models we tested lack a pressure indicator. You check their pressure by weighing them. That's often a serious drawback because the weight must be precise to the fraction of an ounce—impossible to determine with most household scales. Even the *Halonite 90*, the one dual model with a dial, needs to be weighed. Its dial didn't indicate the need for a recharge until the unit was more than half-empty. We downrated the dual-halon models because they are so hard to check.

Tamper seal. Any fire extinguisher should have some kind of device to prevent accidental firing. Some seals are nothing more than a strip of adhesive tape that holds the handle to the cylinder; the tape was sometimes torn, or came off accidentally. As the comments in the Ratings indicate, a few seals were hard to remove—a shortcoming that can cost you precious fire-fighting time.

Firing mechanism. You press a button or a lever with your thumb to fire most small halon and sodium-bicarbonate models. That's not always as easy as it sounds. Some of the buttons and levers required a determined push.

To fire most of the larger dry-chemical models, you have to squeeze a pair of levers. That often required substantial effort, we found. We sometimes needed to exert equal effort to keep the discharge going. Those models won't suit you well unless you have a very firm grip. (As the Ratings comments indicate, many *First Alert* models not only were hard to fire, they have narrow handles that can be hard to grasp.) A few models delivered quite a jolt as they started to fire. They might be too much for small or frail people.

Instructions. An extinguisher should be marked with easy-to-read words and pictures that show at a glance the steps to follow. Small, hard-to-read print could take precious time to decipher when a fire is blazing in a frying pan. The Ratings note those that were hard to read.

Recommendations

Every home should have a sodium-bicarbonate extinguisher in the kitchen, where four out of five residential fires start. Of the six sodium-bicarbonate models we tested, the *American La France P200RA*, \$25, deserves first consideration. The model's 5B:C UL rating means it can handle more than a small fire. It was

Fighting fire with water

Not all fire extinguishers on the market contain gas or dry chemicals. We looked at two units, the *Amerex 240* and the *Badger WP61*, that use plain water instead of chemicals. Each model carries a 2A UL rating and sells for \$35 to \$40.

For fighting Class A fires, the kind that involve ordinary combustibles, water is best. With one of these water models, you can work at a relatively safe distance from the fire. These two extinguishers were quite powerful indeed. When first triggered, both threw a jet more than 30 feet; later on, with the pressure at its lowest, the jet still reached farther than any chemical model's—close to 15 feet.

Each model was quite a handful,

however, weighing in at more than 27 pounds. Just pressing the handle to start the water and keep it flowing took considerable effort. You need a very firm grip indeed to be comfortable with these models.

Unlike chemical extinguishers, water models are easy to keep charged and to recharge; a filling station's air compressor can do the job nicely. The water-filled models need about 100 pounds per square inch of pressure to operate.

For all their power, though, these two models should be considered only as adjuncts to other fire extinguishers because they are useless on liquid-fuel fires and can be downright lethal in an electrical fire.

the most convenient to use, and it's the only sodium-bicarbonate model that has an easy-to-read pressure gauge.

For protecting the garage, the workshop, and other areas, we recommend an all-purpose extinguisher. It's wise to keep one stored under the dashboard or the driver's seat of the car, too. Any of the first four 1A:10B:C models in the Ratings would be a good choice. If you feel you need something more powerful, look for the *Buckeye 10912*. It carries a 3A:40B:C UL rating and costs about \$37.

You should consider the halon models as auxiliary fire extinguishers. They are without peer for protecting prized objects, because halon leaves no messy residue. But they are expensive, and most are small—too small, we think, to be the only protection in a garage or workshop.

Among the small halons, the *Halonite* and *S.A.F.E.* models had no major drawbacks. They're all under \$30. Black & Decker's widely advertised *Flamebuster* is as effective as the four and certainly more stylish, but it's harder to operate.

We rarely paid list price. Discounts ranging from 20 to 40 percent were frequent, but we had to pay almost 30 percent more than list for some of the *Halonite* models. Halon models were consistently more expensive than dry-chemical models with the same UL rating.

The dry-chemical models are not only cheaper to buy, they are also cheaper to recharge. That may not be much of an advantage, however, if recharging prices in our area are any guide. Regardless of the extinguishing chemical used, recharging costs almost as much as a new fire extinguisher, especially if it's a small model. It may make more sense to replace a small unit if its pressure drops too much or if it's been used.

One final caution: Just because you own a fire extinguisher, don't think you have to use it in an emergency. If you can't get closer than 10 or 12 feet, the fire is probably too big to tackle. Flames may deplete the oxygen supply or generate too much heat for you to approach. The burning materials and the chemical reactions under way during burning may generate toxic by-products; gases from the extinguishing agent may also be noxious. (Halon vapor is not especially toxic, but putting out a fire can produce relatively dangerous fumes.)

Even if the fire seems small enough to fight, leave yourself an out. Stay close to a door or window that affords a speedy exit. And get out of the area as soon as the fire is extinguished. Remember, too, that the first burst from the fire extinguisher may not do the job. If you don't smother the fire thoroughly, the flames may stage a sudden comeback. That happened repeatedly in our tests.

CONSUMER REPORTS FEBRUARY 1988

Product recalls

Household products

Black & Decker weed/grass trimmers. Damaged wiring could cause electrical shock.

Products: Blump-feed trimmers with orange housing, model nos. 82209 and 82210 (types 1 and 2). Label on front of trimmer tube, just below handle, gives model no. and type; black band below label means trimmer has been modified and is not subject to recall. On top or back of housing, trimmer has four-digit date code. First 2 digits indicate year; last 2 digits, week of year. Trimmers bearing date code between 8535 and 8736 are being recalled.

What to do: Take trimmer to Black & Decker service center for inspection.

The following is a product warning, not a recall.

Hedstrom Probe VI toy all-terrain vehicle. May catch fire.

Products: 30,000 6-wheel two-speed all-terrain vehicles with two motors powered by two 6-volt gel-type lead-acid batteries. Came with battery charger. Recommended for children aged three to seven. Recalled models have no protective fuses. Label on front underside of body is marked "Made in Bedford, Pa. 15522 USA" and lists date of manufacture and model nos. Only toys made before 6/85 and bearing no. 87-3890, 87-3891, 87-3892, 87-3893, 87-3894, or 87-3895 are being recalled.

What to do: Remove batteries to disable toy, and call toll-free 800-233-3271 (in Pa., 800-242-9034) for free fuse-protector kit.

Spinning Windmill baby rattles. Child could choke on small parts if they come loose.

Products: 61,000 plastic rattles sold '86-'87 for \$3. Top of rattle has four balls, each holding two noise-maker pellets, fastened to hub, which spins on shaft, is labeled "Made in Italy." Toy, identified as Model 81722, has rubber suction cup labeled "CHICCO," and comes in cardboard box marked "Spinning Windmill Rattle, 3 months-24 months, Artisan S.P.A., Made in Italy."

What to do: Return rattle to dealer for refund.

The following is a product warning, not a recall.

Blueray Blue Flame high-efficiency furnaces and boilers. Unless maintained properly every year, furnace or boiler could cause death by carbon-monoxide poisoning.

Products: 21,000 furnaces and 14,500 boilers produced '74-'83. Blue-and-white label says "BLUERAY by Blueray Systems, Inc." and white label lists model no. BR 60/75. **What to do:** Call 215-785-6224 collect, or write Blueray Systems, 8301 Lansdowne Ave., Upper Darby, Pa. 19082, to receive description of proper maintenance and service procedures and cautionary label.

The following is a replacement, not a recall.

Sears portable cribs. Adjustable floorboard, which serves as changing table, could slip and fall, injuring child.

Products: 14,500 cribs sold 3/1-12/14/86 for \$70. Model no. 29-J0691 has maple-stain finish; model no. 293 0692, varnish finish. Replacement applies only to cribs whose floorboard is marked "Front" on upper surface, close to side and near single clip attached to board's underside.

What to do: Call North States Ind. collect at 612-522-6505 for free redesigned floorboard.

The following is a product warning, not a recall.

Cradle Tog infants' garments (see below). Child could choke on small buttons if they come loose.

Products: One garment consists of red, white, and blue jumper with matching booties. Jumper has zipper in front and snaps at crotch, label in neck says "CHICSCOTCH, 60% Cotton 40% Polyester Made in Taiwan RN16435." Booties have poodle face with black eye buttons. 27,000 sets were sold since 4/86. Other garment consists of red and white candy-stripe diaper pants, dress, and cap; white

front of dress has embroidered flowers and red decorative buttons. Label in neck reads "Cradle Tog, Inc., 65% Polyester 35% Cotton Made in China RN16435." 15,000 sets were sold 12/86-4/87.

What to do: Remove buttons.

Vehicles and equipment

'88 Chevrolet C10 and C20 and GMC C15 and C25 pickup trucks. In turns, brake hoses could wear and leak, causing loss of front braking.

Models: 63,196 trucks made 12/86-5/87.

What to do: Have dealer reposition brake hoses.

'86-'87 Winnebago and Itasca Class A motor homes. A fire could develop under floor of motor home during hard driving in warm weather.

Models: 002 Winnebago model WCP37RO and ICP37RO motor homes made 7/86-8/87.

What to do: Have dealer replace heat-resistant cover on wiring harness, add heat shield, and reposition muffler hanger.

'87 Sterling 825 S and 825 SL cars. Headlights, windshield wipers, and other electrical components could suddenly lose power.

Models: 14,900 cars made 9/86-7/87.

What to do: Have dealer replace ignition switch and wiring subharness and lubricate ignition lock.

'86 Polaris Indy snowmobiles. Brakes could fail.

Models: 9268 Polaris Indy Trail snowmobiles (model nos. 0860661 and 0860761) and Polaris Indy 400 snowmobiles (model no. 0860759) sold since '85 for \$3499-3749.

What to do: Have dealer check whether locking nuts have been installed on brake-cable assembly.

'88 Ford Ranger pickup trucks. Incorrect rear brake assemblies could increase stopping distances and could cause rear brakes to lock, especially during heavy braking with lightly loaded truck.

Models: 141 trucks with regular cab and limited-slip rear axle made 7/27-7/31/87.

What to do: Have dealer replace rear brake assemblies.

'84-'88 Audi 5000T Turbo and Turbo Quattro cars. Topping off (repeated filling) of fuel tank after pump nozzle shuts off could allow fuel vapors to escape from fuel system into engine compartment; vapors could ignite from heat of exhaust system.

Models: 25,000 cars made 8/83-9/29/87.

What to do: Have dealer install new filler neck and new vent valve and hose for charcoal filter. Also, stop adding fuel when pump nozzle shuts off.

'87 Pontiac Bonneville, Oldsmobile 98 and Delta 88, and Buick Park Avenue and Le Sabre cars. Electrical component in engine compartment could melt and ignite windshield-washer bottle.

Models: 479,715 cars made 8/86-5/87

What to do: Have dealer replace washer-bottle bracket.

'85-'87 Winnebago and Itasca Class A motor homes (see below). Pressure build-up in fuel system could expel fuel from filler pipe, possibly causing fire.

Models: 9,041 Winnebago Chelton and Elanidan and Itasca Sunliner and Windrunner motor homes, with Chevrolet chassis, made 6/85-5/87.

What to do: Have dealer install extra venting on the main fuel tank.

APPENDIX II

THE SWEDISH PROGRAMME FOR PHASING-OUT OF CFCS

In about two years the Swedish use of CFC (completely halogenated chlorine fluorine carbons), usually called freons, will be reduced in half and by the end of year 1994 it will be completely eliminated in all manufacture of new products and equipment made with the help of, or containing, CFCs. This proposal by the Government in the Environmental Politics Bill was approved by parliament in the beginning of June this year and

The release of freons and halons breaks down the ozone layer in the atmosphere which protects us from the ultraviolet rays of the sun. The release of the freons also contributes to the so called hot house effect which increases the average temperature of the earth and changes the climate. Today Sweden is responsible for 0,5 per cent of the world usage of freons of totally 1 million tons per year.

Sweden has in september 1987 together with a number of other countries signed the so called Montreal Protocol and thereby pledged to reduce the freon usage by 20 percent to July 1, 1994. Sweden has also ratified

The Swedish plan for reducing and phasing out the use of CFCs which reaches further than any other country in the world:

- At the end of 1990 the usage of CFCs will be reduced by at least 2,400 tons, e.g. largely a reduction in half compared to the usage in 1986 which was about 4,800 tons.
- At the end of 1994 the usage of CFCs will have ceased in the production of new goods and plants manufactured with the help of freons or contain freons.
- The usage of CFCs may not be replaced by other chemicals with environmental and health hazards.
- The elimination plan is being carried out with the help of the Chemical and Environmental Protection laws. A new ordinance on CFCs and helons is effective from July 1, this year.
- The plan will be followed up by a control station after two years.

The Government proposes a time schedule for each area listing the time frame the CFC usage will be

eliminated.

USAGE AREA:	USAGE 1986:	LATEST ELIMINA- TION
Sterilization	50 tons	Turn of the year 1988/89
Spray containers	90 tons	Turn of the year 1988/89 Certain pharmaceuticals exempted
Packing materials	130 tons	Turn of the year 1989/90
Cleaning in the engineering industry	350 tons	Turn of the year 1990/91
Dry cleaning	300 tons	Turn of the year 1994/95
Soft foam plastics	650 tons	Turn of the year 1990/91
Hard Foam plastics (extruded polystyrene, XPC)	750 tons	Turn of the year 1990/91
Hard foam plastics Polyurethane	1.240	Turn of the year 1990/91 (for certain applications however, 1994/95)
Coolants in cooling	1,240 tons	Turn of the year

plants and heat pumps

1994/95

In addition to these areas of usage the government's elimination plan also affect the closely related halons which today are mostly used in fire extinguishing substances. The possibilities of substituting halons with other substances are being investigated and the use of halon will thereafter be discontinued as soon as possible.

The government's decision to release the investment funds of the companies for environmental measures might be very important in order to facilitate the changeover from freons to alternatives more friendly to the environment. Also other forms of governmental subsidies for research and technical development will be used.

The government will also change the health protection laws so that an application to the environmental and health protection committee will be required in the future in order to install heat pumps. The usage of heat pumps presents an environmental hazard and that is e.g. the release of CFCs and leakage from frost protection fluids.

The Environmental Protection Board and the Chemical Inspection Board are proposed to receive extra funds for investigations and information on CFCs.

The phase-out programme concerns the use of the fully halogenated chlorofluorocarbon components and halons specified in Annex A to the Montreal Protocol.

It is emphasized however, that the aim should be to reduce and eliminate the use of partially

halogenated CFCs too. These matters will have to be reconsidered. The importance of rigorous efforts to bring about minimization of the use of other ozone-depleting substances than CFCs and halons, particular methyl chloroform and carbon tetrachloride.

B. BACKGROUND TO THE LEGISLATION

"The exact timing of when the substances to be abolished from use have been established after detailed and concrete discussions with representatives of the concerned branches of industry. The substitutes are different for different areas of use: for some, HCFC-123, HFC-134a, HCFC-22. In other areas alternative processing techniques or alternate products can be used. There is a description in the government proposal of the areas in which CFCs can be phased out. (See text of summary of legislation quoted above.)

It should also be noted that a number of Swedish industries have decreased considerably or phased out CFC use. Some examples are: ASEA-Brown Boveri for cleaning circuit boards; SCAN PAC for making packaging material; GAMBRO for sterilizing hospital equipment; and Rockwool Ecoprim for making extruded polystyrene (XPS). A number of other examples can be found.

There have been no measurements of the exact cost of the phasing out program. In the view of the Swedish government, the limited costs that we will see for a phase out program both for industry and

society should be compared to the vastly larger damages and costs that would be the result if the destruction of the ozone layer would be permitted to continue.

The administration of the phase out will be done within the framework of the Swedish legislation on chemicals. A new ordinance on CFC and halons has come into force and is effective from July 1..... specifically the different prohibitions regarding new production in accordance with the timing of the program for phase-out.

The breaking of the different rules will be criminal. There will be no fees for the use of CFCs.

Industrial activities where greater amounts than 100 kilograms of CFCs are used per year will also have to have a permit according to Swedish legislation on the environment. This will give the government authorities the right to decide on economically reasonable and technologically possible regulations on use and emissions during the phase-out.

The use of the controlled CFCs as a medium for new installations of cooling, heating, and other climate equipment, including air-conditioners, is according to Swedish phase-out plan prohibited after December 31, 1994. After that time there should be a very limited and constantly decreasing use of CFCs for service and preparation of existing equipment.

The question of what import regulations may be necessary for making the phase-out program as effective as possible will be dealt with area by area. The competent Swedish authorities will have

US PIRG

. We recommend the approach adopted by S. 201, Sec.312
ard to manufacture and disposal. We suggest the following
n to reclamation and recycling.

- A. Effective January 1, 1991 it shall be unlawful for any person to release Class 1 or Class 2 chemicals from household appliances and automobile air conditioners. Furthermore, it shall be unlawful for any person who sells household appliances, air conditioners, or automobile air conditioners to refuse any request to remove substances covered by this Act from any product which they offer for sale, including sales prior to the effective date of this section.
- B. Effective January 1, 1991 any person who installs, services or repairs automobile air conditioners must possess recycling equipment approved by the Administrator and provide for the recycling of CFCs to the maximum extent possible.
-  C. Effective January 1, 1991 CFCs shall not be introduced into interstate commerce in any container smaller than 15 lbs. 
- D. The Administrator shall issue regulations necessary to carry out the provisions of this section within one year of enactment.

V. Labelling

We recommend the labelling provisions of S.201, Sec. 311.

VI. Authorizations

- A. There is authorized to be appropriated from the general revenues a "Worker Protection Fund" for the purposes of providing income stipends, relocation, retraining and assistance in locating new jobs for workers laid off, furloughed or relocated due to changes in production, distribution or use of substances covered under this act.
- B. There is authorized to be appropriated from the general revenues an "Emergency Research and Development Fund" for the purpose of furthering research into viable long-term alternatives to the substances covered under this Act. The research undertaken in whole or in part with such funds shall be conducted in the pursuit of environmentally sound alternatives that are energy efficient, reduce health and environmental hazards and will be made available to developing nations.

ENVIRONMENTAL DEFENSE FUND

257 Park Avenue South
New York, NY 10010
(212) 505-2100

MEMORANDUM

To: Interested Parties
From: Sarah Clark & Dan Dudek
Date: February 17, 1989
Re: State-Level Refrigerant Recycling

The enclosed working paper presents ideas for a state-level refrigerant recycling program. Its purpose is to stimulate state legislation for the control of refrigerant emissions from air-conditioning and refrigeration systems.

Recent events, such as the conditional acceptance by the Motor Vehicle Manufacturing Society of a purity standard for recycled refrigerant in automotive air conditioners, have created conditions favorable to the wide spread adoption of refrigerant recovery and recycling practices. We offer the following ideas for implementing such programs.

In addition, NASA is scheduled today to announce preliminary results concerning this year's International Arctic Ozone Expedition. The Canadians have already announced confirmation of arctic depletions based on their own experiments. This new revelation gives those of us interested in refrigerant recycling initiatives an added opportunity to capitalize on the renewed interest in reducing CFC emissions.

Due to your expertise at state-level initiatives and/or interest in refrigerant recycling, we wanted to share this proposal with you. Any comments or suggestions you may have are very welcome. Updates of this proposal may follow.



1616 P Street, NW
Washington, DC 20036
(202) 387-3500

1405 Arapahoe Avenue
Boulder, CO 80302
(303) 440-4901

5655 College Avenue
Oakland, CA 94618
(415) 658-8008

1108 East Main Street
Richmond, VA 23219
(804) 780-1297

128 East Hargett Street
Raleigh, NC 27601
(919) 821-7793

*Nonlegal language for a bill for
recycling refrigerants.*

ENVIRONMENTAL DEFENSE FUND

257 Park Avenue South
New York, NY 10010
(212) 505-2100

A Proposal for

State-level Refrigerant Recycling

February 17, 1989

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REDUCING REFRIGERANT EMISSIONS THROUGH A STATE-LEVEL PROGRAM

SECTION 1. OBJECTIVES

The use of chlorofluorocarbons (CFCs) as refrigerants in air conditioning and refrigeration systems represents approximately 45% of the total volume of CFCs utilized in the United States. Refrigerants are used in automotive, commercial and home air conditioning systems and retail and home refrigerators. Typically, these refrigerants are vented to the atmosphere when a unit is serviced and repaired, or dismantled and crushed at disposal. Chlorofluorocarbons are ozone-depleting chemicals that are responsible for the destruction of stratospheric ozone and are also one of the most potent gases contributing to the greenhouse effect. As of 1986, the estimated worldwide "bank" size of unreleased CFCs is 3.7 billion pounds.

Currently, the U.S. Environmental Protection Agency is requiring U.S. producers of CFCs cut their production back to 1986 levels to fulfill the Montreal Protocol, an international agreement signed and ratified by the United States and other countries. The agreement calls for scheduled cuts of five CFCs and three halons so that by 1998 worldwide production of these chemicals is 50% of 1986 levels.

Controlling the emissions of refrigerants is a sensible scheme for minimizing damage from the release of ozone-depleting chemicals currently in use. Non- or low-depleting substitute chemicals such as hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs) and blends currently being developed to replace CFCs, will also contribute to the greenhouse effect, which makes emission control of these chemicals extremely important as well.

Equipment, known as "vampires", can pump refrigerant out of air conditioning or refrigeration units, eliminating the venting of refrigerant to the atmosphere. In some cases, this equipment can also purify the refrigerant for reuse. Currently, the Air-Conditioning Refrigeration Institute (ARI) has approved a purity standard for recycled refrigerant from air conditioning and refrigeration units. The Motor Vehicle Manufacturers Association (MVMA) has conditionally approved a standard for refrigerant used in automotive air conditioners and the Society of Automotive Engineers (SAE) will be adopting the purity standards for automotive air conditioners. Underwriters Laboratories can certify recovery and recycling equipment that meet the standard for automotive air conditioners.

Simple work practice changes, including using vampires to recycle refrigerants on-site, would reduce unnecessary use of refrigerant, thereby substantially cutting needless emissions. Also, recovery and recycling of CFCs would lessen the economic impact of the federally scheduled cuts in CFC manufacture by producing an additional supply of currently regulated CFCs. State or local-level control strategies to reduce CFC emissions should be

comprised of the following program elements.

SECTION 2. REFRIGERANT EMISSIONS REDUCTION TRAINING WORKSHOPS

2.1 The purpose of training workshops is to educate users of refrigerants about the economic opportunities for refrigerant recycling as the price of refrigerants rises in response to federal regulations and the introduction of new non- or low-ozone depleting refrigerants, or other alternatives, to the marketplace. These workshops should provide an overview of the stratospheric ozone depletion problem, the framework of international agreements (i.e. the Montreal Protocol), important federal regulations, refrigerant recovery equipment and their use, future substitute chemicals, and any applicable state programs. In addition, the environmental risk and health and safety implications of managing future alternatives should be explained to owners and operators of businesses who will be changing their work practices to reduce refrigerant emissions.

2.2. States should set up programs whereby training workshops are developed for owners and operators of businesses that use and emit refrigerants during service, repair or disposal of all air conditioning or refrigeration units. They could be developed in conjunction with state chapters of appropriate trade associations such as the Motor Vehicle Manufacturing Association (MVMA), the Mobile Air Conditioning Society (MAC Society), and the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE). These workshops could also be administered by university cooperative extension programs, adult learning centers, etc.

SECTION 3. REFRIGERANT EMISSIONS REDUCTION PROGRAM

3.1. MANDATORY USE OF REFRIGERANT RECOVERY EQUIPMENT DURING REPAIR AND SERVICE OF AUTOMOTIVE AIR CONDITIONERS

3.1.1 Service centers for large motor vehicle fleets, those that work on more than __ vehicles a day, should include, but not be limited to, municipal and private bus fleets, van companies and automobile dealerships. Private businesses and public agencies that operate such fleets and periodically renew their state business permits or licenses should be required to show proof of purchase of refrigerant recovery equipment as a prerequisite to renewing their state business permit or licenses. In addition, the owner or operator should show proof of completion of a training workshop as described in Section 1.1 for permit or license renewal.

Those businesses that are permitted by local municipalities, such as taxi and limousine companies and car and rental agencies, that work on more than __ cars per day, should also be required to show proof of purchase of refrigerant recovery equipment and the completion of a training workshop as described in Section 1.1 as a prerequisite to renewal of the municipal business permit or license.

3.1.2. Small repair shops that operate on less than __ cars per day and that are registered with the State should also be required to participate and complete a training workshop as described in 1.1 as a prerequisite to renewing their state registration. Mandatory purchase and use of refrigerant recovery equipment could be required unless undue economic hardship could be proven. Currently, vampire prices begin at \$1500 per unit.

3.2. TRAINING OF COMMERCIAL AIR CONDITIONER AND RETAIL FOOD REFRIGERATOR CONTRACTORS

All owners and operators of businesses that service commercial air conditioning systems and/or retail food refrigerator units should be required to attend and complete the State training workshop as described in Section 1.1 in order to renew their state or municipal business license or permit.

3.3. IMPROVED WORK STANDARD PRACTICES

3.3.1.--AUTOMOTIVE AIR CONDITIONERS

Improved practices that prevent venting of refrigerants, including CFC-12, HCFC-22, and any new hydrofluorocarbons, hydrochlorofluorocarbon refrigerants or blends, during servicing and repair procedures as developed by the Society of Automotive Engineers (SAE) and/or the Mobile Air Conditioning Society should be incorporated into appropriate State and local codes. Such practices should include but not be limited to:

3.3.1.1 Pumping down refrigerant into receiver tanks during repair sessions and using recycled refrigerant when and where possible;

3.3.1.2. Using alternative agents to conduct leak tests; and

3.3.1.3. Installation of shorter and less permeable hoses.

3.3.2.--COMMERCIAL AIR CONDITIONERS AND RETAIL FOOD REFRIGERATORS

Steps to minimize emissions of refrigerants, including CFC-11, CFC-12, CFC-502, HCFC-22, new hydrofluorocarbons and hydrochlorofluorocarbon refrigerants or blends, during servicing and repair of commercial air conditioning systems and retail food refrigerators and freezers should be enacted into state codes applicable to heating, air conditioning and refrigeration contractors. Such steps should include, but not be limited to:

3.3.2.1. Eliminate the practice of using refrigerants for leak detection purposes in refrigerators and air conditioners. Other alternative agents should be used where possible, including nitrogen with trace amounts of refrigerant.

3.3.2.2. Eliminate practice of using refrigerants to clean refrigerator and air conditioning systems.

3.3.2.3. New installations (or installations being serviced with new components) should have receiver tanks sized to contain the system's full charge and be equipped with adequate isolating valves to minimize venting of refrigerant during servicing.

3.3.2.4. When serviced, the charge in an air conditioning or refrigeration system should be pumped down and contained in a receiving tank to prevent venting or refrigerant to the atmosphere where possible.

3.3.2.5. Wherever and whenever possible, refrigerant should be reused if it meets acceptable American Refrigeration Institute purity standards. Certified refrigerant recovery systems should be used to purify refrigerant for reuse.

[These steps are adapted from the Heating, Refrigerating and Air Conditioning Institute of Canada. These steps could be incorporated into appropriate state codes, until forthcoming American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) guidelines are developed.]

SECTION 4. RESEARCH OPPORTUNITIES FOR REFRIGERANT RECOVERY AT DISPOSAL OF AIR CONDITIONING AND REFRIGERATION UNITS.

4.1. Regulatory measures for the control of CFC emissions at the time of disposal of air conditioners and refrigeration units should also be considered and researched by the appropriate State economic development agency and/or recycling department. Such measures could include inducing a CFC producer (if one is located within the state or region) to initiate a pilot program for recovery of refrigerant from automotive air conditioners by private salvage yards, dismantlers and mobile car crushers. A "milk run" operation would need to be started to pick up canisters of recovered refrigerant and deliver the refrigerant to the central recovery facility (CRF), solvent-recovery business or CFC producer for purification.

This program could easily be coordinated with initiatives concerning other recyclable materials, such as automotive batteries and used oil. Alternatively, if a state program already exists that covers recyclables from discarded automotive vehicles, refrigerant could be included as a recyclable that should be recovered, purified and placed on the market for resale.

4.2. A facility that undertakes large-scale refrigerant reclamation, an industrial process similar to solvent recovery, would be beneficial to a state for several reasons. Primarily, a CRF that purifies refrigerants could receive recovered refrigerant that is too contaminated for on-site purification or from businesses unable to use vampires. The CRF could purify the refrigerant and facilitate the resale of "recycled" refrigerant to business consumers.

The appropriate State agency should research and report to the Governor or Legislature on economic development opportunities available to the State for either setting up a regional or state CRF, or assisting interested companies or existing CFC producers located within the state or in the region to make necessary investments in recycling equipment for large scale, off-site refrigerant purification.

SECTION 5. PROHIBIT THE MANUFACTURE, SALE AND USE OF CFC-BASED AEROSOLS OR CANNED CHLOROFLUOROCARBONS.

5.1. CFC-12 used in aerosol applications, such as over-the-counter cleaning fluid in photographic or computer applications, should be listed by the appropriate State agency and prohibited by state law from being manufactured, sold or used within the state.

5.2 CFC-12 sold in over-the-counter recharge canisters for automotive use should be only be sold with high quality shut-off valves to minimize loss of refrigerant. Those canisters without valves should be phased out from sale within a state over a period of time to be determined, in conjunction with the phase in of canisters with shut-off valves over the same period of time.

For more information, the following EDF publication is available at a cost of \$2.00 from EDF's New York City office. "Protecting the Ozone Layer: What You Can Do--A Citizens' Guide to the Reducing the Use of Ozone Depleting Chemicals". Write to: Ozone Booklet, EDF, 257 Park Avenue South, NY, NY 10010.

RESOURCES AND REFERENCES FOR REFRIGERANT RECYCLING

A. Source Materials

1. Montreal Protocol on Substances that Deplete the Ozone Layer. (1987). United Nations Environment Programme.
2. Protection of Stratospheric Ozone Final Rule. U.S. Environmental Protection Agency. Volume 53 Federal Register 30566, Friday August 12, 1988.
3. Present State of Knowledge of the Upper Atmosphere 1988: An Assessment Report. National Aeronautics and Space Administration Reference Publication 1208. August 1988.
4. Assessing the Risks of Trace Gases That Can Modify the Stratosphere. 1987. U.S. EPA 400/1-87/001A. (Five Volumes).
5. U.S. Environmental Protection Agency, Stratospheric Ozone Protection Program. "How Industry is Reducing Dependence on Ozone-Depleting Chemicals." 1988.

B. Trade Associations

1. Mobile Air Conditioning Society. Upper Darby, Pennsylvania
2. Motor Vehicle Manufacturers Association. Detroit, Michigan
3. Society of Automotive Engineers. Warrendale, Pennsylvania
4. Air-Conditioning and Refrigeration Institute. Arlington, Virginia
5. American Society of Heating, Refrigerating and Air-Conditioning Engineers. Atlanta, Georgia and Washington, D.C.
6. Association of Home Appliance Manufacturers. Chicago, Illinois and Washington D.C.

C. A Sampling of Refrigerant Recycling Equipment Manufacturers

1. Van Steenburgh Engineering Laboratories, Inc. Denver, Colorado
2. High Frequency Products. Miami, Florida
3. Quadrex. Gainesville, Florida
4. Refrigerant Recovery Systems. Tampa, Florida
5. ThermaFlo. Springfield, Massachusetts
6. Draf Tool Company. Bedford Hills, New York
7. Robinair Way. Montpelier, Ohio
8. White Industries. Indianapolis, Indiana
9. Murray Corporation. Cockeysville, Maryland.
10. Applied Ecological Systems. Hazelhurst, Georgia
11. Davco Manufacturing Company. Morristown, New Jersey
12. Corporate Consultants. Abilene, Texas
13. Custom Auto Air & Sound. Jacksonville, Florida.
14. Refrigerant Recovery Systems. Tampa, Florida.

U.S. 1985 PROMPT CFC EMISSIONS
FROM REFRIGERATION UNITS

1985 CFC-12 Emissions from Mobil Air Conditioners

Manufacturing/Installation...	1,046 metric tons
Disposal.....	1,375
Normal Leakage.....	7,251
Abnormal Leakage.....	3,946
Recharge.....	4,184
Service.....	11,370
Accidents.....	3,430
TOTAL.....	32,603

1985 CFC-11, -12, -114, -500 Emissions from Chillers

Manuf/Instal.....	264 metric tons
Disposal.....	820
Leakage/Use/Service.....	7,550
TOTAL.....	8,634

1985 CFC-12, -502, -22 Emissions from Retail Food Refrigerators

Manuf/Instal.....	434 metric tons
Disposal.....	3,610
Leakage/Use/Service.....	4,880
Total.....	8,924

1985 CFC-12 Emissions from Home Refrigerators

Manuf/Inst.....	110 metric tons
Disposal.....	1,620
Leakage/Use/Service.....	350
Total.....	2,080

Sources: Radian Corporation for Office of Air and Radiation, U.S. Environmental Protection Agency. 1987. Draft Regulatory Impact Analysis: Protection of Stratospheric Ozone. Volume III: Addenda to the Regulatory Impact Analysis Document. Parts 3: Mobile Air Conditioning and 4A & B: Refrigeration.

U.S. 1985 PROMPT CFC EMISSIONS BY UNITS AND USES
(metric tons)

EMISSION SOURCE	MACs	CHILLERS	RETAIL REFRS	HOME REFRS
Manuf/Instal	1046	264	434	110
Disposal	1375	820	3610	1620
Leakage/Service	26751	7550	4880	350
Total	32603	8634	8924	2080

CUMMULATIVE UNRELEASED EMISSIONS OF CFC-11 and -12 AS OF 1986

CFC-11.....911.6 million kg

CFC-12.....783.7

Total.....1,695.3 million kg; 1.695 million metric tons; 3.7 billion pounds

Unreleased (banked) emissions of CFC-12 and -11 accumulate at a rate of approximately 65,000 metric tons (143,000 pounds) per year.

Source: Chemical Manufacturers Association. 1987. 1986 Production and Sales of Chlorofluorocarbons of CFC-11 and CFC-12.



U.S. Public Interest Research Group

National Association of State PIRGs

March 1, 1989

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Mr. Rick Adcock
Office of Senator Albert Gore
393 Russell
Washington, D.C. 20510

Dear Rick,

The following are recommendations regarding recovery and recycling programs for Halons used in fire protection equipment and CFCs banked in automobile air conditioners. Mr. Paul Huston of the Amerex Corporation was extremely helpful in giving me an overview of Halons used in the fire protection industry. [See attached letter.]

Halons

The use of Halons in fire protection equipment is declining as equipment manufacturers shift away from non-essential use of the chemical and encourage recovery and recycling of existing stocks. Replacement chemicals will not be available for 7-10 years. Recycling is relatively easy and becoming increasingly cost effective. Halons currently cost approximately \$3/lb. wholesale, and it is probable that a closed recovery system saves about 1.25 lbs. per recharge. There are recharge units currently on the market for about \$4,000 - \$5,000 and more under development. The cost of the units is expected to drop to the \$1,400 range as the market expands and more manufacturers enter the market in the near future.

Three Types of Fire Protection Units

There are essentially three types of Halon fire protection units. The largest are stationary, commercial systems installed in highly sensitive areas

such as avionics manufacturing plants and computer rooms (the Bell system is protected by Halon units). Some of these uses are nonessential. For example, the Air Force uses Halon units at some fueling docks and repair stations where other chemicals would suffice. For most of these units however, there are no suitable alternative chemicals that will extinguish fires without damaging sensitive equipment.

The second type of Halon extinguisher is the large (150lb) portable wheeled unit used primarily for aircraft fire protection. The Department of Defense has 20,000 of these units, and the Navy has purchased 12 recycling/ recharge systems in order to begin closed unit recovery.

The third type of unit is the small, hand-held extinguisher most often used by the general public. Some are relatively large and rechargeable, e.g. the type mounted on building walls. Others are small and nonrechargeable, e.g. those used in boats and aircraft cockpits.

Essential Use Strategy

The largest discharges of Halons from fire protection equipment occur during training and servicing. Halons used in actual firefighting are largely consumed by the fire. According to Mr. Huston at Amerex, Inc., the nation's largest manufacturer of Halon firefighting systems, the major manufacturers and distributors of Halon units have endorsed an "essential uses" strategy. The elements of this strategy endorsed by the National Fire Protection Association (NFPA), include:

- cease production of small non-rechargeable halon units, except for large boats and aircraft (as required by FAA regulations);
- alternative training programs - training videos depicting the performance capabilities of large portables, substitution of dry chemical and water for actual training exercises;
- require closed recharge and recovery systems;
- temporarily adjust the required preventative maintenance "teardown" schedule for large portable units, from one teardown per 6 years to one per 12 years, until non ozone-depleting substitutes are developed;

These appear to be sound recommendations for federal policy. They have been under development for about 5 years and have been reviewed by NFPA committee members that include insurers, firefighting personnel, halon producers, as well as the equipment manufacturers.

Federal legislation should also preempt state laws, military specs and insurance rules that require live testing of halon units. The NFPA alternative testing recommendations appear to be sound. Since the military is one of the largest users of portable Halon equipment, federal legislation should cover all federal agencies.

I hope you find this information helpful. For your further information, I have attached documents I have received from Amerex Inc.. I will contact you soon with regard to automobile air conditioners. Please call if I can be of further assistance.

Sincerely,

A handwritten signature in cursive script, appearing to read "Bill Walsh".

Bill Walsh
Staff Attorney



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To: Rick Adcock
Fr: Bill Walsh
Re: Mobile Air Conditioner Recycling

March 6, 1989

Most CFC recovery systems currently available gather the materials into a vacuum cylinder which are collected by a company for recycling and return. The entire process costs approximately seventy to eighty cents per pound. For large refrigeration units, a 24 hour monitoring devise is available that can detect any systems leak within ten minutes and pump the refrigerant out of the entire system as soon as the leak is detected. Because the devise is very sensitive and small leaks could trigger the shut down of entire system, these recovery systems are not widely used.

Most currently available mobile air conditioner servicing machines simply filter the refrigerants and return them to the system. Without removal of the water moisture, it becomes highly caustic and can eventually ruin the refrigeration system. The refrigerants need to also be cleaned to meet the standards agreed upon by the Mobile Air Society and the Environmental Protection Agency and Underwriters Laboratory.

These proposed standards allow for recycled auto air conditioner refrigerants to contain the following maximum amounts: 15ppm by weight of moisture, 4,000ppm of oil, and .15 grams of noncondensable gas per pound of refrigerant. Underwriters Laboratories states that certification will require the above standards, as well as requiring the machines to have indicators to alert the operator when the recycling process is finished, incorporate a desiccant filter system of 15 microns or less to control the size of particulates that remain in

the system to be replaced when it becomes saturated, and that the filter have a 5% by weight acid neutralization capability. These proposals are going to be used to evaluate equipment because there is not a large likelihood that they will be changed. Although some companies claim their equipment does the job, as of February 23, 1989 no CFC recycling equipment has been approved by Underwriters Laboratories.

The manufacturers anticipate the new technology will be available between May and mid-September of 1989. These dates are dependent on the approval of the underwriters laboratories. One model that is expected to receive early UL certification can be purchased for approximately \$2,500. It will draw out the refrigerant, clean/recycle it and replace it into the system. There is also a \$5,000 machine that has diagnostic functions, e.g. leak detection, in addition to recycling and cleaning functions.

Mobile Air Society Position on Recycling

The Mobile Air society backs mandatory recycling, with a three year phase in period and prohibition of do-it-yourself kits. They believe the three year period will be necessary in order to meet the market demand for recycling machines. They do not support deposit fees and believe there will be a sufficient market incentive for recycling as the price of CFCs increases. Mr. Simon Oulahoian is co-chair of the Mobile Air Society. His telephone number is 215-352-4600

include in Industry
Review — is
Equip. (Users) Point

↑ Comm for Respon Regul. of CFCs
represents Producers



Amerex Corporation

P. O. Box 81

Trottsville, AL 35173-0081

(205) 555-3271

TELEX 702547

FAX: 2056553279

February 28, 1989

Mr. Bill Walsh
U.S. Public Interest Research Group
215 Pennsylvania Avenue Southeast
Washington, D. C. 20003

Dear Mr. Walsh,

It is my understanding your organization is working in cooperation with Senator Gore's committee investigating CFC's and Halons. In accordance with our telephone conversation there is enclosed appropriate information on Halon conservation efforts by the fire protection industry with respect to portable fire extinguishers.

The term "Halon" as used by EPA and the Montreal Protocol refers strictly to the fire fighting agents Halon 1211, Halon 1301 and the rarely used Halon 2402. Halons comprise only a small percentage of the total halogenated chlorofluorocarbon chemicals that are suspected of having ozone depletion potential; however, the fire protection industry is making a serious, earnest effort to reduce agent emissions to fire extinguishment only and Halon extinguisher applications to essential uses.

There is a general opinion that the fire protection industry is a well regulated industry. It is, in fact, thoroughly regulated. The following is a brief description of how portable fire extinguishers are controlled:

1. NFPA-10, Standard for Portable Fire Extinguishers.. covers the selection, installation, inspection, maintenance and testing of portable fire extinguishers. NFPA-10 requires extinguishers must meet the design and performance requirements of the appropriate ANSI/UL standards. These standards require each manufacturer to provide an owner's manual and a service and re-charging manual. Where NFPA-10 requires Halon recovery in a closed system, U/L and other third party certification laboratories require service manuals to be revised to show the appropriate procedures.
2. The Independent Third Party Certification Laboratories which list and label portable fire extinguishers maintain a constant in-plant surveillance of extinguisher manufacturers' product to insure quality and performance is maintained.



3. Many, if not most, state and local authorities have adopted NFPA-10 and inspect and enforce compliance to it. Some states have satisfactory equipment servicer licensing regulations. NFPA-10L is a model enabling act for licensing fire extinguisher servicers. The fire extinguisher servicers are normally referred to in this industry as Fire Equipment Distributors. Many states do not have servicing company licensing procedures based on equipment and training requirements as given in NFPA-10L.

Summarizing the above...selection, installation and servicing is controlled by NFPA-10 which also requires compliance to ANSI/UL design and performance standards. Equipment quality and performance is monitored by third party certification labs such Underwriters Laboratories, Inc., Factory Mutual System and Underwriters Laboratories of Canada.

Other groups which are very active in the portable fire protection industry are (FEMA) Fire Equipment Manufacturer's Association, (NAFED) the National Association of Fire Equipment Distributors, (HRI) Halon Research Institute, and the National Fire Protection Research Foundation. The DOD is a major user of portable and wheeled Halon fire extinguishers. This includes all services: U.S. Air Force, U.S. Navy, U.S. Marine Corps, U.S. Army and the U.S. Coast Guard. These organizations require compliance in most cases to ANSI/UL standards and apply and maintain portable extinguishers in accordance with NFPA-10 requirements. Specific military applications are not specified in NFPA-10.

Since the discovery of the possible ozone depletion potential of Halon fire fighting agents, all of the organizations previously mentioned in this correspondence have been diligently learning and practicing the techniques of Halon conservation. Some of these accomplishments are outlined below:

1. Halon recovery/recharging procedures and recovery equipment developed. Major Halon conservation seminars given by FEMA and NAFED to Fire Equipment Distributors nationwide.
2. All manufacturing service procedures and NAFED service procedures upgraded to latest Halon conservation technology. Halon recovery equipment developed and put into use.



3. Halon Research Institute formed. Serious comprehensive programs started to eliminate emissions of Halon agents for non-fire extinguishment purposes. Define and eliminate Halon agents use in non-essential applications.
4. Eliminate the use of Halon agents for fire training exercises. Significant quick response has been received to reduction and elimination of fire training with Halon. The military is to be specially commended.
5. Introduce Halon conservation requirements into existing standards and codes. Some were placed in NFPA-10 1988. See proposals for NFPA-10-1990. The purpose is to require through these existing regulations strict conservation practices.
6. Eliminate Halon emissions in agent manufacturing and extinguisher manufacturing plants. ANSI/UL procedures have been changed. Industrial recovery and Halon cleaning equipment is on board in many plants. Plant emissions are extremely small.
7. Develop a means of returning sub-standard Halon from field use back thru the supply chain for proper refurbishment or disposal. See Amerex "Stop Discharging Halon In Your Shop"...an attempt to provide an extra incentive to the distributor industry to practice Halon conservation. Note: There has been only a small amount of field contaminated Halon. It was caused by improper charging techniques. Wherever found, advice was given and the problem eliminated.

Where do we go from here? The aim of the industry is to develop clean Halon-like agents which are environmentally acceptable. The attempt will be to develop agents that are retrofitable into the existing portable extinguishers standing by for use around the country. We think this is a reasonable goal. When such an agent is available we intend to reinstitute the six year tear down and internal inspection in NFPA-10. In this way, we could recover the Halon 1211 in the so-called "Bank" of existing extinguishers and return it to the agent manufacturer for remanufacture into some environmentally acceptable agent or chemical, or dispose of it in an acceptable manner. Halon 1211 supply containers are constantly being shipped between agent manufacturer, extinguisher manufacturer and the distributor - so the above is feasible.



Improved training programs in the form of Video, slides or with alternate agents such as water are starting to be used to build the skills of industrial fire teams and professional fire fighters.

There has been a great deal of effort to bring the professional fire service aboard on Halon conservation. There are many areas where they consider Halons essential to life safety and protection. There are many businesses which would have serious disruption, set backs or loss of jobs if the wrong agents were used to protect sophisticated equipment.

The fire protection industry has used the time since the realization of the ozone problem to make significant gains in Halon conservation. We are continuing these efforts and hopefully will exchange the portable fire fighting agents used today with environmentally acceptable alternates. If we are allowed to continue our efforts without major disruption then I believe the goals are achievable, and the hundreds of thousands of people in the industry will enthusiastically and energetically cooperate. The constant evolution of Halon conservation requirements in the NFPA standards is an excellent way to accomplish this end.

We appreciate any opportunity to supply information to your Halon research efforts. Your time schedule for receipt of this correspondence was rather short, and there is much more that can be said.

I and many of the HRI and National Fire Protection Research Foundation Halon Technical Advisory Committee members will be in Washington the week of April 10. The Congressional Fire Services Institute dinner is April 12 in the evening. If I can be of assistance, time could be allowed for a meeting. Mr. Carl Jewell, President of HRI, is knowledgeable about Halon 1301 and systems applications. He would also be glad to be of assistance in supplying information.

Sincerely yours,

Amerex Corporation

Paul O. Huston

Paul O. Huston
Vice President - Government Sales

poh/jp



NATIONAL ASSOCIATION OF FIRE EQUIPMENT DISTRIBUTORS INC.

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Executive Director, Joe Ziembra

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NATIONAL FIRE PROTECTION RESEARCH FOUNDATION

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Committee on Portable Fire Extinguishers

NFPA STAFF LIAISON, MARK CONTOY

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Legal Counsel for FEMA and HRI

Mr. George Keeley

PLEASE REFER TO
OUR FILE NO.



Halon Research Institute

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111 East Wacker Drive, Suite 600
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Executive Director, Joe Ziembra

312-644-6610

FAX 312-565-4658



Executive Director, John Addington, FEMA

FIRE EQUIPMENT MANUFACTURERS' ASSOCIATION, INC.

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Paul Huston V.P. Government Sales

Ned Paine President

Amerex Corporation

P. O. Box 81

Trussville, AL 35173-0081

(205) 655-3271

TELEX: 782547

FAX: 2056553279

Conde Line

① Amend Fed. Hazz. Substances Act
to include this stuff -

↳ Administered by Consumer Products
Safety Comm. + that goes
to Consumer Subcomm.

add something -- for carcinogens --

Leadings will go to CPSC --

② "Beverage Recycle Bill" -- was
administered by EPA but because
of LABELING it helped to go to Commerce

③ "Toy Gun Bill" -- came to Consumer Sub
because of interstate commerce provision

④ Dvorak -- refuses to go to Consumer
+ do so by first getting rid of
FINDOMAS

* Consumer Product Labeling & Recycling Bill
* Get "Preliminary Read" from Subcommittee

Overall, also Ser.

Evaluate the "Change in consumer products"

M E M O R A N D U M

DATE: March 2, 1989

TO: Al

FROM: Rick, Marla

SUBJECT: Legislation on near-term, no-cost-to-low-cost
means to reduce emissions of CFCs and halons

A great deal (EPA is calculating an exact number for me) of the CFCs and halons that have ever been produced in the U.S. are currently still out there, being used in applications that include air conditioners, refrigerators, chillers, rigid insulating foam, fire extinguishers, and soft foam used in furniture. You could introduce legislation that promotes near-term reductions in the amount of those CFCs and halons that escape to the atmosphere.

The logic of this can be presented in the following light: all the talk so far has concerned production phaseouts -- the long-term solution. The EC announcement yesterday, and the possible U.S. position, both fall within this approach. BUT, there are also steps that we can take between now and the time of the production phaseout. Near-term, no-cost-to-low-cost measures that will reduce the release of these damaging chemicals to the atmosphere.

That's what the new Gore legislation that I've been describing will do -- introduce many low-cost-to-no-cost steps that can be taken, that simply make common sense:

(1) Encourage recapture and recycling of CFCs. For example, the next time that your auto air conditioner, refrigerator, etc., are repaired, the mechanic should drain out the freon (CFC) into a sealable jar (recapture), then return the freon to an approved facility for purification (recycling). Presently, standard practice is to simply drain the freon into an open pan or, worse yet, pour it on the ground, either of which allows the CFCs to evaporate and rise to the stratosphere where it destroys ozone.

Recycling standards were approved by the industry just last fall, and now are awaiting only certification by Underwriters Laboratories.

This will obviously require some mechanism to encourage wise handling of CFCs -- a \$5/lb deposit fee has been talked about here.

(2) Develop alternative fire extinguisher (halon) testing procedures -- current procedures simply require discharging the halons into the open air. An alternative procedure could be developed to test the fire extinguisher without halon release each time. (Halon also destroys ozone in the stratosphere.)

(3) Ban the sale of do-it-yourself cans of freon (CFCs), used to recharge air conditioners. This would, for example, require folks to get the leak in their auto air conditioner repaired, rather than just recharging it every few days. In addition, aircraft-quality hoses and fittings could become standard equipment on auto air conditioners.

(4) Promote the use of alternative insulators to reduce the consumption of rigid insulating foam (made with CFCs); be aware that one of the applications of these CFC-based insulators is in the walls of refrigerators.

In addition, promote use of alternative technologies that produce soft foam (urethane) that don't use CFCs -- i.e., phase out the CFC-based production process. Union Carbide announced just such an alternative technology just last fall.

These are just a few of the measures that could be taken to effectively cut down on CFC emissions between now and the time of a complete phaseout. Remember that because CFCs are so long-lived, in order to just stabilize the atmospheric level of ozone-destroying chlorine (from CFCs), we would have to cut back immediately to only 15% of our current rate of emissions. But that level still destroys ozone, just like today. Thus, to stop ozone depletion, we have to attain a 100% emissions reduction as soon as possible.

Another fact: Currently, there are 2.7 parts-per-billion of chlorine in the stratosphere. Even under the present Protocol, we will increase that level to 6-8 ppb chlorine by the end of the next century (2100).

To keep us at 2.7 ppb, we need to phase out CFCs in 2000, and freeze methyl chloroform immediately. Under these conditions, chlorine in the stratosphere would rise to about 4 ppb during the 1990s, then drop to 2.7 ppb by the end of the century.

Remember that we have a lot of CFCs "in the bank." In other words, in addition to the CFCs in applications right now,



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Transmittal Record

TO:

RICK ADCOCK

SEN. GORE

FROM:

BILL WALSH

U.S. PIRG

RE:

SAFE ALTERNATIVES BACKGROUND

TOTAL # OF PAGES, INCLUDING THIS PAGE: _____

6

FAX # (202) 546-2461

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SAFE SUBSTITUTES FOR OZONE DEPLETING CHEMICALS

I. SUMMARY

The need to ban ozone depleting chemicals comes at a time when the global environment is under severe stress from greenhouse gases, acid rain, widespread chemical use and toxic waste. A short sighted substitution policy could compound this stress either by resurrecting hazards that existed prior to the introduction of non-toxic, non-flammable CFCs, or by adding new or unforeseen hazards to human health and the environment.

Some added environmental stress is inevitable since most available chemical substitutes pose some hazard to human health and the environment. However, if we are to make environmental progress rather than simply shift the focus of environmental degradation, the United States' strategy for banning ozone depleting chemicals must include a commitment to safe alternatives that:

1. Prohibits replacement of ozone depleting chemicals with substitutes that are themselves environmental or health hazards, where truly safe alternatives exist. [E.g. Leading electronics manufacturers such as IBM and Digital Equipment are replacing CFC-113 (used to clean circuit boards) with aqueous cleaning solution, less toxic chemicals, and new production techniques that reduce the need for cleaning. We should prohibit the replacement of non-toxic CFC-113 with highly toxic chlorinated solvents where the safe alternatives are applicable.]
2. Spurs innovation and long term R&D of alternatives whose development has been stifled to date by the low cost of CFCs. While it may be necessary to accept slightly more dangerous chemical substitutes for refrigeration and air conditioning in the short term, we should provide incentives for the serious investigation of options such as helium systems and automobile design innovation.

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II. THE UNITED STATES DOES NOT HAVE AN OFFICIAL POLICY WITH REGARD TO THE SAFETY OF SUBSTITUTES FOR OZONE DEPLETING CHEMICALS.

The Bush Administration has qualified its support for international efforts to ban all production of CFCs by the year 2000 with the proviso that "safe substitutes are available." [Wall Street Journal, 3/6/88]. This is a valid concern. Many chemical substitutes for CFCs that are expected to prove harmless to stratospheric ozone have been found to be toxic to humans or potentially explosive. For example, chlorinated compounds [methyline chloride, methyl chloroform, carbon tetrachloride, perchloroethylene, and trichloroethylene] that could replace CFC-113 as an industrial solvents are among the most toxic and heavily regulated chemicals in commercial use. They are also themselves ozone depleting chemicals, whose low ozone depletion factor could be magnified by increased industrial usage.

The Bush Administration has not proposed a policy that would ensure maximum protection of public health and the environment without delaying the needed phase-out. We cannot afford to allow an ambiguous commitment to safe substitutes delay the CFC ban in the same way the incessant study of acid rain has delayed meaningful action to curb on sulfur dioxide emissions.

Without a clearly defined safe substitution strategy that complements stringent phase-out deadlines, the ban will be held hostage to research now underway by CFC manufacturers. CFC producers have already been criticized for abandoning ongoing research into

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3.

alternatives during the early 1980's thereby delaying. Actual and apparent conflicts of interest are predictable as these companies seek to capitalize on the high demand and limited supplies of both the chemicals subject to the phase-out and their replacements during the initial years of transition.

Ad hoc determinations by the Administration regarding the safety of proposed substitutes are inefficient and carry a high potential for abuse. The universe of potential substitutes for various uses of CFCs is evolving. The relative merits of possible substitutes change against the backdrop of increasing ozone depletion and continuing research into other alternatives. For example, substitutes under development to replace mobile air conditioner coolants have toxicity and flammability problems. These problems might not be as significant if automakers agreed to make minor modifications to vehicles that would reduce the load on cooling systems [better ventilation and heat resistant glass] or repositioning air conditioners away from the engine.

III. ELEMENTS OF AN EFFECTIVE SAFE ALTERNATIVES POLICY

An effective Safe Alternatives Policy will deter the introduction of unsafe substitute chemicals as replacements for ozone depleting compounds by providing incentives for the introduction of chemicals and alternative procedures that reduce overall risks to public health and the environment. Such a policy would have three elements:

1. An annual report from EPA to the Congress that reviews credible, objective sources of information concerning substitute chemicals and alternative manufacturing processes

that are potential replacements for ozone depleting chemicals. The report would identify known or suspected health and environmental hazards associated with each and the earliest date upon which each is expected to be commercially available.

2. The report shall identify any alternative production process, product or raw material that reduces, avoids or eliminates the use of toxic or hazardous substances.
3. Where such an alternative is commercially available, the EPA or the Congress shall prohibit the replacement of ozone depleting compounds, with chemicals that may present adverse effects upon public health or the environment. [These may be identified through existing OSHA or EPA lists such as those developed under the federal Community Right-To-Know Act.]
4. Where such an alternative is not commercially available in the near term, the EPA shall recommend whether long term research and development should be supported in order to accelerate the development of promising technologies.

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Estimated Cancer Deaths for All Sites Plus Major Sites, by State—1989

STATE	ALL SITES		MAJOR SITES								
	Number of Deaths	Death Rate per 100,000 Population*	Female Breast	Colon & Rectum	Lung	Oral	Uterus	Prostate	Skin Melanoma	Pancreas	Leukemia
Alabama	8,900	214	700	950	2,600	125	200	550	100	425	300
Alaska	500	221	30	50	150	10	10	20	10	25	10
Arizona	6,500	180	550	700	1,800	100	50	400	70	300	225
Arkansas	5,600	190	350	600	1,800	60	100	300	80	300	225
California	50,000	181	4,400	5,500	14,100	950	900	2,800	700	2,500	1,800
Colorado	4,700	141	450	600	1,200	60	70	275	80	250	200
Connecticut	7,200	217	650	950	1,800	125	125	375	90	400	275
Delaware	1,400	250	125	175	450	10	20	60	10	60	50
Dist. of Columbia	1,700	264	175	175	400	70	60	125	10	100	50
Florida	32,500	182	2,500	4,100	9,800	600	400	2,100	400	1,600	1,000
Georgia	11,200	202	850	1,200	3,400	250	250	700	150	500	400
Hawaii	1,700	191	100	175	375	50	20	80	20	80	50
Idaho	1,800	158	150	175	400	20	25	125	30	100	80
Illinois	24,000	201	2,100	3,100	6,600	450	600	1,300	200	1,300	900
Indiana	11,500	217	950	1,500	3,500	175	300	600	125	550	425
Iowa	6,400	190	550	850	1,600	125	125	400	70	350	300
Kansas	4,900	171	425	650	1,300	90	100	350	50	275	225
Kentucky	8,400	207	650	1,000	2,800	125	175	425	80	375	300
Louisiana	8,800	212	650	900	2,800	150	175	475	80	450	300
Maine	2,800	199	225	400	800	40	60	175	20	150	90
Maryland	9,600	244	800	1,200	2,700	175	175	500	125	425	300
Massachusetts	14,100	220	1,500	1,900	3,500	250	275	750	175	650	475
Michigan	18,600	226	1,600	2,100	5,300	275	400	1,000	200	900	650
Minnesota	8,100	181	700	1,100	2,000	125	125	550	90	450	350
Mississippi	5,100	186	325	500	1,700	80	100	350	60	300	225
Missouri	11,800	196	950	1,500	3,400	175	250	550	125	550	450
Montana	1,600	186	150	175	375	20	30	100	20	100	70
Nebraska	3,300	173	300	450	800	40	70	200	40	200	175
Nevada	2,100	216	150	200	600	40	20	100	30	80	40
New Hampshire	2,100	197	200	250	550	30	40	90	30	100	70
New Jersey	18,100	230	1,600	2,500	4,900	325	375	950	225	900	550
New Mexico	2,300	168	200	250	500	30	40	150	20	125	70
New York	38,500	200	3,800	5,400	9,800	750	950	2,200	475	2,100	1,400
North Carolina	12,200	203	1,000	1,300	3,700	225	275	750	175	550	425
North Dakota	1,300	171	125	175	300	20	20	125	10	90	60
Ohio	24,000	227	2,100	3,100	7,300	400	600	1,300	250	1,200	850
Oklahoma	7,000	163	550	800	2,300	100	100	375	100	325	275
Oregon	5,900	198	500	650	1,800	100	75	350	70	300	225
Pennsylvania	29,500	221	2,600	4,000	7,800	475	700	1,500	350	1,400	1,000
Rhode Island	2,500	227	250	350	650	60	40	125	30	125	70
South Carolina	6,500	209	550	650	1,900	125	125	425	90	325	175
South Dakota	1,500	180	125	200	325	10	30	125	20	100	80
Tennessee	10,400	202	800	1,100	3,300	200	200	600	125	500	375
Texas	27,000	155	2,200	2,900	8,100	475	500	1,400	350	1,300	1,000
Utah	1,800	118	175	175	275	20	30	175	30	90	80
Vermont	1,200	196	100	150	275	20	30	70	10	60	50
Virginia	11,700	219	950	1,400	3,500	225	225	650	150	500	375
Washington	8,600	181	750	900	2,600	150	150	500	100	425	300
West Virginia	4,400	202	350	500	1,400	60	100	225	50	200	175
Wisconsin	10,000	197	950	1,300	2,500	125	175	650	90	500	425
Wyoming	700	128	70	75	175	10	10	30	10	40	30
United States	502,000	204	43,000	61,000	142,000	8,700	10,000	28,500	6,000	25,000	18,000
Puerto Rico	3,500	150	200	250	400	175	150	300	400	80	150

*Adjusted to the age distribution of the 1970 U.S. Census Population.

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NEW CANCER CASES—1989

Estimated New Cancer Cases for All Sites Plus Major Sites, by State—1989

STATE	ALL SITES*	MAJOR SITES								
	Number of Cases	Female Breast	Colon & Rectum	Lung	Oral	Uterus	Prostate	Skin Melanoma	Pancreas	Leukemia
Alabama	18,000	2,400	2,300	2,800	450	950	2,100	400	500	450
Alaska	1,000	150	125	150	40	20	100	50	20	10
Arizona	13,000	1,800	1,700	1,900	350	550	1,500	300	350	375
Arkansas	11,300	1,100	1,500	1,900	200	400	1,000	350	350	300
California	101,000	14,200	13,500	15,400	3,500	5,000	10,000	3,200	2,600	2,800
Colorado	9,400	1,500	1,500	1,200	225	450	1,100	400	250	250
Connecticut	14,400	2,200	2,300	2,000	450	600	1,400	400	375	375
Delaware	2,800	400	450	500	40	125	275	70	70	80
Dist. of Columbia	3,200	450	400	450	250	150	450	60	90	60
Florida	65,500	8,300	10,200	10,600	2,200	2,800	7,600	1,800	1,700	1,600
Georgia	22,500	2,800	2,900	3,700	850	1,100	2,400	600	550	600
Hawaii	3,300	350	450	450	150	150	275	80	90	80
Idaho	3,500	500	475	475	60	125	425	150	80	125
Illinois	48,000	7,000	7,800	7,400	1,400	2,400	4,700	950	1,300	1,300
Indiana	23,200	3,200	3,700	3,800	650	1,200	2,200	600	550	550
Iowa	12,700	1,800	2,100	1,800	400	550	1,500	300	375	375
Kansas	9,900	1,400	1,600	1,600	300	450	1,200	200	300	325
Kentucky	16,800	2,100	2,500	3,000	450	850	1,600	350	375	425
Louisiana	17,500	2,200	2,200	3,000	550	750	1,700	300	500	400
Maine	5,500	750	950	850	150	250	600	100	150	150
Maryland	19,300	2,700	2,900	3,000	650	800	1,900	550	400	450
Massachusetts	28,400	4,800	4,500	3,800	800	1,000	2,600	800	700	700
Michigan	37,400	5,500	5,300	5,800	1,000	1,700	3,600	900	950	1,000
Minnesota	16,400	2,300	2,600	2,100	400	650	2,000	400	450	450
Mississippi	12,000	1,100	1,400	1,800	300	600	1,200	250	325	300
Missouri	23,500	3,200	3,900	3,700	700	1,200	2,000	600	650	700
Montana	3,200	500	425	425	60	150	400	90	100	100
Nebraska	6,400	900	1,100	900	150	350	750	175	225	175
Nevada	4,100	500	500	750	150	175	375	150	90	70
New Hampshire	4,000	650	650	600	80	200	400	125	125	90
New Jersey	36,500	5,500	6,200	5,300	1,200	1,800	3,500	950	1,000	850
New Mexico	4,500	600	600	550	125	175	550	80	150	150
New York	77,500	12,100	13,200	10,900	2,500	4,000	7,900	2,100	2,300	2,000
North Carolina	24,500	3,400	3,200	4,000	900	1,300	2,700	750	700	700
North Dakota	2,700	400	450	325	70	125	450	40	90	90
Ohio	49,000	6,800	7,700	7,900	1,400	2,200	4,700	1,200	1,300	1,300
Oklahoma	14,000	1,800	1,900	2,500	400	550	1,400	500	425	450
Oregon	11,800	1,700	1,600	2,000	300	425	1,200	350	325	350
Pennsylvania	59,000	8,800	10,000	8,600	1,700	2,500	5,300	1,600	1,500	1,500
Rhode Island	4,900	700	900	700	200	200	500	150	150	100
South Carolina	13,000	1,900	1,700	2,000	500	750	1,500	400	350	250
South Dakota	2,900	425	500	375	40	125	350	80	90	100
Tennessee	21,000	2,600	2,800	3,500	700	950	2,200	500	550	600
Texas	54,500	7,300	7,200	8,800	1,800	2,600	5,000	1,600	1,400	1,700
Utah	3,500	550	450	350	100	200	600	100	100	125
Vermont	2,300	350	375	350	80	150	250	50	50	90
Virginia	23,500	3,300	3,400	3,800	800	1,100	2,500	700	600	600
Washington	17,300	2,500	2,300	2,800	550	850	1,800	500	500	450
West Virginia	8,900	1,200	1,200	1,500	200	375	800	200	250	250
Wisconsin	20,200	3,100	3,200	2,700	450	900	2,300	400	550	650
Wyoming	1,300	225	200	200	30	30	150	50	30	30
United States	1,010,000	142,000	151,000	155,000	31,000	47,000	103,000	27,000	27,000	27,000
Puerto Rico	6,000	450	450	350	425	750	400	500	100	175

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*Does not include carcinoma in situ or non-melanoma skin cancer.

These estimates are offered as a rough guide and should not be regarded as definitive. They are calculated according to the distribution of estimated 1989 cancer deaths by state. Especially note that year-to-year changes may only represent improvements in the basic data.



U.S. Public Interest Research Group

National Association of State PIRGs

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Transmittal Record

TO:

Rick Adcock

224 - 4944

FROM:

Bill Walsh

RE:

Bates' Draft. See Sec. 6 for Safe
Alternatives Policy. I have not yet
reviewed, but will this weekend.

TOTAL # OF PAGES, INCLUDING THIS PAGE:

FAX # (202) 546-2461

Greg Whetstone: Herb + Emie Selt
Jay Hansen: Bates Selt

BATES103

HLC

[March 8, 1989]

101ST CONGRESS
1ST SESSION

H. R. _____

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IN THE HOUSE OF REPRESENTATIVES

Mr. BATES introduced the following bill; which was referred to
the Committee on _____

A BILL

To require the Environmental Protection Agency to take certain
steps to protect the stratospheric ozone layer from depletion
resulting from chlorofluorocarbons, and for other purposes.

- 1 Be it enacted by the Senate and House of Representatives
- 2 of the United States of America in Congress assembled,

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1 SECTION 1. SHORT TITLE.

2 This Act may be cited as the ``Stratospheric Ozone
3 Protection Act of 1989``.

4 SEC. 2. FINDINGS.

5 The Congress finds that:

6 (1) As a party to the Vienna Convention for the
7 Protection of the Ozone Layer, the United States has an
8 obligation to take appropriate measures to protect human
9 health and the environment against adverse effects
10 resulting or likely to result from human activities which
11 modify or are likely to modify the ozone layer.

12 (2) There is a possibility that world wide emissions
13 of fully halogenated chlorofluorocarbons and other
14 substances can significantly deplete and otherwise modify
15 the ozone layer, resulting or likely to result in adverse
16 effects on human health and the environment.

17 (3) There is also a potential climatic effect of
18 chlorofluorocarbons emissions.

19 (4) The United States is determined to protect the
20 ozone layer by taking precautionary measures to control
21 total global emissions of chlorofluorocarbons and other
22 substances which may deplete the ozone layer.

23 (5) Precautionary measures for controlling emissions
24 of chlorofluorocarbons have already been taken at the
25 national and international levels.

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1 (6) Measures taken to protect the ozone layer from
2 modifications due to the use of chlorofluorocarbons
3 should be based on relevant scientific and technical
4 considerations.

5 (7) Special provision needs to be made in regard to
6 the production and use of chlorofluorocarbons for the
7 benefit of developing countries.

8 (8) It is important to promote international
9 cooperation in the research and development of science
10 and technology on the control and reduction of
11 chlorofluorocarbons emissions, bearing in mind, in
12 particular, the needs of developing countries.

13 **SEC. 3. DEFINITIONS**

14 As used in this Act--

15 (1) The term ``Administrator`` means the
16 Administrator of the Environmental Protection Agency.

17 (2) The term ``ozone-depleting substance`` means any
18 substance which is known, or may reasonably be
19 anticipated, to cause or contribute to atmospheric or
20 climatic modification, including stratospheric ozone
21 depletion. Such term, includes, at a minimum class 1 and
22 class 2 substances.

23 (3) The term ``class 1 substance`` means each of the
24 following: Trichlorofluoromethane (CFC-11),
25 Dichlorodifluoromethane (CFC-12),

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1 Trichlorotrifluoroethane (CFC-113), _____
2 (CFC--114), _____ (CFC--115), Bromotrifluoromethane
3 (Halon 1301), Bromochlorodifluoromethane (Halon 1211),
4 Tetrachloromethane (carbon tetrachloride), and _____
5 (methyl chloroform).

6 (4) The term "class 2 substance" means any ozone-
7 depleting substance which the Administrator determines to
8 have an ozone depletion factor of 0.05 or more.

9 (5) The term "ozone-depletion factor" means a
10 factor established by the Administrator to reflect the
11 relative stratospheric chlorine and bromine accumulations
12 attributable to an ozone-depleting substance. Such factor
13 shall be based upon the substances atmospheric lifetime,
14 molecular weight of bromine and chlorine, and its ability
15 to be photolytically disassociated, or upon other factors
16 determined to be a more accurate measure of the relative
17 stratospheric chlorine and bromine accumulations
18 attributable to the substance. In the case of the
19 substances referred to in Table 1, the ozone-depletion
20 factor shall be as specified in Table 1, except that the
21 Administrator may adjust such ozone depletion factors
22 based on scientific knowledge:

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TABLE 1

Substance	Ozone Depletion Factor
Trichlorofluoromethane.....(CFC-11).....	1.00
Dichlorodifluoromethane.....(CFC-12).....	0.86
Trichlorotrifluoroethane.....(CFC-113).....	0.80
Bromotrifluoromethane.....(Halon 1301).....	10.00
Bromochlorodifluoromethane....(Halon 1211).....	10.00
Tetrachloromethane.....(carbon tetrachloride)....	1.11

1 SEC. 4. MEASURES FOR THE CONTROL OF SUBSTANCES CAUSING
2 DEPLETION OF OZONE LAYER.

3 (a) REGULATIONS.--The Administrator shall promulgate
4 regulations containing measures for the control of any
5 substance, practice, process, or activity (or any combination
6 thereof) which he deems necessary to achieve the following:

7 (1) Insure that within 1 year after the enactment of
8 this section the aggregate annual emissions of class I
9 substances from the United States does not exceed the
10 aggregate annual emissions of class I substances from the
11 United States during 1988.

12 (2) Insure that within 3 years after the enactment of
13 this section the aggregate annual emissions of class I
14 substances from the United States is reduced by 20
15 percent from its 1988 level.

16 (3) Insure that within 5 years after the enactment of
17 this section the aggregate annual emissions of class I

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1 substances from the United States is reduced by 50
2 percent from its 1988 level.

3 (4) Insure that within 7 years after the enactment of
4 this section the aggregate annual emissions of class 1
5 substances from the United States is reduced by 95
6 percent from its 1988 level.

7 The regulations of the Administrator under this subsection
8 may provide for control measures which are more stringent
9 than those required under paragraphs (1) through (4).

10 (b) CALCULATION OF ANNUAL EMISSIONS.--The aggregate
11 annual emissions of each class 1 substance from the United
12 States for any year shall be calculated by multiplying the
13 aggregate amounts specified in paragraphs (1) through (4) for
14 the year for each class 1 substance by its ozone depletion
15 factor. Then perform the following calculations:

16 (1) Determine aggregate annual production.

17 (2) Add aggregate bulk imports.

18 (3) Subtract aggregate annual bulk exports.

19 (4) Subtract aggregate annual amount of class 1
20 substances destroyed or permanently encapsulated.

21 (c) ASSESSMENT AND ADJUSTMENT OF CONTROL MEASURES.--(1)
22 The Administrator shall establish a monitoring network to
23 detect, or aid in the prediction of, modification in the
24 ozone layer.

25 (2) At least one year before implementing each of the

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1 reductions specified in paragraphs (2), (3), and (4) of
2 subsection (a), the Administrator shall conduct a detailed
3 scientific assessment, subject to the review and approval of
4 the Environmental Protection Agency Science Advisory Board,
5 to review advances in scientific understanding of
6 modification of the ozone layer and the potential health,
7 environmental, and climatic effects of such modification.

8 (3) Based on the scientific review under paragraph (2),
9 the Administrator shall assess, and may adjust, the
10 stringency, timing, and scope of the control measures
11 required under subsection (a) and the ozone depletion factors
12 specified in section 3(5).

13 (d) CONTROL OF TRADE.--(1) The Congress finds that it is
14 necessary to impose certain measures to control international
15 trade in substances covered by this Act in order to conserve
16 an exhaustible natural resources, the stratospheric ozone
17 layer and to protect human, animal or plant life or health.

18 (2) Within 1 year after enactment of this section, the
19 President shall prohibit the import into the United States of
20 class 1 substances in bulk from any nation which the
21 President finds does not have legislation equally as
22 stringent as this section regarding measures for the control
23 of class 1 substances and which has not transmitted to the
24 United States information to that effect. For purposes of
25 this subsection any such nation shall be referred to as a

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1 'nonequivalent nation'.

2 (3) Within 3 years after the enactment of this section,
3 the President shall prohibit the import into the United
4 States of all products containing class 1 substances or
5 products produced with class 1 substances from any
6 nonequivalent nation. At least 1 year before the time such
7 prohibition takes effect, the President shall publish a list
8 of the products subject to the prohibition under this
9 paragraph and standards for applying such prohibition
10 uniformly to all nations.

11 (4) Within 1 year after enactment of this section, the
12 President shall prohibit the following:

13 (A) The export of technologies used to produce class
14 1 substances to the territory of nonequivalent nations.

15 (B) Direct investment in facilities in the territory
16 of nonequivalent nations for producing class 1
17 substances.

18 (5) The President shall not provide bilateral or
19 multilateral subsidies, aids, credits, guarantees, or
20 insurance programs for the export of products, equipment,
21 plants, or technology for the production of class 1
22 substances to any nation which is a nonequivalent nation.

23 (6) Paragraphs (4) and (5) shall not apply to products,
24 equipment, plants, or technologies which contribute to the
25 protection of the ozone layer.

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1 (e) REPORTING OF INFORMATION.--(1) The Administrator
2 shall submit annually to the Congress data showing its
3 calculation of aggregate annual emissions of class 1
4 substances, as specified in subsection (b), using the format
5 developed by the Administrator pursuant to paragraph (3)(A).

6 (2) The Administrator shall submit to the Congress
7 appropriate information to indicate compliance with
8 subsection (d).

9 (3) The Administrator shall--

10 (A) develop a standard format for reporting such data
11 as indicated by paragraph (1);

12 (B) take appropriate measures to ensure the
13 confidentiality of certain data submitted pursuant to
14 paragraph (1) except for the aggregate annual emissions
15 figures; and

16 (C) compile and submit to the Congress an annual
17 report of the aggregate annual emissions figures and
18 other information used to develop the information
19 reported pursuant to paragraph (2).

20 Notwithstanding subparagraph (B) or in any other provision of
21 this law, all information reported to, or otherwise obtained
22 by the Administrator (or any representative of the
23 Administrator) under this section shall be made available to
24 any committee of the Congress upon a written request by the
25 committee.

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1 (F) ADDITIONAL MEASURES.--The Administrator may
2 promulgate such regulations as he deems necessary, in
3 addition the regulations required under subsection (a), to
4 control any substance which he determines may cause or
5 contribute to the depletion of the stratospheric ozone layer,
6 including requirements to mandate submission of data by
7 producers and users of ozone depleting substances.

8 SEC. 5. REVIEW OF ALTERNATIVES.

9 (a) REVIEWS AND REPORT.--The Administrator shall
10 initiate, not less than 30 days after enactment of this
11 section, a review of relevant professional, technical and
12 scientific sources that may contain information concerning
13 substitute chemicals and alternative manufacturing processes
14 that are potential replacements for class 1 substances. The
15 Administrator shall report interim findings to the Congress
16 no later than 6 months after enactment of this section. A
17 final report shall be issued no less than one year after
18 enactment of this section.

19 (b) FINDINGS.--The report required under this subsection
20 shall include the Administrator's findings with regard to
21 each of the following:

22 (1) The identity of potential replacement chemicals
23 or alternative production processes.

24 (2) A chemical profile or an abstract that describes
25 each replacement chemical and alternative production

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1 process identified in paragraph (1) environmental hazards
2 associated with each.

3 (3) The earliest date upon which each chemical and
4 production process identified pursuant to paragraph (1)
5 can be available for commercial use.

6 (c) UPDATES; CLASS 2 SUBSTANCES.--The Administrator shall
7 update the review required by this section on an annual
8 basis. Effective no more than 2 years after enactment of this
9 section class 2 substances shall be included in the
10 Administrator's annual review.

11 **SEC. 6. SAFE ALTERNATIVES.**

12 (a) REPLACEMENT.--Production processes, products, and raw
13 materials using ozone-depleting substances shall, to the
14 maximum extent practicable, be replaced by alternative
15 production processes, products, and raw materials that reduce
16 overall risks to public health and environment.

17 (b) PROHIBITED REPLACEMENT.--Not more than 2 years after
18 enactment of this section, the Administrator shall prohibit
19 the replacement of class 1 substances with any substance
20 listed pursuant to section 312 or 313 of title III of the
21 Superfund Amendments and Reauthorization Act of 1986 or any
22 other substance which the Administrator determines may
23 present adverse effects upon public health or the
24 environment, where--

25 (1) the Administrator has identified, pursuant to

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1 subsection (a), an alternative production process,
2 product or raw material that reduces, avoids, or
3 eliminates the use of toxic or hazardous substances; and

4 (2) the alternative production process, products or
5 raw materials that can be commercially available by the
6 relevant phase-out date described.

7 (c) COMPLIANCE.--Each facility required to file a
8 reporting form pursuant to section 312 or 313 of the
9 Superfund Amendments and Reauthorization Act of 1986 shall
10 certify that the facility is in compliance with this section.
11 Failure to file any such certification or the filing of any
12 false or misleading information in such a certification shall
13 be punishable as provided in section 10.

14 SEC. 7. RECLAMATION AND RECYCLING.

15 (a) PROHIBITIONS.--Effective January 1, 1991, it shall be
16 unlawful for--

17 (1) any person to release any class 1 or class 2
18 substance from any household appliance or automobile air
19 conditioner;

20 (2) for any person who sells household appliances,
21 air conditioners, or automobile air conditioners to
22 refuse any request to remove substances covered by this
23 Act from any product which they offer for sale, including
24 sales prior to the effective date of this section.

25 (b) AUTOMOBILE AIR CONDITIONERS.--Effective January 1,

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1 1991, any person who installs, services, or repairs
2 automobile air conditioners must process recycling equipment
3 approved by the Administrator and provide for the recycling
4 of ozone-depleting substances to the maximum extent possible.

5 (c) SMALL CONTAINERS.--Effective January 1, 1991, ozone
6 depleting substances shall not be introduced into interstate
7 commerce in any container smaller than 15 pounds.

8 (d) REGULATIONS.--The Administrator shall promulgate such
9 regulations as may be necessary to carry out the provisions
10 of this section within one year after enactment of this
11 section.

12 SEC. 8. RESEARCH.

13 There is authorized to be appropriated to the
14 Administrator such sums as may be necessary to establish an
15 ``Emergency Research and Development Fund`` for the purpose
16 of furthering research into viable long-term alternatives to
17 ozone-depleting substances. The research undertaken in whole
18 or in part with such funds shall be conducted in the pursuit
19 of environmentally sound alternatives that are energy
20 efficient, reduce health and environmental hazards and that
21 will be made available to developing nations.

22 SEC. 9. LABELING.

23 (a) Effective 90 days after promulgation of regulations
24 under this section, no container in which an ozone-depleting
25 substance is stored or transported, no product containing

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1 such substance, and no product manufactured with a process
2 that uses a listed substance shall be introduced into
3 interstate commerce unless it bears a label stating either of
4 the following, as appropriate:

5 “(1) Contains (insert name of listed substance) a
6 substance which harms public health and environment by
7 destroying ozone in the upper atmosphere and by
8 disrupting the climate.”

9 “(2) Manufactured with (insert name of listed
10 substance), a substance which harms public health and
11 environment by destroying ozone in the upper atmosphere
12 and by disrupting the climate.”

13 The Administrator shall issue regulations to implement the
14 labeling requirements of this section within 6 months after
15 enactment of this section, after notice and opportunity for
16 public comment. Such regulations shall require all containers
17 and products which are subject to this section and introduced
18 or reintroduced into commerce later than 90 days after
19 promulgation of such regulations to bear the appropriate
20 label. Unless and until such regulations have been
21 promulgated and become effective, the required label shall be
22 permanently affixed on the face of such product, with the
23 lettering and background in contrasting colors and the
24 letters themselves not less than two inches in height (or 20
25 percent of the height of the product which is less than four

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1 inches in height). Neither the labeling requirement nor any
2 other provision of this Act, shall constitute, in whole or
3 part, a defense to liability or a cause for reduction in
4 damages in any suit, whether civil or criminal, brought under
5 any law, whether Federal or State, other than a suit for
6 failure to comply with the labeling requirements of this
7 section.

8 **SEC. 10. FEDERAL ENFORCEMENT.**

9 (a) **COMPLIANCE ORDERS.**--(1) Whenever, on the basis of any
10 information, the Administrator determines that any person has
11 violated or is in violation of any requirement of this Act,
12 the Administrator may issue an order assessing a civil
13 penalty for any past or current violation, requiring
14 compliance immediately or within a specified time period, or
15 both, or the Administrator may commence a civil action in the
16 United States district court in the district in which the
17 violation occurred for appropriate relief, including a
18 temporary or permanent injunction.

19 (2) Any order issued pursuant to this subsection shall
20 state with reasonable specificity the nature of the
21 violation. Any penalty assessed in the order shall not exceed
22 \$25,000 per day of noncompliance for each violation of a
23 requirement of this Act. In assessing such a penalty, the
24 Administrator shall take into account the seriousness of the
25 violation and any good faith efforts to comply with

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1 applicable requirements.

2 (b) PUBLIC HEARING.--Any order issued under this section
3 shall become final unless, no later than 30 days after the
4 order is served, the person or persons named therein request
5 a public hearing. Upon such request the Administrator shall
6 promptly conduct a public hearing. In connection with any
7 proceeding under this section the Administrator may issue
8 subpoenas for the attendance and testimony of witnesses and
9 the production of relevant papers, books, and documents, and
10 may promulgate rules for discovery procedures.

11 (c) VIOLATION OF COMPLIANCE ORDERS.--If a violator fails
12 to take corrective action within the time specified in a
13 compliance order, the Administrator may assess a civil
14 penalty of not more than \$25,000 for each day of continued
15 noncompliance with the order and the Administrator may
16 suspend or revoke any permit issued to the violator.

17 (d) CRIMINAL PENALTIES.--Any person who--

18 (1) knowingly exceeds a regulation under section 4
19 (phase-out of emissions);

20 (2) knowingly introduces into interstate commerce a
21 substance that was produced in violation of section ____;

22 (3) knowingly violates any import or export or
23 investment prohibition contained in rules or orders
24 adopted under section 4;

25 (4) knowingly introduces into interstate commerce a

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1 substance or product in violation of section 9
2 (labeling);

3 (5) knowingly violates any prohibition in effect
4 under section 6 (relating to safe alternatives) or
5 section 7 (relating to reclamation or recycling);

6 (6) knowingly omits material information or makes any
7 false material statement or representation in any
8 application, record, report, permit, or other document
9 filed, maintained, or used for purposes of compliance
10 with this Act or who knowingly destroys, alters,
11 conceals, or fails to file any record, application,
12 report, or other document required to be maintained or
13 filed for purposes of compliance with this Act

14 shall, upon conviction, be subject to a fine in accordance
15 with title 18 of the United States Code for each day of
16 violation, or imprisonment not to exceed two years, or both.

17 If conviction is for a violation committed after a first
18 conviction of such person under this paragraph, the maximum
19 punishment under the respective paragraph shall be doubled
20 with respect to both fine and imprisonment.

21 (e) CIVIL PENALTY.--Any person who violates any
22 requirement of this title shall be liable to the United
23 States for a civil penalty in an amount not to exceed \$25,000
24 for each such violation.

25 SEC. 11. CITIZEN SUITS.

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18

1 (a) IN GENERAL.--Except as provided in subsection (b) or
2 (c) of this section, any person may commence a civil action
3 on his own behalf--

4 (1) against any person (including (a) the United
5 States, and (b) any other governmental instrumentality or
6 agency, to the extent permitted by the eleventh amendment
7 to the Constitution) who is alleged to be in violation of
8 any regulation, condition, requirement, prohibition, or
9 order which has become effective pursuant to this Act; or

10 (2) against the Administrator where there is alleged
11 a failure of the Administrator to perform any act or duty
12 under this Act which is not discretionary with the
13 Administrator.

14 Any action under paragraph (a)(1) of this subsection shall be
15 brought in the district court for the district in which the
16 alleged violation occurred. Any action brought under
17 paragraph (a)(2) of this subsection may be brought in the
18 district court for the district in which the alleged
19 violation occurred or the District Court of the District of
20 Columbia. The district court shall have jurisdiction, without
21 regard to the amount in controversy or the citizenship of the
22 parties, to enforce the permit, regulation, condition,
23 requirement, prohibition, or order, referred to in paragraph
24 (1), to order such person to take such other action as may be
25 necessary, or both, or to order the Administrator to perform

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1 the act or duty referred to in paragraph (2), as the case may
2 be, and to apply any appropriate civil penalties.

3 (b) ACTIONS PROHIBITED.--No action may be commenced under
4 subsection (a)(1) of this section--

5 (1) prior to 60 days after the plaintiff has given
6 notice of the violation to--

7 (A) the Administrator; and

8 (B) to any alleged violator of such permit,
9 regulation, condition, requirement, prohibition, or
10 order; or

11 (2) if the Administrator has commenced and is
12 diligently prosecuting a civil or criminal action in a
13 court of the United States to require compliance with
14 such permit, regulation, condition, requirement,
15 prohibition, or order.

16 In any action under subsection (a)(1), any person may
17 intervene as a matter of right. Any action respecting a
18 violation under this Act may be brought under this section
19 only in the judicial district in which such alleged violation
20 occurs.

21 (c) NOTICE.--No action may be commenced under paragraph
22 (a)(2) of this section prior to 60 days after the plaintiff
23 has given notice to the Administrator that he will commence
24 such action. Notice under this subsection shall be given in
25 such manner as the Administrator shall prescribe by

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1 regulation.

2 (d) INTERVENTION.--In any action under this section the
3 Administrator, if not a party, may intervene as a matter of
4 right.

5 (e) COSTS.--The court, in issuing any final order in any
6 action brought pursuant to this section, may award costs of
7 litigation (including reasonable attorney and expert witness
8 fees) to the prevailing or substantially prevailing party,
9 whenever the court determines such an award is appropriate.
10 The court may, if a temporary restraining order or
11 preliminary injunction is sought, require the filing of a
12 bond or equivalent security in accordance with the Federal
13 Rules of Civil Procedure.

14 (f) OTHER RIGHTS PRESERVED.--Nothing in this section, or
15 this Act, shall restrict any right which any person (or class
16 of persons) may have under any statute or common law to seek
17 enforcement of any standard or requirement or to seek any
18 other relief (including relief against the Administrator).

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U.S. Public Interest Research Group

National Association of State PIRGs

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Transmittal Record

TO:

Rick Adcock

224 - 4944

FROM:

Bill Walsh

RE:

Bates' Draft. See Sec. 6 for Safe
Alternatives Policy. I have not yet
reviewed, but will this weekend.

TOTAL # OF PAGES, INCLUDING THIS PAGE:

FAX # (202) 546-2461

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BATES103

HLC

[March 8, 1989]

101ST CONGRESS
1ST SESSION

H. R. _____

IN THE HOUSE OF REPRESENTATIVES

Mr. BATES introduced the following bill; which was referred to
the Committee on _____

A BILL

To require the Environmental Protection Agency to take certain
steps to protect the stratospheric ozone layer from depletion
resulting from chlorofluorocarbons, and for other purposes.

- 1 Be it enacted by the Senate and House of Representatives
- 2 of the United States of America in Congress assembled,

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2

1 SECTION 1. SHORT TITLE.

2 This Act may be cited as the ``Stratospheric Ozone
3 Protection Act of 1989``.

4 SEC. 2. FINDINGS.

5 The Congress finds that:

6 (1) As a party to the Vienna Convention for the
7 Protection of the Ozone Layer, the United States has an
8 obligation to take appropriate measures to protect human
9 health and the environment against adverse effects
10 resulting or likely to result from human activities which
11 modify or are likely to modify the ozone layer.

12 (2) There is a possibility that world wide emissions
13 of fully halogenated chlorofluorocarbons and other
14 substances can significantly deplete and otherwise modify
15 the ozone layer, resulting or likely to result in adverse
16 effects on human health and the environment.

17 (3) There is also a potential climatic effect of
18 chlorofluorocarbons emissions.

19 (4) The United States is determined to protect the
20 ozone layer by taking precautionary measures to control
21 total global emissions of chlorofluorocarbons and other
22 substances which may deplete the ozone layer.

23 (5) Precautionary measures for controlling emissions
24 of chlorofluorocarbons have already been taken at the
25 national and international levels.

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3

1 (6) Measures taken to protect the ozone layer from
2 modifications due to the use of chlorofluorocarbons
3 should be based on relevant scientific and technical
4 considerations.

5 (7) Special provision needs to be made in regard to
6 the production and use of chlorofluorocarbons for the
7 benefit of developing countries.

8 (8) It is important to promote international
9 cooperation in the research and development of science
10 and technology on the control and reduction of
11 chlorofluorocarbons emissions, bearing in mind, in
12 particular, the needs of developing countries.

13 SEC. 3. DEFINITIONS

14 As used in this Act--

15 (1) The term "Administrator" means the
16 Administrator of the Environmental Protection Agency.

17 (2) The term "ozone-depleting substance" means any
18 substance which is known, or may reasonably be
19 anticipated, to cause or contribute to atmospheric or
20 climatic modification, including stratospheric ozone
21 depletion. Such term, includes, at a minimum class 1 and
22 class 2 substances.

23 (3) The term "class 1 substance" means each of the
24 following: Trichlorofluoromethane (CFC-11),
25 Dichlorodifluoromethane (CFC-12),

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**ENVIRONMENTAL
DEFENSE
FUND**

SARAH L. CLARK
SCIENTIST
ENVIRONMENTAL INFORMATION EXCHANGE

257 PARK AVENUE SOUTH
NEW YORK, NY 10010
(212) 505-2100

ENVIRONMENTAL DEFENSE FUND

257 Park Avenue South
New York, NY 10010
(212) 505-2100

2/27/89

Dear Rich -

I've enclosed our state level
refrigerant recycling proposal; a
letter from Motor Age that discusses leak
testing and a booklet I wrote on
ozone-depleting chemicals.

We would be happy to work with you
this week to shape up federal legislation.
I've already discussed it with Joe Goffman,
our lobbyist in the DC office and he would
like very much to participate. Dan Dudek,
our senior economist is on the road, but I
should be talking to him tomorrow.



100% Recycled Paper

Since I wrote the proposal 2 weeks
ago, some new developments have occurred -
so some modification is necessary. I will
call you today - Regards - Sarah

ENVIRONMENTAL DEFENSE FUND

1616 P Street, NW
Washington, DC 20036
(202) 387-3500

Facsimile Telephone Number:
(202) 234-6049

URGENT PLEASE DELIVER TODAY

FACSIMILE COVER SHEET

TO: Rick Adcock
AT FAX/PHONE #: 224-0580
FROM: Joe Goffman
DATE: 2-27-89 TIME: 442
TOTAL NUMBER OF PAGES, INCLUDING THIS COVER SHEET: 7

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Section by Section Analysis of The Stratospheric Ozone and Climate Protection Act of 1989

Section 1. Short Title

Section 2. Congressional Findings. Includes findings that manufactured substances, such as chlorofluorocarbons, are polluting the atmosphere and may be contributing to the related environmental problems of stratospheric ozone depletion and global climate change due to the greenhouse effect; these related problems threaten human health and the environment on a global scale; it is necessary to control international trade in chlorofluorocarbons and other ozone depleting substances to protect our global environment; and the United States needs to be the world leader in developing substitutes for these harmful chemicals.

Section 3. Objectives and National Goal. Establishes as a national goal, the elimination of atmospheric pollution caused by the release of manufactured chemicals, such as chlorofluorocarbons.

Section 4. Definitions. Includes definitions of "household appliances" and "medical purposes" that receive special consideration under Section 9; "manufactured substances"; and "substances covered by this Act".

Section 5. Listing of Regulated Substances. There are two lists of regulated substances: (1) a priority list of chemicals that must be eliminated by the year 1997 (production of certain CFCs, halons and methyl chloroform is to be frozen at 1986 levels in 1989, reduced by 20% in 1992, reduced by 50% in 1995, and eliminated in 1997 and (2) a list of other chemicals with ozone depletion potential. The priority list includes the most popular and harmful chlorofluorocarbons (11, 12, 113, 114 and 115), halons (1211, 1301 and 2402), and methyl chloroform. The second list includes chemicals such as methylene chloride, carbon tetrachloride, and chlorofluorocarbons-22, 123, 124, 125, 141(b) and 142(b).

The production of chemicals on the second list is regulated and limited on the basis of overall ozone depletion potential. Since the regulated chemicals have differing, relative ozone depletion potential, producers are free to shift their production capacity from a priority list substance to a second list substance or from one second list substance to another, provided the total ozone depletion potential of chemicals manufactured by each producer is reduced significantly over the next several years (based on 1986 levels, ODP must be reduced by 95% no later than 1997).

- 2 -

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Section 6. Reporting. Producers of ozone depleting chemicals are required to submit annual reports to the EPA.

Section 7. Production Phase-Out for Priority List. This section sets forth the phase-out mentioned earlier.

Section 8. National Security Exemption. This section authorizes the President to modify the controls on halons on the basis of national security needs.

Section 9. Limitation on Use and Disposal. In addition to the production limitations set forth in the bill, the Administrator is directed to promulgate, by July 1, 1991, regulations that will reduce the use of chemicals that are destroying the ozone layer and increase the recapture and recycling of such chemicals. By 1994, specific regulations are to be in place regarding the recapture, recycling and safe disposal of the regulated chemicals.

To further supplement the production limitations of the bill, as of January 1, 1993, it shall be unlawful for any person to intentionally vent or release into the atmosphere any of the regulated chemicals (other than the halons that are used in fire extinguishers). This provision is premised on the theory that, if we cannot eliminate production of these harmful chemicals by 1993, we must at least eliminate emissions that are destroying the ozone layer and contributing to the greenhouse effect.

Recognizing that (1) there are some essential medical uses for these chemicals for which no safe alternative is likely to be developed, and (2) many people have recently purchased (or are planning to purchase) household appliances that depend on the continued availability of these chemicals, the prohibition on use of chemicals slated for elimination in the year 1997 does not apply to uses for medical purposes and, for a period not to exceed the year 2007, to service and maintain household appliances.

Section 10. Limitation on Ozone Depletion Potential. This section sets forth the reduction in overall production of ozone depleting substances mentioned earlier.

Section 11. Accelerated Schedule. Based on new information regarding the severity of the problem or on the availability of safe substitutes, the Administrator is authorized to accelerate the phase out schedule set forth in the bill.

Section 12. Certification of Equivalent Programs. Chemicals with ozone depleting potential pose a threat to human health and the environment without regard to where such chemicals or products

- 3 -

**PHOTOCOPY
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that use such chemicals are made. Protection of the environment necessitates the regulation of international trade and the imposition of import controls that track the domestic controls set forth in this Act. Therefore, unless a country of origin is certified as having a phase-out program similar to this Act, the regulated chemicals (or products) from such country cannot be imported into this country. Similarly, this Act will prohibit the use of the U.S. as a free port for transshipment of such chemicals (or products).

Section 13. Labelling. All containers of, or products made with, substances covered by this Act must bear a warning label.

Section 14-19. Miscellaneous Provisions on Federal Enforcement, Judicial Review, Citizen Suits, Separability, Relationship to Other Laws, and Authority of Administrator.

FAX To Rick Adcock (USA) 202 224 6580 From David Dwyer

Fixing the marked-up bill would cost more than \$120 from the hotel, so I'll get it to you with my detailed comments on Thursday AM. For the following reasons, though, I urge you to hold on until we can discuss the politics and substance of this.

I see two important issues:

(1) Jurisdiction. I believe it is a very bad idea to give jurisdiction over this law to the Commerce Department. All related functions are in EPA. Commerce has neither the talent nor the sympathy to carry out such a law. It is obvious that you're doing this to preserve Al's Committee jurisdiction, which leads to issue (2).

(2) Relations between Commerce and EPA; between Gore and Baucus/Chafee. I spoke with Al in London about our concern that we not create jurisdictional rivalry between Commerce and EPA, and negative competition between Al and Baucus/Chafee. He said Baucus and Chafee are too busy on Clean Air and won't mind. I think, with respect, that Al is wrong on both counts. It will create problems for him, for the issue, and for the environmental community if there is tension, or outright conflict because Al puts in a bill that goes to his Committee and/or the Commerce Department.

A better route would be to work out a cooperative approach with Baucus and Chafee. Can't they work out an arrangement under which Al ~~puts~~ puts in an EPA bill and gets to hold his own hearings ~~or participate in~~ joint hearings with EPA, or to participate in EPA hearings?

I urge you not to go down this path before more consultation with those Senators and with us.

David Dwyer

One detail: Re: auto air conditioning - call Ray Dwyer in my office. Ask him to fax you the "Fresh bill" and an letter on changes to it. Tell him I authorized getting them to you.

Commerce

Log. Canal → linked according to issues —
Jim Drewry tell them what you want to do —
41265 they're sworn to secrecy —
50510

Preliminary →

43872
*

Land Lease → Hw 227

Jim →

Amend it to that

→ Comm Points Safety Commission
↳ Fed Hqs Submarine Act 15 USC 1261

→ Amend offered — after
Drewry to Comm

3266656

Day Fine
3379092

Jeffords on Senate — Schneider bill this
year — not clear

Greenpeace — Eric Johnson / 415/4746767

or

FOE — Liz Cook 543-4312

Joe Giffman

3873500

EDF — Sarah Clark (NY) / 212/505-2100
Don Dudek

NRDC — David Goldstein / 915/777-0220
md state has bill → Dave Doniger 783 7800

Sierra Club — Amanda Bidel / 270-5500

✓ US Fish — Bill Welch / 546-9707

WRI — Irving

EPA —

EDF has doc. to control emissions @ state level

— training services

* rep. meeting & meeting

* MMTA has approved use of regulation —
but now emissions have to be worked
by U.S.

Eric S. Robinson

382 7750

(382-6344)

Steve Sidell EPA

- * Ben ^{all corners < 10 ft} ~~10 ft~~ recharge bottles
- * Alb. testing of road flooding fine ex. $\rightarrow$
- * Buy ^{cars for} chassis, 2nd A/C, command speaker
- * Ben non-military car 1 hand-held Hiley for emergency

FAX

Messenger ^{EPA will send} ~~and send to the~~ at end to New Line

Another recycling angle — Limit to Lyle today
CFL

Penniger

MAXING SPEED OVER

Implement recycling agreement among:

* MMA
*
*

to use VAMPRES (2000-1 machine)

Used CFCs

Adv A/C = 25% of CFC use (per EPA)

EPA organized show rooming & did a study - agreed to steps of proving so can reuse CFC, & keep inventory -
UL now standardize machines

UL contribution to start in spring -

Trying to get State-level support -

Ben Do-it-yourself changes of K-Mark -

Decided to go for Mc bill

Joe Gaffman

Chafes to introduce something this week -

Includes gen'l mandate to research & report
CFLs by mid-1950's - not much
more than that -

People in New York EDF have asked a
bill - state level - can translate
to national level -

① Liz Cook / FoE / 343-4312 / FAX / Sand
FoE UK 011441-4901555 4900881

② Joa Goffman / EDF / 387-3500 / 234-6049 / Yes, 3/6 11 AM

③ Sarah Clark / EDF / 212-505-2100 /
Den Dudek
(SC + DD back in office 3/7)

④ Dave Donneger / NRDC / 783-7800 / LONDON / 925-2149
ROYAL TREASURY
44 19304477
c/o JUNE HILL 836 0341 2409205 (F)
David Worth / NRDC-WDC / 783-7800

David Goldstein / NRDC-SE / 415-777-0220 / 415 / 495-5996 / Yes, 3/6 AM

⑤ Bill Walsh / USPIRB / 346-9707 / Yes, 3/6, 1 PM

⑥ EPA: Steve Sidell
JOHN HOFFMAN / 382-6344 / Yes, 3/6 12 noon

⑦ Keki Kehoe / Env. Pl. Inst. / 544-2600

⑧ Comm. for Resp. CFC Policy

⑨ Nick Sunder / OTA / 228-6857 / 228-6098 / Yes, 3/6 11 AM

Rick

Wall Street Journal 4-12-89 Pg. B4

Chemical Reaction Helps to Explain Ozone Depletion

By AMAL KUMAR NAJ

Staff Reporter of THE WALL STREET JOURNAL

DALLAS—A group of atmospheric researchers said they discovered a crucial chemical reaction that helps explain how chlorofluorocarbons, or CFCs, destroy the Earth's ozone layer.

Scientists called the discovery a "major step" toward understanding and better predicting the chain of events that lead to ozone depletion.

CFCs, synthetic compounds used in many air-conditioning and insulation systems and currently being phased out under an international treaty, are inert. However, their strong chemical bonds break down under intense solar radiation when the gases reach the stratosphere. The fragments, such as chlorine and bromine, set off a chain of chemical reactions that lead to ozone destruction.

But scientists, in tests over Antarctica and more recently, the Arctic, found that the ozone was being destroyed much faster than could be accounted for by the number of chlorine atoms they measured in the ozone layer. They assumed there must be an unknown chemical reaction that was "regenerating" chlorine atoms, that is, allowing each chlorine atom to destroy more than one molecule of ozone.

The nature of this unknown reaction has now been discovered, researchers from Jet Propulsion Laboratory in Pasadena, Calif., reported. The chlorine atoms from the man-made fluorocarbons initially react with ozone molecules to form chlorine monoxide or ClO, they explained. Each ClO molecule links up with another ClO molecule to form dimers, that is, pairs of identical molecules. The dimers then break apart, releasing two free chlorine atoms that begin the process all over, destroying additional ozone.

"We had strong circumstantial evidence of this regeneration, and now we have established it," said Randall R. Friedl, a researcher from the Jet Propulsion Laboratory. "If we couldn't have established this, we would have had to go back to the drawing board to investigate what was causing this rapid ozone destruction." Mr. Friedl presented the findings here at the annual meeting of the American Chemical Society.

Mario Molina, a senior research scientist at the Jet Propulsion Laboratory, said, "The ClO dimer is an entirely new species and doesn't exist in chemical literature. We now know a great deal about the molecule." However, he and Mr. Friedl said it hasn't yet been determined precisely how the ClO dimer breaks down to release chlorine atoms, creating a perpetual ozone-depleting reaction, arrested only by the next wave of swirling, fresh ozone.

Robusta Coffee Quota Cut by 350,700 Bags

LONDON — The International Coffee Organization Tuesday announced a cut of 350,700 60-kilogram bags in its world export quota for robusta coffees during April-June, the third quarter of the 1988-89 coffee year.

The cut has occurred because the ICO's 15-day moving average indicator price for all coffees fell below the automatic trigger price of \$1.15 cents per pound and the robusta's 15-day moving average was below the \$1.10-a-pound trigger price.

The average price for all coffees (arabicas and robustas) for Monday was \$1.1498.

The cut applies only to exports of robustas because the average \$1.30-a-pound rate necessary to trigger a cut in the arabica coffees has not been met.

From Wire and Staff Reports

Journal
of
Commerce

4-12-89

Pg.
B4

SPONSOR:

TENN. IMPACT:

STAFF REC:

(Staffer: _____)

AG decision: AGREE with STAFF REC _____ DISAGREE _____ MORE INFO

PRESS?: YES _____ NO _____ MIKE SEE ME _____

MAIL OUTREACH?: YES _____ NO _____

AG COMMENT:

Current uses of CFCs and Halons

Currently CFC-11 is used for: 50% rigid foam, 20% flexible foam, 6% chillers for buildings and equipment (computers), 5% medical aerosols, and 18% uses not listed.

CFC-12 is used for: 37% mobile air conditioners, 11% rigid foam, 4% medical aerosols, 4% retail refrigeration, 2% home refrigeration, 10% misc., 31% uses not listed.

CFC-113 is used as a cleaning solvent in the electronics industry.

Halon 1211 and 1301 are used as fire extinguishers.

UNEP meetings: Workshop on Substitutes and
Alternatives to CFC's and Halons

The Hague, 19-21 October 1988

EXECUTIVE SUMMARIES
OF THE PRESENTATIONS

4. Hermetically sealed mobile air conditioning systems

Presentation by: Messrs H. Owada, M. Hiraga and R.D. Bandeen, Sanden Corp., Sanden International Inc. and W. Bessler, General Electric Corp., U.S.A.

In recent years the percentage of automobiles that are equipped with air conditioning systems worldwide has greatly increased, for example reaching about 90-95% in the United States. These systems use CFC12 in a vapor compressor cycle and represent a significant percentage of the total consumption of this refrigerant.

As all of these systems employ compressors which are driven from the vehicle crankshaft, and are not hermetically sealed, they utilize shaft seals and static joints and seals which are a major source of atmospheric leaks of CFC12.

A hermetically sealed air conditioning system would be a natural consideration for improvement to the ozone depletion potential, for this would eliminate the shaft seal and static joints and seals. Further, the rubber hoses which serve as flexible connections to the engine mounted compressor, could be replaced by metal tubing and this would eliminate the refrigerant emissions by permeation through the hose material.

The apparent difficulties of power losses involved with the alternator and the compressor drive motor, which are not used in the current mobile air conditioning system must be minimized to make such a system possible. Even minimized losses are still additional, therefore, the total vehicle design must be reviewed to reduce the heat influx to the passenger compartment, and to given more favourable conditions to the condenser heat dissipation.

This paper discusses the feasibility of an electric system and gives preliminary test results using CFC12. And consideration to an HCFC22 system is given.

DISCUSSION

Hermetic Compressor - A semi-hermetic scroll compressor was built with a brushless CD motor. Because system efficiency is improved by controlling the pumping capacity continuously to a given load, a shaft speed control method was used. The scroll compressor mechanism was chosen for its high isentropic efficiency.

System Simulation Test - In a wide range of speeds, various heat loads and air velocity conditions were imposed upon the heat exchangers to find that electric power of 2.7 kw was required at maximum to be compatible with the current "open type" system in cooling performance. The air conditioning load to the engine was calculated as 5 horsepower or more when the alternator loss is accounted for, compared with 3 horsepower for the current system.

Vehicle Heat Chamber Tests - Tests were conducted using a 1600cc passenger car and 96 volt alternator and motor. The horsepower requirement of the electric system was compared with the conventional air conditioning system, baseline, equipped with a 155cc wobbleplate type compressor, SD709.

The basic system was a thermal expansion valve type and the heat exchangers and other components were common for the two tests. The heat chamber conditions were: 38°C, 50% relative humidity, 700 KCal/h m² heat radiation. And 100% recirculation air mode was tested at 40 Km/h. When no modifications were made to the car, the maximum power requirement was as high as 1.6 times the baseline. With about 30% reduction of the heat influx to the passenger compartment, the maximum power requirement was reduced down to only 20% higher than that of the baseline, when the condensing capacity was improved by 70%. However, the horsepower required for the same cooling performance as the baseline was even lower than the original, and the electric power input to the compressor was about 1 kw at maximum. This indicates that, if the heat influx reduction and the use of a high capacity condenser are assured in the car design process, the hermetic system is quite feasible.

HCFC22 - can be used in this system if the compressor displacement is optimized for its higher volumetric refrigerating effect, but an improvement of condenser heat transfer is recommended to lower the discharge gas pressure.

CONCLUSION

Further development work is required to overcome the heat load increase due to fresh air introduction for ventilation, location of the compressor, impact of NVH, (noise, vibration, harshness), and possible conflict with the car design concept.

On the other hand this new technology may be able to live with the general trend of car electronics and introduction of high amperage devices, and the elimination of the accessory drive belts assisted by starter-alternator technology and may be compatible with a new way of designing a car with integrated air conditioning components and tubing design.