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Laboratory for Planetary Studies

May 26, 1992

Senator Albert Gore, Jr.
United States Senate
Russell Senate Office Building
Washington, D.C. 20510-4202

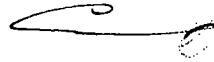
224-4944

Dear Al:

I've just heard some scuttlebutt that some of the HFC's and HCFC's being developed as substitutes for CFC's may have other health hazards. HFC-134a, for example, is said to be a carcinogen. Also, HCFC-123 has carcinogenic effects on rats [Facts on File, *World: World News Digest*, "Wider air pollution studies urged," July 25, 1991]. Do you know if there is any systematic effort to examine the medical effects of the full suite of substitutes being developed and discussed?

With best wishes,

Cordially,



Carl Sagan

going through tox
testing now -

- 1) Safe Alternatives Action
Reva Rubenstein

233-9155

- 2) Nina Bonnellyche
233-9079

Office of Toxic Substances is doing
the study.

CS/ey

Kimmye;
could you look
into this for me?
See if you can find
out the status of
any studies on this
type + get copies if poss.
Thanks, Tom

260-2090
Locate
Dan Blank
Katie, Kara
233-9073
Head of
Off of Atm + Indoor Air Programs
Gary Shan
233-9193
233-9195
— all

***19 FORUM: OZONE DEPLETION**

The EPA recently announced that new data showed that the depletion of the earth's protective ozone layer by industrial chemicals is more severe than previously believed. GREENWIRE asked three scientists intimately acquainted with the issue to assess the scientific and public policy significance of the findings. MACK MCFARLAND, is a senior research associate with the Dupont Company; MICHAEL OPPENHEIMER, senior scientist of the Environmental Defense Fund; and F. SHERWOOD ROWLAND, professor of chemistry at U.Cal.-Irvine, who, with Mario Molina, first discovered the destruction of stratospheric ozone by CFC's. Oppenheimer and Rowland are on GREENWIRE's Board of Analysts.

GREENWIRE: What is your understanding of recent findings about the condition of the ozone layer?

OPPENHEIMER: Data for the time between 1969 and 1986 showed ozone levels globally had fallen something on the order of 2 or 3 percent average. The new data suggests that ozone levels have fallen much faster. For instance, over the United States the ozone decrease is now around 4 or 5 percent. So the rate of ozone, the amount of ozone depletion is about double what we thought it was just a few years ago and, in addition, the rate of ozone depletion seems to have accelerated.

ROWLAND: Basically the satellite data have been extended out to a little bit more than 11 years and they now have one complete solar cycle. That's very important because it allows you to discern the underlying trends. That point is that the satellite data don't begin until November of 1979 and the measurements from ground base stations indicate that ozone depletion had already begun at that time. So that when you read that there has been a 4 or 5 percent decline in ozone as detected by the satellite that's not the total decline but the rather, decline as measured from the time when some had already occurred. In the United States it's more like 7%, reaching as much as 10% in the months of February, March, and April.

MCFARLAND: What is perhaps more important now is that the statistically significant ozone decrease trends extend into May and June over areas of the United States.

GREENWIRE: What is the significance of those findings?

ROWLAND: The rate of depletion seems to be increasing. It's not too surprising because the amount of chlorine is increasing with time. There's more chlorine in the atmosphere in 1991 than there was in 1988 or in 1985 and that makes the ozone depletion go faster. The data say that the ozone depletion will get worse no matter what we do for about another 20 years and the question of how much worse it will get depends on how quickly we can cut down on further emission of CFCs and related compounds in the

atmosphere.

OPPENHEIMER: The fact that we've got already 4 or 5 percent ozone decline is disturbing because ozone depletion means more ultra violet radiation. More ultra violet radiation means increases in skin cancer. The EPA is projecting about 12 million additional cases of skin cancer due to the this increased level of ozone depletion and about 200,000 mortalities, all in the United States. World-wide, of course, there is a much larger impact. In addition, there are effects on biological systems. Ultimately if ozone depletion gets large enough, it could cause an environmental collapse of the sort that we haven't yet seen. So these new results are very disturbing, particularly since we just don't know how far ozone depletion will go. There is an international accord -- the Montreal Protocol -- which was strengthened in London last June, which will eventually eliminate these chemicals. But it will take 20 years to do so and we have no idea how much ozone depletion will occur between now and 20 years from now.

MCFARLAND: There are obviously large uncertainties about the processes that control ozone. But there is a consistent picture that it might be chlorine from man-made sources that's causing the depletion. If you look at that data, there is some indication there that the rate of ozone decline is increasing as chlorine concentrations increase with time.

GREENWIRE: How should public policy respond?

OPPENHEIMER: First of all the schedule for elimination of the chlorofluorocarbon needs to be accelerated. Right now the industrial countries like the United States would eliminate them in 2000. That schedule should practically be accelerated to 1995. The developing countries like India and China are supposed to eliminate the chemicals by 2010 that should be accelerated to 2000. So-called HCFCs, which will be used as substitutes for CFCs should be permitted to be used for only some brief period of time.

ROWLAND: I think if everybody were working as rapidly as possible towards the strengthened Montreal Protocol that would be fine. And in many countries the rate of replacement of CFCs by other methods is going pretty rapidly because it is commercially important to be the first ones into the new product line. I'm not sure that anything one could regulate will make the phaseout any faster. How fast you can get out is really tied up with the availability of substitutes in literally hundreds of markets.

MCFARLAND: The current Montreal Protocol calls for the removal of longer lived chlorine compounds that by 2000. One of the keys to reversing the trends in chlorine in the atmosphere is global compliance. If you don't have global compliance the trend in ozone could continue to increase.

***7 FREE TRADE: 76% IN MEXICAN CITIES SUPPORT TRADE PACT**
Opinion Professional poll, conducted in "Mid-April,"
surveyed 3,500 participants in six major cities; +/- 2%
(Balto. SUN, 5/6)

Support trade deal 75.9%
Oppose trade deal 11%

GAO REPORT: A GAO study "has found that employment in the Los Angeles furniture industry has dropped by as much one-tenth in the last three years as companies have moved to Mexico in pursuit of lower wages and less stringent environmental laws" (Keith Bradsher, N.Y. TIMES). Bush is scheduled to meet today with environmental leaders to lobby their support for the pact (5/8). The groups meeting with Bush are: NRDC, National Audubon Society, Nature Conservancy and the World Wildlife Fund (GREENWIRE sources, 5/8).

OXYGEN BOOTHS: Front-page of today's W.S. JOURNAL reports on a new Mexico City growth industry: oxygen booths, where Mexicans can breathe fresh air for \$1.60 a minute (Matt Moffett, W.S. JOURNAL, 5/8).

***8 PROJECT '88: THE GREENING OF ADAM SMITH'S HAND, ROUND II**
Project 88 -- Round II, co-sponsored by Sens. Tim Wirth (D-CO) and the late John Heinz (R-PA), "is the product of more than 100 contributors working through" Harvard's Kennedy School of Government. Wirth unveiled the plan yesterday: "This report is an attempt to put a 'green thumb on Adam Smith's invisible hand'" (release, 5/7). N.Y. TIMES' Peter Passell writes, the original Project 88 "made a case for market-based incentives as a cheaper, less intrusive alternative to traditional pollution regulation." Round II "digs a little deeper than the original report. The chapter on greenhouse warming ... is particularly intriguing. International limits on greenhouse gases, it suggests, would be more cheaply carried out if emissions rights could be traded among nations. This would allow countries to switch to nuclear power or to plant trees. Poor countries might be compensated with a disproportionate share of rights in the initial allocation, giving them the choice of polluting more or raising capital by selling their permits ... Project 88 is a sign of the growing economic savvy of the environmental movement, recognition that there is more to good environmental policy than just saying no" (5/8).

===== SCIENCE/TECHNOLOGY =====

***9 TECHNOLOGY: BIG CHILLER, LITTLE CHILLER**
ICI Fluorchemicals and SnyderGeneral have developed a method of retrofitting big centrifugal chillers -- air conditioning units used for big office buildings and warehouses--using a hydrofluorocarbon refrigerant that does not deplete stratospheric ozone in place of depleting chlorofluorocarbon refrigerants. The method could reduce the use

of CFC's by millions of pounds a year, said an ICI official.
(GREENWIRE interview, 5/7)

LITTLE CHILLER: Scientists at Battelle Memorial Institute and at the Lawrence Livermore National Laboratory, are developing new, ultralight materials called aerogels that can be used in refrigerators and freezers to replace foams made with ozone-depleting CFCs (John Holusha, N.Y. TIMES. 5/8).

***10 OZONE LAYER: OZONE LOSS MAY TRACK SEA TEMPERATURE**

Ocean temperatures over the equatorial Pacific may affect stratospheric ozone levels over Antarctica and the rest of the globe, according to a new study by scientists with the National Oceanic and Atmospheric Administration (NOAA). In a paper to be published in a forthcoming issue of the CANADIAN JOURNAL OF PHYSICS, the researchers report that following a drop in sea surface temperatures in June, 1988 in the eastern equatorial Pacific, total ozone in the South Pole stratosphere recovered to much higher levels. Ozone had been rapidly decreasing in the previous years. "These observations suggest that the downward trend in ozone observed over the globe in recent years may have been at least partly meteorologically induced," said Walter D. Komhyr of NOAA's Climate Monitoring and Diagnostics Laboratory. The data examined by the scientists indicated that sea surface temperatures affect global wind and wave patterns which, in turn, affect the dispersion of ozone in the stratosphere. Komhyr said that it now must be determined how much changes in ozone are due to chlorofluorocarbons in the stratosphere and how much to meteorological processes caused by sea temperature fluctuations (NOAA release, 5/1).

DESTRUCTION TO WORSEN: Concluding a survey of data about the affects of polar cloud chemistry on stratospheric ozone in the current **SCIENTIFIC AMERICAN**, scientists Owen B. Toon and Richard P. Turco warn that "the destruction of ozone will be more severe every year for the next few decades, leading perhaps to a doubling in area of the Antarctic ozone hole. In effect, society has wagered that somewhat greater ozone loss is less likely to disrupt ecosystems and human activities than are rapid control and disposal of CFCs. No one yet knows the odds of winning this bet" (5/8).

===== WORLDVIEW =====

***11 KUWAIT: CLEANING UP THE MESS**

CHICAGO TRIBUNE's Liz Sly: "In the aftermath of the Persian Gulf war, Kuwait was a waste disposal company's dream come true. ... In the next few days (Waste Management Inc.) expects to sign an \$11 Million, one year contract to provide garbage disposal services for the center of Kuwait City. ... Waste Management also intends to offer to clean other parts of the country and is working to secure contracts to help with oil spill cleanups" (5/7).

EPA Releases Long-Awaited SO₂ Allowance Auction Plan

The Environmental Protection Agency on Monday released its long-awaited rules on the sale and auction of sulfur dioxide emissions allowances under the acid rain provisions of the amended Clean Air Act.

The proposed rule is virtually identical to a proposal distributed by the agency at the Acid Rain Advisory Committee meeting earlier this month.

As written, EPA will begin its allowance auction and sale program in 1993 and continue it annually thereafter. The allowances will be sold on both an "advance" and a "spot" basis. Advance allowances can be traded, but not used by utilities to comply with the Act's SO₂ provisions for seven years; spot allowances can be used immediately for compliance purposes.

EPA plans to auction 150,000 allowances in Phase I and put 25,000 aside yearly for direct sales. In Phase II, the agency will auction 200,000 allowances annually and put 50,000 aside for direct sales.

The auctions will be held no later than March 31. Once these allowances are sold, to utilities through a sealed bid process, private allowance holders may sell their allowances. EPA may not set a minimum price for the allowances it sells, while private sellers may specify a minimum price.

The direct sales will be open to both utilities and private speculators and will take place no later than June 1 each year. These allowances will be sold on a first-come, first-serve basis to any interested party at a fixed price of \$1,500 per unit. Unsold allowances will be added to EPA's auction reserve account.

Once the proposal is published in the *Federal Register*, interested parties will have 45 days to comment. EPA plans to hold a public hearing on the proposal in Washington on June 5.

*NOAA Research Questions HCFC's Benefit

A manmade chemical intended to replace ozone-destroying chlorofluorocarbons (CFCs) may do significantly more harm to the stratospheric ozone layer than previously thought, according to research sponsored by the National Oceanic and Atmospheric Administration. The proposed substitute, hydrochlorofluorocarbon (HCFC) 141b, would be used to clean computer chips and blow insulation, replacing CFC-11, CFC-12 and CFC-113.

According to NOAA's new research, which was conducted by A.R. Ravishankara of NOAA's Aeronomy Laboratory in Boulder, Colo., HCFC-141b has an ozone depletion potential about 50 percent greater than previously estimated because its atmospheric lifetime is 50 percent longer than previously reported. Ravishankara's research, published in the *Journal of Physical Chemistry*, shows that HCFC-141b has an atmospheric lifetime of 13 years, compared to the eight years used in previous calculations. By contrast, CFC-11, CFC-12 and CFC-113 have lifetimes of from 50-100 years.

The error may be attributable to slight impurities in the HCFC compounds originally analyzed by NOAA and other labs, said Ravishankara. For his current research, the NOAA scientist used high-purity samples from Du Pont de Nemours and Allied-Signal, the compound's manufacturers.

DOE, Tenn. Sign \$20 Million ORNL Pact

The U.S. Department of Energy and the state of Tennessee signed an agreement last week to provide for independent state oversight of all environmental, safety and health (ES&H) activities at the department's Oak Ridge facilities. The agreement, signed by Gov. Ned McWherter and Secretary of Energy James Watkins, calls for DOE to give the state \$19.9 million over the next five years to pay for the equipment and staff needed to oversee ES&H activities at Oak Ridge.

Under the agreement, negotiated in 1990 and released for public comment in January, 1991, representatives from the state of Tennessee will be able to review DOE monitoring of surface water, fish and wildlife, groundwater and air quality throughout the 36,000-acre reservation.

Oak Ridge is now in the process of negotiating a similar agreement with the state of Kentucky for oversight of environmental activities at the Paducah Gaseous Diffusion Plant in western Kentucky. DOE has previously signed similar oversight agreements with the states of California, Florida, Idaho, Mississippi, New Mexico, Nevada and Texas.

AirPol Picked For Polish Scrubber Project

The Department of Energy has selected Teterboro, N.J.-based AirPol Inc. to install a high-efficiency scrubber on a 50 megawatt boiler at the Skawina Power Station outside Krakow, Poland. The department will give the company \$7.7 million to install the scrubber, which can remove as much as 98 percent of the sulfur dioxide from the unit's stack gases.

AirPol's scrubber will use a technique known as the "Thiosorbic Lime Process," currently in use at over 20 coal-fired power plants in the U.S. The lime used in the process, which was developed by Dravo Inc., contains magnesium that enhances its sulfur-absorbing properties.

The scrubber is expected to come on-line in 1993. AirPol's proposal was selected from among five proposals submitted to DOE.

Steel Can Recycling Hits 25 Percent

The recycling rate in the U.S. for steel cans climbed to 24.6 percent in 1990, according to figures released recently by the Steel Can Recycling Institute. This is a sharp increase from the 18 percent rate set in 1989 and brings the industry within reach of meeting the Environmental Protection Agency's 1995 goal of a 25 percent recycling rate. SCRI's goal for steel can recycling is 66 percent by year-end 1995.

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NORTHERN TELECOM, EPA, SEDUE ANNOUNCE PLAN TO ELIMINATE
CHLOROFLUOROCARBONS FROM MEXICAN INDUSTRY

Washington, May 6 -- Northern Telecom today announced a partnership with the Secretaria de Desarrollo Urbano y Ecologia (SEDUE, the Mexican government's environmental agency) and the U.S. Environmental Protection Agency to develop a program that will eliminate ozone-depleting chlorofluorocarbons (CFC) solvent emissions from Mexico's electronic manufacturing industries.

Northern Telecom, a leading manufacturer of telecommunications equipment, will organize and lead teams of experts from the other member companies of the Industry Cooperative for Ozone Layer Protection (ICOLP) to provide technical expertise in support of the program. ICOLP was created in November 1989 to coordinate the open, worldwide exchange of non-proprietary information on alternative technologies, substances and processes for CFC solvents in the electronic industry.

The program will be implemented in four stages:

- Planning -- A project planning meeting will be held between Northern Telecom, SEDUE, EPA and ICOLP expert teams and prospective Mexican electronics firms.

(more)

*File - CFC
alternatives*

- Training -- The expert teams will conduct training workshops on ozone depletion and CFCs, conservation technologies and practices, and the technical aspects of various alternative technologies.
- Demonstrations -- Members of the training program will visit Northern Telecom or other ICOLP member company facilities in Mexico or other countries to study alternative technologies in place.
- Plant Conversion -- Experts will provide on-site technical assistance to convert Mexican facilities to alternative technologies.

The full incremental costs of halting the use of ozone-depleting chemicals in Protocol-member developing countries will be financed by a Multilateral Fund that was established by the Montreal Protocol.

In addition, ICOLP will make available to the Mexican electronics industry an on-line, international database called OZONET, which is designed to provide users of CFC compounds with information on alternative processes, materials and technologies.

(more)

Mexico was the first country to ratify the Montreal Protocol on Substances that Deplete the Ozone Layer in 1987. The nearly 70 nations that have signed the accord to date are responsible for phasing out the use of CFC solvents by 2000 and methyl chloroform solvents by 2005 for developed countries, and 2010 and 2015 for developing countries.

Northern Telecom is the leading global supplier of fully digital telecommunications switching systems, providing products and services to telephone operating companies, corporations, governments, universities and other institutions worldwide. Northern Telecom had 1990 revenues of \$6.8 billion. In addition, in the first quarter of 1991 the company acquired STC PLC, a leading United Kingdom telecommunications firm with 1990 telecommunications revenues of approximately \$1.6 billion.

-30-

For more information:
Northern Telecom
Preston Peek
(202) 347-4610 (Monday)
(416) 566-3017 (Office)
(416) 825-8702 (Home)

Embassy of Mexico
Javier Trevino
Antonio Ocaranza
(202) 728-1650

U.S. EPA
Eileen Claussen
(202) 382-7407

Stephen Andersen
(202) 475-9403

L018-050691

Questions & Answers

What is Northern Telecom's position on free trade (or the current talks with Mexico)?

Northern Telecom is generally in favor of open markets, no matter what market we're discussing. However, I must stress that today's announcement is not linked in any way to the free trade talks. Our announcement today concerns the global environment, and we would be pursuing these initiatives in eliminating CFCs globally whether those talks were going on or not.

Does Northern Telecom have a position on free trade?

We have not taken a public stand on the issue. I am not the appropriate spokesperson anyway, and as I stated, I am here to discuss environmental, not political, issues.

Do you have any arrangements like this one with any other countries? Can you name them?

While we will work diligently to share our technology and methods everywhere we can, we do not at this time have any other relationships like this. We will make announcements to that effect as appropriate.

Does Northern Telecom have manufacturing interests [or maquiladoras] in Mexico?

Northern Telecom does not have any direct manufacturing facilities in Mexico. However, for the past two years we have shared an interest in a small operation in Monterey (30 employees) that assembles cable harnesses for some of our switching products. We have also subcontracted for some equipment assembly in Tijuana for a number of years.

I should point out that as a global corporation, we have manufacturing facilities all over the world.

[FYI but not necessarily for disclosure: The employees at the Monterey facility are hired by a labor broker (subsidiary of NATEL). The facility is non chemical, surpasses any U.S. standard for a manufacturing facility, and will be totally unaffected by our announcement today.]

Are either of these operations Maquiladoras?

Yes, the facility in Monterrey is a type of maquiladora, but once again, it is not a full-fledged manufacturing facility and it certainly does not emit any CFCs.

Do you intend on opening any [other] maquiladoras in Mexico?

We do not have any such plans at this time.

Was this announcement timed to coincide with the trade talks?

No. This initiative has been underway for many months and is completely independent of the current talks on free trade.

Will Northern Telecom receive any special business considerations or other favors as a result of this program?

Absolutely not. This program is entirely independent of any social or political agenda. Our interest is solely the preservation and conservation of the environment.

Why is the EPA involved in this? Why doesn't Northern Telecom just work directly with the Mexican government?

Northern Telecom is working directly with the Mexican government. However, under the terms of the Montreal Protocol, the United States was tasked to be the "partner country" to Mexico in sharing technology with them on CFC elimination. Thus the EPA's involvement.

You say your corporate environmental goal is to eliminate CFC emissions from electronic manufacturing all over the world. How do you plan to "clean up" such industrially antiquated markets as, say, Eastern Europe?

Such initiatives will be taken on a case-by-case basis. Certainly we cannot solve all of the world's CFC solvent problems overnight. We are, however, in this for the long haul and will do everything we can with whoever would like to partner with us.

All of this is well and good, but you've been one of the worst offenders in CFC emissions in this country for years. Why should we applaud your efforts to fix something that should never have happened in the first place, and how do we know that you aren't polluting just as badly in some other area now?

When the electronics industry first began using CFC solvents XX years ago, their impact was unanticipated. When their destructive impact on the ozone layer was understood, Northern Telecom immediately began to seek alternatives. We are the first electronics manufacturer to completely phase out their use, and we are doing so almost a decade earlier than mandated.

Furthermore, we have programs in place to phase out our use of halons and other harmful solvents that are just as ambitious as the ones that have resulted in our successful elimination of CFCs. For example..(MGK--need info).

While visiting Mexico last month, your Chairman, Dr. Stern, announced his intentions to bring Northern Telecom's presence into Mexico in a big way -- including R&D and manufacturing. Isn't this announcement today just a way to position your company to accomplish its own business interests in Mexico?

Mexico obviously represents opportunities for our company, and we are pursuing them there as we are in dozens of other countries. However, our decision to work with Mexico at this point is in response to their request, and their admirable commitment to eliminate CFC emissions from their manufacturing processes.

(Also: Northern Telecom's efforts in non-North American markets have been on-going for years, and have accelerated year by year. We have had a presence in Mexico for more than a decade.)

Is Northern Telecom a Canadian or U.S. company?

Northern Telecom maintains global corporate headquarters in both Toronto and Washington, D.C.

[If pressed: We are 53% owned by Bell Canada Enterprises.]

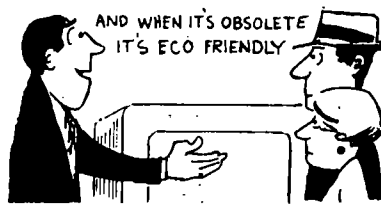
PATENTS

filed
gone
alternative

Greener fridges

THE need to rid refrigerators of chemicals that destroy ozone in the Earth's upper atmosphere has led Sanyo, one of Japan's largest manufacturers of household electrical equipment, to file patent applications round Europe (402 937) on a refrigerant it says breaks up before it can do any damage.

Refrigerants currently in use (halogenated hydrocarbons such as dichlorodifluoromethane), destroy ozone when they release chlorine. Refrigerants which release chlorine before reaching the upper atmosphere do less damage, the company says, but do not work well in refrigerators because they do not mix with the



oil needed to keep the refrigerator's compressor lubricated. The oil and refrigerant separate, and the compressor seizes up.

Sanyo suggests mixing two materials, such as dichloromonofluoromethane and trifluoromethane. This mix is non-flammable, decomposes before reaching the upper atmosphere and mixes well with the paraffin or similar oil used to lubricate the compressor. □

Posture alarm

YUNG-TSUN Liu of Taiwan worries about people getting a "camelback" through bad posture. He has invented a device which warns of slumped shoulders (UK 2 228 869).

The device looks like a shoulder harness for a gun. Elastic straps round the shoulders hold a box of electronics on to the wearer's back.

The back box has a spring-loaded switch which is held open when the wearer has a straight back. At the first sign of slouching the belts pull on the switch to close it and sound an alarm buzzer. The alarm then goes on sounding until the wearer straightens up. □

French battle to outsmart Amstrad

THE FRENCH company which holds the patent rights on smart cards has sued Amstrad and its Japanese supplier Funai for building satellite receivers, that make use of smart cards, without first obtaining a licence. Twenty years ago a French journalist, Roland Moreno, came up with the idea of the smart card—a token, ring or credit card which encapsulates computer memory and a microprocessor that controls access to it. The British patent (1 504 196), now owned by Innovatron of Paris, remains in force until March 1995. Amstrad's receivers will only decode Sky's scrambled film channel when a smart card is inserted. Innovatron wants Amstrad to hand over or destroy all satellite receivers which use the cards.

Amstrad has rejected the offer of a licence. "We are very relaxed about this. We told them to stop talking and sue us. Even if their patent is valid we don't infringe it," says a company representative. Amstrad's confidence may be due to the fact that the smart card circuitry for its decoders has been recycled from older machines for which a licence has already been paid.

The satellite trade believes that Amstrad is only able to sell its receivers for the low price of £199 by stripping out smart card reader circuits from a batch of second-hand decoders that it bought after Sky reclaimed them from viewers who had defaulted on payments. Because the decoders were originally made by Thomson and Philips under licence from Innovatron, Amstrad should not now need a licence to reuse the circuits in its decoders. Amstrad will neither confirm nor deny that this is why it is so "relaxed" over Innovatron's patent claim. □

Chilled out

CHILLED food has a shelf life of only about 7 days because it can become contaminated with microorganisms after being cooked.

The chocolate company Nestlé of Switzerland claims to have developed a system (European patent 402 682) which can increase the shelf life of chilled foods without the need for preservatives.

Meat is spread over mesh trays in a large pressurised tank. Nitrogen is pumped in under a pressure of several atmospheres. Cooking stock is pumped through a heat exchanger, where steam heats it to cooking temperature, and is then passed through the pressurised container to cook the food.

As soon as the food is cooked, the steam supply to the heat exchanger is turned off and replaced with cooled liquid. The same stock, which continues to circulate, now chills the meat. All this happens in a sealed container and inert atmosphere,

so there is no risk of microbes getting in.

Finally, the tank is taken to a clean room, where it is opened, and the food is immediately packaged. Nestlé claims this process gives a shelf life for the chilled food of three weeks or more. □

Farewell to fraud

TEXAS instruments hopes to curb telephone fraud by checking callers' voices. The company estimates that, in the US alone, long-distance telephone companies lose more than \$500 billion a year when people pay for calls using someone else's credit-card number.

The obvious solution is to check the caller's voice, but differences in audio quality between different telephones and lines add distortion which may fool the system. Texas Instruments suggests (in European patent 397 399) that when initially authorised to make credit-card calls, the card holder should have to speak a short, but secret,



phrase down the line.

This is recorded in digitised form and stored in memory at the card control centre. Several recordings are made at different times over different lines, to average out characteristics of different lines and phones.

When asking for a credit connection, the caller must first speak the secret phrase. If they get it wrong they are obviously an imposter. If the words match, the control centre then compares the sound with the stored version. □

Virus protection

ALAN Solomon, a British expert on computer viruses, has filed a British patent application (2 231 418) for a system which, he claims, will prevent viruses getting into a computer and storing themselves on the hard disc.

Although virus protection programs exist, the latest viruses defeat them because they store themselves in the sectors at the start of the hard disc which contain the code used when a computer is first switched on. So the virus can take control of the computer before any virus prevention program has a chance to start working.

Preventing the computer from recording to the hard disc would of course stop viruses storing themselves on it. But programs, like word processing, must continually write to the disc. The answer, says Solomon, is to stop the computer writing to the first sectors but not the rest of the disc.

An electronic circuit senses when the writing head is over the first sectors of the disc, and physically disables the head's recording circuitry while it is over those sectors. This means that the only way for manufacturers to record the necessary programs in these sectors when constructing the computer is to connect a wire which temporarily shorts out the sensor circuit. □

Patent information

Copies of patents, which contain fuller details and the addresses of inventors, are available from science reference libraries around Britain. For details of free public access and purchase price, contact the London

Patent Office at State House, 66-71 High Holborn, London WC1R 4TP (Tel 071-831 2525) or Science Reference and Information Service at 25 Southampton Buildings, London WC2A 1AY (Tel 071-323 7919).

SUBSTITUTES

SUVA: replaces CFC 12 as a refrigerant. Manufactured by Du Pont. Also known as HCFC 134a. Costs \$10 lb - much more than CFC-12. Has potential to contribute to global warming at one tenth the effect of CFC 12.

HCFC 22: Can be used as a refrigerant in auto air conditioners. Causes problems with current hoses - would require redesign of some cars for use. Made by Du Pont.

HCFC 141b: replaces CFC's used as solvents and blowing agents. Manufactured by Allied Signal. Is flammable.

HCFC 123 : replaces CFC's used as solvents and blowing agents. Manufactured by Du Pont. Not flammable.

Air Conditioners: Made by the Albers Company of Phoenix. Is an air conditioner with no use of CFC's. Relies on water evaporation to cool. Costs same as existing air conditioners, is same size, but uses 1/2 the electricity to run as regular air conditioners, and removes humidity from air as well.

Trocellen Cross Linked Polyolefin foam: Made by Huls America. Foams made without CFC's as blowing agents. Cost is same as CFC blown foam.

Water Detergents: Replaces CFC's used as cleaners in the electronics industry. Currently used by IBM. Costs more than CFC's and can be too harsh on some chips.

Terpenes: Replaces CFC's used in the electronics industry. Also known as EC-7. Made by Petrofirm of orange peels. Cost is higher. Can cause waste disposal problems after terpenes are used.

CO2: Can be used as a CFC replacement for aerosols at same price.

Fiberglass: Can be used in insulation instead of CFC blown foam.

ALTERNATIVES TO HALON

1. RESIDENTIAL FIRES:

a. Testimony of BILL COLUMBUS, marketing manager of ANSUL FIRE PROTECTION, a manufacturer of halon fire extinguishers, before the EPA:

"In many instances, the application of a [halon] 1211 to a fire might not be the right--there are other substitute agents that do the same job. There are a few instances, that is not true, in industrial applications. But in some residential applications certainly that is definitely true."

a. UNEP Halons-Technical Options Committee Report (August 11, 1989):

Multi-purpose dry chemical fire extinguishers perform better than halon 1211 portables on ORDINARY COMBUSTIBLES and LIQUID FUEL fires.

2. BOAT FIRES:

COAST GUARD REGULATIONS:

Foam, CO2, and Dry Chemical are approved alternatives to halon for use on boats.

3. ELECTRONIC EQUIPMENT:

PHEONIX 2000--a system developed for the Navy by Shihyung Security Technology, Inc.

--combines the use of sprinklers, watertight cabinets and existing cooler systems for electronic equipment

--allows use of alltypes of fire fighting agents--Halon not necessary.