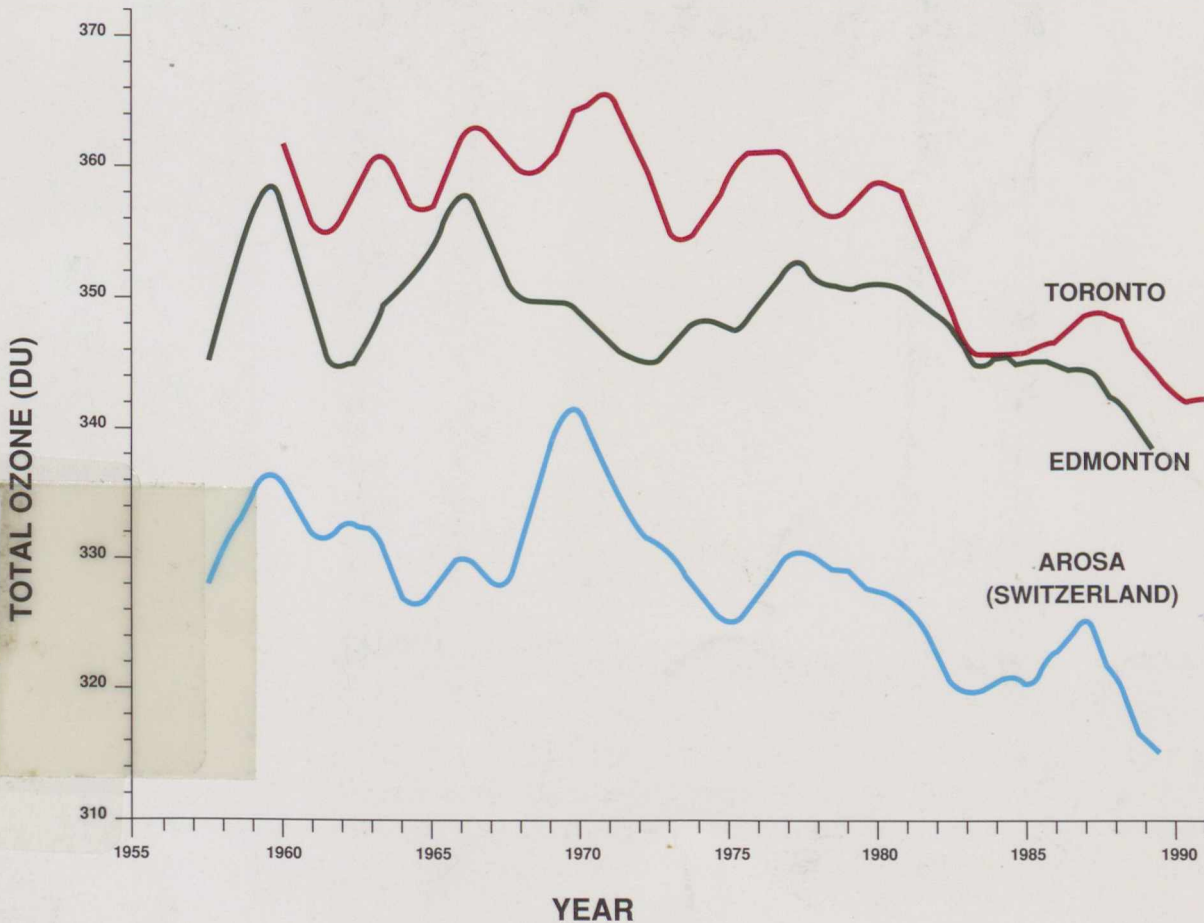




Report of the
Standing Committee on Environment

**OZONE DEPLETION:
ACTING RESPONSIBLY**

TOTAL OZONE: 1955-1991



J
103
H7
34-3
E582
A123

The Honourable David MacDonald, P.C., M.P.
Chairperson

JUNE 1992



P AAC J103 H7 34-3 E582 A1
Canada. Parliament. House
Ozone depletion, acting re
00098-0659 01-0278220

DATE

NAME — NOM

P AAC J103 H7 34-3 E582 A1
Canada. Parliament. House
Ozone depletion, acting re
00098-0659 01-0278220

The Cover graph illustrates the natural variability of stratospheric ozone and a 4% decrease since the early 1980's due to industrial chemicals. The Canadian stations use the Canadian made Brewer Ozone Spectrophotometer, while the Arosa data is measured using a Dobson Spectrometer. This indicates that the quality of the Brewer data is world class and that mid-latitude ozone depletion can be found throughout the Northern Hemisphere.

(Courtesy: Experimental Studies Division, Atmospheric Environment Service)

J
103
47
34-3
E582
A123

HOUSE OF COMMONS

Bill No. 43

Monday, June 22, 1992

Chairperson: David MacDonal

CHAMBRE DES COMMUNES

Projet de loi

Le mardi 22 juin 1992

Président: David MacDonal

REPORT OF THE STANDING COMMITTEE ON ENVIRONMENT

Environment

Environnement

RESPECTING:

In accordance with its mandate under Standing Order 106(2), a study of ozone depletion.

CONCERNANT:

Conformément au mandat que lui accorde l'article 106(2) du Règlement, une étude sur l'appauvrissement de la

INCLUDING:

Final Report to the House of Commons
Ozone Depletion: Acting Responsibly

OZONE DEPLETION: ACTING RESPONSIBLY

Document communiqué de la commission d'étude sur le futur



The Honourable David MacDonal, P.C., M.P.

JUNE 1992

HOUSE OF COMMONS

Issue No. 43

Monday, June 22, 1992

Chairperson: David MacDonald

CHAMBRE DES COMMUNES

Fascicule n° 43

Le lundi 22 juin 1992

Président: David MacDonald

Minutes of Proceedings and Evidence of the Standing Committee on

Procès-verbaux et témoignages du Comité permanent de l'

Environment

Environnement

RESPECTING:

In accordance with its mandate under Standing Order 108(2), a study of ozone depletion

INCLUDING:

Fourth Report to the House

Ozone Depletion: Acting Responsibly

CONCERNANT:

Conformément au mandat que lui accorde l'article 108(2) du Règlement, une étude sur l'appauvrissement de la couche d'ozone

Y COMPRIS:

Le Quatrième rapport à la Chambre

L'appauvrissement de la couche d'ozone: agir de façon responsable

Third Session of the Thirty-fourth Parliament,
1991-92

Troisième session de la trente-quatrième législature,
1991-1992

Printed on recycled paper.

Imprimé sur papier recyclé.

MEMBERS OF THE STANDING COMMITTEE ON ENVIRONMENT

CHAIRPERSON

David MacDonald, P.C., M.P. —Rosedale

VICE-CHAIRPERSONS

Yvon Côté, M.P. —Richmond—Wolfe

Paul Martin, M.P. —LaSalle—Émard

MEMBERS

Marlene Catterall, M.P. —Ottawa West

Lee Clark, M.P. —Brandon—Souris

Jim Fulton, M.P. —Skeena

Brian O'Kurley —Elk Island

Ross Stevenson —Durham

OTHER MEMBER WHO PARTICIPATED

Lynn Hunter, M.P. —Saanich—Gulf Islands

CLERK OF THE COMMITTEE

Normand Radford

RESEARCH OFFICER OF THE COMMITTEE

William Murray
Research Branch, Library of Parliament

Table of Contents

INTRODUCTION	1
SCIENTIFIC EVIDENCE OF OZONE DEPLETION	1
POTENTIAL SYMPTOMS OF OZONE DEPLETION	4
SKIN CANCER	4
FOURTH REPORT	
HOW TO HELP PREVENT AND TREAT SKIN CANCER	5
TECHNOLOGICAL APPROACHES	8
POLICY	10
CONCLUSION	15
LIST OF RECOMMENDATIONS	15
APPENDIX A -- RE-CONSIDERATIONS OF THE JUNE 1990 REPORT OF THE STANDING COMMITTEE ON ENVIRONMENT "HEALTHY SKIN CARE"	17
APPENDIX B -- LIST OF WITNESSES	21
REQUEST FOR GOVERNMENT RESPONSE	25

The Standing Committee on the Environment has the honour to present its

FOURTH REPORT

In accordance with Standing Order 108(2), the Standing Committee on Environment undertook a study on ozone depletion.

Table of Contents

INTRODUCTION	1
SCIENTIFIC EVIDENCE OF OZONE DEPLETION	1
POTENTIAL EFFECTS OF OZONE DEPLETION	4
SKIN CANCER	6
HOW TO HELP PROTECT AGAINST SKIN CANCER	7
TECHNOLOGICAL ADVANCES	8
POLICY	10
GLOSSARY	13
LIST OF RECOMMENDATIONS	15
APPENDIX A – RECOMMENDATIONS OF THE JUNE 1990 REPORT OF THE STANDING COMMITTEE ON ENVIRONMENT “DEADLY RELEASES CFC’S”	17
APPENDIX B – LIST OF WITNESSES	21
REQUEST FOR GOVERNMENT RESPONSE	23

INTRODUCTION

“Ozone depletion is a threat to the continuation of life on Earth.” This unanimous opinion was reached by the House of Commons Standing Committee on Environment, and expressed in the Committee’s report *Deadly Releases CFCs* (June 1990, p. 1). From this concern arose 23 recommendations and a call to the governments of the world to “declare themselves at war with all of those elements which are responsible for depletion of the Earth’s ozone. . .” (*Ibid.*) Although less than two years have passed since the release of *Deadly Releases CFCs*, rapidly changing events have compelled the Committee to revisit this issue.

On 6 April 1992, the Committee held a one day set of hearings to investigate recent scientific evidence that indicated stratospheric ozone over the Northern Hemisphere was becoming depleted at rates in excess of earlier predictions. University and Environment Canada scientists were requested to critically evaluate Canadian atmospheric data and recent preliminary observations by the United States National Aeronautics and Space Administration (NASA). Health care professionals appeared before the Committee to review the human health risks posed by possible increased levels of UV-B; and the Committee received valuable suggestions and recommendations from concerned environmental groups.

Committee members are strongly of the opinion that Canada must be able to respond effectively and promptly to the challenge of ozone depletion. To ascertain the level of Canadian preparedness, representatives of Du Pont Canada, and the Heating, Refrigerating, and Air Conditioning Institute of Canada were asked to discuss recent advances made towards the development of replacement chemicals for CFCs and alternative refrigeration technologies. In addition, Dr. J. Buccini, Director, Commercial Chemicals Branch, Environment Canada, outlined the department’s action plan for the accelerated phase-out of ozone-depleting chemicals.

One of the major objectives of these hearings was to provide the Canadian public with a factual assessment of ozone depletion, in order that they may make informed decisions in regard to individual initiatives, precautionary measures, and to affecting ozone policy. As pointed out by Committee Chairperson, the Honourable David MacDonald, the success of a program to accelerate the phase-out of ozone-depleting chemicals depends upon the participation of a well-informed public.

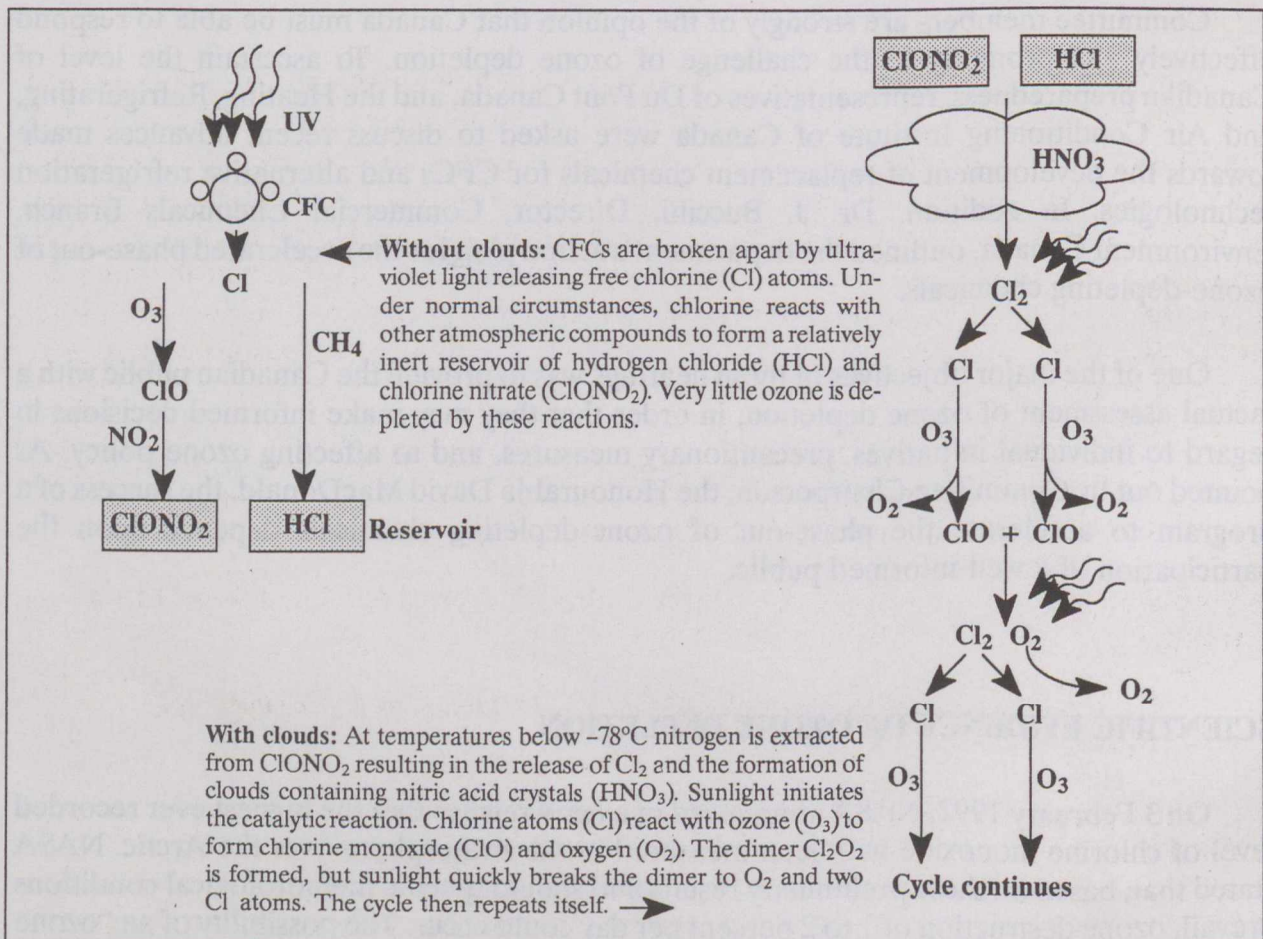
SCIENTIFIC EVIDENCE OF OZONE DEPLETION

On 3 February 1992, NASA announced in a news release that the highest ever recorded level of chlorine monoxide had been measured in the stratosphere over the Arctic. NASA stated that, based on these preliminary results and should specific meteorological conditions prevail, ozone destruction of 1 to 2 percent per day could occur. The possibility of an “ozone hole” over populated regions of the Northern Hemisphere elicited alarming news media reports, and brought a previously distant problem to the immediate concern of Canadians.

The Committee heard scientific evidence from Dr. D. Wardle, Chief, Experimental Studies Division, Atmospheric Environment Service, and Dr. J. McConnell, Professor of Atmospheric Science, York University, that in February 1992 weather conditions were conducive to severe ozone depletion within an Arctic vortex of extreme cold stable air. Chlorine in the stratosphere above the Northern Hemisphere is at a concentration of approximately 3.0 parts per billion (ppb). Dr. McConnell stated that 0.7 ppb of this chlorine (23%) is of natural origin while 2.3 ppb (77%) is from man-made sources. This chlorine is usually present as hydrochloric acid or chlorine nitrate, relatively stable molecules that do not deplete ozone. However, at temperatures of -78°C and lower, polar stratospheric clouds, basically made up of nitric acid crystals, are formed. This cold-temperature phenomenon releases active chlorine molecules from hydrochloric acid and chlorine nitrate. Chlorine monoxide is formed and the chemical scenario is then set for rapid ozone depletion to be initiated by the first rays of sunlight (Figure 1).

FIGURE 1

How Polar Stratospheric Clouds Help Destroy Ozone



Source: Scientific American, 1991, Vol. 264, pp. 68-74.

NASA initially measured a chlorine monoxide concentration of 1.5 ppb but subsequent measurements were only 0.5 ppb. Fortunately, by the end of February warmer temperatures and unstable weather conditions disrupted the polar vortex. As a result only very minor ozone depletion occurred. Although ozone was not substantially depleted this year, it is now known that a large repository of chlorine exists in the stratosphere over the Northern Hemisphere. Consequently, the potential for bouts of large-scale ozone depletion will persist long into the foreseeable future. Further, the continued release of ozone-depleting chemicals to the stratosphere may increase the severity of such events.

The Committee continues to believe that the depletion of stratospheric ozone is one of the most critical environmental problems facing the world and humanity today. Accordingly, we are encouraged by the government's commitment to end halon production and import by 31 December 1994, and to accelerate the phase-out of all CFCs by the end of 1995. However, as previously recommended in *Deadly Releases CFCs* (recommendation 1b):

Recommendation No. 1

The Committee reiterates its recommendation for a complete phase-out in the production and consumption of carbon tetrachloride and methyl chloroform by 1995, except for their use as a feedstock for CFC or halon substitutes and as organic laboratory solvents.

Conditions in the stratosphere are known to undergo large day-to-day variation, and NASA has been severely criticized for the disclosure of preliminary data based on a one-day observation. The Committee appreciates that the measurement of chlorine monoxide at an unexpectedly high concentration was important scientific news and, to a degree, understands the fervour with which the NASA information was made public. However, it is of prime importance that scientists protect their credibility. Scientific data must be verified and the significance of findings be exposed to peer review and consensus, prior to public disclosure. Further, scientists must appreciate the goals of the news media and act responsibly in their interactions with the press. As Dr. J. McConnell said:

“There is a problem with how scientists present their data. That data is processed by the press, and how that is viewed by the public is a problem.” (*Minutes of Proceedings and Evidence*, Issue No. 35, 6 April 1992, p. 25)

This problem was very aptly summarized by Dr. T. Ball, Professor of Climatology, University of Winnipeg:

“...scientific speculation becomes prediction.” (*Minutes of Proceedings and Evidence*, Issue No. 35, 6 April 1992, p. 12)

While it is essential that scientists become more prudent in their dealings with the news media, it is of even greater importance that the news media report environmental events in a responsible manner. The news media has an obligation to provide the public with objective and factual information. Committee members assert that the issues of human health and environmental quality must be treated with the accuracy and respect these profoundly important concerns deserve.

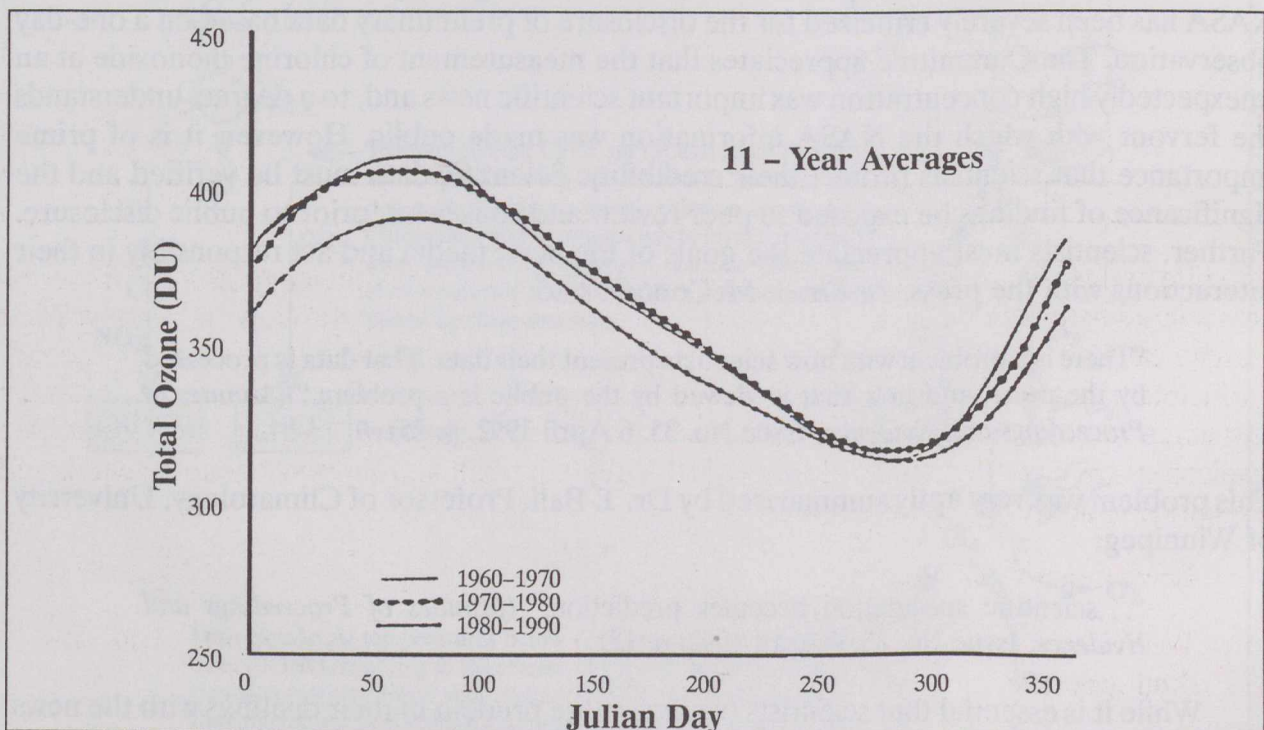
POTENTIAL EFFECTS OF OZONE DEPLETION

It has been suggested that each 1% loss of ozone will result in a 2% increase in UV light reaching the earth, and a 1% reduction in crop yields in such UV-B sensitive plants as soybeans, corn, rice and wheat (United Nations Environment Program, *Environmental Effects of Ozone Depletion: 1991 Update*, November 1991, 52 p.). In addition increased UV-B over the Antarctic Ocean has been found to have an adverse effect on phytoplankton populations. Even a temporary decrease in primary productivity could result in decreased biomass at the end of the aquatic food chain. A 1% decrease in ozone could lead to a 0.6% increase in cataracts; while exposure of experimental animals to increased levels of UV-B has been correlated to various degrees and forms of immunosuppression. According to Dr. J. Rivers, National Director of Sun Awareness and Screening Programs, the Canadian Dermatology Association, it is predicted that a 1% loss of ozone will correspond to approximately a 2.5% increase in non-melanoma skin cancers each year.

Dr. D. Wardle presented data showing that during the past decade vernal ozone levels have been depressed by 4% over Toronto, resulting in an approximate 4% increase in UV-B during the months of April through July (Figures 2 and 3).

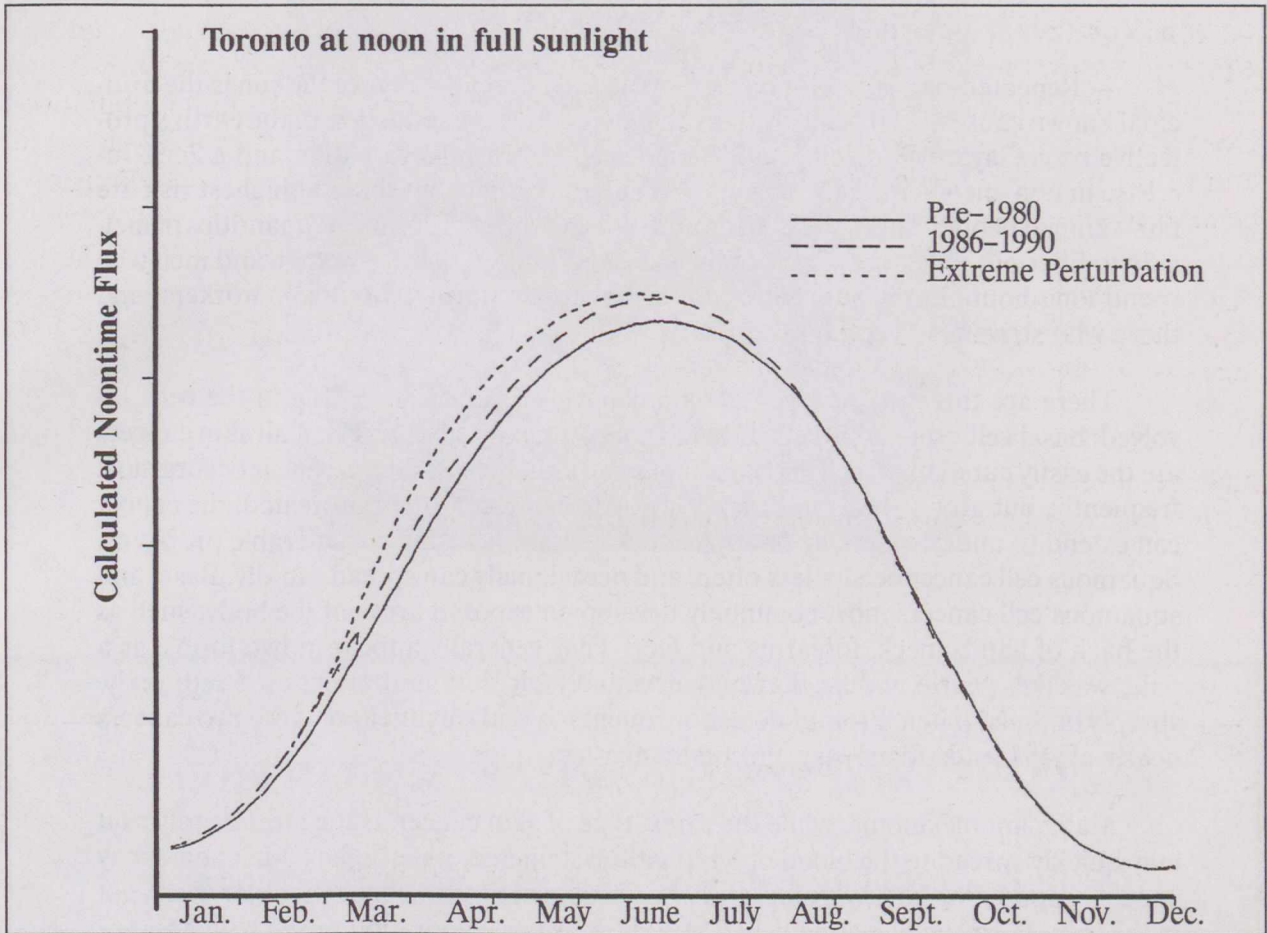
FIGURE 2

Total Ozone Toronto



Average total ozone as a function of time of year through three 11-year cycles of the solar cycle

FIGURE 3
Calculated UV-B Radiation



In spite of this fact, there have been no significant increases in health or agricultural problems associated with ozone loss. As yet, ozone loss appears to be well below any critical level that might cause a measurable effect. While the Committee believes in the "precautionary principle"; that is, when in doubt, act rather than wait; we also believe that every effort must be made to obtain sound scientific data upon which to base policy making. The Committee welcomes the announcement of increased Green Plan funds to support ozone research and monitoring activities. In addition:

Recommendation No. 2

We recommend that the effects of increased UV-B on human health and on food-crop productivity be considered a priority research area.

Skin cancer is both the most common and fastest growing type of cancer in Canada. It is estimated there will be 50,000 new cases of skin cancer this year. However, these new cases are occurring independent of ozone depletion, as 20 to 30 years generally elapse between the initiating event and the onset of the disease. The increase is believed to be largely due to the increasing preoccupation of Canadians, during the past 40 to 50 years, in acquiring deep

SKIN CANCER

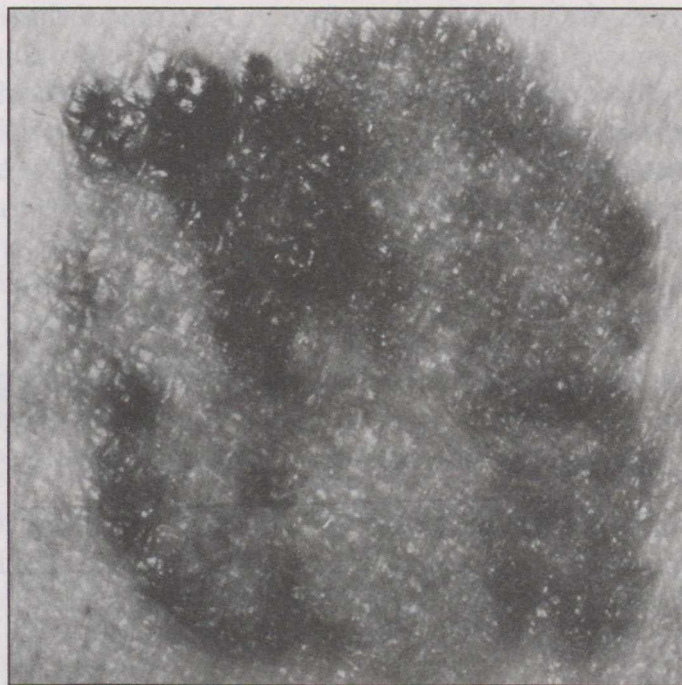
— Repeated exposure over many years to the ultraviolet rays of the sun is the principal known cause of skin cancer. It is predicted that a 1% reduction in the earth's protective ozone layer will result in a 2% increase in ultraviolet radiation and a 2.5% increase in non-melanoma skin cancers. No one is immune, but those at highest risk are fair-skinned people, notably redheads and blonds, who lack sufficient quantities of melanin to filter out the harmful rays of the sun. Also at high risk are women and men who spend long hours in the sun; for example, fishermen, farmers, outdoor workers, and those who strive for deep tans.

There are three major types of skin cancer, classified according to the cells involved: basal cell, squamous cell and melanoma. Luckily, about 93% of all skin cancers are the easily cured basal cell and squamous cell varieties. Basal cell cancer occurs most frequently, but grows slowly and rarely spreads. However, if left untreated, the cancer can extend to underlying bone or adjacent skin tissue, causing considerable problems. Squamous cell cancer occurs less often, and occasionally can spread rapidly. Basal and squamous cell cancers most commonly develop on exposed areas of the body, such as the back of hands, neck, forearms and face. They generally appear in two forms: as a pale, waxlike, pearly nodule that may eventually ulcerate and crust; or a red, scaly, sharply outlined patch. Prompt detection, diagnosis and treatment of these two cancers nearly always leads to an easy and permanent cure.

Malignant melanoma, while the rarest type of skin cancer, is the most deadly as it may quickly spread to the blood or lymphatic system and other organs. Melanoma may suddenly appear without warning, and often occurs in or near a mole or other dark spot in the skin. It is usually distinguished by a dark brown colouration mixed with areas of white, pink, blue or grey. It starts as a small mole-like growth which may increase in size or change colour or shape. It may become itchy, and occasionally a minor injury may cause it to bleed. If the melanoma is discovered and treated at an early stage there is an excellent chance for cure. If, however, the melanoma has become raised and has formed nodules, the tumor may spread to other organs.

Melanoma may spread rapidly, so it is essential, particularly for those who have spent long periods of time in the sun, to be able to identify the indicators of malignant melanoma. The easy to remember "A, B, C, D" signs of a malignant melanoma are:

- A. ASYMMETRY — one half unlike the other half;
- B. BORDER IRREGULAR — scalloped or poorly circumscribed border;
- C. COLOUR VARIED— from one area to another, shades of tan and brown, black, and sometimes white, red and blue;
- D. DIAMETER LARGER — than 6 mm as a rule (diameter of a pencil eraser).



HOW TO HELP PROTECT AGAINST SKIN CANCER

- Avoid prolonged exposure to the sun especially between 10:00 a.m. and 3:00 p.m.
- Wear protective clothing, such as long-sleeved shirts, and wide-brimmed hats.
- Use a sunscreen with a SPF of 15 or higher to absorb ultraviolet rays. Sunscreens are rated in strength, and the higher the number, the greater the protection.
- For the nose or lips, use a sun block preparation containing zinc oxide or titanium dioxide that will deflect ultraviolet rays. However, since it is heavy and completely coats the skin, a sun block is suitable only for small areas.
- The key to saving lives from skin cancer is first prevention and then early detection and prompt treatment of any skin abnormality ■■

Source: Facts on Skin Cancer, Canadian Cancer Society, January 1990.

summer and vacation tans. Behaviour is therefore at the root of this health problem, but fortunately behaviour can be changed. This is particularly important as possible future increases in UV-B could mean a dramatic increase in skin cancers and health costs. Tremendous cost-benefit savings could be achieved by changing the public's attitude to the sun and tanning. As discussed by Dr. J. Rivers, education is the key to "making people take responsibility for their own health" (*Minutes of Proceedings and Evidence*, Issue No. 35, 6 April 1992, p. 92).

Recommendation No. 3

We recommend that the government, in cooperation with industry, and the medical profession, immediately embark upon a public education program to inform Canadians of the link between skin cancer and unsafe exposure to the sun.

As pointed out by both Dr. Rivers, and by Dr. A. Cullen, Director, School of Optometry, University of Waterloo, a number of countries have taken steps to standardize and promote sun-care products. For example, both Australia and the United States have developed UV-B standards for sun glasses, and Australia has exempted suntan lotion from taxation. In Canada, it is very difficult to determine the degree of UV-B protection that a pair of sun glasses provides.

Recommendation No. 4

We recommend that Health and Welfare Canada establish UV-B standards for sun glasses and for suntan and sunscreen lotions.

TECHNOLOGICAL ADVANCES

Mr. R. Hornung, Acting Executive Director, Friends of the Earth, very correctly observed: "We have consistently underestimated . . . the rate and extent of technological change that would allow us to end the production of ozone-depleting chemicals" (*Minutes of Proceedings and Evidence*, Issue No. 35, 6 April 1992, p. 110). Tremendous advances have been made toward the development of CFC-replacement chemicals. HCFC-123 is now commercially available as a "drop-in" refrigerant. The Committee appreciates the usefulness of HCFC-123 as a transitional refrigerant; but does not wish to see the long-term use of this chemical as it has a low, but significant, potential to deplete ozone, and it is a greenhouse gas.

Subsequently, the Committee has learned that a number of manufacturers in Japan and the United States are already producing car air conditioners that run on HFC-134a. This compound is a greenhouse gas but does not deplete ozone. Du Pont is sponsoring research at the National Research Council of Canada (NRC) directed toward the development of new compressors to use HFC-134a. NRC scientists feel that they are quite close to the point where new domestic appliances could be built with a coefficient of performance equal to present-day cooling appliances. Further, North America's largest manufacturer of domestic freezers, W.C. Wood Company, Guelph, Ontario, has found that in new, fine-tuned compressor systems, HFC-152a is as efficient as CFC 12. At present, only a minor safety concern appears to be impeding the introduction of HFC-152a into the marketplace.

Recommendation No. 5

We recommend all car air conditioners built in or imported into Canada after 31 December 1993 be manufactured with HFC-dedicated compressors. Further, we reiterate our recommendation (*Deadly Releases CFCs*, recommendation 6) that air conditioning units for the passenger compartments of all motor vehicles be leak-proof. Also, we recommend that domestic refrigerators, freezers and air conditioners, built with HFC-dedicated compressors, be introduced into the Canadian marketplace as soon as possible.

Recommendation No. 6

We recommend that replacement of CFCs in car air conditioning units by drop-in HCFCs be encouraged the first time the air conditioning unit is serviced.

Dr. Zelonka, General Manager, Fluorocarbon Products, Du Pont Canada, stated that the pace of research to find environmentally-safe substitutes for CFCs and for HCFCs is progressing at the maximum possible rate, and that the further acceleration of deadlines is unlikely to hasten new discoveries.

Recommendation No. 7

We recommend that Environment Canada closely monitor and assess scientific achievements made towards the replacement of CFCs and HCFCs, and accelerate the phase-out date on a case-by-case basis.

Du Pont introduced a reclamation program to recover and reprocess CFCs from commercial equipment. Du Pont pays for both the recovered material, and freight, and they reclaim the product. Du Pont claims that their customers in the refrigeration and air-conditioning businesses have a viable economic and environmental solution for dealing with spent refrigerant. In spite of this program, out of the 5.5 million kg of CFCs produced last year, only 20,000 kg, or 0.36%, were recycled. The program does not work because neither financial incentives nor regulations exist to promote the three Rs, recovery, recycling and reuse.

Environment Canada and the provincial environment ministers have worked together to develop a National Action Plan, that highlights the specific steps that need to be taken to implement the three Rs. However, the National Action Plan has not been officially endorsed or approved by all participants. Mr. W. Heeley, President, The Heating, Refrigerating, and Air Conditioning Institute of Canada, believes that:

“...the most effective way to establish the concept of the three Rs in our industry is to provide training to the service people who are handling refrigerants on a daily basis. However, it is clear to us that unless training is mandatory and regulated, the three Rs will not be performed in the industry at the levels required to protect the environment and ensure product for future service purposes” (*Minutes of Proceedings and Evidence*, Issue No. 35, 6 April 1992, p. 52).

Recommendation No. 8

We recommend that the federal government, in conjunction with the provinces, endorse, approve and implement the National Action Plan for the complete management of ozone-depleting chemicals.

Recommendation No. 9

We recommend that the provinces use the National Action Plan as a guide to enact harmonized regulations, no later than 31 December 1992, that mandate the recovery, recycle, reuse and destruction of refrigerants, and the training of service personnel handling refrigerants.

POLICY

As stated by Robert Hornung:

“...[E]very year of continued global CFC production adds three to four years to the ozone layer’s recovery time”. (*Minutes of Proceedings and Evidence*, Issue No. 35, 6 April 1992, p. 111)

The Committee recognizes the benefits of early CFC phase-out, and is greatly encouraged by the accelerated timetable that did not look possible less than two years ago. Success for further accelerated phase-out depends upon a maximum effort by politicians, industry, scientists, environmental groups, and particularly by the individual citizen. Mrs. K. Anderson, Environmental and Planning Manager, Fluorochemicals, Du Pont Canada, held that the informed individual has a major responsibility and role to play:

“through such things as demanding CFC-free new appliances; ensuring their place of work . . . recycles CFCs during equipment service; and ensuring their refrigeration and air-conditioning systems are either retrofitted to use alternatives or are replaced with CFC-free technology if they’re older and less efficient. Consumers need to ask questions and select only dealers that can recover and recycle CFCs when doing maintenance on their car or refrigerator”. (*Minutes of Proceedings and Evidence*, Issue No. 35, 6 April 1992, p. 49)

Recommendation No. 10

We recommend the development and implementation of an education program that informs Canadians of their role and responsibilities in the campaign to bring about an early and effective phase-out of ozone-depleting chemicals.

To date research has focused on the development of CFC-replacement chemicals, and on compressor modification for use of new refrigerants with limited or zero potential for ozone depletion. In many cases this approach may be seen as treating the symptom rather than offering a cure. Alternatively, as Mr. R. Hornung said: “we can change the job in such a manner that chemicals are no longer required” (*Minutes of Proceedings and Evidence*, Issue No. 35, 6 April 1992, p. 114). While industry is certainly interested in the possibility of

second-generation cooling technologies, they do not feel confident that the pay-back would justify R&D costs. It is generally felt that such high-risk research belongs in federally-funded university and government laboratories.

Recommendation No. 11

We recommend that the development of second-generation cooling technologies be recognized as a priority research area.

The phase-out of ozone-depleting chemicals has as its final goal the collection and ultimate destruction of these chemicals. In spite of this intent very little effort has been directed at determining how destruction will be accomplished. CFCs are extremely stable compounds, that are not readily broken down by chemical means. At present high-temperature incineration, which can achieve "six-nines" of destruction efficiency (99.9999%), appears to be the logical solution.

Recommendation No. 12

We recommend that Environment Canada immediately initiate test CFC burns in high-temperature incinerators, with exacting emission monitoring. Further, independent monitoring under the direction of various environmental groups should verify incinerator efficiency. This information should then be presented to the public.

The Committee's review of ozone depletion was described by one of the participants as a cry for responsible behaviour. Scientists have the professional responsibility of subjecting their findings and conclusions to the scrutiny of the scientific community. The news media has an obligation to provide the public with objective, and factual information. The environment is not an area where the press can abrogate itself of responsibility. Health care professionals must provide non-alarmist and factual information so that Canadians can take responsibility for their own health. Industry has the very onerous task of ensuring that their activities do not impair human health or degrade environmental quality; and, as in the case of CFCs, to implement mitigative action when previous activities, assumed to have been benign, prove to have negative environmental impacts. Governments have the responsibility of developing and implementing policies that safeguard human health and the environment. In addition, there is an obligation to provide public education programs so that Canadians can make informed environmental decisions. Finally, it is up to the individual citizen to do what is right. The rapid phase-out of all ozone-depleting chemicals is a formidable task, but one which can be facilitated if we all act responsibly.

GLOSSARY

- CFCs** **Chlorofluorocarbons:** highly stable, man-made chemicals used primarily as refrigerants. When released these compounds can migrate to the stratosphere, where they absorb infrared radiation and contribute to global warming. CFCs also may be broken apart by high-energy radiation. Chlorine atoms released to the stratosphere have the potential to cause ozone depletion.
- HCFCs** **Hydrochlorofluorocarbons:** a class of alternative refrigerant chemicals. These compounds are basically CFC molecules, where one or more chlorine atoms have been replaced by hydrogen atoms. This replacement will decrease the amount of chlorine released to the stratosphere, thereby decreasing the potential to deplete ozone. HCFCs can still contribute to global warming.
- HFCs** **Hydrofluorocarbons:** alternative refrigerant chemicals with no ozone-depleting potential. These compounds are similar to CFCs, except all of the chlorine atoms have been replaced by hydrogen atoms. HFCs can contribute to global warming.
- UV** **Ultraviolet light:** Solar radiation beyond the visible spectrum at its violet end, having a wavelength shorter than visible light and longer than X-rays. UV radiation is further subdivided according to wavelength into UV-A, B and C.
- National Action Plan** The provincial environment ministers and Environment Canada, under the direction of the Canadian Council of Ministers of the Environment, have developed a national plan for the complete management of ozone-depleting chemicals. When endorsed by all of the provinces, this action plan will serve as a guide for the establishment of harmonized regulations governing the recovery, recycle, reuse and destruction of ozone-depleting chemicals and the training of service personnel handling these chemicals.

LIST OF RECOMMENDATIONS

Recommendation No. 1

The Committee reiterates its recommendation for a complete phase-out in the production and consumption of carbon tetrachloride and methyl chloroform by 1995, except for their use as a feedstock for CFC or halon substitutes and as organic laboratory solvents. (p. 3)

Recommendation No. 2

We recommend that the effects of increased UV-B on human health and on food-crop productivity be considered a priority research area. (p. 5)

Recommendation No. 3

We recommend that the government, in cooperation with industry, and the medical profession, immediately embark upon a public education program to inform Canadians of the link between skin cancer and unsafe exposure to the sun. (p. 8)

Recommendation No. 4

We recommend that Health and Welfare Canada establish UV-B standards for sun glasses and for suntan and sunscreen lotions. (p. 8)

Recommendation No. 5

We recommend all car air conditioners built in or imported into Canada after 31 December 1993 be manufactured with HFC-dedicated compressors. Further, we reiterate our recommendation (*Deadly Releases CFCs*, recommendation 6) that air conditioning units for the passenger compartments of all motor vehicles be leak-proof. Also, we recommend that domestic refrigerators, freezers and air conditioners, built with HFC-dedicated compressors, be introduced into the Canadian marketplace as soon as possible. (p. 9)

Recommendation No. 6

We recommend that replacement of CFCs in car air conditioning units by drop-in HCFCs be encouraged the first time the air conditioning unit is serviced. (p. 9)

Recommendation No. 7

We recommend that Environment Canada closely monitor and assess scientific achievements made towards the replacement of CFCs and HCFCs, and accelerate the phase-out date on a case-by-case basis. (p. 9)

Recommendation No. 8

We recommend that the federal government, in conjunction with the provinces, endorse, approve and implement the National Action Plan for the complete management of ozone-depleting chemicals. (p. 10)

Recommendation No. 9

We recommend that the provinces use the National Action Plan as a guide to enact harmonized regulations, no later than 31 December 1992, that mandate the recovery, recycle, reuse and destruction of refrigerants, and the training of service personnel handling refrigerants. (p. 10)

Recommendation No. 10

We recommend the development and implementation of an education program that informs Canadians of their role and responsibilities in the campaign to bring about an early and effective phase-out of ozone-depleting chemicals. (p. 10)

Recommendation No. 11

We recommend that the development of second-generation cooling technologies be recognized as a priority research area. (p. 11)

Recommendation No. 12

We recommend that Environment Canada immediately initiate test CFC burns in high-temperature incinerators, with exacting emission monitoring. Further, independent monitoring under the direction of various environmental groups should verify incinerator efficiency. This information should then be presented to the public. (p. 11)

APPENDIX A

Recommendations of the June 1990 Report of the Standing Committee on Environment “Deadly Releases CFC’s”

- (1) We recommend that the following be adopted as the basis for regulations under the *Canadian Environmental Protection Act* (CEPA) and be promoted prior to amending the Montreal Protocol:
 - a) a minimum 85% reduction in the production and consumption of all CFCs by 1995, with a complete phaseout by 1997; and
 - b) a complete phaseout in the production and consumption of carbon tetrachloride and methyl chloroform by 1995, except for their use as a feedstock for CFC or halon substitutes and as organic laboratory solvents.
- (2) We recommend that regulations be invoked under CEPA requiring a 95% reduction in halon production and consumption by 1993, and a complete elimination by the year 2000, except for those “essential uses” where no reasonably performing substitute is available.
- (3) We recommend that the proposed regulations governing non-essential uses of CFCs and of halons in hand-held fire extinguishers (Ozone depleting Substances Regulations No. 2 and No. 3) be implemented as soon as possible and that any portions of the regulations to which there has been no legal objection be adopted immediately.
- (4) We recommend that:
 - a) neither HCFCs nor HFCs be used in any aerosols;
 - b) HCFCs and HFCs only be used in other products as replacements for CFCs where safe alternatives are not available;
 - c) only those HCFCs and HFCs with the least ozone depletion and global warming potential be used in products or processes requiring such substances;
 - d) in future, HCFCs and HFCs not be substituted for CFCs at any time in amounts greater than 30% and 9%, respectively, of present CFC use, and by 2010 the production and consumption of HCFCs and HFCs be discontinued.
- (5) We recommend that the Canadian Council of Ministers of the Environment take the lead when multijurisdictional participation would accelerate initiatives for the reduction, recovery, recycling and eventual safe destruction of CFCs and halons.

- (6) We recommend that air conditioning units for the passenger compartments of all motor vehicles be leak-proof, beginning with the 1992 model year.
- (7) We recommend that the proposed "Code of Practice for the Reduction of CFC Emissions in Refrigeration and Air Conditioning Systems" developed by Environment Canada for commercial refrigeration units be made a regulation under CEPA. The Committee further recommends that this Code be applied to the management of HCFC and HFCs. These regulations should come into effect by 30 June 1991.
- (8) We recommend that Environment Canada be provided the necessary funds to assist the relevant authorities in developing programs for the recovery and recycling of CFCs from commercial, household and mobile refrigeration systems that are to be scrapped or that have been previously abandoned. Once destruction technologies and less harmful substitutes are available then the recovered, more harmful substances must be destroyed.
- (9) We recommend that the Canadian Council of Ministers of the Environment coordinate appropriate jurisdictions in the making of regulations for the recycling of CFCs used as solvents. When alternatives to solvent CFCs and destruction technologies are available, the CFCs must be recovered and destroyed.
- (10) We recommend that funding be provided by the federal government to assist the provinces and producing industries in developing the appropriate destruction technologies for CFCs, halons, HCFCs, HFCs and related substances. Once developed, the appropriate jurisdiction should make regulations for the destruction of these substances.
- (11) We recommend that national standards and guidelines be developed for classifying CFCs and related substances to ensure that regulations concerning their handling and transportation are uniform across the country.
- (12) We recommend that "cradle-to-grave" management be applied to new CFCs, HCFCs and HFCs used for refrigeration purposes, ensuring that the producing and importing industries are responsible for tracking these chemicals to their final end use. Regulations with respect to the recovery, recycling and destruction of these substances should govern the remainder of their life cycle.
- (13) We recommend that the National Fire Code and the National Building Code be amended immediately and as necessary to prohibit the testing of flooding systems with halons and to prohibit the construction of "non-essential" halon flooding systems. They must also be amended to require the removal of all non-essential halon flooding systems as early as possible but no later than 1 January 1993. Halons will be supplied for essential uses from the existing stock of halons before new halons are consumed. Once substitutes and destruction facilities are available, the remaining stock of halons must be destroyed.

- (14) We recommend that the federal government immediately develop a coordinated plan for the removal of "non-essential" halon systems used by any federal government department or agency, and that it provide justification for the retention of any system it identifies as essential.
- (15) We recommend that the federal government and the provinces collaborate in the developing a national education program for municipal and other officials responsible for activities that involve CFCs, halons and related substances.
- (16) We recommend that Environment Canada's budget be increased to ensure the enforcement of and compliance with new regulations where the federal government retains responsibility.
- (17) We recommend that a tax be levied on CFCs and halons at least equivalent to that to be implemented in the United States. Funds equal to those derived from the tax should be used to support initiatives arising from recommendations of this report.
- (18) We recommend that when there is a substantial difference in the environmental impacts of two or more substitutes for a given end use, an equalizing tax be placed on the substitute(s) that is (are) more harmful but less costly. The tax should be revised every six years to allow time for the market to regulate itself.
- (19) We recommend that adequate funding be made available to the Atmospheric Environment Service of Environment Canada to conduct monitoring of and research into ozone depletion.
- (20) We recommend that the federal government contribute to all funding mechanisms developed under the Montreal Protocol. We also recommend that a roundtable be established in Canada consisting of all government departments, industry, non-government organizations and other stakeholders who would be involved in funding and facilitating technology transfer to developing countries.
- (21) We recommend that Canada take the lead in negotiating "global bargains". In the CFC global bargain, substitutes for CFCs could be offered in exchange for full participation in the Montreal Protocol, with appropriate conditions for monitoring and inspection. The intention of this bargain is to assist developing countries eliminate their consumption of CFCs.
- (22) We recommend that a review be undertaken of trade development programs and subsidies, and of foreign aid policies, programs and projects to ensure they are consistent with the preventive aims of this report.
- (23) We recommend that all levels of government, producers of these chemicals, and manufacturers of CFC-containing equipment, develop and implement a coordinated, nationwide public education program for the recovery, recycling, handling, storage, and ultimate destruction of CFCs and related substances.

APPENDIX B

List of Witnesses

FORUM ON OZONE DEPLETION

HELD ON 6 APRIL 1992

(ISSUE 35)

Science Panel

ENVIRONMENT CANADA:

David Wardle, Chief,
Experimental Studies Division,
Atmospheric Environment Service.

UNIVERSITY OF WINNIPEG:

Timothy Ball,
Professor of Climatology,
Department of Geography.

YORK UNIVERSITY:

Jack McConnell,
Professor of Atmospheric Science,
Department of Earth and Atmospheric Sciences.

Technology Panel

DU PONT CANADA:

Ron A. Zelonka, General Manager,
Fluorocarbon Products;

Katherine L. Anderson, Environmental and
Planning Manager, Fluorochemicals; and

Tom H. Symonds, Business Manager,
Refrigeration and Air Conditioning Fluorochemicals.

THE HEATING REFRIGERATING CONDITIONING INSTITUTE:

Warren Heeley, President; and

Fred Chorley, Vice-president, Government Relations.

Effects Panel

THE CANADIAN DERMATOLOGY ASSOCIATION:

Jason Rivers, National Director of Sun Awareness and Screening Programs.

UNIVERSITY OF WATERLOO:

Anthony Cullen, Director, School of Optometry & Associate Dean of Sciences; and

Michael Doughty, Associate Professor, School of Optometry.

OTTAWA CIVIC HOSPITAL:

Maxwell Richter, Director of the Immunology Laboratory, Clinical Studies Unit.

Policy Panel

FRIENDS OF THE EARTH:

Robert Hornung, Acting Executive Director.

GREENPEACE CANADA:

Steve Shallhorn, Legislative Director.

ENVIRONMENT CANADA:

John Buccini, Director, Commercial Chemicals Branch; and

Jim Armstrong, Chief, Chemicals Control Division.

Request for Government Response

Your Committee requests that the Government table a comprehensive response to this Report within 150 days of its tabling, in accordance with the provisions of Standing Order 109.

A copy of the relevant Minutes of Proceedings and Evidence (*Issues Nos. 35 and 43, which includes this report*) is tabled.

Respectfully submitted,

DAVID MacDONALD,
Chair.

