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CONVENTION ON THE PROTECTION OF THE OZONE LAYER

The Right Honourable Joe Clark, Secretary of State for External Affairs, and the Honourable Suzanne Blais-Grenier, Minister of the Environment, announced today the successful completion of a diplomatic conference in Vienna that adopted a Convention for the Protection of the Ozone Layer. The Canadian Permanent Representative to the United Nations Office at Vienna, Mr. Allan Sullivan, signed the Convention on behalf of Canada.

"It is significant that Canada has taken a leading role in the development of this Convention", said Mr. Clark. "This clearly demonstrates Canada's desire to cooperate in protecting the global environment for all mankind."

The Convention commits participating nations to protect human health and the environment against adverse effects resulting from modifications to the ozone layer. It also provides for international cooperation in research, monitoring, scientific assessment and exchange of information on matters pertaining to the status of the ozone layer.

The diplomatic conference also requested the United Nations Environment Programme to continue work on a protocol to the Convention which would provide for internationally agreed measures "to control equitably global production, emissions and use of chlorofluorocarbons (CFCs)". Recognizing that it would

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be several years before agreement could be reached on such a protocol, the diplomatic conference urged all States in the meantime "to control their emissions of CFCs by any means at their disposal".

Mrs. Blais-Grenier stated that "Canada has taken an active role in research, monitoring and regulatory measures to protect the ozone layer. Canada has operated the World Ozone Data Centre for the past 25 years. A Canadian remote sensing instrument, the Brewer Spectrophotometer is now under commercial manufacture and being sold internationally to make ground-based measurements of the ozone layer. Regulations under the Environmental Contaminants Act to ban the use of CFCs in hairsprays, anti-perspirants and deodorants have reduced chlorofluorocarbon use in Canada by 45 percent."

Chlorofluorocarbons, which are non-toxic gases with unique physical properties, are used to propel aerosol sprays, manufacture foam plastics, and operate refrigerators and air conditioners. While these gases are not harmful at the earth's surface, they diffuse into the stratosphere where they are broken down into their constituent elements by intense ultraviolet radiation.

The chlorine which is thus released depletes the ozone layer and permits increased amounts of ultraviolet radiation to reach the earth's surface. Current chemical models of the stratosphere indicate that even modest growth in CFC use could result in substantial depletion of the ozone layer within 50 to 75 years. The resulting exposure to ultraviolet radiation would cause increased incidence of skin cancer, affect the human body's immunological response and decrease production of some of the world's most important food crops, including wheat, rice, corn and soybeans.

For further information, see attached backgrounder.

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BACKGROUNDER: OZONE LAYER CONVENTION

1. Scientific Aspects: The stratospheric ozone layer, which lies between approximately 15 and 45 km above the earth's surface, acts as a giant filter for the sun's damaging ultraviolet radiation by absorbing this radiation in photochemical processes. A depletion of the ozone layer as small as 1% could result in a 2% increase in ultraviolet radiation and a 4% increase in skin cancer rates. Many of the world's food crops, including wheat, rice, corn and soybeans are also sensitive to ultraviolet radiation. While quantitative estimates cannot be made, it is safe to say that a 10% increase in ultraviolet radiation would have significant and highly undesirable effects on world food production.

Concern about the ozone layer first surfaced in the mid-1970's with regard to aircraft emissions of NO_x by supersonic transports. However, these concerns were replaced by the depleting effects which chlorine (as one of the constituents of chlorofluorocarbons broken down by the intense ultraviolet radiation in the stratosphere) was predicted to have on the stratosphere. These predictions, based on constant CFC production levels typical of the late 1970's, showed that depletions of the total ozone column in the long term would lie between 5% and 20%. Models accounting for CO_2 and methane have recently shown that there will likely be a compensating production of ozone in the lower stratosphere which would all but offset the depletion of the ozone in the upper stratosphere caused by chlorofluorocarbons.

While this compensating effect would mean little change in the amount of ultraviolet radiation reaching the earth's surface, the profile of ozone in the stratosphere would change drastically. This in turn would affect temperatures and the circulation in the stratosphere. While climatic changes in the troposphere could be expected, the magnitude of such changes is unknown.

The assumption of constant CFC production has recently been challenged. Chlorofluorocarbons are essential for many industrial purposes and usage rates in non-aerosol areas have typically grown at 5-6% per year. Recent studies have indicated that CFC production/use is expected to rise globally at growth rates between 1.4 and 4.1% per year (average 2.5%).

When such growth rates in CFC emissions are included in the existing photochemical models, precipitous and essentially irreversible ozone layer depletions are shown to occur within 50-100 years. The fact that CFC's remain in the atmospheric system for 80-120 years means that the CFC concentrations are essentially cumulative. Thus use of CFC's today, for which economic alternatives exist, may mean that draconian measures in the future will be necessary to achieve the appropriate level of control.

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While history has shown that photochemical modelling of the stratosphere is an uncertain science, there is little question that continual rises in CFC concentrations in the atmosphere constitute a risk which cannot be ignored. The question lies in what type of control action should be taken - and how much is appropriate.

2. Control Aspects

A number of countries have taken or are taking actions to control the use of CFC's. Since alternatives do exist for CFC's as propellants in aerosol sprays, most domestic regulatory action has been taken in this area. Canada's regulations under the Environmental Contaminants Act have reduced aerosol use of CFC's by 87% and overall CFC use by 45%. The European Economic Community currently has a policy which has reduced the use of CFC's in aerosols by 36%. It has been estimated that 30-35% of the global use of CFC's is still for aerosol propellant purposes. Regulatory action should be capable of reducing this to 5% or so of the total CFC use.

Canada produces/uses approximately 2% of the world production of CFC's. Presently between 80 and 90% of the world's CFC's are produced by OECD countries, whose annual consumption is approximately 1.0 kg per capita per year. Canadian consumption is well below this level at 0.6-0.7 kg per capita per year. This is largely a result of the regulatory action which Canada has already taken.

3. Canadian Research/Monitoring Contributions

Monitoring and research with respect to the ozone layer is of necessity a global task which is coordinated by the World Meteorological Organization (WMO), the United Nations Environment Programme (UNEP) and the International Ozone Commission (IOC) of the International Council of Scientific Unions (ICSU). Canada operates ground-based ozone monitoring stations at Toronto, Edmonton, Churchill, Goose Bay and Resolute Bay. Weekly ozonesonde soundings are taken at the above locations (with the exception of Toronto). This is a substantial contribution to the Global Ozone Observing Network coordinated by the World Meteorologial Organization, totalling some 94 stations of which 21 regularly take ozonesonde soundings. Canada operates the World Ozone Data Centre for WMO, archiving and publishing ozone data from around the world.

These ground-based measurements, while now being augmented by satellite measurements, constitute a historical and basic data set which is essential for determining trends in the status of the

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ozone layer. For over 40 years these measurements have been made with a Dobson spectrophotometer. A state of the art replacement for this instrument has been developed in Environment Canada's laboratories. It is known as a Brewer Spectrophotometer and is capable of measuring the overburden of ozone and sulfur dioxide automatically and with greater accuracy than existing instrumentation. It is currently under manufacture by Sci-Tec of Saskatoon and sales have been made abroad in Sweden, Germany, Belgium and Greece.

Marc Garneau, Canada's first astronaut, carried equipment aboard Shuttle Mission 41-G to take measurements of the ozone layer using a solar sunphotometer. These data are currently being analyzed to deduce profiles of ozone, water vapour and aerosol concentration for comparison with satellite instruments, which cannot be calibrated directly.

Canadian scientists regularly participate in U.S. stratospheric experiments conducted by NASA. Many of these involve measurements of stratospheric trace constituents on board large stratospheric balloons which get to altitudes of 30-35 km and rockets which reach altitudes of 50 km.

These measurements are used as inputs to the photochemical models of the stratosphere and to verify their results, which have pointed out the possibility of depletion of the ozone layer.