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ONGOING AND PLANNED ACTIVITIES RELEVANT TO THE WORLD PLAN OF ACTION ON THE OZONE LAYER

Submitted by

Canada

Report on the Canadian Contribution to the UNEP CCOL Program for 1981

1. Ozone Monitoring

i) Canadian Ozone Monitoring Network

Canada continues to operate a network of five Dobson spectrophotometers at Resolute Bay, Churchill, Edmonton, Goose Bay and Toronto taking daily total ozone measurements. Weekly ozonesonde flights are undertaken at four of the above five stations (Toronto excluded) to measure the ozone profile.

ii) Brewer Spectrophotometer

Two Mark I Brewer Ozone Spectrophotometers have been actively engaged in field measurement programs as well as in the ongoing ozone and sulphur dioxide monitoring program at Atmospheric Environment Service Headquarters, Toronto, Canada.

One of these two instruments was used in fall 1981 as a travelling standard to intercompare the Dobson instruments at Arosa, Belsk, Bracknell and Brussels.

The new Mark II Brewer Ozone Spectrophotometer is in operation at Toronto. It is also utilized to measure sulphur dioxide amounts for correction of local Dobson values.

Three new Brewer spectrophotometers have been ordered for installation in the Canadian ozone monitoring network. A method for the evaluation of zenith observations has been developed and an Umkehr method is planned. A modification to the Brewer spectrophotometer to permit conversion to UV-B measurement has also been made.

iii) World Ozone Data Centre

Canada continues to operate the World Ozone Data Centre on behalf of the World Meteorological Organization. Data are published monthly in "Ozone Data for the World", along with an annual catalogue of ozone data available at the Centre. Magnetic tapes of total ozone, Umkehr and balloon ozonesonde data are sold to scientists and research institutes at minimal cost.

iv) SBUV/TOMS

Active participation in the SBUV/TOMS net team has continued and a comparison with Canadian Dobson Spectrophotometer data is underway.

2. Recent Research Results and Planned Research Programmes Relevant to the World Plan of Action on the Ozone Layer

i) Stratoprobe Balloon Flights

The analysis of further Stratoprobe balloon flights including one from October, 1980, supports the previous conclusion of low hydroxyl densities in the middle stratosphere. A simulation of this flight with the new NASA - CODATA 1981 reaction rate set reproduces the balloon measurements well.

A scenario with the same chemistry at constant 1979 fluorocarbon usage levels predicts less than 5% ozone depletion in the long term.

ii) Ground Truthing

Ground truthing for the LIMS experiment has continued as well as participation in the HALOE Science Team planning activities.

iii) One-Dimensional Modelling

The York University one-dimensional photochemical model is continually being used to simulate balloon flight results and to conduct scenario calculations. OECD scenarios have been run using the York 1-D model which indicate that ozone depletions of 0.8% should have occurred by 1980.

iv) Two-Dimensional Modelling

The AES 2-D model, incorporating feedback effects between chemistry, radiation and transports, has been run using seven OECD scenarios. Global and annual average ozone reductions for CFC 11 and 12 range from 1.2% for scenario 15 (7% decline), to 27% for scenario 1 (7% growth) in 2020. The estimated steady state value for scenario 8 (constant 1979 emissions) was 5% depletion.

Report to UNEP/CCOL on Canadian Production, Sales and Related Requested Information

1. Canadian Production and Sales

It must be pointed out that CFC production data are classified as "proprietary" under the Canada Environmental Contaminants Act. Thus it is not possible to supply total Canadian production data from federal government sources. Nonetheless, production data are available in other forms - CPI Product Profiles and the CMA Alexander Grant Report (Canadian Production Data are aggregated in the World Production Figures). The following information should be of use:

i) Canadian Nameplate Production

Total nameplate production capacity for CFC-11, CFC-12 and CFC-22 was 32,000 metric tons in 1980. Total use of these products decreased from 21,500 metric tons in 1974 to 19,500 metric tons in 1978. (Source: CPI Product Profiles "Fluorochloromethanes", Revised July 17, 1978 and January 15, 1980).

ii) Canadian CFC Sales

Data from industry indicate that 1980 sales (and hence usage) of CFC-11 and CFC-12 were approximately 55% and 60% respectively of their 1974 peak. The usage of CFC-22 has steadily increased since 1974.

CFC-115 is not produced in Canada, however, sales of this material were in the area of 400 metric tons in 1980. It was used primarily in refrigeration systems. We are unable to provide information on CFC-114 due to its proprietary nature.

2. UV-B Effects on Non-Human Biota

Presently, we are not aware of any ongoing or planned projects concerned with the effects of UV-B radiation on non-human targets.

3. Canadian Participation in the UNEP Stockholm Meeting

Informally, Canada is fully prepared to participate in the Stockholm Expert's Meeting.

4. Legislative/Administrative Arrangements

The Environmental Contaminants Act (ECA) which came into force in April 1976, is the appropriate (Canadian) legislation which is being used to protect the ozone layer from chemicals used in commerce. Under this Act there are regulations to provide protection to the ozone layer. This Act and the regulations promulgated thereunder are specifically designed to protect human health and the environment from substances that contaminate the environment.

5. Acceleration of International Cooperation for Limiting Production of CFC-11 and CFC-12

Presently, it is considered that the only satisfactory way of accelerating international cooperation for limiting production of CFV-11 and CFC-12 would be by the provision of more and firmer scientific data on the measurement of the magnitude of any predicted or actual problem relating to the ozone layer. In particular, increased emphasis is needed in the development of an acceptable warning system which could provide sufficiently strong evidence to promote a desire to protect the environment.