CFCs, like DDT and PCBs, were considered valuable and beneficial chemicals before their environmental costs were recognized. They are used as coolants in refrigerators and freezers, and in air conditioners for automobiles and large buildings. In some countries, CFCs continue to be employed as propellants in aerosol cans for such products as hair sprays and deodorants. In recent years they have been increasingly used in manufacturing soft foam for cushions, solid foam for packaging and insulation and as a cleaning solvent for micro-electronic circuitry.

CFCs are not the only chemicals responsible for depleting the ozone layer. We now realize that related chemicals such as halons used in some fire extinguishers and certain industrial solvents have similar destructive properties. Only recently, however, have we discovered these same chemicals act as greenhouse gases and that their past release to the atmosphere will cause an estimated 20 to 25% of future global warming.

Controlling the use of these substances will therefore have two benefits: allowing the ozone layer to replenish itself slowly (since ozone molecules do form under normal atmospheric conditions) and decreasing the rate of global warming.

A. Ozone Depletion

Why the Alarm?

Ozone is a pungent gas about 90% of which occurs naturally in an upper region of the atmosphere known as the stratosphere. This region is referred to as the ozone layer. "Ground-level ozone", resulting primarily from motor vehicle exhaust and gasoline vapours, is the key ingredient of the smog that blankets many of our cities but is not a subject of this report.

Ozone protects us from the sun's harmful ultraviolet (UV) radiation. This natural screening by the stratospheric ozone layer is necessary or we would be exposed to levels of UV radiation that could seriously damage living tissue, animal or plant, and which would also degrade some man-made materials.

CFCs and related chemicals are considered predominantly responsible for the depletion of the ozone layer. These chemicals are able to migrate to the stratosphere where the sun's radiant energy causes them to decompose and release chlorine and bromine. These molecules act as catalysts for chemical reactions leading to the breakdown of ozone. A single molecule of chlorine can destroy tens of thousands of molecules of ozone before being removed from the atmosphere. The problem is compounded in that, once released, many ozone depleting substances remain in the atmosphere for long periods of time, typically 75 to 100 years.