

APPENDIX II

Ozone Depleting Potential and Global Warming Potential

Chlorine and bromine containing compounds that are sufficiently stable migrate to the stratosphere (that zone of the atmosphere located 15 to 45 kilometres above the Earth's surface) where, over time (5 to 100 years or more), high-energy radiation from the sun causes these compounds to decompose, releasing chlorine or bromine. The chlorine and/or bromine then reacts with other gases in the atmosphere, the net result of which is a reduction in the concentration of ozone while the chlorine or bromine remains. Chlorine and bromine act as catalysts for this destructive process, each atom participating in as many as 100,000 ozone-destroying reactions before being washed out of the atmosphere.

Factors governing the relative efficiency of these compounds in destroying ozone are recognized to be:

- (1) the rate of release of the compound into the atmosphere;
- (2) the rate of removal of the compound in the troposphere and its persistence in the stratosphere; and
- (3) the efficiency of the compound in destroying ozone in the stratosphere.

ODP is defined as the model-calculated ozone depletions under steady state conditions. More specifically, it is defined as the ratio of calculated ozone column change for each mass unit of a gas emitted into the atmosphere relative to the calculated depletion for the reference destruction potential of various chemicals.

The ability of a compound to absorb infrared radiation characterizes global warming potential (GWP). GWP is defined as the ratio of calculated warming for each unit mass of a gas emitted into the atmosphere relative to the calculated warming for a mass unit of reference gas CFC-11 or CFC-12. The estimated global warming potential of CFCs ranges up to 20,000 times that of carbon dioxide, on a molecule-for-molecule basis.

Sources: (1) United Nations Environment Program, Technology Review Panel, *Technical Progress on Protecting the Ozone Layer*, 30 June 1989, pp. 4-5.

(2) United States, Environmental Protection Agency, *Policy Options for Stabilizing Global Climate*, Draft Report to the Congress — Executive Summary, February 1989, p. 16.