

## ***6. Other Ozone Depleting Substances***

### ***Introduction***

CFCs are not the only ozone-depleting chemicals (ODCs). A number of other halocarbon species are capable of destroying ozone in the stratosphere. Halocarbons include the chlorofluorocarbons (CFCs), the hydrochlorofluorocarbons (HCFCs), methylhalides, carbon tetrachloride (CCl<sub>4</sub>), carbon tetrafluoride (CF<sub>4</sub>), and the halons (bromide species). Although the HCFCs do not contribute significantly to the destruction of the ozone layer, they, along with the other halocarbons are all considered to be powerful greenhouse gases and contribute towards global warming.

### ***Hydrochlorofluorocarbons***

Hydrochlorofluorocarbons or HCFCs contain chlorine but, unlike CFCs, they also contain hydrogen (the H) which causes them to break down in the lower atmosphere (troposphere). They are called transition chemicals because they are considered an interim step between strong ozone-depleters and replacement chemicals that are entirely ozone-friendly. Unfortunately, like CFCs, they are strong greenhouse gases and contribute towards global warming.

### ***Carbon Tetrachloride***

Carbon tetrachloride (CCl<sub>4</sub>), despite its toxicity, was first used in the early 1900s as a fire extinguishant, and more recently as an industrial solvent, an agricultural fumigant, and in many other industrial processes including petrochemical refining, and pesticide and pharmaceuticals production. Recently it has also been used in the production of CFC-11 and CFC-12. It has accounted for less

than 8% of total ozone depletion. The use of carbon tetrachloride in developed countries has been prohibited since the beginning of 1996 under the Montreal Protocol.

### ***Methyl Chloroform***

Methyl chloroform, also known as 1,1,1 trichloroethane is a versatile, all-purpose industrial solvent used primarily to clean metal and electronic parts. It was introduced in the 1950s as a substitute for carbon tetrachloride. Methyl chloroform has accounted for roughly 5% of total ozone depletion. The use of methyl chloroform in developed countries has been prohibited since the beginning of 1996 under the Montreal Protocol.

### ***Halons***

Halons, unlike CFCs, contain bromine, which also destroys ozone in the stratosphere. Halons are used primarily as fire suppressants. Halon-1301 has an ozone depleting potential 10 times that of CFC-11. Although the use of halons in developed countries has been phased out since 1996, the atmospheric concentration of these potent, long-lived ozone destroyers is still rising by an estimated 11 to 15% annually. To date halons have accounted for about 5% of global ozone depletion.

### ***Methyl Bromide***

Methyl bromide, another bromine-containing halocarbon, has been used as a pesticide since the 1960s. Today, scientists estimate that human sources of methyl bromide are responsible for approximately 5 to 10% of global ozone depletion.