

HYDROGEN SULPHIDE SOURCES

It has been estimated that 330,000 tonnes of hydrogen sulphide are emitted annually to the atmosphere in Canada. Approximately 90% of these emissions are from natural sources, since hydrogen sulphide is one of the key chemicals in the environmental sulphur cycle. The principal sources are decaying plant and animal protein, anaerobic bacterial reduction of sulphate, and geothermal areas. Worldwide emissions of hydrogen sulphide have been estimated to be approximately 100 million tonnes annually, and include contributions from volcanic emissions, in addition to the sources listed above for Canada.

Kraft pulp mills account for most of the 10% "man-made" hydrogen sulphide in Canada. The gas is generated as a by-product during digestion, evaporation, condensation and recovery stages of the process. Although kraft mills are minor contributors to hydrogen sulphide emissions, local concentrations are well above average since they are point sources of relatively high concentration. Other industrial sources include oil wells and refineries, natural gas wells and purification plants, and viscose rayon plants.

Hydrogen sulphide is produced biologically in sewers from organic compounds such as sulphur-containing amino acids (cysteine and methionine) and by reduction of sulphates. It is present in the exhaust of engines and is emitted from many industrial effluent treatment processes, sewage treatment plants, liquid manure systems, and agricultural feed-lots.

Another widespread source of hydrogen sulphide is exhaled human and animal breath. In one study of this delicate subject, concentrations measured in the mouth air of human volunteers ranged from less than 0.007 ppm to 1.06 ppm hydrogen sulphide. Early morning concentrations averaged 0.26 ppm.