

## **Glossary – Atmospheric pollutants**

### **Ammonia (NH<sub>3</sub>)**

Ammonia is an acid rain precursor and is predominantly emitted from spreading animal manure and some fertilisers.

### **Benzene (C<sub>6</sub>H<sub>6</sub>)**

Benzene is a non-methane volatile organic compound (NMVOC), that is largely released from the distribution and combustion of petrol. Benzene is a carcinogen.

### **1,3-Butadiene (C<sub>4</sub>H<sub>6</sub>)**

1,3-Butadiene is a colourless, gaseous hydrocarbon. It is produced by dehydrogenation of butene, or of mixtures of butene and butane; it may also be made from ethanol. 1,3-butadiene is believed to be a carcinogen, for which the safe level is not known. Emissions of 1,3-butadiene arise from combustion of petroleum products and in the manufacture of synthetic rubber, nylon and latex paints in the chemical industry. 1,3-butadiene is not present in petrol; it is formed as a by-product of combustion. The increasing use of catalytic converters through the 1990's has caused a significant reduction in emissions from the road transport sector.

### **Black smoke and PM<sub>10</sub>**

This is suspended solid matter arising from incomplete combustion of fossil fuels, it causes soiling of buildings and materials. Blacksmoke arises in urban areas primarily from diesel fuels. Particles whose diameter is less than 10 microns, known as PM10, have been linked to premature mortality from respiratory diseases. These fine particles are the primary reason for reduced visibility on hazy days.

### **Cadmium (Cd)**

Cadmium is a normal constituent of soil and water at low concentrations. Industrially, cadmium is used as an anti-friction agent, in alloys, semi-conductors, control rods for nuclear reactors and PVC and battery manufacture. The main sources of cadmium emissions are from waste incineration, and iron and steel manufacture. Emissions of cadmium have declined over recent years; this is mainly attributable to the decline in coal combustion. Environmentally, cadmium is dangerous because many plants and some animals absorb it easily and it becomes concentrated in tissues. Cadmium competes with calcium in the body, and if levels are sufficient, it will displace calcium, causing embrittlement of bones and painful deformations of the skeleton. Cadmium also competes with zinc in the body, and if levels of cadmium are high enough, it will also displace zinc from enzymes in the body.

### **Carbon dioxide (CO<sub>2</sub>)**

Carbon dioxide is one of the major combustion products from burning fossil fuels. It is also produced in certain non-combustion chemical reactions, for instance in the manufacture of cement. Carbon dioxide is a long lived pollutant and will remain in the atmosphere for between 50 and 200 years. Carbon dioxide contributes to the greenhouse effect.

### **Carbon monoxide (CO)**

Carbon monoxide is produced in small quantities when fossil fuel is burnt without sufficient oxygen being present. At high concentrations carbon monoxide is toxic.

**Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>)** are artificial fluids that contain chlorine and/or fluorine. Because of their low reactivity and non-toxicity they were widely used as refrigerants, foam blowing agents, aerosol propellants and solvents

### **Methane (CH<sub>4</sub>)**

Methane is produced when organic matter is broken down in the absence of oxygen. Large quantities are produced by enteric fermentation in cattle and sheep, by spreading of animal manure and landfill sites. Methane is also emitted from coal mines, oil extraction and gas distribution activities. Methane is an important greenhouse gas.

**Lead (Pb)**

Lead is a heavy metal that is emitted from the combustion of petrol, coal combustion and metal works. Emissions of lead continued to fall in 2000, mainly as a result of the ban on the sale of leaded petrol from 1 January. Lead has been found to inhibit the development of children's intelligence. If the levels of lead are sufficient, lead can cause degenerative processes such as osteoporosis, inhibit many enzyme reactions in the body and cause reproductive disorders such as sterility and miscarriages.

**Mercury (Hg)**

The main uses of mercury are in the production of electrical apparatus, in chloralkali electrolysis cells for the industrial production of chlorine and sodium hydroxide solution, and in fungicides for seed preservation. The main sources of mercury emissions are waste incineration, the manufacture of chlorine in mercury cells, non-ferrous metal production and coal combustion. Emissions of mercury have declined over recent years due to improved controls on mercury cells and their replacement by diaphragm cells and the decline of coal use. Due to the volatility of mercury, if levels are sufficiently high, compounds containing mercury attack and destroy various parts of the body, particularly teeth, lung tissues and intestines.

**Non-Methane volatile organic compounds (NMVOC)**

Volatile organic compounds are a variety of chemicals with very different economic uses and environmental effects. Emissions of VOCs arise from the deliberate evaporation of solvents, from accidental spillage or non-combustion of petroleum products. The UKENA also includes emissions of NMVOCs from forests. NMVOCs play a role in the formation of ground level ozone which can have an adverse effect on health. The NMVOCs emissions include benzene.

**Nitrous oxide (N<sub>2</sub>O)**

Man-made nitrous oxide is created in a few industrial processes and from nitrogen fertilisers applied to agriculture. Nitrous oxide is a long lived pollutant, lasting about 120 years and is a potent greenhouse gas.

**Oxides of nitrogen (NO<sub>x</sub>)**

Nitrogen oxides arise when fossil fuels are burnt under certain conditions. High concentrations are harmful to health and reduce plant growth. Like sulphur dioxide nitrogen oxides contribute to acid rain, nitrogen dioxide also plays apart in the formation of ground level ozone.

**Sulphur dioxide (SO<sub>2</sub>)**

Sulphur dioxide is produced when coal and some petroleum products containing sulphur impurities are burnt. Sulphur dioxide is an acid gas which can cause harm to people. It causes damage to ecosystems and buildings when deposited as acid rain.