

## **BOC AUSTRALIA: Trainee physicians' visit with scenario**

Trainee occupational physicians will visit the premises of BOC Australia in Preston which stores gases used for welding, metal cutting and health services and fills steel bottles that are new and recycled.

On site, the visitors will see parts of the plant and then gather for discussion of a scenario.

The aims of the visit are:

- to inform trainee physicians enough about the gas bottling industry that they know the common hazards and their control and can envisage where a doctor could provide a service that a company would value;
- to recognise the most useful ways that an occupational physician may contribute to an emergency.

### **Scenario**

For our scenario for discussion, we *take you back 35 years* to before BOC had this site. It is based on a true incident.

You are medical advisor to CIG and are called to an urgent meeting. Two hours ago, there was an explosion in the acetylene bottle-filling plant with a subsequent fire that caused further bottles to explode. Within each bottle, acetylene [H - C  $\equiv$  C - H] is dissolved in acetone and is protected from shock by a porous matrix of chrysotile. When the many bottles exploded, particles of this chrysotile matrix filled the air and were visibly deposited like snow on the trees, ovals, footpaths and roofs for several hundred metres in the neighbourhood of the plant.

*An explosion produces a blast wave that travels at the speed of sound causing an almost instantaneous rise and fall of atmospheric pressure within tens of metres – enough to tear lung tissue and eardrums and cause shearing forces within the abdomen. This is followed by a blast wind – a fireball of hot gases that hurls fragments of metal, glass and building materials and pyrolysis products causing lacerations, burns and torn internal tissues including the brain.*

*Pyrolysis products of acetylene depend on the temperature of the flame and the ready availability of oxygen. In the explosion situation, pyrolysis will include particles of elemental carbon (soot), hydrogen gas and a range of hydrocarbons including cyclic compounds such as benzene and polycyclic aromatic hydrocarbons.*

When you arrive on site, six severely injured workers have already been transported to hospital. Police, Fire Brigade are on site. Members of the Departments of Health, Labour and the EPA will arrive shortly. Various media representatives are also present.

The cause of the explosion has yet to be determined but a likely explanation is the re-filling of a bottle returned from a customer whose valve is damaged or whose internal matrix is matted unevenly.

The site manager conducts the meeting. He requests that you advise on the health of on-site workers and their families, leaving the environmental issues mainly in the hands of the government authorities.

What do you recommend should be done immediately and what later follow-up should occur?