

# Safety and health alert

## 14/02 Worker overcome by toxic gas in well

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### Incident

A contractor was engaged to repair a pump situated at the bottom of a 12 metre deep well used for garden reticulation at a manufacturing workplace. Another contractor was engaged to test the atmosphere and provide emergency back-up and first aid, in line with confined space procedures.

The pump contractor was wearing a harness, attached to a frame and pulley system. The atmospheric testing initially indicated the atmosphere was safe. The pump contractor worked on the pump for about an hour, in visual and voice contact with several people above. It was then decided to remove the pump. The reticulation pipe was disconnected and allowed to drain back into the well. The people above noticed a rotten-egg smell (hydrogen sulfide gas), and mentioned it to the pump contractor, who said it was normal. He was then observed to lose consciousness. He was immediately pulled to the surface (in about 10 seconds) and given oxygen, upon which he regained consciousness.

The atmosphere in the well was re-tested and found to contain levels of hydrogen sulfide significantly above the occupational exposure standard. (The 8-hour exposure standard for hydrogen sulfide is 10 ppm and the short term exposure limit is 15 ppm.)

Hydrogen sulfide at 500ppm can cause immediate loss of consciousness and death in 30 - 60 minutes. At 700ppm respiratory paralysis and death can occur in seconds.

### Factors

1. Non-operation of bore pumps may cause build-up of large volumes of hydrogen sulfide in the reticulation pipes due to breakdown of organic matter.
2. The risk of hydrogen sulfide forming in reticulation pipes and entering the well.
3. Ventilation requirements such as blowing air into the well, extracting air from the well or using an air-line respirator.
4. Work practices and personal protective equipment appropriate for confined space work such as the use of a personal gas monitor or a multi-gas monitor.

### Recommendations

1. Employers are required to conduct risk assessments to ensure that employees are not exposed to hazards when working in a confined space. Where risks are identified from such assessments, appropriate control measures must be introduced to eliminate or minimise such risks. (Refer to OSH Regulations 3.85-3.86 and AS/NZS 2865.)
2. Persons entering wells, bores, drains, water pipes and similar spaces should be aware that highly toxic hydrogen sulfide gas may be present.



3. Where there is any risk to the safety and health of the persons in the confined space, a stand-by person or persons must be stationed outside the confined space.
4. Adequate emergency and rescue procedures must be in place for confined space work.
5. Persons working in confined spaces and those directing or assisting them must be trained. (Regulation 3.87)
6. Should there arise the need to introduce or drain any product into a confined space, the space must be vacated and a risk assessment conducted to determine if risk controls are needed.

### **Further Information**

Further information can be obtained from the WorkSafe internet site [www.worksafe.wa.gov.au](http://www.worksafe.wa.gov.au), or by contacting customer service on 1300 307 877 or email: [safety@docep.wa.gov.au](mailto:safety@docep.wa.gov.au).

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