

Safety ALERT

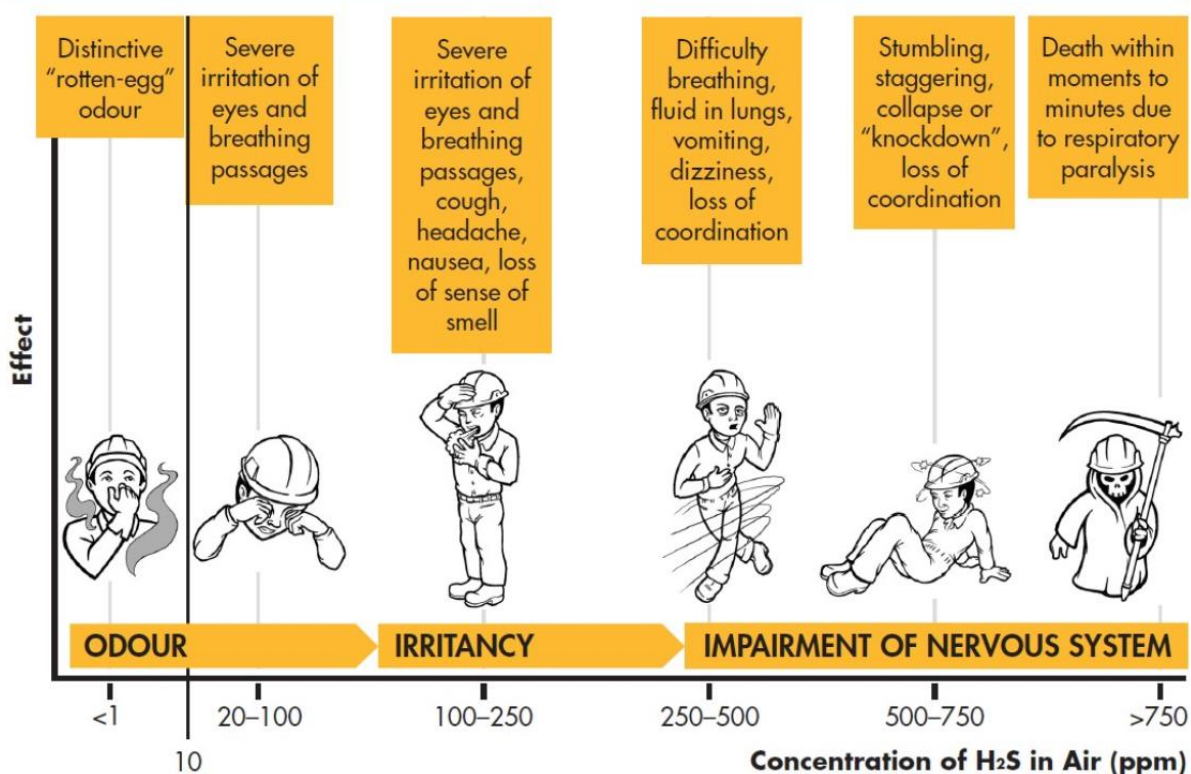
Alert 23-5

WHAT HAPPENED:

While a rig was quayside undergoing reactivation activities, deadly hydrogen sulfide (H₂S) concentrations were encountered within the bilge water tank in the machinery space. After the top hatch of the tank was removed, large concentrations of H₂S escaped out into the immediate surrounding atmosphere posing high risk to personnel.

100 PPM of H₂S is considered Immediately Dangerous to Life and Health (IDLH). H₂S concentrations over 1,000 PPM can cause immediate collapse with loss of breathing, even after inhalation of a single breath. This corrosive gas can pit and corrode steel, which can also affect the integrity of cargo containment systems and hull structures. H₂S is a highly flammable/explosive gas with a concentration in the air between 4.3% (Lower Explosive Limit) and 45% (Upper Explosive Limit).

EFFECTS OF H₂S EXPOSURE



Source: <https://open.alberta.ca/publications/ch026-h2s-hydrogen-sulphide>

A Safety Alert can consist of any type of health, safety & environment (HSE) notification or Near Miss/Near Hit alert. Proactive Alerts on jobs well done are also encouraged.

Contributing Factors

H₂S was generated within the bilge water tank by Sulfate Reducing Bacteria (SRB) which thrives in low-oxygen water and sludge that is mildly caustic to acidic (pH 8 to 5) with optimum temperature around 30°C (86°F). Critical nutrients for H₂S production are sulfates, phosphates and carbon.

Seawater and biodegradable cleaning agents are sources of both biological and sulfate nutrients and were associated with increased SRB H₂S production.

LESSONS LEARNED:

The company undertook a review of its confined spaces and identified those with potentially high H₂S concentrations and require respiratory protection when breaking the containment of these spaces unless gas content can be measured prior to opening them.