FACT✓SHEET:
Hydrogen Sulfide (H_2S) and Hydraulic Fracturing

ENERGYINDEPTH

Because of its presence in some oil and natural gas basins, hydrogen sulfide (H_2S) exposure has become a source of criticism among groups that oppose U.S. energy development. When not properly controlled, hydrogen sulfide (also called "sour gas") can be dangerous -- but thanks to a proactive approach on the part of both regulators and the industry, that risk has been effectively minimized or even eliminated.

FACT: Hydrogen Sulfide is Heavily Regulated

In addition to well construction regulations, states and federal agencies have adopted specific measures to prevent H_2S exposure. For example, OSHA not only **regulates** the breathing space of a worker, but also requires that employees – including drilling and other independent contractors – be trained regarding all aspects of proper sour gas handling, from **appropriate hazard identification and communication to detailed emergency response procedures**.

Many states have also expanded upon these regulations. For example, under **Rule 36**, the Texas Railroad Commission **requires** any person working in an oil field that has known H_2S concentrations to complete an H_2S certification course every year. That's similar to California, where, under **title 8 of the California Code of Regulations**, comprehensive training is required in oil fields with significant H_2S concentrations. The Colorado Oil and Gas Conservation Commission monitors H_2S at the well site, per **rule 607**, and the Air Pollution Control Division of the Colorado Department of Public Health operates an inventory of H_2S.

The U.S. Bureau of Land Management, through **onshore order No. 6**, requires that drilling plans on federal lands with a high probability of finding H_2S follow highly detailed technical requirements and elaborate contingency plans.

In addition to worker-specific regulations, **32 states** have ambient air quality standards for hydrogen sulfide.

FACT: Technology Helps Prevent Hydrogen Sulfide Releases

Wells are designed to prevent leaks: several concentric strings of metal casing, which are cemented in place, **confine** fluids or gases to the well bore. Casing, pipelines, and containers where corrosive elements (i.e. H_2S) may be found are **specifically engineered** with appropriate alloys to resist corrosion. As **Resources for the Future** has observed, setback rules are also pervasive in natural gas producing states, which require wells and other infrastructure to be situated a certain number of feet from buildings and other public structures.

In case of an emergency, wind direction indicators, hydrogen sulfide detection monitors – which include colorimetric tube detectors, personal monitors, and fixed monitors (with an audible alarm at 10 ppm) – blowout preventers, and breathing apparatuses are **utilized** in areas where sour gas is likely to be found. In other words, emergency situations are detectable, manageable, and – most importantly – preventable.

FACT: Fatal Exposure to Hydrogen Sulfide is Exceedingly Rare

Even for oil and natural gas workers, the risks from hydrogen sulfide are markedly low. Based on data from **PwC** and the **Bureau of Labor Statistics**, the risk of a fatality from H_2S exposure on an oil and gas site is around 0.00015 percent. To put this into perspective, the odds of being involved in a fatal shark attack have been estimated at more than **double** that figure.

FACT: Proactive Industry Measures Further Reduce Worker Risk

The oil and natural gas industry has **partnered** with **NIOSH**, the **Centers for Disease Control (CDC)** and the **Occupational Safety & Health Administration (OSHA)** to help ensure that H_2S and other risks are properly managed and operations remain safe. This partnership has been successful: as Eric Esswein, a Senior Industrial Hygienist at NIOSH, **stated** recently after visiting a number of well sites, the oil and natural gas industry "runs very, very safe work practices and sites."

The Oil and Natural Gas Industry: Room for Improvement, But Getting Safer

According to the **EIA**, from 2007 to 2013, employment in the oil and natural gas industry increased by 40 percent. Over that same time-frame, the number of total fatal work injury cases related to oil and natural gas production **fell by 8.2 percent**. Overall, fishing, bartending, and even limo driving have **higher work risk** rankings than oil and natural gas production.