



PRODUCTION  
TECHNOLOGIES.  
**FULL SERVICE.**

# OUTSTANDING H<sub>2</sub>S REMOVAL

Reduce risk. Increase return.



**Schlumberger**



# 50% REDUCTION IN COST

after replacing existing  
H<sub>2</sub>S remediation solution  
with SULFATREAT  
FAMILY adsorbents



# EFFICIENT, EFFECTIVE HYDROGEN SULFIDE REMOVAL

Hydrogen sulfide, a natural component of reservoirs or the result of bacterial reduction of sulfur compounds in produced water, can form insoluble salts with different types of metal ions in produced water, causing fouling, filter blocking, and injection well damage.

As part of the innovative CURE suite of chemical-based technologies that neutralize and remove production impurities and risks, Schlumberger offers a broad range of triazine, amine, aldehyde and non nitrogen containing liquid sulfide scavengers complemented by world-leading SULFATREAT\* granular iron oxide-based hydrogen sulfide adsorbents and SELECT FAMILY\* mixed metal oxide-based hydrogen sulfide adsorbents.

Together, these technologies efficiently remove H<sub>2</sub>S from gas, water, and oil streams, optimizing flow performance, improving revenue, and minimizing risk.

Customer requirements are assessed to identify the most cost-effective treatment solution, which may be a fixed-bed or liquid system or a consolidated solution of bulk removal with liquids following fixed-bed polishing.

## **Pioneering technology to cure H<sub>2</sub>S threats**

Schlumberger has dedicated specialist laboratories for the research, development, and testing of liquid scavengers and fixed-bed adsorbent media and uses its considerable expertise to identify the most cost-effective treatment based on specific process conditions and operational requirements.

Unrivaled global expertise combined with a network of advanced oilfield research and development laboratories ensures that customers have fast access to innovative product developments to optimize flow performance and ROI.

# **HYDROGEN SULFIDE SCAVENGERS**

## **COST-EFFECTIVE, COMPACT SOLUTIONS**

### **Protecting production, assets, and the environment**

As part of the pioneering Schlumberger CURE suite of chemical removal products, liquid scavengers are particularly cost effective where the total H<sub>2</sub>S mass is relatively low or where space offshore restricts equipment size.

### **Bubble tower assembly application**

Scavengers may be applied as a solution in bubble towers for gas treating, either atomized directly into produced gas streams or via direct application into mixed fluid flow streams.

Products for application in bubble tower assemblies are designed to deliver high scavenging efficiency and capacity via direct bulk liquid or gas contact.

### **Wet gas stream application**

Wet gas streams are typically treated by direct injection of products into separator gas outlets in the phase separation train. Usually, the largest proportion of H<sub>2</sub>S is removed at the high-pressure separator.

In many cases, the water present at the scavenged wet gas stream will consist solely of condensed water. Where produced or formation water is present, carbonate scale problems may be anticipated and mitigated. When used in water systems, these products can rapidly remove sulfide and often redissolve insoluble metallic salts of sulfides.

Products designed for water and gas applications form water-soluble, low-toxicity, biodegradable compounds that are noncorrosive and will not release hydrogen sulfide, even over extreme pH variations.

### **Oil system application**

Products destined for use in oil systems can be pumped directly into the stream and yield soluble, biologically friendly by-products.





# FIXED-BED ADSORBENTS

## Customized solutions at the forefront of fixed-bed technology

Schlumberger is a world leader in providing cost-effective solutions for the removal of contaminants from gaseous and light liquid hydrocarbon streams using fixed-bed technology. Schlumberger technology is used to treat nearly 3 trillion cubic feet of gas per year with in excess of 1,500 applications in more than 30 countries.

Fixed-bed processes are simple and easy to operate and require minimal operator attention. During the adsorption process, gas or liquid flows through the adsorbent media in the vessel's bed. The hydrogen sulfide chemically reacts with the media to form a stable by-product.

The flexibility of the fixed-bed process allows the system to adapt to variations in process conditions, with product consumption only dependent on the amount of hydrogen sulfide that passes through the bed.

Schlumberger offers two primary product lines for removal of  $H_2S$  from gas: SULFATREAT granular iron oxide-based  $H_2S$  adsorbents and SELECT FAMILY mixed metal oxide-based  $H_2S$  adsorbents.

Nonhazardous SULFATREAT adsorbents are the industry's leading adsorbents for treatment of water-saturated gas, and SELECT FAMILY adsorbents are engineered using enhanced porosity control for improved activity. These products facilitate greater flexibility in system design, and formulations are available for treatment of both dry and water-saturated gas.

## Case Study

# H<sub>2</sub>S SCAVENGER ALSO INHIBITS CORROSION AND SCALE, NORTH LOUISIANA

## CHALLENGE

A pipeline company's produced gas averaged 13 ppm of H<sub>2</sub>S within a range of 4–30 ppm.

A multifunction chemical treatment program was required to scavenge H<sub>2</sub>S, reduce pipeline corrosion, and inhibit scale deposition. The solution was to be applied to two fields, each with several wells.

## SOLUTION

Schlumberger recommended HR-2636, a unique combination of a triazine H<sub>2</sub>S scavenger, mixed amine corrosion package, and phosphonate scale inhibitor. For high efficiency and maximum gas contact, the atomized product was continuously injected into the pipeline.

## RESULTS

Calcium and barium scale were effectively controlled, and average corrosion rate was 0.15 mm/a. H<sub>2</sub>S content was reduced to a maximum of 2 ppm.



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ppm  
425.00

MIC/D  
16.50

Days Out

Days  
58

## Facility Overview

H2S Adsorbent - Single Vessel

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Water Saturation Data



Gallons Per Day Pumped  
5.46

Gallons Generated  
44.41

Operational parameters

Outlet H2S

ppm  
2.10

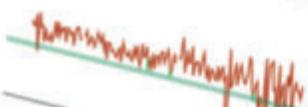
Inlet H2S

ppm  
425.00

Inlet gas rate

MIC/D  
16.50

Gas Flow



Vessel Status

# UNLOCK POTENTIAL **OPTIMIZE PRODUCTION**

A full service offering to maintain and restore full production.

Schlumberger production technology specialists deliver targeted, integrated strategies that help to decisively remediate production issues such as deposit formation and naturally occurring gases, enabling customers to restore and improve flow performance and revenue while avoiding costly repairs and shutdowns.

Firmly established at the forefront of technology, Schlumberger has a full service offering that integrates pioneering chemical and process solutions, equipment, and software with unrivaled technical expertise.

Working with the world's largest oilfield services provider, customers benefit from a truly unique combination of outstanding technological capabilities and improve their understanding of how to successfully address production challenges in an increasingly competitive marketplace.

The team's global footprint and extensive suite of technologies helps customers to reliably and efficiently maximize production—regardless of system complexities or geography.

**MAXIMIZE PRODUCTION  
FROM RESERVOIR TO REFINERY**



# UNLOCK POTENTIAL

## OPTIMIZE PRODUCTION



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