

Middle East

Fast-track sour water treatment facilitates safe fracturing water supply at scale

Integrated H₂S stripping and targeted chemistry deliver compliant water supply and eliminate trucking and scaling risk in the Middle East

CHALLENGE

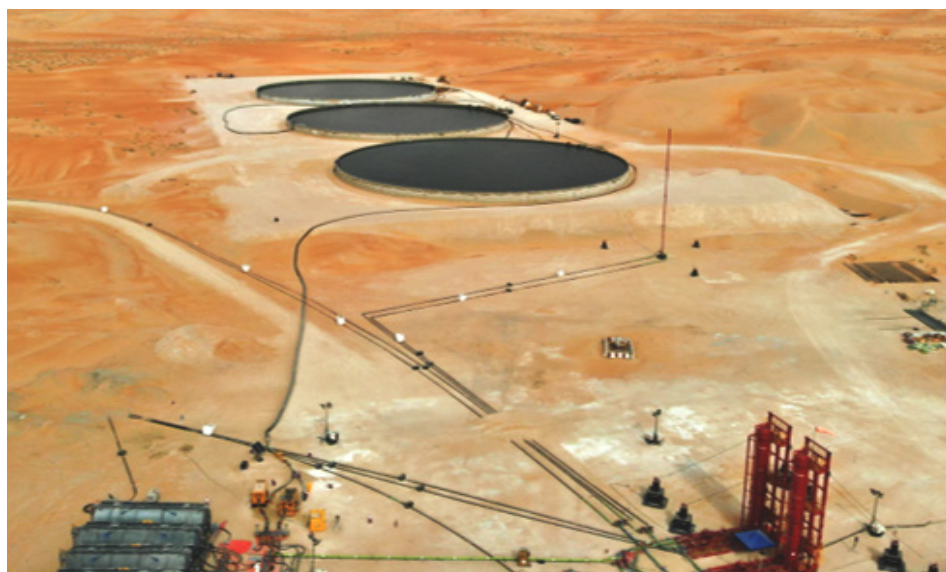
- Sour water with high H₂S requiring ≤10 ppm
- Severe scaling from chemical-only treatment
- High cost of chemicals and water trucking

SOLUTION

- H₂S stripping columns with nitrogen injection
- Targeted scavenger and scale inhibition
- Closed-top storage with vent scrubbing and export pumps

RESULT

- Delivered treated water to specification
- Reduced chemical usage and scaling risk
- Eliminated water trucking, and logistics costs
- Allowed rapid scale-up to 50,000 bpd



Overview

A major operator in the Middle East required a reliable and scalable solution to treat sour aquifer water for hydraulic fracturing operations. High dissolved hydrogen sulfide (H₂S) levels, combined with chemical-only treatment approaches, caused severe scaling, elevated chemical consumption, and increased operating costs. In addition, the transportation of treated water from remote sources increased logistics complexity, cost, and emissions.

To address these challenges, the operator implemented an integrated sour water treatment system that combined physical H₂S removal with targeted chemical treatment. The solution provided a safe and compliant water supply for fracturing operations, minimized chemical usage, reduced scaling risk, and facilitated rapid capacity expansion as demand increased. The system initially operated at 20,000 bpd and later expanded to 50,000 bpd to support continuous development.

Challenge

The operator needed to treat sour aquifer water for fracturing operations and simultaneously meet stringent health, safety, and environmental requirements. Dissolved H₂S concentrations exceeded acceptable limits, which required treatment to ≤10 ppm to allow for safe handling and downstream use. Earlier chemical-only treatment methods led to significant scaling in surface equipment, which increased maintenance requirements and chemical consumption.

The operator considered the transportation of treated water from distant sources, but this method would introduce substantial cost, emissions, and logistical risk. The operator required a solution that reduced reliance on chemicals, minimized scaling potential, eliminated water hauling, and could deploy quickly with the flexibility to scale capacity as operational needs evolved.

Solution

Halliburton delivered a fast-track, integrated sour water treatment solution centered on physical H₂S removal supported by targeted chemical treatment. The team deployed H₂S stripping columns with nitrogen injection as the primary removal method, which significantly reduced dissolved H₂S levels upstream of chemical polishing. This approach lowered overall scavenger demand and improved process stability.

Targeted chemical treatment included MULTISWEET® MX 8-5399 scavenger for final H₂S polishing and MX 2-4489 scale inhibitor to control mineral precipitation throughout the system. The solution addressed scaling risk upstream, protected surface equipment, and maintained consistent performance at high flow rates.

The system incorporated closed-top storage tanks equipped with vent scrubbing and export pumps to provide safe handling and continuous delivery of treated water. A modular design allowed for rapid mobilization and commissioning on an accelerated timeline and provided a clear pathway to expand capacity from 20,000 to 50,000 bpd without a disruption to operations.

Result

The integrated treatment system consistently delivered treated water that met H₂S specifications at high flow rates, which facilitated uninterrupted fracturing operations. The prioritization of physical H₂S removal and chemical application optimization allowed the operator to significantly reduce scavenger consumption and mitigate scaling risk.

The operator eliminated water trucking, which reduced operating costs, simplified logistics, and lowered transport-related emissions. The modular design allowed the operator to expand treatment capacity to 50,000 bpd as demand increased, support ongoing field development, and maintain safety, environmental compliance, and operational efficiency.

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