

Case study: Reservoir souring study, Sub-Saharan Africa

GaffneyCline energy advisory reservoir souring study boosts well performance at less risk, lower costs

An operator offshore Africa faced increasing hydrogen sulfide (H₂S) concentrations in its producing wells. The rising H₂S levels jeopardized well integrity, compromised process equipment, and drew mounting scrutiny from regulators. The operator risked heavy fines and potential shutdowns unless effective H₂S mitigation measures were implemented.

Conventional treatment methods, including H₂S scavengers, corrosion inhibitors, and bacterial control, added cost and complexity without addressing the root causes of reservoir souring. The operator recognized the need for a thorough, in-situ reservoir souring study to understand the souring event and implement sustainable solutions.

Standing out as the right solutions provider

The operator solicited proposals from several consultancy firms to resolve the H₂S challenges from its producing wells. But GaffneyCline energy advisory set itself apart with its Reservoir Characterization services. These services offer integrated subsurface expertise and a proven track record of providing sharper reservoir insights for improved production at lower costs and risks.

Specifically, GaffneyCline's Reservoir Characterization services provide:

- Reduced production risks and improved hazard identification. Proprietary workflows, advanced subsurface analysis, local reservoir

knowledge, and global domain expertise combine to predict behavior and identify hazards early.

- Lower OPEX/CAPEX and optimized resource deployment. A deeper understanding of reservoir behavior, fit-for-purpose treatment chemistries, and optimized technology integration from the subsurface to surface help improve cost efficiency.
- Enhanced well lifespans for maximized recovery. Reservoir simulation and performance monitoring allow for real-time adaption and optimization of mitigation strategies.

When GaffneyCline energy advisory presented its proposal to the regulator on behalf of the operator, the solution stood out among competitors. Compared to the recommendations from other firms, the GaffneyCline presentation convinced the regulator that this solution offered the best chance of resolving the H₂S issues from the producing wells. The regulator mandated that the operator work exclusively with GaffneyCline energy advisory and Baker Hughes.

Collaborating on an advanced solution

GaffneyCline's 3D reservoir souring simulations were instrumental in guiding operational changes. Working alongside Baker Hughes chemical treatment specialists, the team proposed alternative chemistries as interim solutions for H₂S removal from production streams.

Challenges

- Offshore wells with rising H₂S levels and increasing treatment chemical costs
- Growing pressure from regulators, with potential for significant penalties and field shutdown
- A need to understand the souring event and implement the right short- and long-term mitigation solutions

Results

- Reduced H₂S production from the reservoir by 50% within six months of implementing recommendations
- Significantly lowered treatment chemical spend as integrity threat diminished
- Allowed field operations to continue as regulator eased pressure on the operator

The study integrated:

- Predictive souring simulations
- Comprehensive sampling and analysis
- Real-time data interpretation
- On-site technical support from Baker Hughes personnel

Upon implementing this proposed solution in the field, H₂S levels in the production wells dropped by 50%—and continued to decline.

Building confidence and delivering lasting results

GaffneyCline's predictive modeling of in-situ reservoir souring helped eliminate the immediate regulatory threat of fines and field shutdown.

Collaboration between GaffneyCline energy advisory, Baker Hughes technology specialists, the operator, and the regulator led to:

- Measurable reductions in H₂S levels and associated risks
- Decreased chemical usage and associated costs
- Enhanced safety for personnel and equipment

The team also conducted training sessions for both the operator and the regulator, fostering transparency and trust. The quality of the engagement left a strong impression—so much so that regulator personnel offered a rare round of applause following the final presentation.

Impressed by the results and GaffneyCline's collaborative approach, the operator has since engaged the firm for multiple follow-on reservoir studies, each unlocking new optimization opportunities.

