

EXTREME EXPERIENCE



CASE STUDY

Project: H₂S removal from Natural Gas

Location: Remote oil production facility, Badra, Iraq

Equipment: 2 skids, each rated for 6 MMSCFD

Specs: 4.5% H₂S inlet to 1000 ppm H₂S outlet

End User: GASPROM (Russian)

**PEEK-Sep™
membrane system
performance for
Badra Plant**

PoroGen

NG Feed Conditions		NG Product from PEEK-Sep™ Membrane System	
Feed flow, Nm ³ /h	10,000	Product flow, Nm ³ /h	5,100
Feed pressure, barg	11.7	Product pressure, barg	≤1 bar pressure drop
Feed temperature, °C	30	Product temperature, °C	N/A
H ₂ S, mol%	4.78	H ₂ S, mol%	0.1
CO ₂ , mol%	5.5	CO ₂ , mol%	3.3
CH ₄ , mol%	55.1	CH ₄ , mol%	71.2



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In 2013, a multi-national Engineering, Procurement and Construction company (EPC) developing a central processing facility in the Wasit province of Iraq encountered a potential dangerous and damaging problem. High levels of hydrogen sulfide gas (H₂S), at times exceeding 45,000 ppm, were found in the site's natural gas.



High levels of H₂S create a lethal working environment for employees, and H₂S-related corrosion can severely shorten the life and performance of the downstream equipment. In addition, if the gas is used as an ignition source, high levels of H₂S violate emission guidelines.

The project engineer from the EPC had to quickly find a way to condition the gas, stay within tight budget restrictions and complete the project in around seven months. "We faced some extreme budget limitations and extreme deadline limitations," he said.

Integrated Flow Solutions (IFS) was one of many bidders on the project but the only manufacturer capable of providing a technology that did not require a lot of additional pretreatment and compression upstream. "We chose IFS because we had worked with them on a previous project," the engineer said. "We knew they had the right technology and an experienced and dedicated project management team. Their approach could minimize operating costs and meet our project specifications."

IFS delivered two skids featuring membranes made by PoroGen. These membranes are manufactured from high performance polyether ether ketone (PEEK) polymers. Unlike traditional polymer membranes, PEEK membranes are resistant to the liquids that can harm conventional membranes.

The IFS system solved the problems of cost and ongoing maintenance as the system is less complex, requires fewer rotating components, eliminates expensive pretreatment downstream and operates effectively under varying process conditions. This vastly reduces the "down time" for maintenance.

While the skid package was considered a "plug and play" solution requiring few adjustments during installation and little ongoing maintenance during operation, IFS engineers provided hands-on support to the field team in the remote Iraqi region.

The IFS team's presence onsite allowed them to address an unexpected issue that arose - high levels of condensation in the gas stream. Experienced engineers from IFS' headquarters in Texas collaborated with the local engineer working on the start-up and devised a way to remove condensate from the system, a design feature that is now incorporated into all membrane skids.

"The IFS system runs more than 98% of the time," the project engineer said. "The system's field performance exceeds the advertised value. We have very little down-time and are able to run around the clock. Knowing IFS, I put my trust in IFS. They can find solutions."