

Addressing sour gas processing challenges

Up to a third of the world's natural gas reserves contain high concentrations of sour gas, with the Middle East a region where such fields are prevalent. John Young, CEO, Twister BV, discusses a new technology that can help to make the development of sour gas fields safe and commercially viable.

AS OIL AND gas reserves worldwide continue to dwindle and many Middle East countries struggle to produce enough natural gas to meet domestic requirements, sour gas fields that were previously left under-developed due to high costs and technical and safety challenges, have come to the fore as an important energy source.

Examples include the Shah gas field in the UAE, the world's largest sour gas project, as well as the Bab gas field – also in the UAE; Kuwait, where operators are looking into the challenges of developing HP/HT Jurassic sour gas fields; and Qatar, where the North Field has up to seven per cent CO₂ and six per cent H₂S by volume.

However, sour gas and its extraction and processing come with significant challenges.

H₂S in the gas stream is highly toxic and flammable with significant HSE implications, the dangers of toxic gas releases or leaks; and threats to both production and transportation infrastructure, with H₂S's highly corrosive nature requiring special handling.

There is also a need to remove CO₂ from the gas stream due to the fact that its presence represents a non-value added gas transport cost. CO₂ can also cause problems for the transportation of LNG.

Furthermore, the need to remove water to allow cost-effective gas transportation also adds complexity, cost and safety implications to gas separation projects.

Traditional technology limitations

The corrosive nature of sour gas fields and processing and separation challenges have subsequently led to pressures on existing technologies and infrastructures.

For example, fully manned glycol-based or amine gas treating production platforms come with the dangers of the potential venting of toxic H₂S, contamination of the glycol regenerator with H₂S, high H₂S gas inventories, intensive personnel and



maintenance requirements, and logistical and safety challenges in operating from remote offshore locations. There are accompanying technology challenges as well.

Turbo expanders are often used to dew point natural gas to meet export specifications and recover condensate. In a sour gas environment, however, there are significant pressures on the gas seals of turbo expanders, sometimes leading to availability of only 50 per cent.

Other technologies used to pre-empt corrosion in sour gas fields include Kinetic Hydrate Inhibitors (KHI) that are very popular in Saudi Arabia and are used to mitigate hydrate formation through injection into the natural gas pipelines system.

However, concerns over the performance of KHIs, and in many cases their significant costs, are obstacles to their more widespread usage. In a paper at the 9th North American Conference on Multiphase Technology in 2015, Saudi Aramco discussed the challenges of qualifying a compatible KHI in

the Karan sour gas field.

It is against this context of both safety and the need to make sour gas fields commercially viable that operators are looking to alternative gas separation and processing technologies. One such alternative comes from Twister.

Safe, sustainable and profitable gas processing and separation

Based in the Netherlands, Twister BV delivers reliable, high-yield and robust solutions in natural gas processing and separation to the upstream and midstream oil and gas sectors. The Twister technologies are particularly suited to sour gas fields through the Twister Supersonic Separator, a robust, compact gas conditioning solution characterised by condensation and separation taking place at supersonic velocity; and the Twister Hydrate Separator that isolates hydrates and liquids from natural gas without using chemicals through heating coil and cyclonic separation melting hydrates.

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