

H2S Inhibitor Optimization

Case Study Snapshot

Date: 2012

Customer: International energy company

Location: Eagle Ford Shale, South Texas, United

States **Challenges:**

- Coiled tubing pipe being corroded by the sour environment
- High costs associated with the use of corrosion-inhibiting

chemicals **Trican Innovation:**

- Reduce the amount of H₂S-inhibiting chemicals that have to be pumped, based on well conditions

Results:

- Reduction in the amount of chemicals used, which allows for significant cost savings
- Extended life of metal goods in sour environments

Business Needs

Working with sour gas wells poses a number of challenges. In addition to the risks to humans, the significant amounts of hydrogen sulfide (H₂S) contained in sour gas are damaging to pipes. Because coiled tubing can be corroded by the sour environment, H₂S-inhibiting additives are required to protect the pipe. Trican Well Service uses a chemical specifically designed to inhibit corrosion that results from metal exposure to gaseous or dissolved H₂S and/or CO₂. This product, called H₂S Inhibitor SC (sulfide cracking),

is a liquid, organic film-forming corrosion inhibitor that is also oil-soluble and water/brine dispersible.

Corrosion inhibitors are, however, expensive, and the extra chemical requirement and handling come with extra costs. This additional cost is substantial, therefore, Trican performed a study to re-evaluate the amount of chemicals needed for every job.

Trican Solution

Current suggested loadings are approximately 227 L (60 gal) each of H₂S Inhibitor SC and AI-9 per 24-h period. In addition to extra chemical handling, this means a substantial extra cost. After re-evaluating the necessary chemical loadings, Trican determined that it could limit the chemical loadings, depending on the well conditions. A distinction was made between wells above and below 100°C (212°F). The wells within the Eagle Ford coiled tubing operations are predominately above 100°C (212°F), with H₂S concentrations of 20 ppm or less. For these wells, the chemical loadings are added every hour. This equates to loadings of 10 L (2.5 gal) H₂S Inhibitor and 10 L (2.5 gal) of the acid inhibitor AI-10 every hour per 10 bbl, which is significantly less than the current loadings. For wells where the temperature is below 100°C (212°F), the load is added once every four hours. The AI products are used with H₂S Inhibitor SC as a dispersant. AI-10 (AI-9 can also be used) increases dispersibility. H₂S Inhibitor SC is supplied in 200-L (50 gal) drums and can be added directly to water or oil.

The Trican Advantage

Using H₂S Inhibitor SC has many advantages. The inhibitor extends the life of metal goods, such as coiled tubing and production tubing, when operating in sour environments. The inhibitor is specifically designed to prevent sulfide stress cracking, is dispersible in mineral acid solutions and brines, and soluble in hydrocarbons. Most importantly, defining the required amount of H₂S Inhibitor SC according to the well results in a considerable reduction of chemical usage and costs.

Mixing Instructions

Well Conditions	Loadings per 1.5 m ³ (10 bbl) sweep	Frequency
> 100°C (212°F) and/or > 10% H ₂ S, gas lifting, brine/spent acid present	10 L (2.5 gal) of H ₂ S inhibitor SC 10 L (2.5 gal) of AI-9	Every hour
< 100°C (212°F) and/or < 10% H ₂ S, brine/spent acid present	5 L (1.25 gal) of H ₂ S inhibitor SC 5 L (1.25 gal) of AI-9	Every four hours