KI-3108 Corrosion Inhibitor Mitigates Sour Corrosion in Onshore Gas Condensate Field, Western Canada

Specifically developed inhibitor controls corrosion with minimal residuals in pipelines and equipment

CHALLENGE
Mitigate corrosion in 15 gas condensate pipelines and 4 water injection wells.

SOLUTION
Apply KI-3108* corrosion inhibitor at an optimized dose rate of 400 ppm to prevent corrosion from carbon dioxide and hydrogen sulfide.

RESULTS
- Met or exceeded all corrosion inhibitor benchmarks set by previous product.
- Removed sour corrosion products and scale from pipe walls.
- Mitigated general and localized corrosion in the pipelines and injection system.

Protect carbon steel pipelines and injection system from corrosion
The gas condensate pipelines and produced water injection system of an onshore oil field in western Canada contained significant levels of carbon dioxide and hydrogen sulfide. Because the production pipelines, vessels, and produced water reinjection system were manufactured from carbon steel, they were at risk of severe localized corrosion. The operator was in search of a more effective inhibitor to mitigate corrosion in 15 gas condensate pipelines and 4 water injection wells.

The corrosion inhibitor needed to be applied at the wellhead to provide maximum corrosion protection of the pipelines upstream of the three-phase separators. This required the inhibitor to travel with the produced water to the injection system and provide corrosion protection.

Mitigate localized corrosion with KI-3108 corrosion inhibitor
Schlumberger specifically developed KI-3108 corrosion inhibitor to mitigate the localized corrosion occurring within this system. KI-3108 corrosion inhibitor is a synergistic blend of several corrosion inhibitor components formulated for controlling localized corrosion in sour systems. In addition, the product contains surfactants, which aid inhibitor adsorption and performance by removing corrosion products and scale from pipe walls.

Test results indicated that 250- to 500-ppm KI-3108 inhibitor would be required to mitigate general and localized corrosion in the pipelines. After comparing the performance of KI-3108 inhibitor with products from several other chemical vendors, the operator selected KI-3108 inhibitor for application in this oil field. KI-3108 corrosion inhibitor was subsequently deployed in the field and injected at the wellhead at an optimized dose rate of 400 ppm.

Reduced corrosion and inhibitor residual rates
The operator evaluated performance of KI-3108 corrosion inhibitor using data from strategically placed coupons mounted at the bottom of gas condensate pipelines. These results indicate that the corrosion rates in the field are equivalent to or less than the rates achieved by the previous product. The general corrosion rate for all coupons has not exceeded 0.01 mm/year since the deployment of KI-3108 corrosion inhibitor. The overall severity of any pitting corrosion on the coupons has also been minimized. Inhibitor residuals measured at the injection wells have not dropped below 250 ppm by volume. This indicates that the overall residual in the pipelines and injection wells are at levels that are equal to or greater than the acceptable minimum concentration required for adequate protection.