Fluid®

CASE STUDY

Enviro-Syn® HCR-7000-WL® Modified Acid™ technology saves operational time per stage and reduces HSE risk

Permian basin, Wolfcamp formation, Texas

An E&P operator working in the Wolfcamp shale formation of the Permian basin was looking to improve the efficiency of their simulation operations. They chose to pump Enviro-Syn HCR-7000-WL modified acid, which minimizes the corrosion rates and negative HSE properties of hydrochloric acid (HCl) while maintaining solubility and reactivity rates. This enabled the operator to pump the modified acid with the wireline bottom hole assembly, saving 13 min per stage on average in operational time.

CHALLENGE

The operator had 2 wells drilled in the Wolfcamp A2 and Wolfcamp X. Both wells were designed with a 2-string completion and 43-stage plug-and-perf stimulation with dissolvable ball-in-place plugs. The operator wanted to improve the efficiency of operations by placing acid during wireline pump down to reduce the time required for each fracturing stage.

SOLUTION

Enviro-Syn HCR-7000-WL is a strong modified acid specially designed to efficiently spot acid to the perforations with wireline tools in hole – a patent-pending process. HCR-7000-WL also reduces precipitation issues prevalent with HCl, minimizing formation damage that can occur when used as a spearhead acid.

A concentrated solution of HCR-7000-WL was delivered to location and diluted on the fly 2:1 with fresh water to 33% concentration, which provides similar solubilizing reactivity as 15% HCl. A total of 86 stages were treated with 2,500 gal of 33% HCR-7000-WL. To compare time savings, HCR-7000-WL was either pumped down with the wireline or with the frac treatment on adjacent stages at the toe, mid-lateral and heel of both wells.

RESULTS

Figure 1 shows a comparison of acid breakdown times between adjacent stages of Well A. HCR-7000-WL was pumped with the wireline on Stage 22 where breakdown was observed at 7 min, and with the frac on Stage 23, which required 19 min to breakdown. Therefore, the operator was able to save 12 min by pumping HCR-7000-WL during wireline pump down. Well B showed similar results on adjacent stages with 5 min and 19 min until breakdown, respectively, for a 14 min savings.

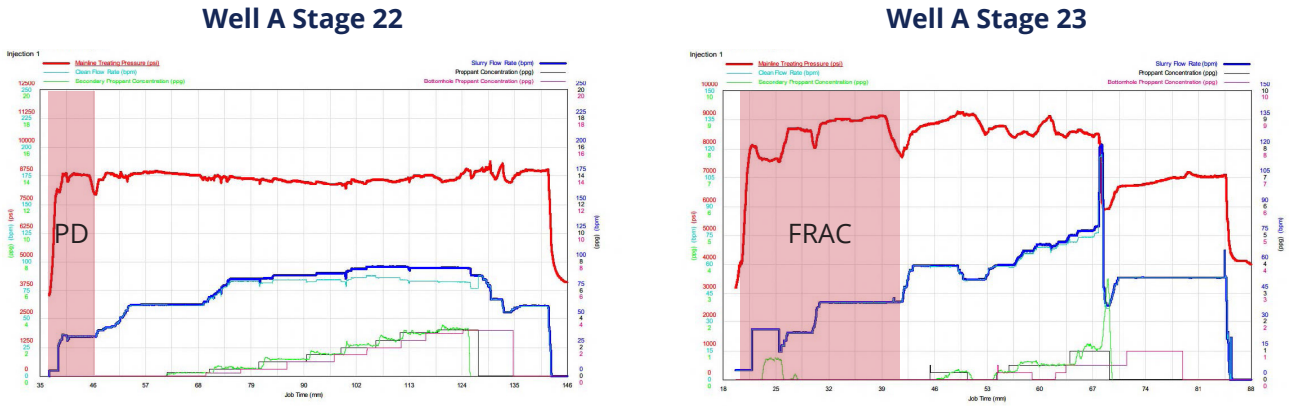

Figure 1. Adjacent stages on Well A. HCR-7000-WL was pumped with the wireline on Stage 22 and with the frac on Stage 23.

Figure 2 provides the average acid breakdown times for all stages on both wells. Green indicates stages where HCR-7000-WL was pumped with wireline, and blue shows stages pumped during fracture treatment. The average time for the modified acid to hit formation during wireline pump down was 6.5 min and 19.5 min during fracturing stages. Therefore, the operator was able to complete stages faster using HCR-7000-WL, with average saving of 13 min per stage, eliminating 11 hours of operational time to finish the pad 0.5 days faster. The additional benefit of using a non-corrosive modified acid on location improved the HSE footprint.

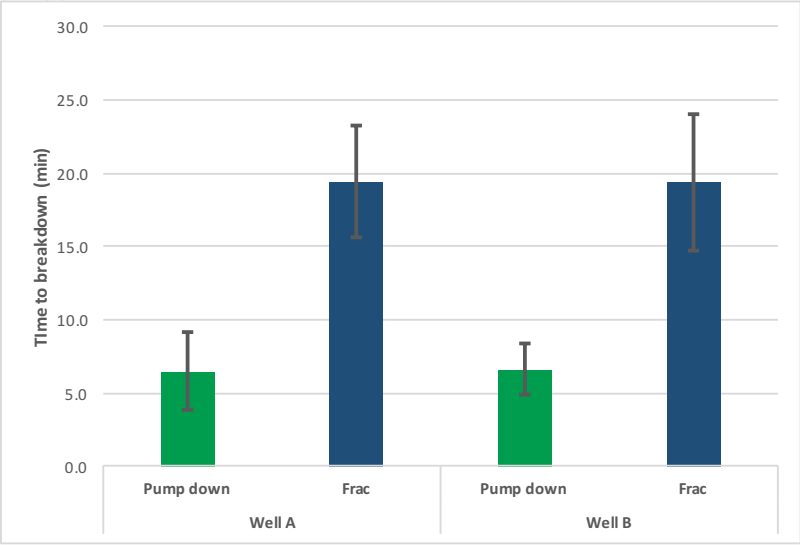

Figure 2. Average acid breakdown times for Well A and Well B. Green: HCR-7000-WL pumped with wireline; Blue: HCR-7000-WL pumped with frac treatment.