

Joint Development Program Yields Superior Friction Reducer

MC MX 14-5 Saves Operator \$118,000

BACKGROUND

Multi-Chem was asked by the producer to jointly participate in research to determine if utilizing produced water in completion operations was a viable option. Traditionally only fresh water from lakes, streams, ponds, or fire hydrants had been used. There was a huge concern that commingling multiple water sources would increase scaling potential to a point of not being able to be controlled, pumping pressures would be increased due to friction reducer failure in high TDS fluid, and formation damage to the solids content of the produced fluids.

ISSUES

This operator was utilizing high salinity produced water to fracture shale. The objective was to not cause pumping pressure increases or grossly increasing friction reducer treating rates with this procedure.

ANALYSIS

Multiple water sources were selected to be analyzed. These sources were producing wells that contained chlorides ranging from 50,000 mg/l to 136,000 mg/l. These waters were loaded into totes after filtration through 20 micron filters. This fluid was taken to a local lab where high pressure frac simulations were run on various percentage mixtures of the produced fluids. These samples were run using "standard" frac packages of biocide, scale inhibitor, and oxygen scavenger, plus experimental friction reducers. After completing 209 frac simulations, one friction reducer was selected which met all the criteria of accepted pumping pressure and treat rate. While these samples were being tested, over 400 water analyses were being run at Multi-Chem labs to determine increased scaling potential from mixing waters.

RESOLUTION

Multi-Chem recommended utilizing our MX 14-5 friction reducer at a rate of 0.5 gpt in conjunction with our standard package of completion chemistries to frac this well. Water, varying in chloride content from 50,000 mg/l to 82,000mg/l was filtered with a 25 micron filter and then utilized for the frac makeup water just as fresh water would have been. This process was completely successful. So much so, in fact, that at one point the 2 other wells on the pad were opened up and the flowback water was turned around and used for the completion at a temperature of 140 F. Pumping pressures were never elevated at any point and friction reducer treating rate stayed at an accepted, traditional rate of 0.5 gpt, or less.

DELIVERED VALUE

By not having the need to purchase fresh water and not having to dispose of flowback water, it was estimated that the operator saved \$118,000 on a 120,000 barrel frac. Also, of the 3 wells on the pad, the one completed with produced water had the highest IP gas rate, sustained the greatest production, and is currently the only well on the pad that has not had the need for artificial lift.

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