An operator in the Deepwater trend, Gulf of Mexico (GOM) needed a weighted fracturing fluid to help counter high bottomhole pressures in a large six-zone completion. Since the job had to be pumped in one trip, the operator asked Baker Hughes for a frac and pack solution.

The first requirement was to develop a weighted fracture fluid for the completion. Starting with the Baker Hughes PrimeStar™ family of fracturing fluids, which was designed for use in deepwater well stimulation applications, staff at the Baker Hughes Technology Center in Tomball, Texas, analyzed well data and the operational parameters of the stimulation.

Working with that data, engineers developed a recipe and breaker package that would meet both the well conditions and the customer’s time requirements. The fluid was a 10.5-lbm/gal (1.25-kg/l) sodium bromide fracturing fluid that would allow for 120 minutes of stability above 200 cP and give a complete break within 30 minutes of the desired stability time.

The job was pumped from the Baker Hughes Blue Dolphin stimulation vessel. The technology and enhanced capabilities of the Blue Dolphin provided room for enough proppant and Baker Hughes chemicals for all six zones of this completion with no planned trips to the dock to resupply. Since contamination was a potential problem, a flushing plan for the dockside facilities, supply vessels, and the Blue Dolphin was implemented before loading and during operation to keep all equipment and vessels clean to prevent contamination.

The vessel carried 3 million lbm (85048 kg) of total proppant, including a combination of two different heavyweight proppants, along with 78,000 gal (295262 l) and 24,000 lbm (10886 kg) of fracturing and acidizing chemicals. The Blue Dolphin carried the maximum amount...
of base brine, while three additional supply vessels carried 37,000 bbl (5882 m³) of 10.5- ppg sodium bromide base brine.

The Baker Hughes PrimeStar fluid met all the operator’s expectations on all six zones, with no fluid issues during the job. Since the gel could be mixed on the fly, the operator didn’t have any expense for unused fluid. The efforts of the Baker Hughes Technology Center and vessel operations made for an easy transition from regular KCl-based brines to the more complicated NaBr-based fracturing fluid.

During the 24 days the Blue Dolphin was on location, the crew managed simultaneous logistical issues of vessel-to-vessel transfers of fuel, brine, water, and chemicals. The vessel was staffed with an additional crew to perform maintenance on the equipment between each zone. This was particularly important part of the project since harsh material was being pumped in roughly 500,000 lb increments, more than 35 bpm, and at more than 8,000 psi operating pressures.

The fracturing fluid and vessel operations met all the operator’s goals and earned Baker Hughes praise for the high quality of the overall job.