



GeoPACK carrier fluid delivered effective gravel packs in five shale wells

A customer operating in the Gulf of Thailand had drilled five wells in the Bualuang field and was considering different sand control completion options. The wells, which were located in water-sensitive shale, were susceptible to swelling and destabilization, making an alpha-beta wave gravel-pack job using conventional water- or brine-based carrier fluid especially challenging. Other options, such as alternate path screens and viscous brine packs, were too complex and costly.

To help the customer maintain wellbore stability and achieve complete heel-to-toe gravel packs, Baker Hughes, a GE company recommended using the **GeoPACK™ invert emulsion gravel-pack carrier fluid**. Free of solids and composed of oil, brine, and proprietary surfactants, the GeoPACK fluid is specifically designed for alpha-beta wave gravel-pack operations. It is also versatile, covering a broad range of fluid densities. This allowed the BHGE team to easily formulate the GeoPACK fluid at a slightly higher weight than the 9.4-lb/gal (1,126-kg/m³) synthetic-based-mud (SBM) used during the drilling phase.

Before pumping began, **DISPLEX™ engineering software** was used to hydraulically model and simulate the

displacement operations in each of the five wells, helping to ensure fast, accurate placement of the gravel.

Using 9.6-lb/gal (1,150-kg/m³) GeoPACK carrier fluid, the BHGE team displaced the SBM in the first well in one full circulation and with a minimal interface of approximately 10 BBL. The gravel was then pumped using the alpha-beta wave technique and reached all areas of the openhole wellbore. After confirming screenout, the fluid—which contained less than a 1% solids volume—was filtered and used on the next well. The SBM was successfully displaced in each of the wells, and all gravel-packing operations concluded with a full screenout.

Upon review of the planned versus actual gravel volumes, the team confirmed that the actual volumes exceeded the calculated volumes in each well.

In addition to aiding with wellbore stability, the GeoPACK fluid also enabled quick and efficient placement of the gravel, delivering an effective annular pack that would help to prevent unwanted sand production in the challenging shale wells.

Challenges

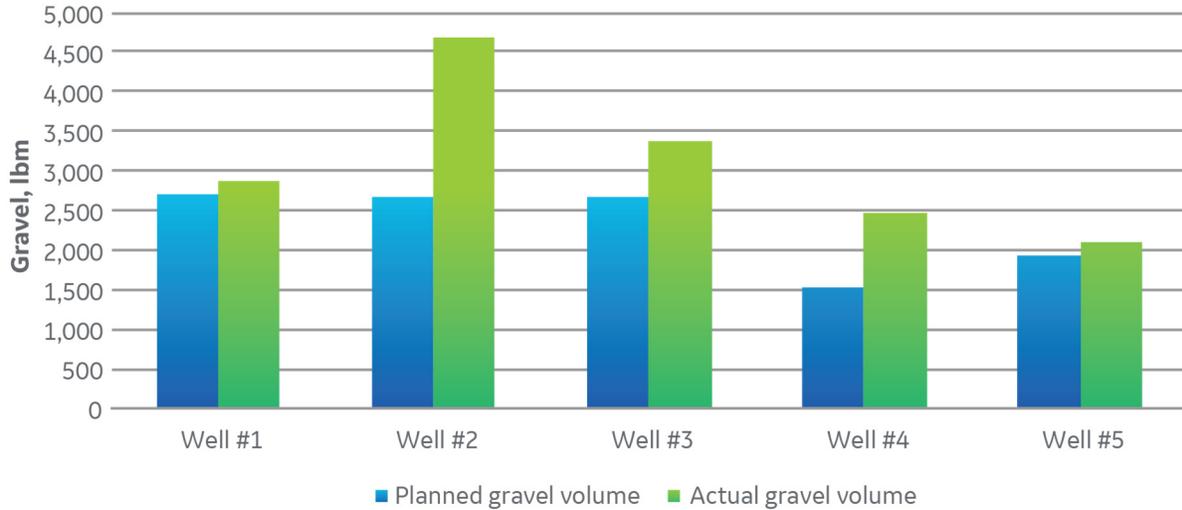
- Maintaining wellbore stability across water-sensitive shales during an alpha-beta wave gravel-pack job
- Achieving a complete heel-to-toe gravel pack
- Alternate-path screen systems and specialized viscous-brine packs were cost prohibitive

Results

- Displaced 9.4 lb/gal SBM with 9.6 lb/gal GeoPACK fluid in one full circulation per well and with minimal interface
- Transported gravel to all openhole sections
- Placed more than 100% of the calculated sand volume in each wellbore
- Minimized the interface of SBM and GeoPACK fluid in each well



GeoPACK Carrier Fluid Performance



The GeoPACK carrier fluid enabled effective alpha-beta wave gravel packs in all five wells, with the actual volume of gravel placed exceeding the planned volume.