**Benefits**
- Lowered operating time and NPT:
  - Reduced time between frac stages by 70%
  - Performed cleanout using the BHA already in hole
  - Accumulated only 12 hours of downtime from screenouts
- Reduced operational footprint by 30%
- Reduced hydraulic horsepower usage

**Background and Challenges**
- Barnett shale formation in Texas with the water-bearing Ellenberger formation stacked below the hydrocarbon-producing zone
- Breaking into the Ellenberger formation could result in unwanted water production
- 4,000-ft horizontal section
- Customer required the maximum number of frac stages possible in cemented casing with the lowest impact on operational time

**Baker Hughes Solution and Results**
- Used OptiPort multistage hydraulic fracturing system to complete 48-stages in 9 days
- Pumped more than 90,000 bbl of slickwater
- Pumped more than 3 million lb (1 360 777 kg) of proppant

Baker Hughes was called in to perform a targeted fracturing job in the 4,000-ft (1219-m) horizontal section of a well in the Barnett shale formation in Texas. The well had 5.5-in. 17-lb casing run to a measured depth of 10,000 ft (3048 m). The client agreed on the use of the Baker Hughes OptiPort™ multistage fracturing system because it can perform a nearly unlimited number of targeted fracture stimulations rapidly and economically. The OptiPort system is composed of multiple pressure-balanced OptiPort collars that are hydraulically opened using a specially designed coiled tubing (CT) bottomhole assembly (BHA) that remains in place for zonal isolation. The stimulation treatment is then pumped down the casing/CT annulus.

The CT equipment used consisted of a 2-in. outside diameter 16,000-ft (4877-m) long CT string with 15,000-psi (1034-bar) pressure control equipment. The BHA consisted of a Baker Hughes SureSet™ isolation packer set up for 5½-in. casing, a mechanical casing collar locator, and a memory gauge package. The BHA lasted for 24 stages before the slips needed service, and the packer was still usable for more stages.

The frac job was designed to be 30–35 bpm using up to 3 lb (1.3 kg) of proppant added (ppa) sand stages and 68,000 lbs (30 844 kg) of proppant per stage (total of 3.15 million lb [1 428 816 kg]).
After beginning the job in this new area, Baker Hughes experts were able to dial in the frac design by stage four. Controlling fracture height was critical because the Barnett shale has the water-bearing Ellenberger formation stacked below the hydrocarbon-producing zone, and a break into the Ellenberger could result in water production. The OptiPort system is ideal for new areas where frac designs are not already established and variables need to be adjusted on the fly.

Targeted fracturing enabled the operator to achieve the required frac rates while controlling frac height growth during the job.

As the project moved forward, the Baker Hughes crew reduced time between stages by 70% from the beginning of the job, until the time between stages was only 10 minutes. At one point, 10 stages were pumped in only 12 hours.

A total of 48 OptiPort collars were run and cemented in the well. Each collar was individually treated. Only four screenouts occurred, representing a total of only 12 hours of recovery time for the entire job, and the longest recovery time for a screenout was 5 hours.

The targeted fracturing technique and associated operational efficiencies combined to reduce the amount of power and fluid used, shrink the operating footprint by 30%, substantially lower NPT, prevent water production, and ensure a successful frac job. The entire job took only 9 days, working in daylight only.