



MST system delivered fastest completion yet in six-well campaign

An operator with a deepwater field development project in the Gulf of Mexico's challenging Lower Tertiary Basin needed a multizone single-trip (MST) system when the technology was still in its infancy.

The Lower Tertiary is considered extremely challenging because water depths exceed 8,000 ft (2438 m) and well depths are generally greater than 25,000 ft (7620 m) with downhole pressures typically near 20,000 psi (1,379 bar).

The customer was seeking a method to stimulate several zones at once in this environment, in a single trip. Doing this successfully was imperative; to lose a zone would mean the loss of production from that zone for the life of the well.

The customer chose Baker Hughes, a GE company (BHGE), to pull off the job because it had the engineering and technology expertise needed for such a delicate deepwater operation.

The first two efforts using the **multizone single-trip (MST) sand-control completion system** were completed successfully, but the team encountered many operational challenges. BHGE engineers used those experiences to further improve the MST system.

A cost-saving game changer in expensive deepwater plays

Each of the remaining four wells was completed faster than the last as BHGE continuously improved its MST system. The system consistently delivered high-pressure differentials of 12,500 psi (862 bar), high treatment rates, and proppant volumes of 40 bpm.

The sixth and final installation was flawlessly completed in August 2018 with zero nonproductive time. It was the fastest operation on record for this project, completed more than eight days faster than the fifth well and nearly 24 days faster than the first.

The reservoir for the sixth well, which had a total depth of 26,480 ft (8071-m) in 8,931 ft (2722 m) of water, included a payzone that extended 1,000 ft (305 m). The payzone included laminated plays comprising two distinct sections subdivided into three zones that measured about 300 ft (91 m) each.

The recommended completion strategy was cased-hole sand control consisting of a frac pack with acidized stimulation treatments. The downhole forces generated meant that every engineering design detail had to be perfect to ensure

Challenges

- 26,480-ft (8071-m) TD deepwater well in 8,931 ft (2722 m) of water
- Customer needed to stimulate multiple zones in large, laminated reservoir of two distinct formations
- Solution had to withstand high hydraulic pressures, erosional forces, and loads
- Job needed to be completed quickly to minimize cost, and flawlessly to ensure maximum production

Results

- Completed sixth well faster than the five wells before it
- Executed operation with zero nonproductive time, nearly 24 days faster than the first well in the program
- Saved customer \$9 million USD on sixth and final well in program, part of a cumulative \$35 million USD in savings



the long-term well integrity for the entire production life.

The BHGE MST system allowed for the sequential frac packing and isolation of multiple zones in one deployment. With the economics so drastically improved, zones that previously would have been considered unfeasible were now able to be profitably completed.

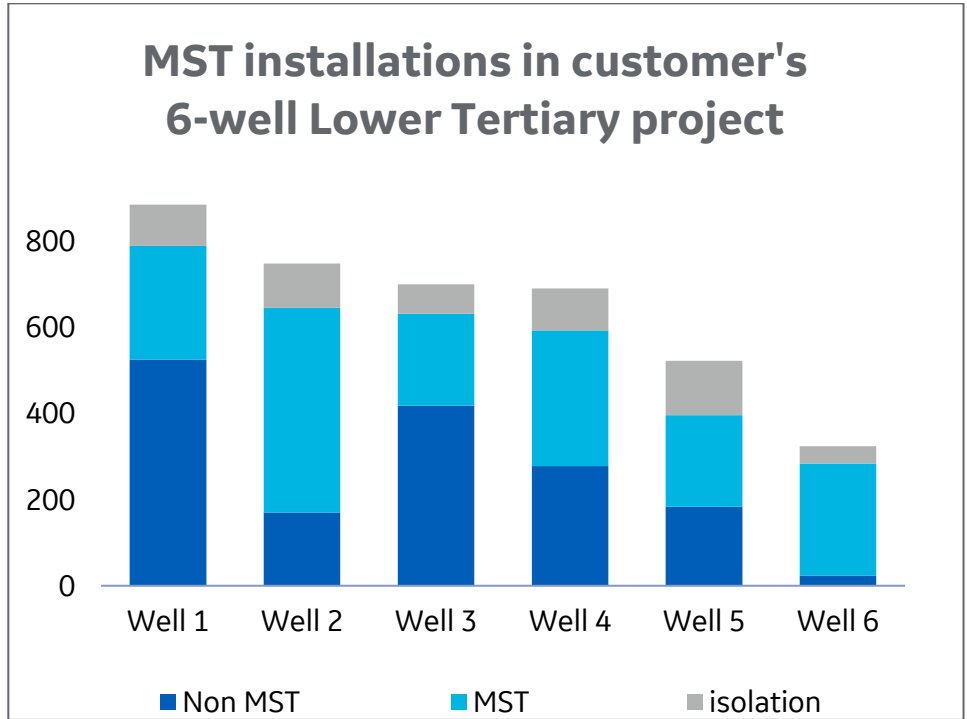
Differentiating technology offers multiple configurations

The BHGE MST system portfolio contains several performance tiers. The MST system’s downhole equipment is modular and includes hydraulic-activated disconnects if retrieval is required. It is also compatible with various downhole fluid-control valves for completions and expansion joints.

The MST system used in this operator’s program included the **SC-XP™ VO-rated intermediate isolation packer**, which features a proven **ZX™ seal element** that resists swab-off and is designed for use in deepwater high-pressure/high-temperature environments. The cost effectiveness of the MST system increases exponentially with the number of zones when compared to conventional stack packs.

With these downhole configurations and effective frac-pack stimulations, customers can expect to produce 20,000 to 30,000 B/D.

Using this system, the customer saved approximately \$9 million USD on its final installation. Cumulative savings for the entire project are around \$35 million USD.



	Hours	Days	Non- MST	MST	Isolation
Well 1	885.5	36.9	526	264	96
Well 2	748.5	31.2	170	476	103
Well 3	676.5	28.2	419	214	69
Well 4	691	28.8	278	315	98
Well 5	523	21.8	184	213	127
Well 6	324	13.5	24	260	40