Maximize Production and Lower Costs in Shallow Gas Wells

Case study: CoilFRAC CT-conveyed fracturing treatment in southeast Alberta stimulates multiple zones faster using less equipment

Challenge
Individually fracture and adequately stimulate multiple zones in shallow gas wells in southeastern Alberta.

Solution
CoilFRAC* stimulation service to fracture multiple zones individually via coiled tubing (CT) in one run in hole, with isolation provided by a straddle packer.

Results
Reduced completion time from 16 to 4 days on average. Reduced setup costs, trips into the well, and equipment requirements. Cut well flowback times by half.

Traditional shallow gas well fracturing techniques
Shallow gas wells in southeastern Alberta are usually completed in four zones, ranging from 820 ft to 1,480 ft in depth. The formations comprise layered, silty sands that fracture easily. Historically, operators in this area have used various fracturing techniques, including

- perforating, fracture stimulating, and isolating (with a composite bridge plug) for each zone. The process required multiple trips into the wellbore (8) and a significant amount of time to complete the well with flowback required between each stage (16 days).
- commingled multizone stimulations relying on limited entry or ball sealers for diversion. This process was significantly faster but sacrificed production due to inefficient stimulation and diversion of each zone.

In addition, wells are typically stimulated in groups to take advantage of volume pricing and to make the most efficient use of fracturing equipment. Stimulation has generally been done during the winter because summer access is restricted to 10- to 14-day windows of operations. Fracturing treatments during the summer must be done as quickly as possible for both environmental and economical reasons.
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**Fracturing of multiple zones using CT**

The operator determined that the zones in the southeastern Alberta wells should be fractured individually at reduced pump rates for adequate stimulation and optimum production from each of the reservoirs perforated. The objective was to find a more cost-effective method for shallow gas fracturing on the wells: more fracturing in less time with better economic results.

The reduced injection rates, coupled with the short time frame considerations, have facilitated the use of CT-conveyed fracturing treatments for segregated multizone stimulations. Now, the entire well is preperforated with select fire perforating guns, which results in significantly fewer runs into the well. Next, the coiled tubing and fracturing equipment is mobilized. A straddle tool is then deployed on CT to straddle each zone separately. When the zone is straddled, the fracture stimulation treatment is pumped down the CT and into the zone of interest. Once all the zones are completed, the entire well is flowed back and put on production. No composite plugs are left in the well to mill, and no bridge plugs are left to retrieve. The operation has become so efficient that a single CT/fracturing crew often completes 2 wells in 1 day.

The same technique can be used to recomplete wells by fracture stimulating bypassed zones. The bypassed interval is perforated, straddled with the CT, and fracture stimulated down the CT. The bypassed zone is now effectively fracture stimulated without affecting the other zones of interest that were already completed.

**Operational and economical advantages**

The following operational and economical advantages were realized using CoilFRAC stimulation through CT

- reduction in operational logistics, set-up costs, travel time, and equipment
- reduction in the total cumulative flowback time per well by a factor of 2 or greater, resulting in payout in less time
- reduction in average total completion time (4 days versus 16 days)
- individual fracture stimulation of each zone, maximizing reservoir contact
- elimination of retrievable and millable plugs left in the wellbore.

**About the Contact family**

CoilFRAC technology is part of the intervention category of the Contact® four-category portfolio of staged fracturing and completion services. These technologies maximize reservoir contact by offering the most efficient and effective services for each well. The Contact intervention category enables multiple stages to be perforated/jetted, fractured, and isolated in one intervention. Contact services can be enhanced with real-time measurement options.

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