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ThorFRAC

Extreme overbalance CT stimulation system

APPLICATIONS
- Thin, dry coal beds
- Shallow gas reservoirs

ADVANTAGES
- Customize formation stimulation design
- Minimize cleat damage and eliminate fluid recovery
- Reduce footprint and completion costs
- Effectively access more perforations in a single trip
- Enable variations in treatment pressures

ThorFRAC* extreme overbalance CT stimulation system is a way of shocking coalbed methane formations to produce longer, cleaner perforations without damaging the coal. This novel method minimizes both the cleat damage that can lead to fluid recovery problems and the complex fracture behavior that can cause excessive near-wellbore pressure.

Conventional approach
Cleats in coal seams are often wide enough to accept whole cement slurry, not just cement filtrate. The serious damage the slurry causes to the connection between wellbore and reservoir can reduce the effectiveness of perforating and stimulating.

Therefore, most coalbed formations are stimulated to improve the recovery of methane. One conventional approach to stimulating coalbed methane fields involves dry nitrogen hydraulic fracturing. The well is preperforated and CT is run into the well with a straddle tool assembly to isolate separate perforation intervals. Providing effective zonal isolation is essential for subsequent stimulation treatments because coal seams store and produce gas differently than conventional clastic reservoirs.

Nitrogen is then pumped through the CT at high rates without proppant. The goal is to build up nitrogen pressure in the near wellbore onto the formation as quickly as possible by increasing the rates of the nitrogen pumps. This process requires both large CT and significant nitrogen pump horsepower on location to achieve the required nitrogen pressure in the near wellbore.

New approach
The ThorFRAC system combines CT and fracturing technology using specially designed bottomhole assemblies. Similar to the conventional approach, a CT string and straddle tool are used to isolate separate perforation intervals. However, the tool has a multiset release valve built in to allow nitrogen pressure to be stored in the CT string. The valve releases at the preset pressure, and the stored high-pressure nitrogen is released into the formation. The nitrogen gas extends the cleats in the coal without damaging the formation. The tool is then repositioned across the next perforation interval and the process is repeated.
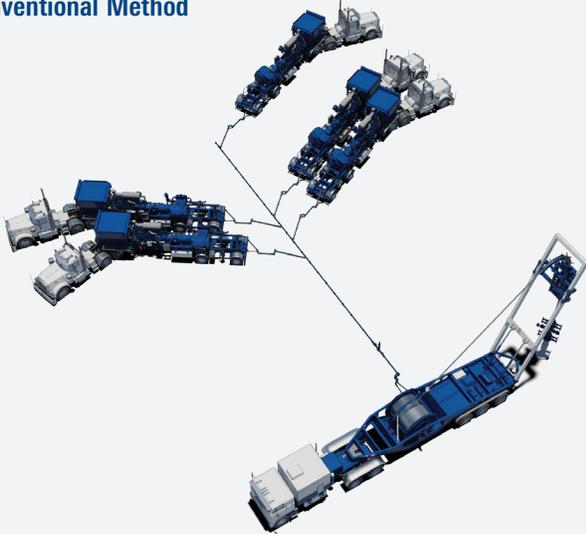
Shocking the formation with stored nitrogen optimizes the amount of nitrogen required and opens up a bigger area in the formation to effectively access more perforations in a single trip. This reduces footprint, lowers costs, and increases efficiency.
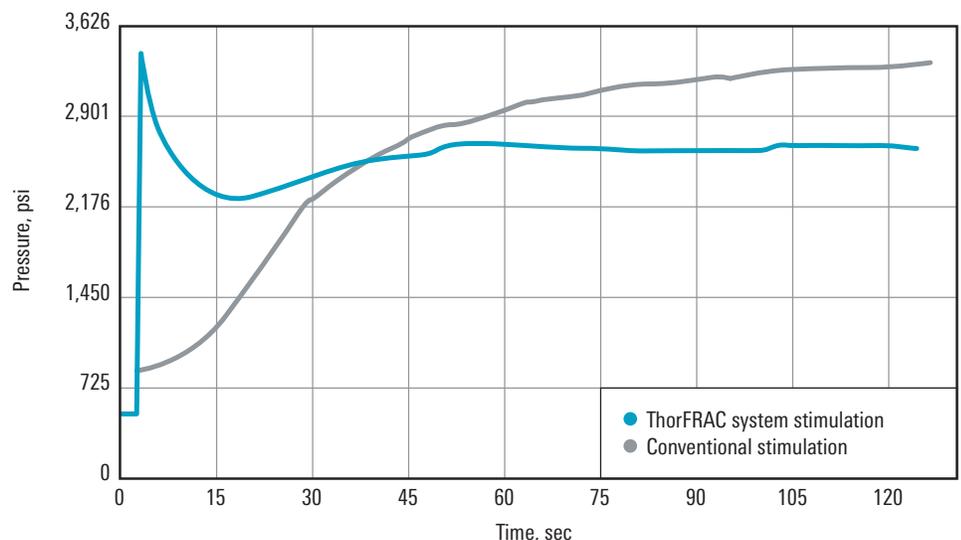
Comparison of pressure and time using the ThorFRAC system stimulation and conventional treatments.

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Conventional Method	ThorFRAC System Method

Surface rig-up of operations using conventional technology and using ThorFRAC system.

An additional feature of the ThorFRAC system is the multiset release valve that can be set to release at various pressures in the same deployment. This allows for customized stimulation designs for each set of perforations in the wellbore. Memory gauges can also be deployed in the straddle assembly to assist in future stimulation designs.

About the Contact family

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

ThorFRAC system operation in southern Alberta, Canada.

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