The Horn River Basin Shale Gas Play – Past, Present and Future

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Abstract

The Horn River Basin, located north of Fort Nelson, British Columbia, is the first producing shale gas play of its type in Canada. It's the third largest natural gas accumulation discovered to date in North America, with an estimated 500 Tcf of gas in place.

Not every shale deposit works as a shale gas play. The ideal candidate should be thick, brittle, organic-bearing, highly pressured and thermally mature. The right combination of all of these criteria in Horn River has resulted in one of the best shale gas prospects discovered to date.

The amount of gas in place in formations like the Horn River Shale has been known to geoscientists for years. What now makes this play appealing to companies like EnCana Corporation are recent technological breakthroughs in horizontal drilling and fracture stimulation. In our operations at Horn River, horizontal wells are drilled laterally for longer than 2000 m in the formation, providing a wellbore access to much more rock than with a vertical well. Multiple large fracture stimulations are then applied to the formation, creating a Stimulated Rock Volume (SRV) that allows gas to flow from the tight shale into the wellbore.

EnCana first realized the potential of the Horn River Basin shale in 2003, while drilling a Nahanni seismic target. After four years of intensive research and development, EnCana and its partner Apache drilled and produced gas from the first horizontal well in the Horn River Basin in 2007.

EnCana continuously strives to reduce its environmental impact when developing any play, and Horn River has provided a new set of operational challenges.

Primarily, Horn River's remote location near the British Columbia / Northwest Territories border requires that any equipment or personnel required must travel a long distance to the work site. In addition, its distance from existing infrastructure and markets means pipelines and facilities must be built to transport gas to market.

Secondly, vertical wells access too little of the formation to be an economic option. Horizontal drilling allows much more of the formation to be stimulated from a given pad site. Currently, up to 16 horizontal wells have been drilled from one surface location, with up to 20 fracs in each wellbore. In a vertical well development scenario, 320 vertical wells would have to be drilled to access the same amount of shale. One multi-well pad uses less than 2% of the surface area that a vertical development scenario would require, yet creates the same sized SRV.

Thirdly, large volumes of water are required for fracture stimulations. At 4000 m^3/frac with 20 fracs / well and 16 wells / pad, 1.3 million m^3 of water are required to frac one

pad, the equivalent of 510 Olympic swimming pools. Two challenges result: what source can meet our needs with minimal environmental impact, and how do we handle that much water in sub-zero Canadian winters? The technical teams at EnCana have come up with a number of inventive solutions to meet these challenges.

This presentation will outline the fundamentals of shale gas geology, the depositional setting of the Horn River Basin, and summarize the progression from discovery to commerciality of EnCana's operations in the Horn River play.