geoconvention
Virtual Event
September 21-23
2020
CSPG • CSEG • CWLS • GAC • MAC • IAH

Porosity and its impact on production in the Montney

Andrew Iverson, Jay LeBlanc, Marco Perez and Samuel Muller
Velvet Energy Ltd.

Summary

Porosity is a critical geologic parameter which controls various aspects of production seen at the well. Porosity impacts the mapping of in-place resource volumes, influences the in-situ fluids in a multi-phase fluid system, is often related to the permeability of the rock controlling fluid flow, and during hydraulic fracturing can influence how the rock fails. This is displayed at multiple scales from thin section and logs up to the seismic scale. It is demonstrated how predictions can be made by mapping porosity with carefully calibrated seismic data which directly impact production at the wellbore for the Montney formation. Though the unconventional Montney has relatively low porosity, the subtle variations make a significant impact.

To understand how subtle variations can make such a large impact, a critical first step to is to evaluate porosity at the core and well log scale. Variations in both porosity and pore size distribution is shown and how it impacts the fluids that reside in these pores. The results and conclusions from the core and log scale can then be used to map porosity using seismic. The hope is to show that using finer scale data deeper inferences can be made from seismic data.

How porosity is distributed throughout the Montney vertically and horizontally impacts the interpreted fracture geometry after hydraulic stimulation. The fluids that are produced are tied to the units that are accessed, and thus estimating productivity is tied to the ability to estimate the variable fracture dimensions and porosity in the distinct Montney units. Seismic mapping of porosity has a predictive impact on the features noted initially such as in-place resource volumes, fluids both in-situ and produced, permeability and fracture geometry.

Acknowledgements

The Authors would like to thank Velvet Energy Ltd, for permission to publish this work.