

## **Intergrated Geology Sweet Spot and Microseismic Monitor to Optimize Reservoir Stimulation -A Case for Shale Gas, China**

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### **ABSTRACT**

Shale play, as one kind of non-conventional natural gas resource, has become the focus of domestic and overseas research in recent years. shale is pertained to be a reservoir with an ultralow porosity and permeability, its occurrence mode, accumulation pattern of natural gas, as well as development model are remarkably different from that of conventional oil/gas reservoirs, its development must be implemented reservoir stimulation, e.g., hydro fracturing etc. Research shows, shale gas production impaction factors exist mainly two types, one is seismic factor (e.g. Total organic carbon, brittleness, core pressure, fractures, stress etc.), the other is engineer factors (e.g., micro seismic monitor, fracturing schemes), Single factor, seismic or engineering factors often preferred not guarantee shale gas highly production, only when the most optimal combination of both, can achieve shale gas production maximization. How to integrate seismic and engineering factors for a comprehensive assessment of shale reservoirs it? This is a serious problem. Previously, we also take into account well logging responds and cementing quality to determine fracturing segment numbers and space. If the wellbore condition is well, this method can get some effect. But for the bad wellbore condition, e.g., wellbore collapse, cementing problem, and result to the logging are incorrect. What's more important, for some logging, there exists a lots challenge in horizon well, so we are always difficult to determine fracturing segment numbers and space. How to solve these problems? 3D Seismic will play an important role in this research. It's known to all us, reservoir fracturing stimulation effective is impacted by many factors, e.g., stress field, natural fracture, geological structure, reservoir characteristic, etc. micro-seismic events is prefer to occur around the natural fractures. And also, in the high brittleness area, the strata are easier to fracturing, the less of differential horizontal stress ratio (DHSR), the easier to form net fractures, we should take into account these factors. We can extract natural attribute from seismic data and apply seismic pre-stack inversion to estimate brittleness and stress. The 3D Seismic will help us to design horizontal well fracturing, telling me the number and the space of horizontal well fracturing segment.