Completion Best Practices: Fracture Diagnostics in UCR Fracturing - Capabilities, Insights, and Best Practices

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Craig Cipolla is a hydraulic fracturing and unconventional reservoir engineering advisor who works with ResFrac as a contractor, providing part-time technical advisory services. He will speak on Thursday, October 15, 2026, at 9:00 a.m. Central Time. The topic is "Completion Best Practices: Fracture Diagnostics in UCR Fracturing - Capabilities, Insights, and Best Practices."

Abstract

This presentation focused on fracture diagnostics for multistage hydraulic fracturing in unconventional resource (UCR) horizontal shale wells. The presentation summarizes insights from URTeC 4493261(2026) and URTeC 4244384 (2025), synthesizing findings from field surveillance and recent SPE publications to present a concise overview of diagnostic technologies and their role in understanding stimulation distribution, fracture geometry, inflow profiling and properties towards the goal of reservoir-specific fracture design optimization and UCR development.

Fracture diagnostics such as fiber-optic sensing (DAS, DTS, DSS), perforation imaging, microseismic, fracture driven interactions (FDI), pressure monitoring, geochemistry, and tracers etc., are essential for measuring the geometric and flow capability properties of generated hydraulic fractures through time and thereby optimizing fracture treatments. The industry has utilized these diagnostic techniques and resultant lessons learned to improve daily production, ultimate recovery, recovery factor, and efficiency for a range of reservoir types. Innovation in hydraulic fracture diagnostic techniques has produced a significant number of new technologies with differing capabilities in the last decade.

The innovations are not limited to development of these diagnostics for a single well but, for application methodologies associated with UCR developments such as slant observation wells, science pads, and specially designed trials to increase learnings. The UCR value creation opportunities are accelerated with good design of experiment methods and complementary diagnostics. This work summarizes key lessons learned from field surveillance and integrated analysis that combine multi-modal data sources.

The presentation concludes with a case history illustrating the 3Ms – Measurements to Models to Money, where multiple diagnostic technologies are utilized to develop a highly calibrated, full coupled hydraulic fracture and reservoir model to optimize fracture treatment designs, increase asset value, and guide innovation projects.

Biography

Craig Cipolla is a hydraulic fracturing and unconventional reservoir engineering advisor who works with ResFrac as a contractor, providing part-time technical advisory services.

Craig currently supports select companies deploying industry-leading technologies and brings more than four decades of global experience across hydraulic fracturing, subsurface fracture diagnostics, geomechanics, geophysics, and fractured-reservoir modeling.

Craig retired from full-time employment after a 45-year career in the energy industry, with roles at Dresser Titan, CER Corporation, Union Pacific Resources, Pinnacle Technologies/Carbo, SLB, and Hess/Chevron. Throughout his career, he has focused on the application of innovative technologies and workflows to improve well productivity and maximize hydrocarbon recovery.

Craig is widely recognized for his contributions to hydraulic fracturing and completion optimization. He has co-authored more than 100 technical papers, served as an SPE Distinguished Lecturer on hydraulic fracturing, and received the prestigious SPE International Completion Optimization and Technology Award. He is also an SPE Distinguished Member and has chaired and served on organizing committees for numerous SPE conferences, workshops, and forums.