

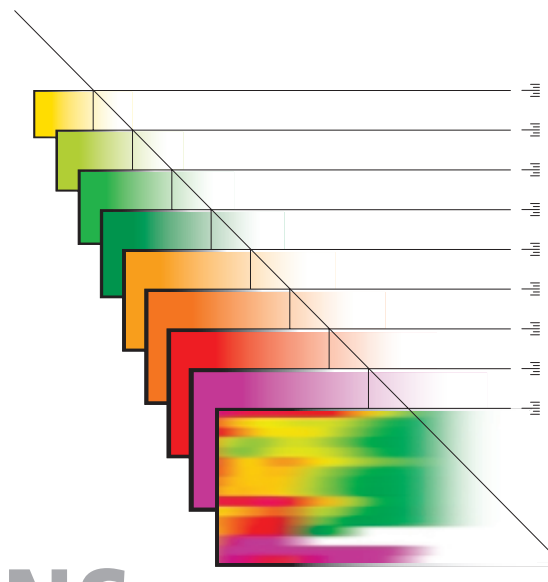
Measurements to Enhance Completion Placement and Effectiveness

APPLICATIONS

Engineering Challenge	Applied Measurement	Resulting Value
Depth Correlation <ul style="list-style-type: none"> Setting completion hardware Perforating on depth Compaction issues 	SpectraMark - Depth correlation casing PIP tags	<ul style="list-style-type: none"> Reliable depth correlation for setting hardware and perforating Determine casing deformation due to formation compaction
Zonal Coverage <ul style="list-style-type: none"> Single stage or stacked pack Large gross intervals 	SpectraStim / SpectraScan - Diagnostic tracer and imaging services	<ul style="list-style-type: none"> Optimize number of stages for effective completion Determine zonal coverage • Identify unstimulated pay
Fluid System Selection <ul style="list-style-type: none"> Compatibility with reservoir Clean up efficiency Proppant transport 	SpectraChem - Chemical tracer services Stim-Lab - Proppant and fluid laboratory testing	<ul style="list-style-type: none"> Minimize fluid damage to formation and proppant pack Maximize effective proppant pack conductivity • Maximize frac fluid recovery • Improve flowback techniques to maximize proppant conductivity
Annular Pack <ul style="list-style-type: none"> Quality of annular pack Amount of reserve on blank Voids or holidays in pack 	SpectraStim / SpectraScan - Diagnostic tracer and imaging services PackScan - Gamma density image	<ul style="list-style-type: none"> Determine top of sand in blank • Identify voids in annular pack Determine formation sand influx
Fracture Geometry <ul style="list-style-type: none"> Frac model calibration Fracture height determination Water zones and contacts Rock mechanics 	SpectraStim / SpectraScan - Diagnostic tracer and imaging services GOHFER - 3D fracture simulator Petroleum Services - Routine and special core analysis	<ul style="list-style-type: none"> Determine fracture height growth • Measure actual placement of frac pack • Determine early screenout of zones • Calibrate post-frac geometry • Design optimal frac program
Smart Well Equipment <ul style="list-style-type: none"> Proper sliding sleeve operation BH pressure and temperature 	SpectraChem - Early Production Test (EPT) wellsite diagnostic tracer services PROMORE - ERD permanent downhole pressure and temperature	<ul style="list-style-type: none"> Earliest positive indication that all sliding sleeves are shifted to correct production position • Reliable real-time pressure and temperature during all phases of completion • Optimize flowing draw-down across the screen • Obtain reservoir pressure over life of well
Production Evaluation <ul style="list-style-type: none"> Where is production coming from? Potential hot spots in screen What are the major gas/oil/water contribution zones? 	CompletionProfiler - Combination SpectraScan and full production evaluation tool	Evaluate zonal production • Determine potential hot spots on screen • Establish post-frac production index • Determine problem production zones • Determine major gas and oil production zones

Offshore completions in unconsolidated sand reservoirs are some of the most demanding and complex treatments faced by an operator. The extreme environments and high costs associated with these completions require high-quality stimulation and sand control for success.

ProTechnics has a diverse and unique set of completion diagnostic tools that provide offshore completion and production engineers with direct measurements of the completion placement and effectiveness. Patented washpipe deployment of our imaging services reduces the risk and cost of obtaining this vital diagnostic information.



MEASURED SOLUTIONS

THE COMPLETION DIAGNOSTICS COMPANY

ProTechnics

Service Description

ProTechnics provides a wide range of services and technology for completion diagnostics that optimize offshore completions, including:

Tracer Services

SpectraStim™ – Gamma emitting tracer service

SpectraChem™ – Chemical tracer service

SpectraMark® – Tracer marks for casing

Imaging Services

SpectraScan® – Memory spectral gamma ray image service

Completion Profiler® – Full service production evaluation imager; spinner, pressure/temperature, nuclear density and electrical capacitance

PackScan™ – Gamma density log

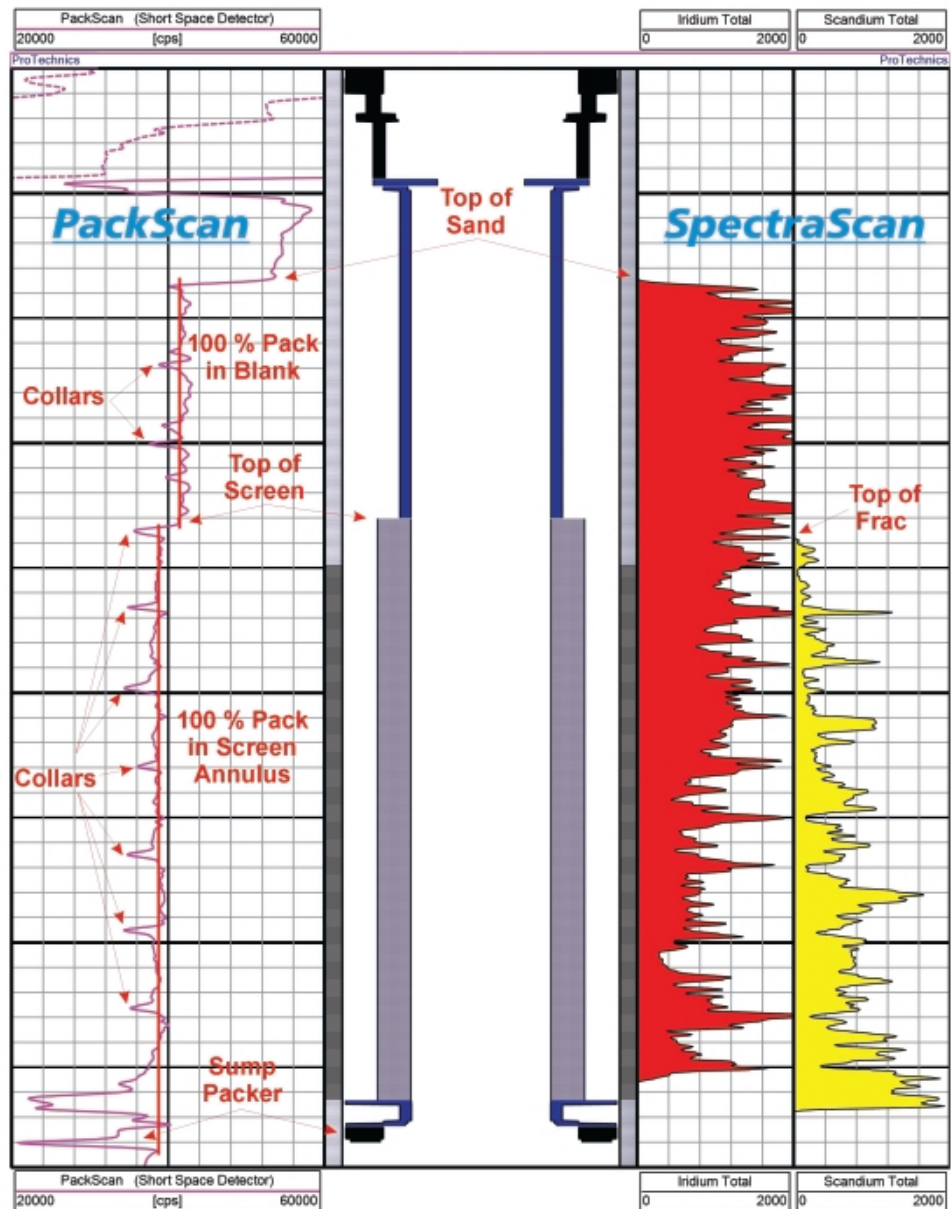
Other Services

Stim-Lab – Laboratory services for reservoir fluid compatibility testing, regained permeability testing, and fluid performance testing at fracture conditions

PROMORE – ERD sensor technology for permanent downhole pressure and temperature gauging systems

GOHFER® 3D-fracture simulator

Petroleum Services – Routine and special core analysis services, rock mechanics testing, sand onset, Poisson's ratio, Young's modulus



For more information, please visit our website at:

www.corelab.com/protechnics

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