

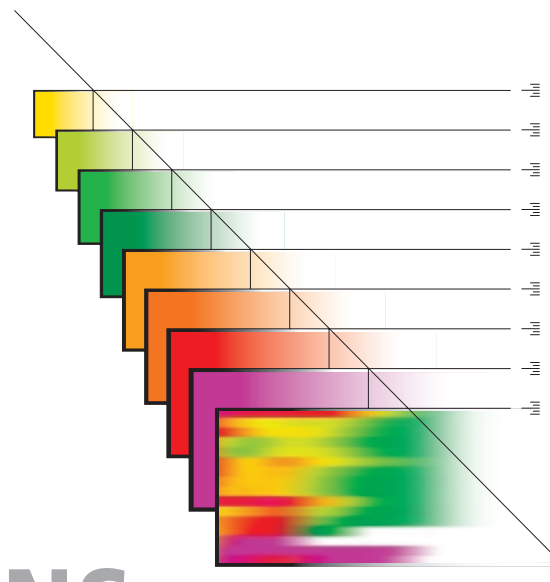
Measurements for Improved Sweep Efficiency

APPLICATIONS

Engineering Challenge	Applied Measurement	Resulting Value
EOR Feasibility <ul style="list-style-type: none"> Pilot project parameters Determine type of flood pattern Full-field parameters How much oil can be produced? 	SpectraFlood - Interwell tracer studies Stim-Lab - Compatibility studies (fluid-to-fluid, fluid-to-rock) Petroleum Services - Detailed core analysis, core flood studies	<ul style="list-style-type: none"> Optimize EOR project with better understanding of parameters Better knowledge of flood pattern configuration and efficiency Understand issues regarding potential formation damage
Injection Fluid Compatibility <ul style="list-style-type: none"> What type of fluid to inject for maximum recovery Fluid compatibility with reservoir 	Stim-Lab - Compatibility studies, (fluid-to-fluid, fluid-to-rock)	<ul style="list-style-type: none"> Optimize injection fluid compatibility with reservoir Maximize recovery factor
Reservoir Sweep Effectiveness <ul style="list-style-type: none"> Directional flow paths Reservoir heterogeneity Sweep patterns and efficiency Early breakthrough sources or paths 	SpectraFlood - Interwell tracer studies	<ul style="list-style-type: none"> Determine direct communication between injectors and producers Determine compartmentalization Increase flood recovery by maximizing flood effectiveness
Operational Efficiency <ul style="list-style-type: none"> High permeability systems and their fractional volume Direct flow paths or fractures Water cycling 	SpectraFlood - Interwell tracer studies PROMORE - ERD permanent downhole pressure and temperature	<ul style="list-style-type: none"> Determine type of water cycling Determine fractional volume of high permeability systems Reduce operating costs by reducing water cycling Compare simulated reservoir models to actual measured pressure data
Conformance Control <ul style="list-style-type: none"> Need for conformance control Conformance control design parameters Post-treatment evaluation 	SpectraStim / SpectraScan - Diagnostic tracer and imaging services SpectraFlood - Interwell tracer studies	<ul style="list-style-type: none"> Appropriate conformance treatment design Determine conformance treatment effectiveness Measure post-treatment efficiency

The reservoir and production engineers who manage Enhanced Oil Recovery (EOR) projects are constantly challenged to understand project effectiveness on a field-wide scale. ProTechnics **SpectraFlood™** interwell tracer technologies provide measurements of sweep efficiency to help optimize EOR performance.

ProTechnics has designed and executed interwell EOR studies around the globe and in all major U.S. basins. Economical interference studies provide a quick look at well-to-well pressure connectivity; interwell tracer studies examine direct connectivity between wells and pattern sweep efficiency.



MEASURED SOLUTIONS

Service Description

ProTechnics **SpectraFlood™** technology and an experienced staff of reservoir engineers and chemists offer a wide range of services to optimize EOR projects, including:

- Engineered designs using black oil reservoir simulation
- A versatile array of tracers
 - Radioactive
 - Chemical
 - Gas phase
- Accurate and reliable tracer injection
 - High pressure injection
- Advanced wet lab capabilities
 - Gas chromatography
 - Mass spectrometry
 - Liquid scintillation
- Engineered final report

Tracer Services

SpectraStim™ – Gamma emitting tracer service

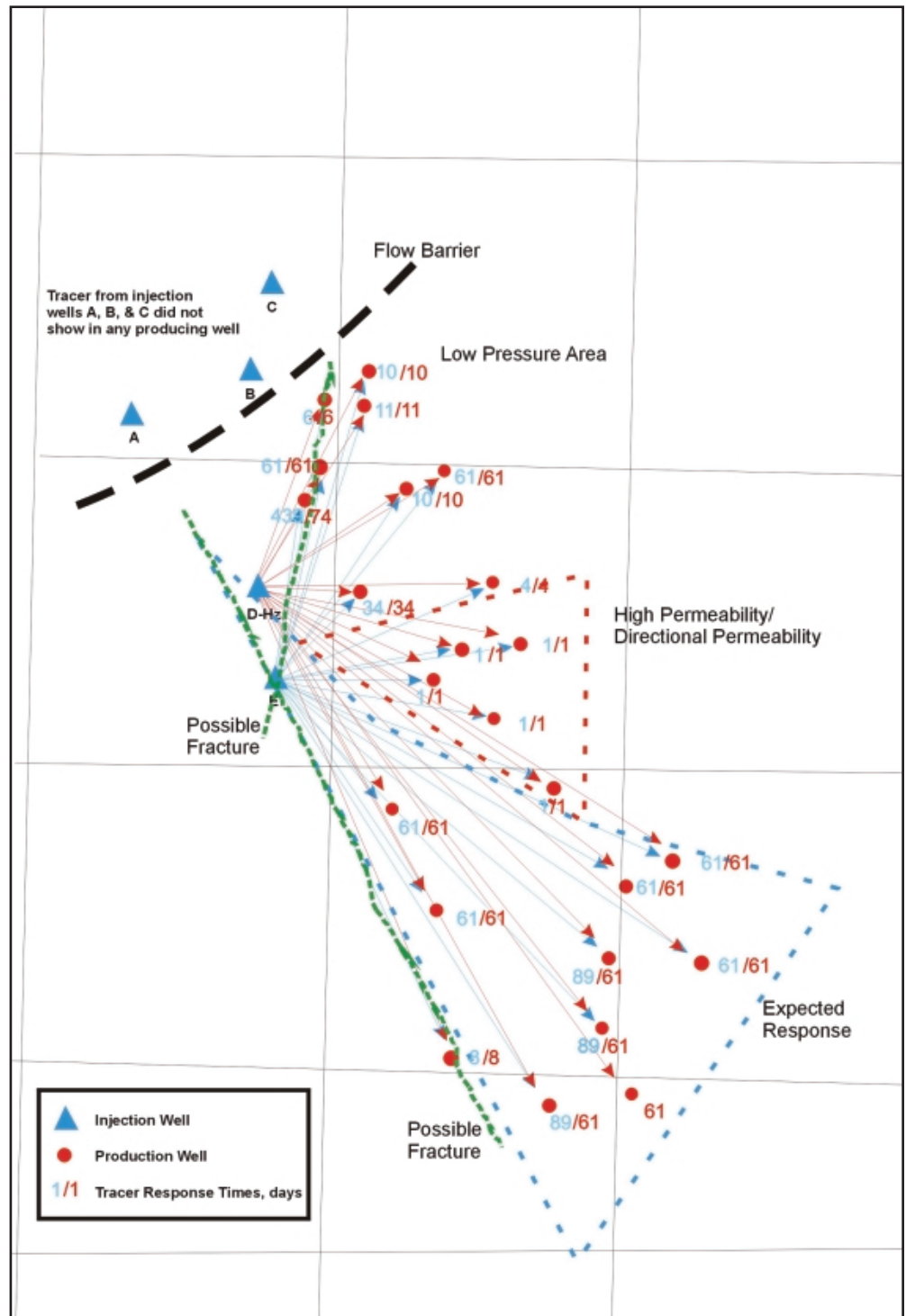
SpectraScan® – Memory spectral gamma ray image service

Other Services

Stim-Lab – Laboratory services for compatibility studies (fluid-to-fluid and rock-to-rock)

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

Petroleum Services – Routine and special core analysis services



For more information, please visit our website at:

www.corelab.com/protechnics

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