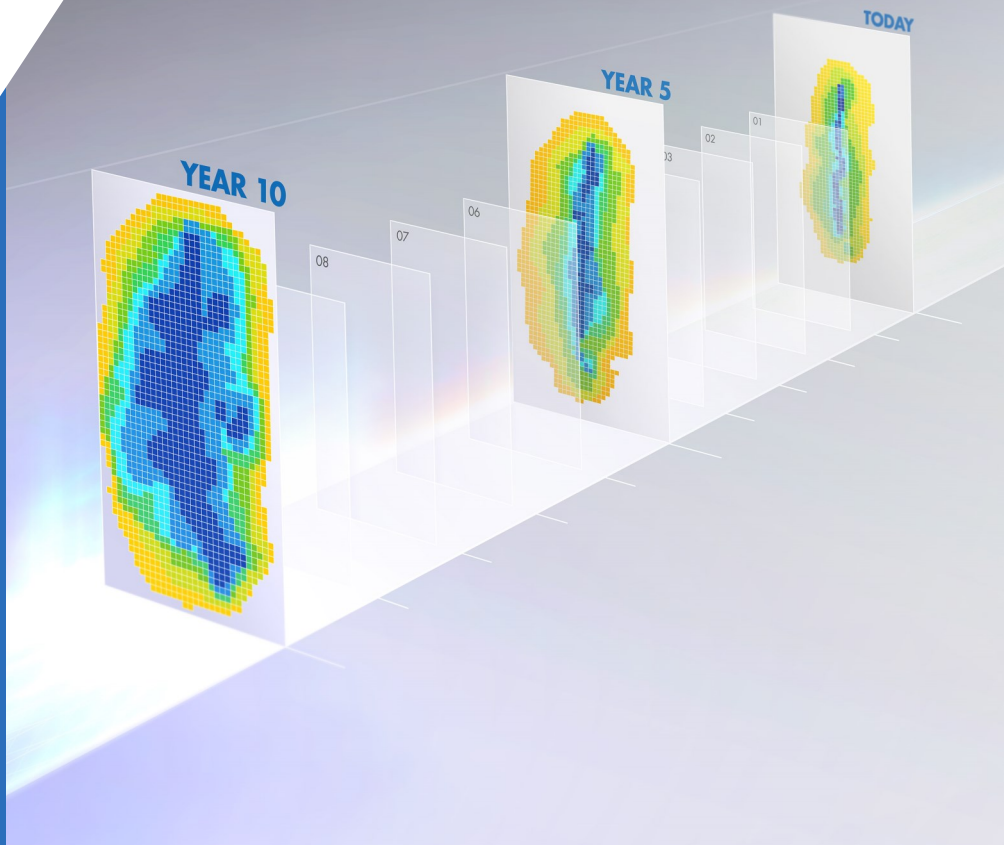# Predictive Completions Evaluation

MicroSeismic, Inc.'s Predictive Completions Evaluation Services predict future production from the stimulated reservoir through a numerical production simulator using PermIndex® and Productive-SRV® as inputs, all within a few days after hydraulic fracturing.

Now operators are able to assess the success of operations early and in a more meaningful way by accurately estimating productivity for each well in units of hydrocarbon volume . This gives E&P companies the control to balance completion and stimulation parameters with production goals and economic hurdles, saving time and reducing exploration risk.

Indicate Well Performance With Three Key Services

» **PIndex®** – Predict productivity for each stimulated stage, well, or pad soon after well completion
» **Production Forecast** – Predict absolute production volumes
» **DIndex®** – Predict the reservoir's depletion pattern at any point in time

Predict Future Production From The Reservoir

MicroSeismic's Predictive Completions Evaluation Services takes the evaluation of the fracture treatment one step beyond a simple description by integrating the productive volume, the Productive-SRV, with the permeability distribution within that volume, the PermIndex, through the process of reservoir production simulation.
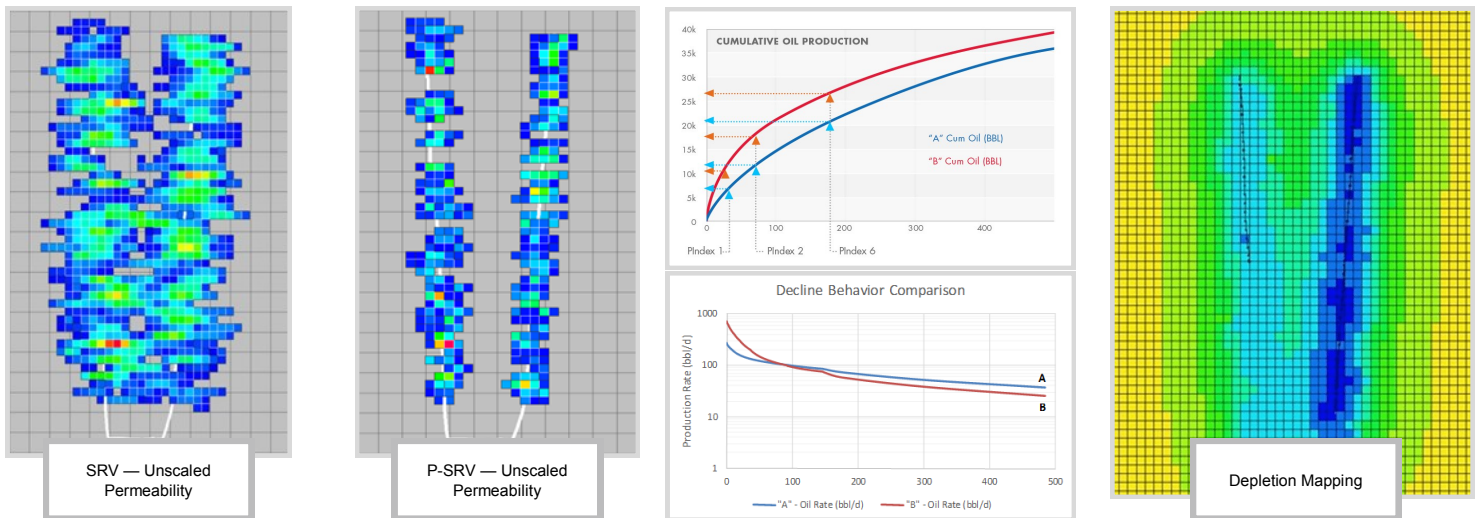
Using a client approved pressure decline curve and the requisite fluid and rock properties, an unscaled estimate of production over time from any stage, well, or pad can be achieved. We term this the productivity index, or PIndex®, of that stage, well, or pad. Such an estimate can be made within days of the completion and gives a robust indication of the relative productivity of each stage, well, or pad. With this analysis the operator gets an early look at the effectiveness of completion procedures as well as the likely value of a given play.

MicroSeismic

Calibration and History Matching

After the monitored well has been produced for a sufficient amount of time, 6 to 12 months, it is possible to return to the analysis and derive a calibration constant to scale the PermIndex values so that the production estimates match what the well produced. This calibration allows for three additional analysis steps:

 » A prediction of the actual production into the future, including EUR in real world units
 » A prediction of the pressure drawdown around the well at any time in the future, the depletion index (DIndex[®]), allowing for an intelligent, economics-based decision on well spacing — one that takes into account the timing of production as well as the drainage volume
 » A prediction of production in real world units for nearby wells using the same PermIndex calibration constant

SRV — Unscaled Permeability

P-SRV — Unscaled Permeability

CUMULATIVE OIL PRODUCTION

"A" Cum Oil (BBL)
"B" Cum Oil (BBL)

Decline Behavior Comparison

Depletion Mapping

MicroSeismic's Predictive Completions Evaluation Services offer the opportunity to make real-time, well specific, in situ observations of the factors that drive well productivity.

Improve Unconventional Field Development
 » Calibrate production estimates at any future point in time, including EUR
 » Use a reservoir drainage map to quantify depletion progression and timing
 » Rank productivity for every well, stage, or pad in the evaluated reservoir area, reflecting the treatment's effectiveness in generating fracture intensity and increased production

Mitigate Risk In Completions Project Planning
 » No need to wait 6 months for initial production information or employ expensive well logging techniques
 » Evaluate and optimize completions faster and with more confidence than conventional methods
 » Predict reservoir depletion timing and pressure drawdown competition between adjacent wells
 » Plan field development according to project financial goals