

# NuTech Frac Study Methodology

## Select Wells For Study

Data Needed: *(min. requirements in red)*

- Triple Combo
- Sonic
- Core
- Completion Reports
- Wellbore Schematic
- Frac data (post-job reports &/or ASCII files)
- Production (Daily Oil, Gas, & Water Rates w/ Pressures)

### Additional Selection Criteria:

Supplementary Well Test Data such as:

- FT Pressure
- Buildup Test
- FET/Minifrac
- Microseismic
- Tracer/Production Logs

Single-interval completions (if any exist)

Future Development Area: sample area focusing on new drill spots

## Petrophysical Processing



### NuLook Description:

A petrophysical evaluation providing a well-by-well analysis that respects all conventional data and utilizes NMR (Nuclear Magnetic Resonance) based outputs including free fluid, bound fluid, and permeability data. These magnetic resonance outputs are simulated from the curve response of conventional log data to produce output similar to what you get from NMR data.

### NuLook Petrophysical Evaluation Outputs:

- Hydrocarbon Pore Volume
- Hydrocarbon Saturations
- Textural Permeability
- Free Fluid Identification (Water & Hydrocarbon)
- Net Pay Intervals

## NuStim Model Calibration



### NuPro LookBack Description:

NuPro "Look Back" describes the NuStim calibration process, utilizing reservoir properties from logs (NuLook) combined with actual completion and test data for a well to determine if the reservoir is performing to its capabilities and to diagnose well problems. This report summarizes NuTech's engineering analysis of past stimulation treatments, well tests, and production results.

### NuPro LookBack Outputs:

Outputs include an advanced evaluation of the past completion and an evaluation of the formation characteristics as they relate to the completion and production data. These characteristics include:

- Rock Properties
- Fracture Dimensions
- Effective Permeability
- Drainage Area
- Current Pore Pressure
- EUR

## Reservoir Description

## Frac Optimization



### NuStim Description:

The NuStim completion and optimization process is a perpetually evolving learning cycle which honors all reservoir data to diagnose field specific problems and present unique and optimized solutions. By utilizing proprietary, field calibrated relationships, NuStim offers clients a detailed formation depiction that is used to evaluate the completion efficiency of potential oil and gas fields.

Optimizations in select intervals to identify optimal treatments for **Good**, **Fair**, and **Low** ranked pay intervals.

### NuStim Optimization Outputs:

Outputs include an advanced prediction of the deliverability of a completion interval with 30 separate completions, highlighting the optimal completion strategy for the interval. This report includes a description of the formation characteristics determined from the NuStim process, as well as predicted fracture geometry and production responses such as IP, CUM, EUR and Net Present Value calculations versus time for the 30 completion scenarios.

## Frac Templates Based on Reservoir Quality

# New Well Implementation

## Reservoir Classification



- Ranking of Zones  
Good, Fair, or Low
- Perforation Selection
- Free Water Detection

The results of the NuLook indicate the well is different than those previously studied, or the well is a step out.

The results of the NuLook indicate the well is similar to those previously studied.

The results of the NuLook indicate the interval is tight, questioning the economic viability of the completion.

### Measure Formation Properties Directly



### Apply Appropriate Frac Template

### Forecast Results



#### NuFIT Description:

NuFIT is an analysis oriented product in which NuTech engineers aid in the development of an injection test procedure in order to collect specific data on the interval. This data is then analyzed to obtain direct measurements of the formation properties. NuFIT (NuTech Fracture Injection Test) is used to aid in the calibration of the NuStim process as a means to alter the treatment prior to hydraulic fracturing.

#### NuFIT Outputs:

- Leak-Off Regime
- Closure Stress
- Pore Pressure
- Effective Permeability

#### NuPro LookForward Description:

NuPro "Look Forward" provides an advanced production and reserve estimate for oil and gas wells based on the petrophysical parameters defined in the NuLook product. This analysis can incorporate a given completion design provided by the client, or predict the results of a natural completion.

#### NuPro LookForward Outputs:

- IP
- EUR
- NPV vs. Time

## Analyze Results



- Verify the process
- Continue calibration in new and boundary areas