

Terralog Technologies Inc.™ (TTI™) offers unique, cost-effective and sustainable stimulation processes for the development of unconventional hydrocarbon resource plays.

Unconventional hydrocarbon resource development has become increasingly important in world energy markets as new discoveries of conventional resource plays have diminished. Further, current stimulation treatments for unconventional resources experience rapid production decline and poor EUR results.

Key unconventional resources that are actively being developed globally include:

- Shales and Coal Bed Methane (CBM)
- "Tight" deposits – stiff, low permeability reservoirs (conglomerates, sandstones, carbonates)
- Heavy oil deposits – with cold production or requiring thermal EOR

Unconventional resources are generally more difficult to produce than conventional plays, with limited EUR results. Many unconventional resource projects face economic and environmental challenges that can limit successful and sustainable development, as follows:

- High stimulation costs
- Flowback water management (sourcing, treatment, disposal)
- Well completions and costs not conducive for re-fracs
- Frac hits
- Induced seismicity
- High field development costs:
  - Tight well spacing
  - Poor EUR

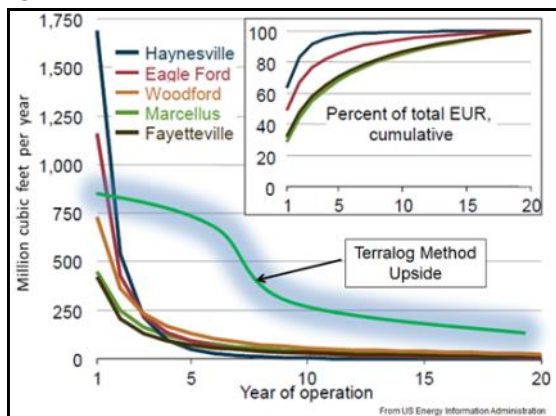
Therefore innovative and specialized stimulation technologies are needed for exploitation to achieve sustainable production rates and improve overall field development economics.

### Slow & Easy and Multi-Cycle Hydraulic Stimulation (MCHS) Processes

TTI has developed alternative stimulation methods for unconventional reservoir development for sustainable hydrocarbon production and significantly reduced environmental impact:

- Slow & Easy Stimulation
- Multi-Cycle Hydraulic Stimulation (MCHS)

These unique methods offer innovative and specialized technology solutions for stimulation of unconventional resources to meet industry challenges.



For more information please contact:

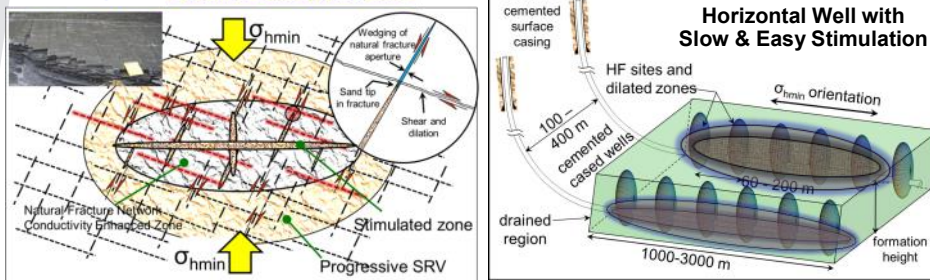
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Slow & Easy and MCHS are proprietary technologies. TTI and Terralog are registered trademarks.

## Slow & Easy Stimulation Process

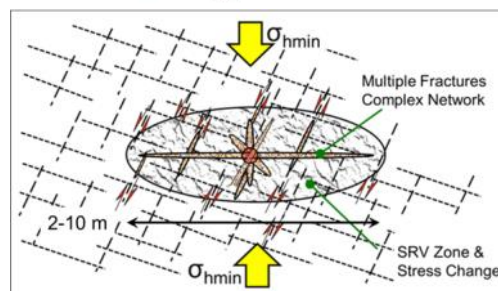
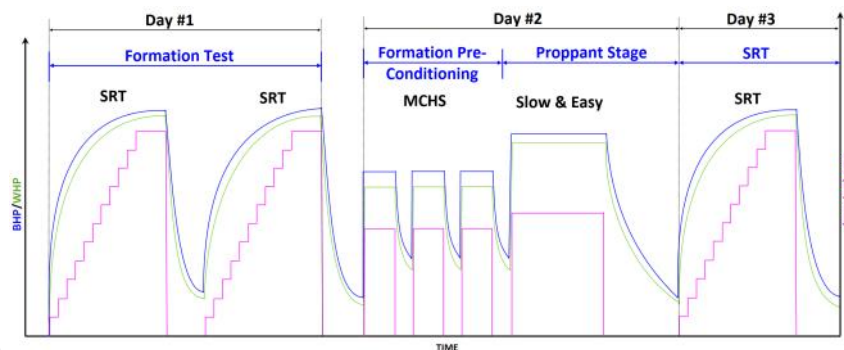
- An innovative low rate, lower pressure, continuous-cyclic hydraulic stimulation process.
- The process induces mechanisms related to stress state and kinematic controls to create a complex, optimized Stimulated Reservoir Volume (SRV) in the reservoir.
  - Conductivity enhancement of the *in situ* natural fracture network.
  - Concurrent development of an expansive, continuous SRV from the wellbore out into the formation.

Stress & Kinematic Mechanics  
Put it all together... Optimized SRV development



## Multi-Cycle Hydraulic Stimulation (MCHS)

- An innovative process for **injectivity pre-conditioning** of the reservoir, with low injection rate, multiple-rapid injection cycles, and low proppant load.
- The process induces mechanisms to create **near wellbore** formation "softening" and conductivity enhancement.
  - Complex formation yielding around the well: development of multiple short fractures.
  - Integration with re-stressing of the near well area for sand control.



## 'Slow & Easy' Benefits

- Sustainable & improved EUR.
- Improved water management.
- Reduced stimulation costs.
- Integration of re-frac stimulation operations with water management.
- Asset protection - reduces the probability of frac hits.
- Induced seismicity risk is mitigated.
- Reduced field development costs with optimized well spacing.
- Reduced environmental 'foot print'.

## MCHS Benefits

- 'Pre-conditioning' of tight, stiff formations (< 50 md) for improved SRV development.
  - Integration with production and/or stimulation technique.
- Injectivity enhancement in tight formations.
- Formation pre-conditioning for sand control.
  - Improved solids control while maintaining high rate gas production.
- Optimized field development:
  - Improved performance of stimulation treatments (can be used with Slow & Easy process).
  - Improved steam injection for thermal-EOR (CSS or SAGD) to maximize steam/reservoir contact area.