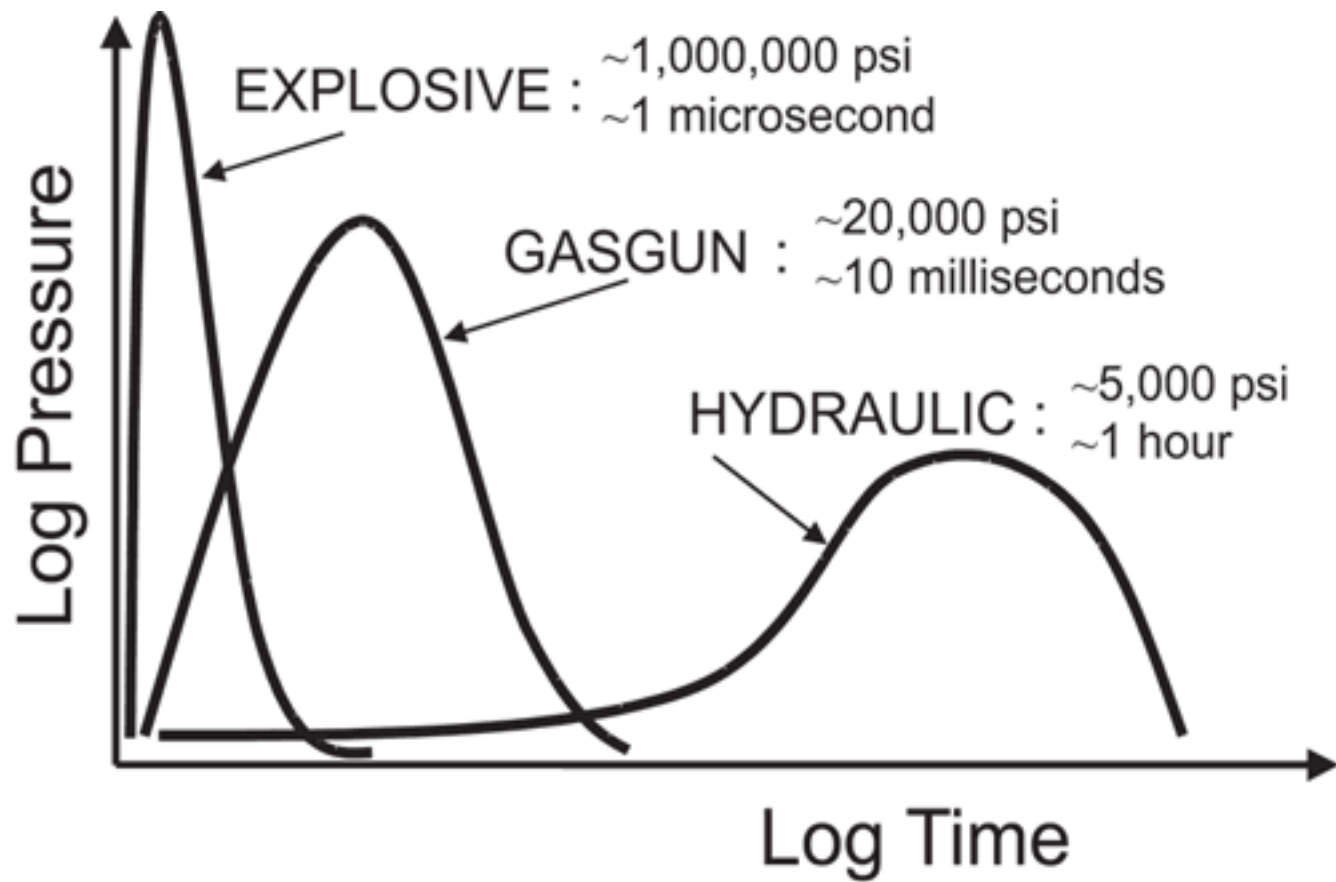


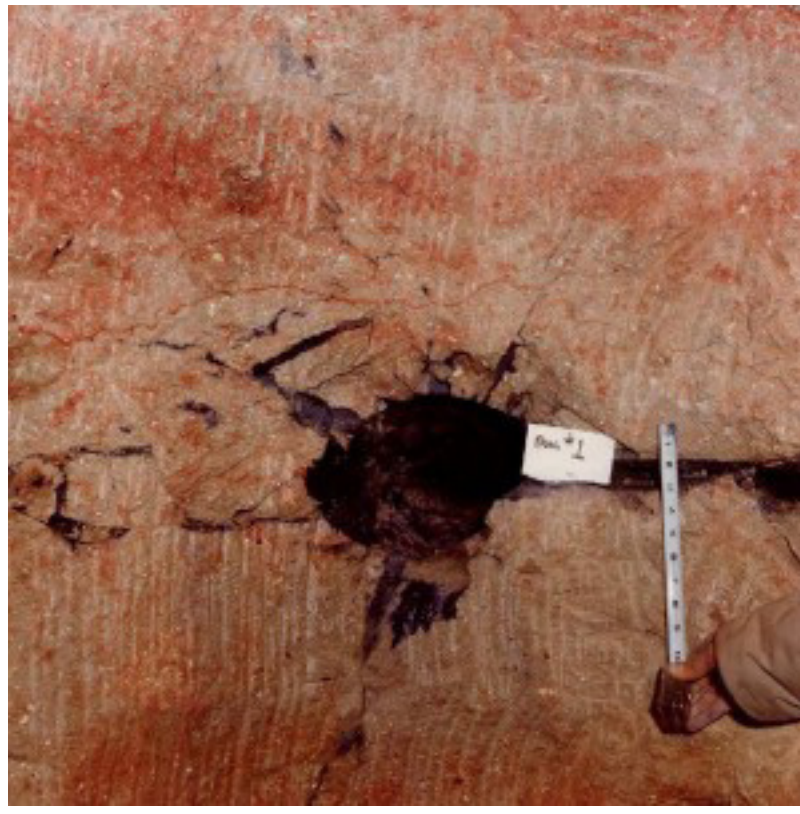
The Gas Gun

Advantages:



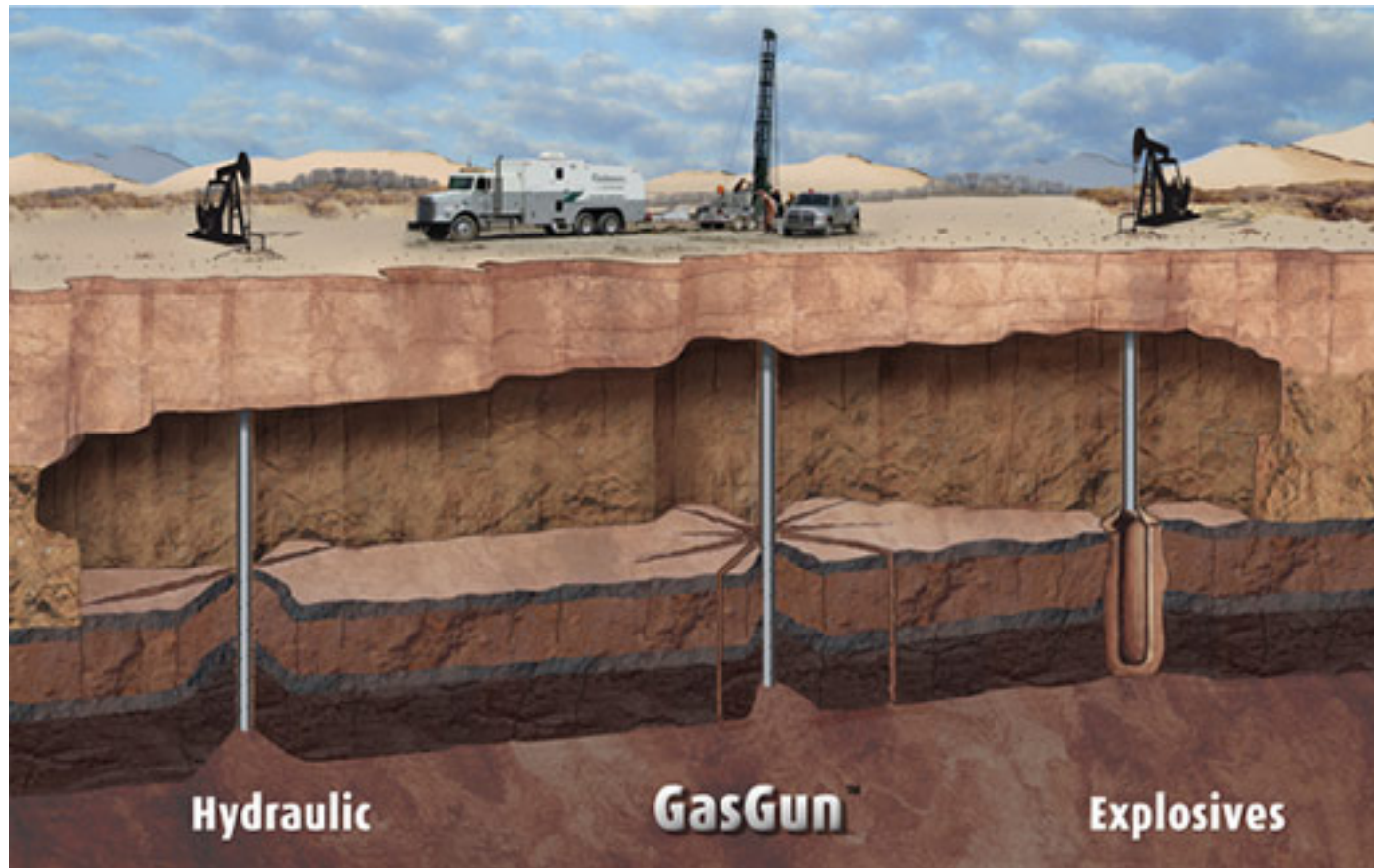
The GasGun generates high pressure gases at a rate that creates a fracturing behavior dramatically different from either hydraulic fracturing or explosives. The time to peak pressure is approximately 10,000 times slower than explosives and 10,000 times faster than hydraulic fracturing. While the physics of this dynamic process are complex to model, proven results from the field demonstrate the practical advantages to a GasGun stimulation.

The GasGun uses solid propellant, often referred to as a low explosive, to generate high pressure gas at a rapid rate. The rate is tailored to the formation characteristics to be rapid enough to create multiple fractures radiating 10 to 50 feet from the wellbore, but not so rapid as to pulverize and compact the rock as is experienced for classic high explosives such as nitroglycerine. The star-shaped pattern of multiple fractures removes wellbore damage or blockage and increases the formation permeability near the wellbore.



The propellant used is similar to that used in large-bore military guns. While the concept of using solid propellants to stimulate oil and gas wells is not entirely new, the GasGun incorporates a vastly improved design with progressively burning propellants that have been proven by independent research to be many times more effective in creating fractures and increasing formation permeability.

Independent research at Sandia National Laboratories demonstrated how the GasGun produces multiple fracturing. The tests were conducted in a tunnel complex at the Nevada Test Site, and direct observations of the fracturing were made by mining out the borehole after stimulation.



GasGun vs. Explosives

- No compaction zone or stress cage
- Pressures last longer for maximum fracture penetration
- Can be used in perforated casing
- Less cleanup - immediate production
- Predictable results
- Easier and safer handling

GasGun vs. Hydraulic Fracturing

- Minimal vertical growth out of pay
- Multiple fractures
- Selected zones stimulated without the need to set packers or ball off
- Minimal formation damage from incompatible fluids
- Homogeneous permeability for injection wells
- Minimal on-site equipment needed
- Much lower cost

GasGun vs. Other Propellant Tools

- Full-bore charge for maximum energy density and gas volume
- Progressive burning for maximum fracture penetration
- No fillers added - All active ingredients
- Scientifically proven burn rate provides for optimal multiple fracturing
- Minimal energy loss unlike slow burning rocket-motor propellants
- Better propping characteristics
- Technology proven by independent research

GasGun vs. Fracing

How does the GasGun compare with hydraulic fracturing?

The GasGun will never replace hydraulic fracturing. Large hydraulic fracture treatments can create a fracture hundreds, if not thousands, of feet in length. But many small pay zones in marginal wells cannot justify the expense of these treatments. The GasGun can be a very economical alternative, requires much less on-site equipment and can in some cases replace small hydraulic fracture treatments.

GasGun vs. 5 Tonne Sand Frac: Look at these results obtained by a major Canadian producer who compared the GasGun against their frac treatments.

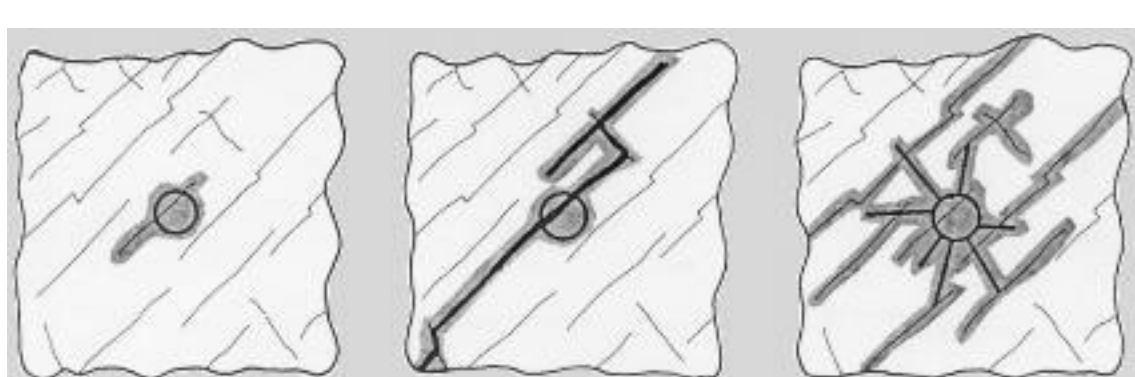
Hydraulic fracturing creates a single fracture oriented perpendicular to the least principal in situ stress. Unfortunately, the fracture propagates vertically as well as laterally seeking the path of least resistance. Many hydraulic fractures have been known to break out of the producing formation and into aquifers and thief zones. While the fractures produced by the GasGun are more limited in length, gas pressures overpower the in situ state of stress, creating multiple radial fractures with minimal vertical growth. As a result GasGun fractures are much less likely to wander out of the producing zone.

The multiple fractures created by the GasGun may also be much more effective than hydraulic fracturing in naturally fractured reservoirs. Hydraulic fractures commonly propagate parallel to most of the existing fractures or "with the grain". Multiple fractures may not extend as far, but may link the well to more of the natural fractures.

Advantages - GasGun vs. hydraulic fracturing

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- Multiple fractures
- Selected zones stimulated without the need to set packers or ball off
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Comparison of Drainage Areas Achieved in a Naturally Fractured Reservoir



SOURCE: The GasGun, Inc.