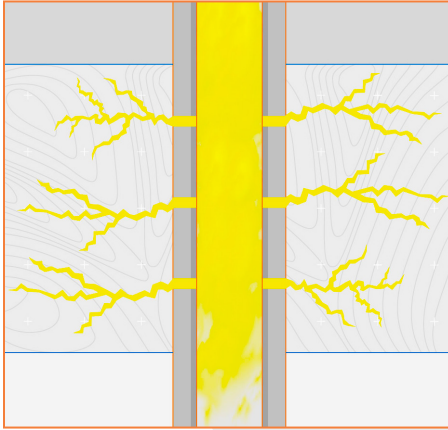


CASE STUDY



Permian Operator Improves Production from San Andres Well with Kraken Technology



Pre-acid enhanced treatment

- Improves effectiveness of spotting acid
- Breaks down formation, reduces treating pressure
- Etches channels in newly created fractures

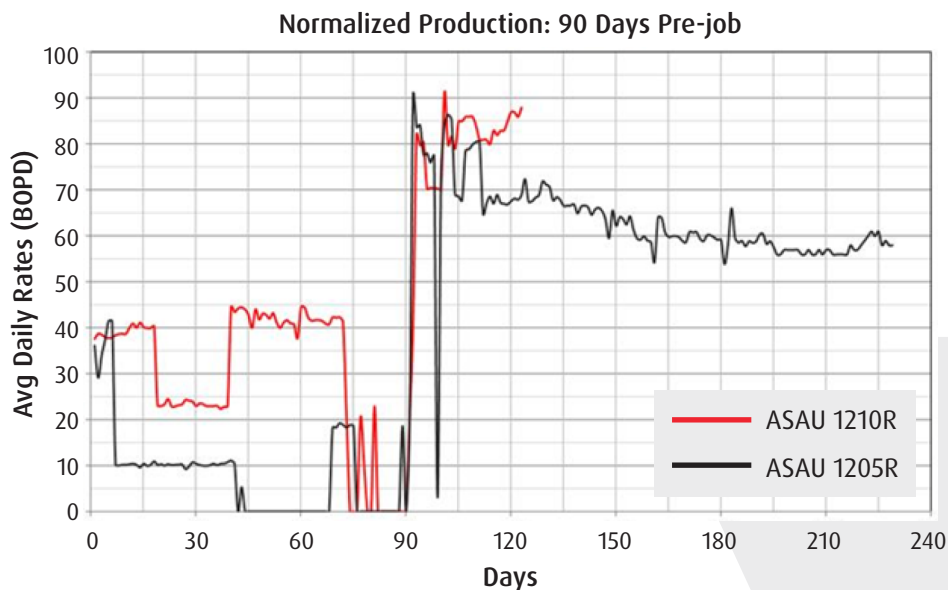
Project Challenge

An operator in the San Andres dolomite formation wanted to improve production in two existing cased hole wells initially completed with conventional perforations and acid treatment.

Kraken® Stimulation Solution

The Kraken propellant-enhanced perforating gun is designed to overcome formation damage and improve the performance of the subsequent acid stimulation. A 5,000-gallon acid job was run after each Kraken perforating job. The 5,000 gallons comprised 15% HCl split 90% with acid and 10% acitol (xylene) for paraffin inhibition. Each acid job was diverted with approximately 3,500 lbm of rock salt.

Both wells saw a consistent, valuable increase in production with the Kraken-enhanced stimulation method. Before-and-after oil production for both wells is illustrated in the graph below.



Application

Reperforation/stimulation (existing zone)

Interval

4,770–4,850 ft

Formation

San Andres (dolomite)

Location

Gaines, TX

Porosity

15%

Permeability

4 mD

Skin

Unknown

Gun design

3⅛-in. Kraken perforating gun

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Better Treatments with Kraken Perforating Guns



The Kraken® propellant-enhanced perforating gun is designed to overcome the reservoir damaging effects of conventional perforating gun systems. The propellant boosters inside the Kraken gun are based on the same progressively burning propellant technology used in our GasGun® stimulation tools. Progressively burning propellants have been proven by independent research to be many times more effective in creating fractures than competitor solutions.

Benefits

- Perforates and stimulates the reservoir in one trip
- Creates multiple radial fractures extending 1 to 5 ft past the perforation tunnels.
- Removes skin and cleans up the wellbore damaged by perforators, drilling fines, cement, mudcake, etc.
- Prepares the well for hydraulic fracturing by breaking down the formation first with the Kraken gun. Treating pressures are often dramatically reduced, flow rates improved, and the effects of tortuosity minimized.
- Improves the effectiveness of acidizing by fracturing first with the Kraken gun.

Features

- Compatible with shaped charges that create a 0.42-in. or larger entrance hole.
- 4-spf standard shot density; can be customized from 1 to 4 spf.
- 60-degree standard shot phasing; can be customized upon request.
- Compatible with simultaneous or select fire systems.
- Conveyed via wireline, pumpdown, TCP, coiled tubing and tractor



Nominal OD	2.75, 3.125, 4.0 and 4.5 in. [70, 79, 102 and 114 mm]
Maximum shot density	4 spf [13 spm]
Maximum pressure	20,000 psi [138 MPa]
1-hr temperature rating*	280°F [138°C]
10-hr temperature rating*	260°F [127°C]
Recommended detonating cord	80 grains/ft

*Exceeding maximum temperature ratings can result in unintentional detonation.

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