

## GasGun Goes International

With the increasing demand for GasGun services throughout North America and overseas, J Integral Engineering is once again expanding its areas of operation.

We are pleased to announce that Endeavor E-Line Services is now providing GasGun services in Canada. Endeavor's multiple field offices cover the Canadian provinces of British Columbia, Alberta, and Saskatchewan. They shot their first GasGun in January of this year and have now fielded over 70. Endeavor has an outstanding reputation with the operators in Canada, and we are very excited to have the opportunity to work with them.

Contacts from operators overseas have been pouring in over the last year. We expect to make our first overseas shipment of GasGuns to the government owned oil and gas company in India by the end of this year. They plan to test the effectiveness of the GasGun in four of their wells that suffer from various production problems.

We have also established a business partnership with a distributor in Croatia. They plan to market and distribute the GasGun throughout most of Europe. We just received our first order of guns from them and expect to ship to them shortly.

## 240 Foot GasGun Shot in Horizontal Well

J Integral Engineering performed their first horizontal GasGun stimulation on June 11, 2003. Several companies have expressed interest in shooting the GasGun in their horizontal wells, but the concept never seemed to get to the drawing board. One of our good customers who has shot several GasGuns in the past decided to push the idea into reality.

The well is located in Borden County, Texas, and was originally drilled in 1987. The well produced 90,000 bbl of oil from the Sprayberry formation at a depth of 5180 feet, but when production fell to 10 BOPD, the operator drilled a 500 foot horizontal open-hole section with a diameter of 4.875". The lateral never produced any significant quantity of oil, even after acidizing, and the operator felt that a GasGun treatment would be a cost effective way to stimulate it.

There were several engineering hurdles to be overcome. These included the assembly of a 240-foot long GasGun, how to push the tool into the lateral, and what kind of firing assembly would be needed. The operator was concerned about hole

stability in the lateral and suggested that the GasGun be fielded inside perforated 3.5" diameter Hydril pipe that would act as a liner in case of a collapse. The use of the Hydril pipe with a crossover to 2.375" tubing solved the challenge of pushing the GasGun to the end of the horizontal section. Special 2.75" O.D. GasGun tools were constructed to fit in the Hydril pipe. Twenty-four tools, each 10 feet long, were built for later field assembly.

Since the GasGun is normally fired electrically from a wireline truck, we had to design a new tubing-conveyed firing system. Standard TCP firing systems were not suitable. A downhole fireset with battery pack and pressure switch was designed and tested. The fireset was sealed inside a pup joint to be fielded at the bottom of the tubing string at the crossover connection.

We arrived on location the morning of June 11. The rod and tubing had been pulled and the crew was ready to start lowering the Hydril pipe in the well. By early afternoon the 240-foot GasGun was

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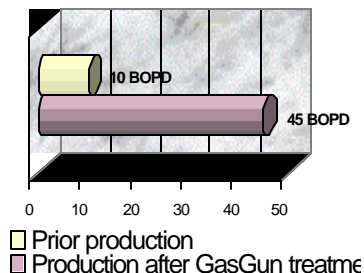
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### Quick Fact:

**33,000 psi was the peak gas pressure recently recorded with a Kipster gage during a GasGun stimulation.**



**Endeavor Wireline Truck**

**Aux Vases (New Well)**

For more information about the GasGun please contact:

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in position at the end of the horizontal section and the tubing was filled with water to throw the pressure switch. The GasGun was detonated and the well immediately began to gas hard at the surface. The flow died down, and the well was shut in overnight.

Not surprisingly, the tubing and Hydril pipe could not be pulled from the well, so

## GasGun Field Results

In July 2003, a new well in White County, Illinois, was stimulated with a 4 foot GasGun. This well is a cased hole completion in the Aux Vases sandstone formation at a depth of 3180 feet. The well was reportedly making 10 BOPD naturally. After the GasGun treatment, production increased to 45 BOPD.

Two very similar wells in Caddo County, Louisiana, were stimulated with the GasGun. These wells were both completed in the Annona chalk formation at a depth of approximately 1450 feet. The first well, which is an open hole completion, was stimulated with a 4 foot GasGun. Production in this well went from 0 to 3 BOPD. The second well, which is a cased hole completion, was also stimulated with a 4 foot GasGun. Production in this well went from 0.3 to 3 BOPD. According to the operators, this is very good production for these wells.

## Retrieved GasGun Canister Supports Fracturing Claims

In March of this year, our newest wire-line company, Endeavor E-Line Services, retrieved a spent rubber canister from a stimulation they had just performed. This canister provided us with conclusive evidence about the fracturing characteristics of the GasGun.

We have been claiming for some time that the GasGun generates gas at a sufficient rate that all perforations get gas and produce fractures, unlike a hydraulic fracture in which the fluid will find one

the tubing was perforated at the bottom of the string. Tubing pressures are now higher than ever measured before, but one or more bridges have formed from open hole debris that are restricting the flow. The operator will soon be running acid to clear the obstructions and remains very optimistic about the potential production. We will follow up on this story in our next newsletter.

In August 2002, a shallow well in Montague County, Texas was stimulated with an 8 foot GasGun. This well is a cased hole completion with the treated interval at a depth of 714 feet. The operator has several hundred wells in the area and frequently stimulates them with a small hydraulic fracture treatment. The frac treatments typically bring the wells in at 2 BOPD and 200 BOPD. Production after the GasGun stimulation was 12 BOPD and 60 BOPD.

In May 2002, a well in Butler County, Kansas, was stimulated with a 10 foot GasGun. This is a cased hole completion in the Arbuckle dolomite at a depth of 2398 feet. The well had a polymer treatment in the 80's to shut off water production, but it unfortunately shut the oil production off as well. After the GasGun stimulation, production came in at 6 BOPD and 30 BOPD. The operator was very pleased with this result.

or two holes that represent the "path of least resistance." The photo of the canister in the left column shows holes for each casing perforation and is direct proof of our claim.

This photo also supports the hypothesis that when the GasGun ignites, gases inflate the rubber until it presses against the wall of the casing. Pressures then cause the rubber to rupture at each perforation and then gases flow through the perfs, fracturing the formation.