

Distributed Seismic Source™ – Eliminating the Ghost of Sources Past?

GPUSA has upgraded its Distributed Seismic Source™ for marine applications, which can eliminate source ghost reflections from seismic operations

In the August issue of InnovOil we reported on GPUSA, a California-based company that had recently developed a new line of seismic sources. We recently spoke to the company's CEO, Jim Andersen, who told InnovOil that interest in the applications from oil majors and leading oilfield service companies had taken off. GPUSA has subsequently improved the technology so its products provide solutions to problems that are frequently identified as being disruptive by the industry.

Latest model

In October GPUSA unveiled its newest patent pending MV-24 marine vibrator (with four times the active surface area of the earlier MV-12 transducer) at the 2015 Annual Meeting of the Society of Exploration Geophysicists (SEG) in New Orleans.

Working in conjunction with Lenze America's factory automation team, GPUSA engineers added the



The MV-24 Marine Vibrator has 24 inch diameter opposed piston transducers sealed to a rugged high performance flexible tire bead for long life

capability to adjust precisely the volume displacement of the MV-24 source as well as the frequency using the existing Lenze Programmable Logic Controller (PLC) touch screen.

This feature allows the operator to maintain a relatively constant sound pressure level (SPL) as the source is swept across its standard 5 to 100 Hz operating band. But with the new MV-24 transducer faceplate now displacing approximately 1.5 inches at low frequency and about 1/16 of an inch at high frequency, a rugged, flexible, watertight seal had to be developed.

An additional key feature of the upgrade is GPUSA's steel-belted radial tire housing. With flexible sidewalls designed for 100M+ cycles and a bead ring tire seal similar to that proven on some of the world's toughest off road vehicles, GPUSA believes it will stand up to rigours of oilfield use.

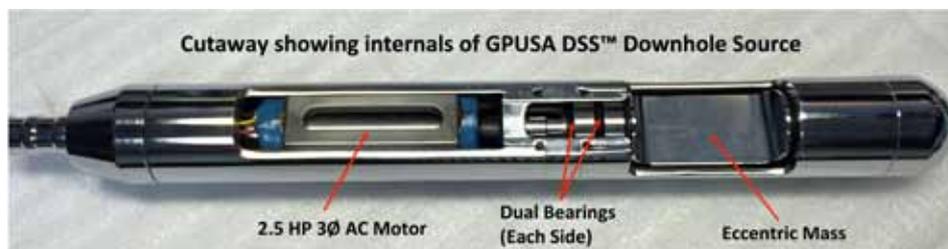
Another step forward is that the marine vibrator's design should be able to eliminate the source ghost reflection and its associated ghost notch, the most undesirable phenomena associated with existing marine seismic sources.

Traditional seismic sources, such as air guns, cannot operate at the water's surface because they require some amount of water column above them for proper operation.

This means that when the source goes off, energy reflected from the surface



Fully Packaged GPUSA DSS™ Downhole Source



Cutaway showing internals of GPUSA DSS™ Downhole Source

2.5 HP 3Ø AC Motor

Dual Bearings (Each Side)

Eccentric Mass



DRILLING/SEISMIC



Right: IP65 Enclosure provides protection from dust, oil and water wash down. Electronics meets UL-508C standards for Industrial Control Equipment. The system is completely controlled via an easy to use touch screen and can also be controlled remotely via the Internet.

►► (delayed by the travel time to the surface and back) combines with the downward pulse, leading to destructive interference (ghost notch).

Typically, source and receiver depth are selected to keep the ghost notch out of the desired frequency band, rather than being selected for optimal acoustic performance. Given that GPUSA's marine

vibrator can operate at the surface, there is no ghost reflection.

GPUSA's marine vibrator sources can be mounted on the underside of specially designed surface craft and used for streamer, OBC or transition zone applications.

Providing solutions to problems such as ghost reflection and ghost notch

demonstrates the strength of GPUSA's enhanced applications and meets the industry's need for improved seismic sources. ■

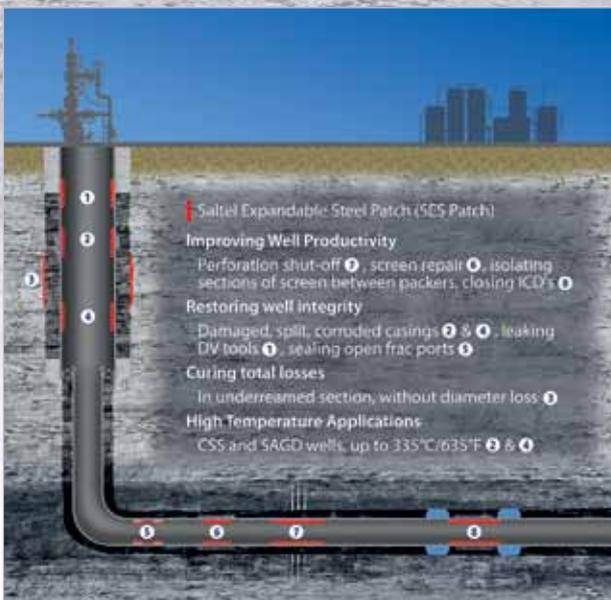
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Saltel Expandable Steel Patch

An enhanced Oil Recovery Solution

Innovative setting process with high pressure inflatable packer contrasts with traditional cone setting



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 - Restoring Well Integrity
 - Damaged, split, corroded casings ❹ & ❺, leaking DV tools ❻, sealing open frac ports ❼
 - Curing total losses
 - In underreamed section, without diameter loss ❶
 - High Temperature Applications
 - CSS and SAGD wells, up to 335°C/635°F ❸ & ❹

Saltel Industries has developed, tested and successfully trialed the use of an expandable stainless steel Patch (steel tube + outer skin with a profiled sealing system) for perforation shut-off.

Run on tubing or e-CTU, it is expanded downhole using an inflatable packer to create a high pressure inner lining inside the casing.

Applications include water and gas shut-off, modifying injection profiles, and repairing short lengths of damaged or corroded casing.

Benefits

- A proven technology (+ 500 patches set worldwide since 2010)
 - 97 % Success ratio
 - Small run-in diameter, simple setting process
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 - A reactive skilled operations team available worldwide
 - Fast feasibility study, job evaluation and proposal
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