



ENVENTURE

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Company name: Enventure Global Technology

Formed: 1998

Headquarters: Houston, Texas, U.S.A.

Primary technology: Solid expandable tubulars

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In wells as deep as 27,000 feet, a company called Enventure is installing expandable casing, a technology that helps drill deeper, more complex wells than ever before. Solid expandable tubulars are also allowing operators to redrill and repair their wells more efficiently.

It's a challenging concept, to run solid casing, then expand it to a uniform diameter inside the borehole. The result is that the well loses less of its diameter with each change in casing size, even at great depth, than a conventional well. The technique still allows all of the flexibility of conventional extended reach wells, and more.

Most of the wells that employ expandable tubulars are offshore, although there are a growing number of onshore and deepwater applications.

"So far, we have drilled wells with angles up to 100 degrees, which is more than horizontal," says Robert Hinkel, president and CEO of Enventure. "We have installed casing in zones up to 400 degrees F, and have used mud weights up to 18 pounds per gallon."

Metallurgy was a key part of advancing the technology. "We use standard oil-country tubular goods that are modified to our specifications," Hinkel says. "The heat treating process is also modified, and we have much tighter specifications than conventional pipe in areas such as wall thickness."

Some might be concerned that expanding the casing could weaken it, but that's not the case. When casing is stretched to a larger diameter, its wall thickness remains almost unchanged. Instead, the pipe shrinks in length about four percent.

"The actual burst strength of the pipe improves," Hinkel adds. "That's because as we expand the casing, we are cold working the steel, which makes it stronger. We run L-80





grade pipe right now, which is 80,000 psi yield strength steel. After it is expanded, the yield strength is more than 90,000 psi."

Although a few other companies offer well services using expandable pipe, they are primarily for short sections and casing repairs. Enventure is the only company that can use its patented system for installing expandables throughout the well.

The process involves first running and cementing the casing, just as you would in a conventional well. At the bottom of the casing string, however, is a preassembled launcher, which is a thinner-walled section of pipe from 5 to 12 feet long and larger in diameter than the rest of the casing or liner above it. Inside the launcher is a cone that screws into the drill string.

While the cement is still drying, a dart is dropped in the pipe to latch into and seal the bottom of the casing. The drill string is run into the hole and screwed into the cone inside the launcher. Next, drilling mud is pumped down the tubing and into the launcher, which has been sealed at the bottom. Hydraulic force then pushes the cone up the hole, expanding the casing as it goes.

"We generally expand at the rate of 100 feet every 10 to 20 minutes," Hinkel says, "so we can do as much as 600 feet an hour."

The popularity of solid expandable tubulars is growing fast among independents and majors alike. Enventure has completed more than 325 wells worldwide, and is continuing to develop new applications.

"There is always something more to learn about the technology and ways to improve it," Hinkel says. "We just came out with a compact launcher, which improves our ability to get pipe to the bottom of the hole. We also have a new lubricant for coating the inside of the pipe, and we are continuing to test our design for monodiameter wells."

Robert McKee, Enventure Global Technology chairman, adds "the industry in general benefits from the combination of innovation by companies like Enventure. Some applications, like pipeline repair, are a natural spin-off that is yet to be explored.

"Ours is an enabling technology," McKee says. "In some cases we can install our expanded pipe on re-drills so that smart well completions can be run inside multilateral wells. Another area is extreme extended reach drilling of up to 15 kilometers. We think that will be a very big market for our product in the future."