



# THE LAND RIG NEWSLETTER

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We are pleased to introduce a recurring feature on technology employed in land drilling: **Tech Corner**. This feature will look at ongoing technical challenges and new technology solutions as they relate to the onshore drilling industry. We welcome input to enable this feature to serve as a forum for discussion on technology issues among our readers.

## Tech Corner

### The buzz: Coiled tubing drilling poised to take off in resource plays?

We had been hearing some scuttlebutt that coiled tubing drilling (CTD) is about to take off in the Lower 48 as a powerful new tool for exploiting unconventional oil and gas resources. After a little investigation, we've found that view to be a bit premature. We visited with some industry experts to firm up this perspective.

And yet there are some promising new developments that could give that technology some traction in an arena where it has long been overlooked: the U.S. Lower 48. Thousands of wells have been drilled in Canada with CTD over the years, but the technology has never been more than a tiny niche market in the Lower 48. CTD accounts for perhaps 2% of all U.S. drilling. But there are a few instances in the U.S. where CTD is making a major difference:

- Chittim Ranch shallow oil field redevelopment with Advanced Drilling Technologies' (ADT) hybrid CTD rig by ConocoPhillips in Maverick County, Tex.;
- BP horizontal CTD re-entries in the Cleveland tight gas sands in Oklahoma's Anadarko Basin.
- Alaska's North Slope, where a purpose-built, arctic class CTD rig developed by Nabors and ConocoPhillips is helping to redevelop giant Kupark River oil field;
- The Niobrara chalk (biogenic gas) in Nebraska and Kansas, where ADT has drilled hundreds of shallow wells with its hybrid CTD rigs; and
- San Juan Basin coalbed methane development by BP.

These efforts alone are noteworthy, but what really piqued our interest were reports that some operators were beginning to deploy CTD in the deeper oil and gas shales, something we hadn't heard of before. That seemingly challenged the consensus view that CTD wasn't suitable for the deeper drilling in the shales, where 10,000 ft laterals married to 10,000 ft motherbores are common.

#### Xtreme Coil in the shales

Much of the speculation fell on Xtreme Coil and its fleet of new hybrid CTD rigs that incorporate a coil-over-top-drive (COTD) design that can readily switch between jointed-pipe drilling and coiled tubing drilling. The driller has stepped up deployment of its dual-function COTD rigs to the Bakken, Niobrara, and Eagle Ford plays in recent months. Has Xtreme Coil been using CTD to drill these wildly popular shales? As it turns out, no. A visit with Xtreme Coil's leadership put the kibosh on that notion, yet it shed fresh light on viable opportunities today for CTD and the technology advances needed to expand CTD's market share in the U.S. We sat down with Rod Uchytel, president and CEO, and Tyson Seeliger, vice-president, sales and marketing, to discuss CTD in the U.S. today.

While Xtreme Coil has its COTD rigs in those key shales, said Uchytel, all the drilling work has been on the drillpipe side, driven by hole sizes and the total depths of the wells: "You can get to about 10,000 ft with 8¾-in. hole size [with CTD], but that's about it. To get a 6-in. hole size out to 20,000 ft or even 16,000 ft, you could never do that with 3½-in. coil."

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## Tech Corner: Coiled tubing drilling poised to take off

Apart from the logistical considerations of carrying that much coil, the truly critical issue is the BHA, according to Uchytel: "With the types of wells being drilled in the shales, most of the well paths are built out at 15 degrees per 100 ft. In that range, there's no rotary steerable tool that can build out to about seven or eight, so you don't have any options for the build section. You're out of it on depth when you go to the horizontal section, and you're not able to meet the directional profile when you're in the build-up section. So you're stuck with drillpipe drilling in that scenario."

### CTD advantages

One veteran drilling technology guru nevertheless sees potential opportunities for CTD in the unconventional plays.

"I think you're going to see coiled tubing drilling emerge as an alternative in horizontal drilling," he claimed. "It's economic now, but if we can turn the corner on metallurgy, you're going to see it really take off."

Tubing life is a critical issue for CTD, ranging from a few wells to a dozen or so.

"What people aren't seeing is that Xtreme Coil has come up with a different kind of cat," said the expert. "Even given the metallurgy limitations—you have to replace the coil all the time—they're taking 3½-in. coil and going to 10,000 ft with it. That's a whole new ballgame. You are still going to need the right kind of environment to make that pay off. You've got to get a high-ROP BHA."

High ROP and the virtual absence of trip time are the main advantages touted for CTD, resulting in sometimes dramatic reductions in drill time—we've heard anywhere from 20% to 60%—that have meant as much as 30–40% decreases in total well costs.

The guru noted Xtreme Coil, using CTD with a Baker Hughes Inteq Coil Trak BHA, drilled S-shaped directional wells in Colorado at a rate of 100 ft an hour through the build and drop sections: "That's not bad. That's knocking a day off some of the best wells in the area."

Some experts see CTD moving more into the horizontal and directional well categories and in time replacing conventional drilling in the shallow-depth ranges.

"I don't know if you're going to get there with 3½-in. coil anytime soon." Uchytel said.

What's needed is a BHA for CTD that is inexpensive to make and operate, he contends, adding that some high-tech BHAs can cost as much as the rig.

It's been estimated that there are 300,000–400,000 re-entry candidate wells in the U.S. A low-cost BHA could help open up that entire market to CTD, according to Uchytel. CTD is enjoying noteworthy success with re-entry work in Alaska, Algeria, and Saudi Arabia, he added.

Drilling applications	Appropriate for CTD?
Shallow gas wells	Yes – long track record
Heavy oil wells	Yes – long track record
Nonconventional wells (shale, CBM, etc.)	Yes – long track record
Vertical wells to 10,000 ft, 8½-in. max hole size	Yes
Deviated wells to 35°, 1,400 m using ratchet tool	Yes – long track record
Re-entry of existing wells	Yes
S-curves to 30°	Yes – BHI TruTrak® Tool
S-curves to 60°	Needs proving with rotary steerable tools
Horizontal wells—build rates to 8°/100 ft at 6 1/8-in. to 7 7/8-in. diameter	Needs proving with rotary steerable tools
Horizontal wells—build rates to 50°/100 ft and to 4¾-in. diameter	Well proven with BHI CoilTrak® steerable tool

Source: Xtreme Coil Drilling Corp.

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