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Targeting CBM, CMM industries

COAL bed and coal mine methane and the methods used to obtain it are hot topics in the industry – a trend Pennsylvania firm Target Drilling (TDI) plans to capitalize on. President Steve Kravits recently spoke with *Coal USA* about drilling trends, new technology and the company's recent record-breaking project – back-to-back US record in-mine boreholes.

Cumberland record

Earlier this year, TDI marked milestone back-to-back in-mine horizontal borehole US records of 5420 and 5560 feet, an achievement that the company's specialty of directionally drilling of long in-mine coal boreholes and surface CBM well coal laterals greater than 5000ft had prepped them for.

In fact, he noted, the company has logged nearly 5 million drilled feet of in-mine boreholes for degasification, water drainage and exploration since 1995, including abandoned sidetracks, or branches. It has 145 in-mine boreholes that have measured over 4000ft and six, including the recent Cumberland boreholes, that exceeded 5000ft. The Cumberland mine is operated by a Foundation Coal Corporation affiliate.

"The drilling conditions of the coal were favorable and the support from Cumberland mine could not be over-emphasized," according to project manager John Wood. Kravits concurred with Wood's evaluation of the operation's ideal conditions.

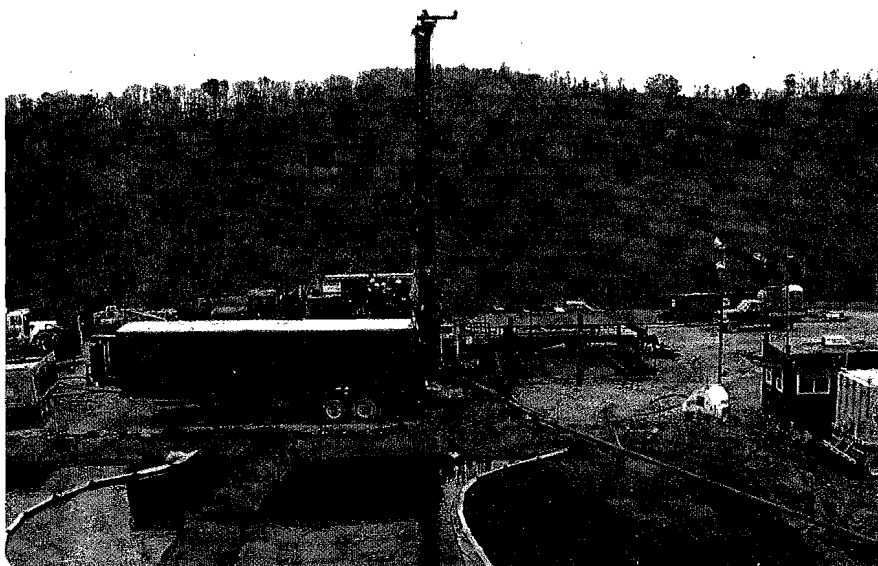
"TDI strongly believes that its coal directional drilling procedures applied to the Pittsburgh and other coalbeds, including but not limited to sidetracking [or branching] of the soft, weathered sedimentary roof and floor rock being intercepted, either intentionally or unintentionally, to eliminate all rock intervals drilled is paramount," he said.

The company said it will always make efforts to steer to intercept roof rock at drilling intervals of about 200ft to identify the coal's elevation profile. If intercepted, drill crews will not continue to drill roof or floor rock, but will instead pull back into the coal and branch, a process that allows the "parent borehole" to remain entirely in coal.

"Consequently, directionally drilling the parent borehole in the coal keeps the borehole stable while drilling record horizontal depths. If intervals of borehole were drilled in the rock and then steered back into the coal, the weak roof and floor rock interval could collapse, squeeze or bridge, resulting in drag on the drill string, possibly causing the drill string to get stuck or broken in the borehole," he said, meaning the borehole would never reach the 4000-5000ft range it works towards.

"Longwall mine operators understandably are not too keen on leaving a stuck or broken off drill string in their longwall panel," Kravits noted.

TDI uses coal directional drilling procedures on its drilled surface CBM



One of Target Drilling's surface CBM well sites.



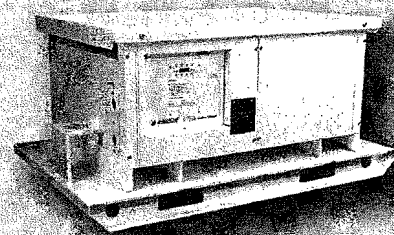
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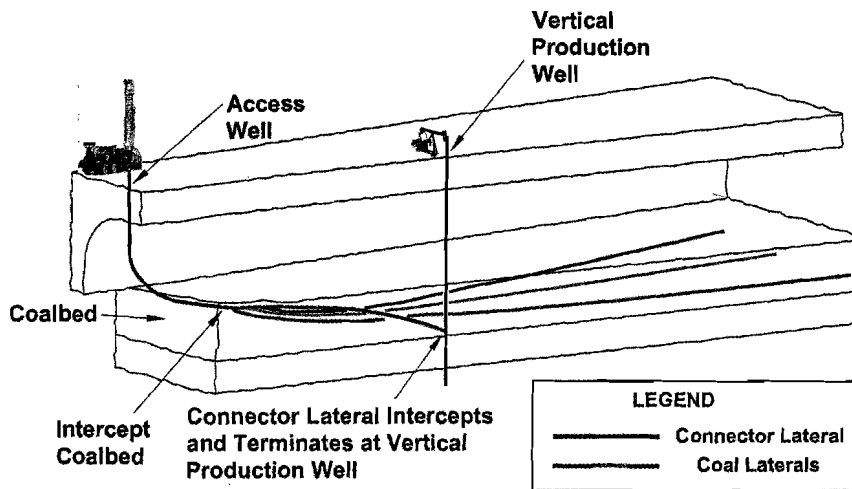
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DRILLING AND GAS DRAINAGE



3D representation of Target's dual well strategy for surface CBM wells.

horizontal wells that are steered directionally into coal, but its methods vary from other drillers in the sector.

"Although TDI uses state-of-the-art electromagnetic measurement (EM MWD) equipped with focused, natural gamma, the gamma measurement is taken about 20 feet behind the bit, not at the bit, therefore it serves as a coal or rock confirmation 20 feet in hindsight or after coal or rock was drilled," he explained.

However, its process to keep the parent in coal, or the "pay zone" as Kravits referred to it, has been looked on by others with apprehension. "Other companies drilling surface CBM wells might think TDI's

branching procedure is antiquated, perhaps even an unthinkable waste of time because sidetracking, or time drilling as it is called in the oil and gas industry, can take hours to complete."

Because TDI focuses much attention on coal directional drilling, it takes very little time – typically less than an hour – to sidetrack, eliminate or abandon the rock intercepted, and continue laterally into the coal. It is practices and efficiency like this that have allowed the company's boreholes that approach or exceed a mile in length, both in-mine and from the surface (CBM wells).

"In blocky, relatively high cleat permeability coal like the Pittsburgh coal and other North

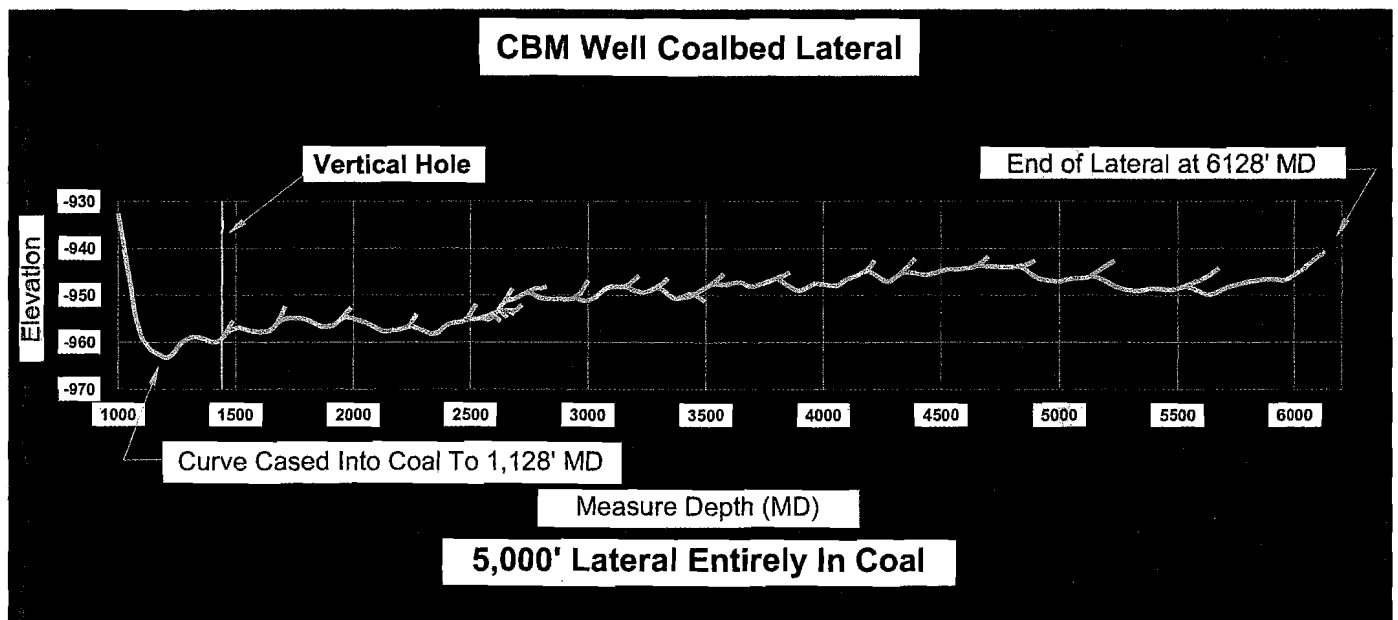
American coal beds, the longer the laterals are drilled, the more cleat system or natural fractures are incrementally intercepted and connected to the borehole, which acts like a pipeline," he noted. "The result is that TDI's surface CBM wells with longer laterals directionally drilled entirely in the coal produce 1.5 to two times the gas production of CBM wells drilled by other companies."

CBM/CMM a golden ticket?

Kravits said that while TDI does not assume it identifies with all of the current trends in the CBM/CMM industry, it can say without hesitation that surface CBM wells are continuing to gain popularity for the recovery and/or production of methane on a commercial level, all without interfering with mine operations.

"Mine operators have realized that they can cost-effectively degas the coal through surface CBM horizontal wells drilled years in advance of mining, creating stand-alone profitable business units," said Kravits. "The overused cliché 'converting methane from a liability into an asset' has been proven by numerous companies and has grown to a much larger level."

With the growth of CBM well popularity has come a host of inherent challenges, including landowner negotiations and obtaining well permits from state oil and gas divisions, which can take a month by themselves. Site construction can be another major pitfall – particularly in areas short on ideal weather conditions, making it difficult to satisfy the project schedule. Foresight is needed, as the entire process can often take six to 12 months. "You just don't pick a spot on the map that you want to drill a surface CBM well and get it drilled and on production in a couple months," Kravits said.



ACBM coal lateral elevation sideview of TDI's sidetracking technique.

INDUSTRY FOCUS

Hitting the mark: CBM well research

TDI's research and development efforts are constant, Kravits said, with one area of focus being a dual well method. In this, the company cases the curve from the surface to the coal, initially drills the connector laterally in coal to intercept the vertical access well, then stops and pulls back to initiate the main coal laterals.

The main coal laterals sidetracked from the connector lateral are steered left or right to not intercept or "drill through" the vertical well. The process continues to be highly regarded.

Its CBM wells include coal laterals into the depths of many of the nation's most notable coal beds, including the Pittsburgh, Lower Kittanning and Sewickley seams, and soon the

Freeport seam. Sidetracking, Kravits said, has helped to maximize CBM deliverability in all of those regions.

"TDI can say factually that we do not drill the rock above or below the coal, consequently only produce methane from the targeted coal," he noted.

"By casing the curve [we are] only producing methane from the targeted coal and, very importantly, producing water only from the targeted coal, not unwanted water from formations above [it]."

The company, he added, is the only one in the industry that cases from the surface to the coal, drills the connector lateral that ends at the vertical well, and then sidetracks or branches in the connector lateral to initiate the main coal laterals steered left or right of

the vertical well and, finally, sidetracks to eliminate rock if intercepted to keep the parent boreholes of each main lateral entirely in coal.

Because state and federal mine regulatory bodies have been concerned for the safety of mining through in-mine and surface CBM well coal laterals, TDI has taken on a project with Concrete Construction Materials to develop a cross-linked polymer gel to seal or plug these boreholes and laterals. To date, the company has gelled more than 80 in-mine boreholes and five surface CBM wells.

"[We] believe use of the gel could be a trend of the future to prevent sterilization of the coal – due to the potentially unsafe conditions from the mine-through of boreholes – from mining" **CU**

Illinois fatality-free milestones

THE nation's mines may be on the road to zero deaths in coal mining, but one state has a head start with the past several years marked with fatality-free milestones.

According to the Illinois Coal Association's Phil Gonet, the state has not had a single death in coal mining, either surface or underground, since 2003.

"I think our outstanding safety record can be attributed to the efforts of management and workers and the emphasis they place on safe working conditions," he said of the milestone that currently no other American state can match.

While Gonet said he did not know of any special safety initiatives put into place to help better its safety records, the state of Illinois did sign Senate Bill 929 in July 2006 to require additional self-contained self-rescuer access, emergency communication system installations, and rescue shelter placement.

"With this new law, Illinois will double its

efforts to protect those who make their living going underground to mine coal," Senator Gary Forby said at the time of Governor Rob Blagojevich's passage of the Bill. "This new law and the safeguards that it brings will go a long way in making sure that our coal miners leave their job safe and secure at the end of the day."

Mines in the state have recorded steady production over the past five years: total coal extracted in 2003 was 31 million tons, while the figures have been between 32Mt and 33Mt every year since.

Gonet said despite reports of the region's coal "explosion", evidence has yet to reveal itself in production figures. "For a benchmark, coal production in 1990, when the Clean Air Act amendments became effective, was 62Mt ... so production declined 50 percent by 2003," he said.

Employment in the coal industry is now about 3500 at six surface mines and 11 underground operations. The figures wavered

slightly when employment climbed in late 2006 but were reduced a short time later with the closure of three of the state's mines.

However, Gonet said, growth is coming.

The Mach mine, which commenced production in 2006, will be a 6 million ton per annum operation once its longwall begins service.

"This is part of the Cline operation, and they are seeking mine permits for longwall operations in Franklin County and Montgomery County," he noted.

Another significant new project is Peabody Energy's Lively Grove mine, which will feed the Prairie State Energy Campus with 6Mtpa when it opens in 2012.



Illinois has not recorded a fatality for five years.



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