



UGS multi-year study continues

Cane Creek Shale Keeping Utah in Energy Mix

By LOUISE S. DURHAM, EXPLORER Correspondent

Industry interest and activity in shale reservoirs continues to escalate. The big headline-makers, such as the Barnett, Haynesville, Marcellus, comprise only some chapters of the big story. The less familiar names also are beginning to make their mark. Count the Cane Creek shale in the Pennsylvanian-age Paradox formation in the Paradox Basin in southeast Utah among those receiving considerable attention. "The Cane Creek is a transgressive-regressive sequence in the lower portion of the Paradox," said AAPG member Stephanie Carney, geologist at the Utah Geological Survey (UGS). "It's tens of feet to nearly 200 feet thick, over-and underlain by salt beds," Carney said. She noted that it's divided into the A, B and C intervals, in descending order: ▶ B interval is the primary hydrocarbon



VANDEN BERG

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source rock and productive zone, comprised of black organic-rich shale, dolomite, dolomitic sandstone and some anhydrite. Naturally occurring fractures are essential for economic production. ▶ A and C intervals are principally dolomite and anhydrite and act as seals for the B interval. "There's been activity in the Cane Creek since the 1960s, but just vertical wells with limited production," said AAPG member Mike Vanden Berg, senior geologist and petroleum section manager

at the UGS. "In the 1990s, operators started drilling horizontal wells but with short laterals, which hindered success. "Recently, they're drilling much longer laterals with much more success," Berg emphasized.

A Big Deal

The UGS is in the midst of implementing a multi-year study of the shale oil potential of the Cane Creek shale formation. The effort is being funded by

the U.S. Department of Energy. This is a big deal. The USGS recently assessed the undiscovered oil resource in the Cane Creek shale in the Paradox Basin at 103 MMb (95-percent confidence level) and 198 MMb (50-percent confidence level). Most of the operators and explorers in the play are small independents who are not in a position to conduct their own detailed basin-wide research, which is needed to truly understand the tight oil potential of this shale formation. Carney pinpointed the goals of the UGS study: ▶ Gain insight into the geological, geochemical and geomechanical rock properties of the Cane Creek shale. ▶ Further define the play and the reservoir characteristics. "The Big Flat field (near Moab) in the central portion of the play area is where

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most of the current production is taking place,” Berg said. “We’re trying to determine what is the production potential to the north and south, where there’s been very limited drilling.

“We think there’s still potential (in these areas),” he emphasized. “The differences could be as simple as better structure in the Big Flat that has caused more fracturing.

“We do see that the thermal maturity changes from south to north,” he said. “The organic matter is still kind of in the early oil window, but in the central to north – it’s in the peak oil window.

“This may have something to do with why there’s pretty good production in the central portion.”

Looking for Fractures

Because they have cores from the south and the Big Flat field, they can see lithology and facies change between the two areas. Carney noted that this could contribute to the area productivity.

“This is where our study goes beyond studies done in the past,” Berg noted. “It’s access to all of the new cores from wells drilled in the last couple of years.

“We can map the three intervals using geophysical logs,” he said, “but the question has always been: Has the facies changed across the basin?

“It’s hard to tell from geophysical logs,” he said, “and that’s where the cores come in.”

Carney noted there is significant work yet to be done, including a more detailed look at the fractures.

“We’ll do fluid inclusion work on the fractures to figure out timing, whether the fractures occurred before or after oil migration,” she said. “We’ll look at more cores to do geomechanical work on a lot of the cores to help come up with strategies for well completions.”

The outcome of just one of the wells drilled by Fidelity E&P in 2010 in the Big Flat field makes a profound statement about the production that can be attained.

After the first year of production, no other well in the lower 48 states had produced as much as that one well, according to Jayne Gates, asset team manager for the Paradox Basin at Fidelity.

The Cane Creek 12-1 reportedly produced between 600,000 and 700,000 barrels of oil during its first year in operation. The oil continues to free-flow to the surface today, meaning it doesn’t yet require a pumping unit.

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