LOUISIANA COTTON VALLEY

Toiling in the shadow of the Haynesville Shale, two pure-play Cotton Valley producers believe they have struck richer soil, and are seeking more.

ARTICLE BY
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While the East Texas Cotton Valley trend has attracted marquee producers such as XTO Energy, Devon Energy and Anadarko Petroleum, on the Louisiana side of the border the bigger public names tend to chase the Haynesville Shale. That opens up shallower Cotton Valley targets to smaller, niche producers. And two of those are eagerly adding to their positions with high cotton in mind.

In October, both Memorial Resource Development Corp. and Indigo Minerals LLC made Cotton Valley acquisitions that will provide each with years of running room in the sandstone play. Memorial secured approximately 45,000 net acres in Jackson and Lincoln parishes in North Louisiana, near its highly successful Terryville Field complex, for $284 million, and signed a separate acreage option agreement for another roughly 39,000 net acres. Indigo bought 90,000 acres largely in the Holly and Greenwood Waskom fields in DeSoto, Bossier and Caddo parishes near the Texas line for $160 million, also in proximity to its existing program.

"Most people don't know how good it is," said Bill Pritchard, chairman and CEO for the pure-play Indigo. "Of the best natural gas plays in North America right now, we're in the top five. That's why we're sticking with the Cotton Valley, and that's why we're quietly going about adding to our positions acquisition by acquisition."

The Cotton Valley's charms are still somewhat below the industry's radar, according to Bill Pritchard, chairman and CEO for the pure-play Indigo Minerals LLC, which is "quietly going about adding to our positions acquisition by acquisition."

Economics drive the dealmaking. Pritchard touts Indigo can achieve up to 40% internal rates of return drilling Cotton Valley, a number supported by Stifel analysts evaluating offset wells drilled by PetroQuest Energy Inc. Memorial, whose acreage is located further northeast in a higher-pressured part of the play, contends it sees returns exceeding 120% at $50 oil/$2.50 gas.

"The well economics, supported by the liquids-rich and overpressured nature of these wells, justify the drilling of these wells even on an unhedged basis," said Greg Robbins, Memorial Resource senior vice president of corporate development. Even its third-best target zone within the Cotton Valley reaches a respectable 25% IRR under the same measures, he said.

Indigo's patient persistence

Indigo, a Houston-based private producer, focuses its drilling activity along the Caddo/DeSoto Parish line in Louisiana. The company's latest negotiated deal in a series of many involved offset assets from Compass Production Partners, the E&P arm of HRG Group Inc. (formerly Harbinger), and rights once owned by Exco Resources. Indigo paid roughly $1,800 per acre, and that includes some 34 MMcf/d production from legacy vertical Cotton Valley wells.

Of the 90,000 acquired acres, "none has ever been drilled horizontally." Pritchard estimates some 500 locations, a 40% upsize to the company's pre-deal inventory. "It gives us a lot of running room."

Getting a foothold in the play is difficult, he said, as the majority of acreage is held by production from legacy vertical wells. Pritchard has made it his mission to be in front of every company holding quality acreage across the trend with an offer, slowly building relationships and a portfolio. "It's taken me years to put together this position."

Since 2006, in fact, when he formed the company with 450,000 acres of mineral rights contributed by Louisiana's largest private land owner, Roy O. Martin Lumber Co., and an equal valuation in cash from Yorktown Partners. Pritchard proceeded to sell off deep rights to Encana Corp. and Chesapeake Energy, companies seeking Haynesville Shale inventory, and bought shallow rights over the remainder of Chesapeake's Haynesville portfolio with drilling rights from the base of the Cotton Valley and above.

It's a model Indigo has perfected, collecting shallow rights acquisitions from others since. "We're specifically targeting shallow rights only, and primarily the Cotton Valley."

Indigo currently controls 235,000 acres to the Cotton Valley and above, pro forma the Compass deal. "It takes time and patience to convince others to sell their positions. That's why

"The well economics, supported by the liquids-rich and overpressured nature of these wells, justify the drilling of these wells even on an unhedged basis," said Greg Robbins, Memorial Resource senior vice president of corporate development.

Memorial figures it has more than 2,500 drilling locations in the play, or a 58-year inventory at its current drilling pace.

you don't hear much about the play."

A sizeable portion of Indigo's portfolio falls on the Texas side of the fairway, a geology Pritchard deems "very good," but he prefers to drill in Louisiana, where flexible regulations make drilling cross-unit laterals easier. "The rocks in East Texas are just as good, it's just harder from a land perspective to get wells drilled."

With more than 100 horizontal wells drilled in the play since 2010, recent Indigo wells exhibited initial 30-day production rates from 8 million to 15 million cubic feet of gas per day (MMcf/d), and estimated ultimate recoveries similarly ranging from 6 to 17 billion cubic feet (Bcf) per well. The results reflect upsized completions on 7,500-foot laterals with 36 stimulation stages spaced 210 feet apart, with 250,000 to 400,000 pounds of proppant per stage. Wells cost an average $7.5 million.

"We're doing everything everybody else is doing," Pritchard said. Best practices in the Cotton Valley mean "tighter frack spacing, bigger jobs and longer laterals."

While this area of the Cotton Valley tends to be normal pressured, one of the motivations for moving into this part of the play was the liquids component in the gas stream. Unfortunately, NGL realizations are down with the price of oil, in the $12-$20 per barrel range at press time.

"In the past, we've had about 40% of our revenue from NGLs, and today it's about half that number," he said. Yet, "with the benefit of the back end of the natural gas curve moving into the $3s, I am still signing AFEs with IRRs in the high teens to mid 40s."

Only recently have economic returns dropped below those of the big brother Haynesville, a higher rate, overpressured shale also benefitting from enhanced frack designs, he said. The humility is only temporary. "When liquids come back, this play will be a much better play economically than the Haynesville—but not today." In the meantime, "we're trying to build inventory."

The company ran two rigs throughout the whole of 2015 in the Cotton Valley, drilling 20 wells through the year, but drilling efficiencies on four-well pads resulted in a backlog of 14 wells waiting on completion by October. Both rigs were thus let go, with plans to bring one back in the second quarter of 2016 when the completions are worked down.

"We're waiting on better NGL prices before we get super active with rigs," he said. "I'd love to see $30-plus NGLs per barrel and natural gas at $3.50 before adding more rigs."

However, the company has grown production by 25% year-over-year since inception, a rate he continues to target. Production stands at 140 MMcf/d presently, requiring running two rigs annually to meet that goal.

"If the market gives us a strong rebound in NGLs, we'll hit it harder."

Indigo reports Netherland-Sewell proved reserves of 1 Tcf, 3P reserves of 6 Tcf, in a horizon many in the unconventional stampede bypassed.

"This is our play," said Pritchard. "We're committed to this play. It's what we're good at."

Expanding Terryville's reach

Some 100 miles northeast, Terryville Field in Lincoln Parish has become a poster child for converting age-old conventional production into unconventional riches. An early mover in this modern Cotton Valley play with approximately 52,000 net acres at its IPO, Memorial Resource Development in September reported its Dowling well with an initial 24-hour IP of 40.7 MMcfe/d and its two-well Bellevue Timber pad with a combined 61.8 MMcfe/d rate—a bumper crop by any measure.

"This is where the stars aligned," said Memorial's Robbins. "It's over-pressured and liquids rich and located in an industry friendly part of the world; that's what makes Terryville special."

And it has multi-stacked pay zones. Memorial is currently targeting four horizontal objectives within the Cotton Valley trend: the Upper and Lower Red, and the Upper Deep and Lower Deep Pink. The Upper Red tops the economics.

"There's no secret to this: It is technology combined with redeveloping these fields horizontally that is producing these results."

The average Upper Red well came on line with an IP30 of 25 MMcfe/d during the third quarter 2015, he said. "Since 2012, we've drilled 36 of the top 100 gas wells in the country. The performance of these wells speak for themselves."

But Cotton Valley geology can be complicated, and not all wells have turned out full bolls. Memorial's Louisiana Methodist Orphanage (LMO) well came on at a disappointing 4.4 MMcfe/d in March, the Gleason at 3.5 MMcfe/d in late 2013. The reason? The laterals missed the target zone by half the length.

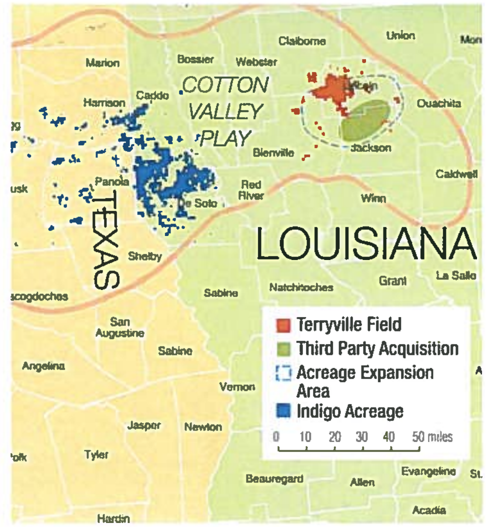
The Houston-based company adapted by deploying 24-hour geosteering on all wells drilled. Memorial followed the Gleason previ-

Memorial Resource PUD Assumptions

	Upper Red	Lower Red	Lower Deep Pink
Lateral Length (feet)	7,500	7,500	7,500
Capex ($MM)	$11.80	$11.80	$11.80
EUR (Bcfe)	20	13.5	9.4
EUR/1,000' (Bcfe)	2.7	1.8	1.3
NGL Yield (bbl/MMcf)	49	49	49
Oil Yield (bbl/MMcf)	7.8	7.8	7.8
% Gas	71%	71%	71%
IP-30 (MMcfe/d)	28.1	23	20.3
IRR (%)	>200%	86%	50%
PV-10 ($MM)	$22.10	$11.60	$6.40

Note: Assumptions are based on $60/bbl oil and $3.00/Mcf natural gas
Source: Memorial Resource Development Corp.

MEMORIAL RESOURCE DEVELOPMENT



Even Memorial's third-best target zone within the Cotton Valley reaches a respectable 44% IRR. Above left, Memorial Resource Development's T.L. McCrary pad in Terryville Field, Lincoln Parish.

ously with a two-well direct-offset with average IP30s of 30 MMcfe/d, and the LMO well with the aforementioned Dowling one and a half miles away at a peak 24-hour rate of 41 MMcfe/d, "arguably the best well in the field."

"It just shows we have consistently come back and drilled great offsets, and the reason is we have more subsurface data from that existing well that we can use to help us stay in zone. The key is staying in zone."

At the end of the third quarter, Memorial had 79 wells producing from four horizons in Terryville. Approximately 75% of its 2015 D&C capex is expected to be directed to the Upper Red interval.

Now Memorial hopes the cotton is as thick or thicker on the other side of Terryville's fence row. Memorial bought out Rockcliff Energy's roughly 45,000 net acre block in Jackson and Lincoln parishes to the southeast of Terryville Field and between Vernon Field for $6,300 per net acre.

"We were searching for contiguous acreage that had both seismic and well control without depletion risk. This opportunity checked all of these boxes as it has the same Upper Red and Lower Red sands and reservoir and geologic characteristics that are found in Terryville," said Robbins.

Maybe better. The pay intervals are thicker, and the pressure gradient is slightly higher due to greater depth. Fifty vertical wells drilled since 2000 in and around the acreage give the company confidence in the well control. No horizontal wells have been drilled on the acquired land to date.

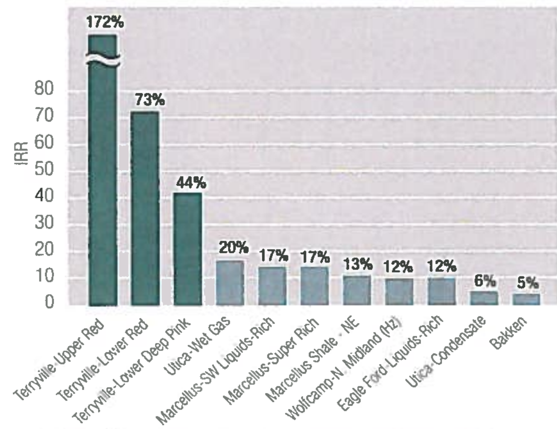
"We're extremely excited about putting some capital to work on this acreage" in 2016.

Simultaneously, Memorial locked up an option to acquire another 39,000 net acres in and around Terryville Field in Jackson, Bienville, Claiborne and Lincoln parishes, supported by 3D and 2D seismic, and an additional 42,300 net acres via organic leasing.

"Year-to-date, we've added almost 132,000 net acres for $374 million, with an all-in blended cost of about $2,800 per acre," Robbins said. "We think we're adding a lot of value."

Since its IPO in June 2014, Memorial's foot-

Terryville IRRs Measure Up



Source: Memorial Resource Development. Assumes $50/bbl flat, $2.90/MMBtu year one and escalating through year six. Non-Terryville IRRs from Credit Suisse.

print in the Cotton Valley has grown 276% to approximately 194,000 net acres. Robbins is not disclosing how far south the play might extend, only that boots are on the ground increasing the position.

Memorial director of land Steve Venturatos said that while the Cotton Valley sands are intermittent through northern Louisiana, the company has ample seismic and vertical well control to direct its path.

"The seismic shows a clear picture," he said. "It seems the more we branch out, we look at seismic and find more opportunity. We haven't gotten to a point yet where we've hit a dam."

Memorial expects to average eight to nine rigs in 2015, a slight increase from eight rigs provided in its guidance earlier this year. The company took advantage of the downturn to upgrade rigs and secure top-notch crews.

Production at the end of third-quarter 2015 exceeded 400 MMcfe/d, and Memorial anticipates spending between $475- and $525 million in 2015 capex.

"We have over 2,500 drilling locations," Robbins said, "so that's going to keep us busy for a long time to come. That's a 58-year inventory at our current drilling pace."

Layer in hedges for 78% of production in 2015 at approximately $4 gas and $89 oil, and "we're drilling some of the best economic wells in the country. We're going to stay focused in North Louisiana." □