

Oil and Gas Investor

A HART ENERGY SPECIAL EDITION PUBLICATION/DECEMBER 2009



Cordillera Energy Partners Celebrates Its 10th Year in Business

Celebrating 10 Years of building domestic energy companies
with quality assets, talented and dedicated people, growing organically
by drilling and through strategic acquisitions.

Cordillera
ENERGY PARTNERS

Cordillera Energy Partners III, LLC is a private company backed by the financial strength of EnCap and participating institutional investors.

 Core areas of focus:

Western Anadarko Basin

Texas Panhandle & Western Oklahoma- Granite Wash, Cleveland, Atoka, Tonkawa, Cottage Grove, Marmaton, Morrow, and Douglas

East Texas Basin

Cotton Valley Sand, Cotton Valley Lime, and Haynesville Shale

Appalachian Basin

Marcellus Shale

-  Over 230,000 gross acres concentrated in core areas of focus
-  Gross daily production > 55 mmcfed with 210 operated wells
-  Seeking drilling projects in our core areas and acquisition opportunities in the \$1 million to \$300 million range

Cordillera
Celebrating Ten Years

George Solich
President
gsolich@cordilleraep.com
(303)-785-1550

Tad Herz
Executive Vice President &
Chief Financial Officer
therz@cordilleraep.com
(303)-785-1546

Kamil Tazi
Vice President -
Engineering & Planning
ktazi@cordilleraep.com
(303)-785-1579

Steve Fitzgerald
Vice President -
Business Development
sfitz@cordilleraep.com
(940)-241-2227

Frank Nessinger
Vice President - Land
fnessinger@cordilleraep.com
(303)-785-1549

COMPANY HISTORY

Cordillera Energy Partners was formed in February 2000 and incorporated as a Limited Liability Company formed in the state of Texas. The company was formed by George Solich, President and his Management Team. CEP's major equity partner was EnCap Investments. The company employed the "acquire/exploit" strategy buying producing assets and underdeveloped assets in two or three core areas and enhancing production, cash flow, and reserves through a combination of drilling, lowering cost structures and additional "bolt-on" acquisitions.

Cordillera Energy Partners I core areas were the Anadarko Basin, the Delaware Basin and the San Juan Basin. Through a combination of acquisitions and drilling, CEP I grew its production to 30 mmcfed, annual cash flow to \$35 million, and proved reserves to 250 Bcfe by mid 2003. In October 2003, CEP I sold its assets to Patina Oil & Gas for cash and warrants to purchase Patina stock valued at \$247 million.

Upon completion of the CEP I sale, the core Management Team formed Cordillera Energy Partners II, again with EnCap Investments, 7 along-side institutional investors and management. In March of 2004, the company was capitalized with a \$200 million private equity investment and a \$300 million credit facility of six banks lead by JP Morgan Chase. CEP II added to its management team ranks and set out to chart the same "acquire/exploit" strategy that had been so successful in CEP I.

Again through a combination of focused acquisitions and vertical and horizontal drilling, CEP II grew quickly in both size and value. By mid 2008 CEP II was producing close to 50 mmcfed from 600 wells (97% operated with annual cash flow exceeding \$200 million and proved reserves of 725 Bcfe. These high quality natural gas assets were concentrated in the Texas Panhandle (Douglas, Cleveland, Granite Wash, Atoka, and Marrow), West Central Anadarko Basin, and the East Texas Basin (Cotton Valley Sand, Cotton Valley Lime, Hosston, Pettet, Travis Peak)

In September of 2008 CEP II sold all the assets of the company in three separate transactions for total

consideration in cash and stock valued at \$1.023 Billion. The Texas Panhandle and East Texas assets were sold to Forest Oil, the Oklahoma assets to Merit Energy, and the Deep Woodford assets to Devon Energy.

Prior to the sale of CEP II, the Management Team and CEP's equity investors elected to form Cordillera Energy Partners III while still managing and operating CEP II so as not to lose momentum, opportunities, or human talent. In March of 2007, CEP III was formed with a \$500 million equity investment from EnCap Investments, along-side institutional investors and management. CEP III also entered into a \$600 million six, bank credit facility again led by JP Morgan Chase.

With the Management Team from CEP II intact, CEP III is active again in three core areas. CEP III holds assets and operations in the Texas Panhandle, Western Oklahoma, and the East Texas Basin. CEP III is also actively pursuing opportunities to enter into the Marcellus Shale Play in Appalachia. By the end of the 3rd quarter 2009, CEP III has production approaching 25 mmcfed with over 1,200 low risk, high quality, vertical and horizontal locations to be drilled in the Granite Wash, Tonkawa, Cleveland, Atoka, and Morrow.

In 2010 Cordillera will be celebrating its 10th year in business and making plans to from its fourth enterprise centered around the "acquire/exploit" strategy. During this period, the Cordillera Management Team has executed on both small and large producing property and acreage acquisitions totaling over \$700 million and has drilled over 235 wells (vertical and horizontal) investing over \$300 million.

Since our inception, we have been blessed with dedicated employees, top quality equity and debt partners, and high quality assets to pursue investment of both acquisition and drilling dollars. Our Culture focuses on creating value for our shareholders with a hard working, loyal, and technically advanced team of professionals while dealing with our constituents, landowners, communities, vendors, and competitors with respect and integrity. Our goal is to be the buyer of choice, lessee of choice, driller of choice, investment of choice, and eventually seller of choice. ■

GRANITE WASH

The Midcontinent's Granite Wash offers a mélange of opportunities to operators seeking solid economics in these uncertain times.

ARTICLE BY
PEGGY WILLIAMS

PHOTOGRAPHY BY
LOWELL GEORGIA

Excerpted from

**Oil and Gas
Investor**

October 2009
Copyright © Hart Energy
Publishing
1616 S. Voss Rd.
Suite 1000
Houston, TX 77057
(713) 993-9320

Like monumental pinwheels, wind turbines have sprouted across the Texas Panhandle. The new energy economy has established a firm foothold in North America's prime wind-resource corridor. And yet, beneath the undulant rangelands, the old energy economy quietly hums along.

Oil and gas are far from exhausted in the Panhandle, and one reservoir that is in the midst of a reconstruction is the Pennsylvanian Granite Wash.

Operators are applying both horizontal and vertical wells to produce reserves from this longtime target. Economic rates are achieved by multistage, slickwater fracture treatments and close attention to costs. It's a challenging venture, given the softness in natural gas prices and the vagaries of Midcontinent differentials, but it's one that several companies find quite appealing.

Humongous horizontals

A leader in present-day Granite Wash drilling is Newfield Exploration Co. The Houston-based explorer lit up the industry with its recent announcement of a series of prodigious

horizontal completions in the Granite Wash in Wheeler County, Texas.

Newfield has been working the Granite Wash since 2002, when it obtained a property in the play in concert with its acquisition of EEX Corp. The asset was minor, consisting of some 30 Granite Wash wells making about 2.5 million cubic feet of gas a day.

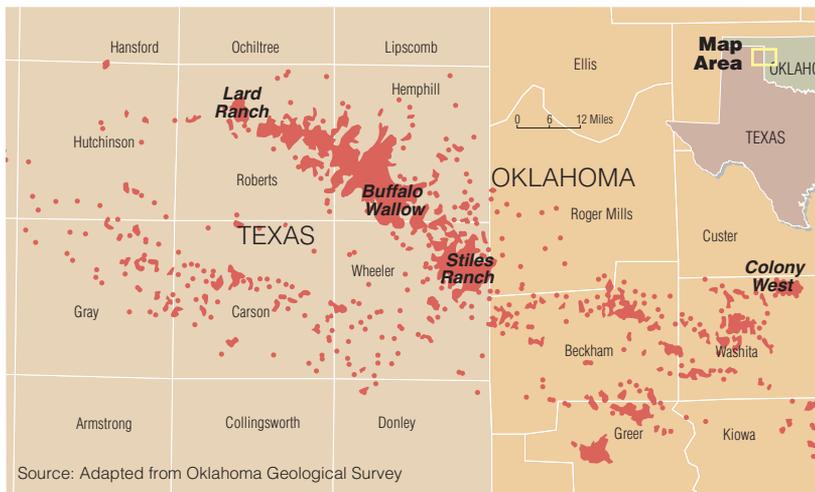
Gradually, Newfield added more acreage. In 2003, it kicked off a vertical drilling program in the Stiles Ranch area in Wheeler County, where the Wash sediments reach 3,000 feet in thickness. This is in the slightly overpressured, deeper part of the trend—the reservoir occurs below 12,000 feet and the pressure gradient is some 0.5 psi per foot. The company recognizes up to 15 primary intervals across its 35,000-net-acre position.

Following the common practices of the time, Newfield initially confined its efforts to the top 500 to 1,000 feet of the sequence. In short order, however, it was drilling deep into the section and completing more intervals.

Up to mid-2008, Newfield drilled more than 150 vertical wells and increased production in the Stiles Ranch area from 2.5- to 90 million

Triple stands of pipe frame the derrick man high above the floor of Cactus Drilling Co.'s Rig #138 on the #7-9H Britt in Wheeler County, Texas. Newfield Exploration Co. is about to run 7-inch casing across the build section in the horizontal Granite Wash well. True vertical depth is some 14,000 feet.





The Granite Wash play runs across the Panhandle of Texas into Oklahoma, covering a swath 160 miles long and 30 miles wide.



Above, George Dunn, vice president of Newfield Exploration Co.'s Midcontinent division, says the company's Granite Wash laterals target intervals that can deliver high production rates.

Right, Newfield Exploration's #27-7H McCoy in Wheeler County, Texas, started production in December 2008 and averaged 27.1 million cubic feet equivalent per day during its first 60 days of production.

cubic feet net per day. The verticals typically recovered 2.5- to 3.5 billion cubic feet equivalent (Bcfe) apiece and were completed in seven to eight zones. Nonetheless, the company was intrigued with the impressive gas-in-place potential of the Granite Wash, and determined to find a way to up its recovery factor.

In 2005, it drilled a Granite Wash lateral in Buffalo Wallow, a shallower and less-pressured field northwest of Stiles Ranch. "Our results were moderate, at best," says George Dunn, Tulsa-based vice president of Newfield's Midcontinent division. "The well produced a lot of water."

Newfield also joined in several nonoperated wells located between Buffalo Wallow and Stiles Ranch. "There were mechanical problems in the laterals, but the production response was promising," says Dunn.

The company reinitiated detailed geologic mapping, and dug deep into the data. By late 2008, it was ready to test horizontal drilling in its prime Stiles Ranch asset.

The #27-7H McCoy was a runaway success: it came on production in December 2008 at an initial rate of 25 million cubic feet of gas and 1,900 barrels of condensate per day. It averaged 27.1 million equivalent a day for its first 60 days on production, and produced more than 4 Bcfe in the first nine months.

It was just the beginning. To date, Newfield has drilled seven horizontal wells into three different intervals, and posted spectacular results. Of its initial tranche, five wells were gauged at more than 20 million cubic feet per day, and the smallest well made 8 million cubic

feet and 180 barrels of condensate per day.

"So far, our production rates have been high and fairly consistent," he says.

Given the tremendously thick section of stacked intervals that occurs in the Granite Wash at Stiles Ranch, selecting a horizontal target is not simple. "The difficult part is to bore in on how productive each zone is," he says. "We use vertical production data, production logs and petrophysical analyses to determine the zones with the highest productivity. We're targeting intervals that can deliver high production rates."

Newfield's results have been so appealing that it has shifted its 2009 program entirely to horizontal wells. The company recently added a third rig to the two already engaged, and plans to be at four by year-end. For the next few years it expects to keep between three and five rigs busy in the Wash. "We'll do a combination of developing zones that are economic and assessing the other zones," says Dunn. "We are looking at different intervals to get a feel for productivity across our entire acreage spread."

At present, the operator drills its Stiles Ranch wells to true vertical depths (TVDs) between 12,200 and 14,200 feet, depending on the target zone, and takes its laterals sideways 4,000 feet



and more. It cements in liners and completes the laterals in seven to eight slickwater frac stages.

The high flow rates are combining with sinking well costs to improve metrics. From initial well costs of around \$10 million each, Newfield engineers have dropped costs to less than \$8 million. Its most recent well, the #33-7H Williams, was completed for 21 million cubic feet of gas and 570 barrels of condensate per day at a cost of \$7.4 million.

While it's quite early to toss about EURs for horizontal Granite Wash wells, Newfield thinks its first batch will range from 6 to 10 Bcfe each. "Currently, within our footprint we see poten-

tial of 400 to 600 Bcf," says Dunn. "Depending on how many intervals ultimately test out, there's room to go above that figure."

Interval quality appears to be directly related to thickness, superior reservoir properties and presence of natural fractures. "A number of intervals are economic to develop at today's forward strip prices, and some intervals might be best described as gas-price plays," he says.

"Right now, the Granite Wash is our third-largest asset and we're hoping to grow that significantly as we prove up more of the interval.

"We're in the early stages of assessing the ultimate potential, but it looks really good."



Top, Forest Oil Corp. now exclusively drills horizontals in the Granite Wash, says J.C. Ridens, executive vice president and chief operating officer. According to Baird Whitehead, above, executive vice president and chief operating officer, Penn Virginia Corp., the average estimated ultimate recovery on the initial 23 wells in its Granite Wash project in Washita County, Oklahoma, is 6.2 billion cubic feet equivalent.

Newfield's correlation scheme for the Granite Wash divides the package into the Marmaton, Cherokee-Redfork and Atoka washes. Naming conventions for the Wash sediments are often individualistic.

IN THE WASH

The Granite Wash is an extraordinary reservoir, prone to extreme variations in thickness, grain size, pore-size distribution, number of prospective intervals and gas/oil ratio.

It is one of a series of Midcontinent Wash plays that run northwest to southeast across the Panhandle of Texas and into Oklahoma, occupying a swath 160 miles long and 30 miles wide.

The unusual reservoir consists of stacked, submarine fans made up of detritus shed from uplifts to the west and south. Individual lobes can cover several sections and reach some 70 feet thick. Deposition spanned several geologic ages, and the variety of source terrains translated into a potpourri of mineralogies in the resulting Wash sediments.

Depths run from 300 feet to 19,000 feet, and the entire Wash package can be as thin as 10 feet to as thick as 4,000 feet.

The complex series of sands, shales and siltstones are subdivided by various schemes that evolved within companies and within specific segments of the play. Designations include the Granite, Marmaton, Des Moines, Strawn, Cherokee, Red Fork, Cleveland and Atoka washes.

Geologists have long had a broad familiarity with the Wash deposits, as thousands of wells drilled through the section on the way to deeper Morrow and Hunton targets. These latter zones yielded immense gas fields that dominated the Panhandle for decades. By the mid-1960s, certain portions of the Wash became targets in their own right, and today more than 4,200 wells have been completed in various Wash reservoirs.

The Granite Wash defies categorization. Parts of the deposit qualify as conventional, sporting sand layers that have sufficient porosity and permeability to produce stout volumes of gas and liquids with little techno-

logical intervention.

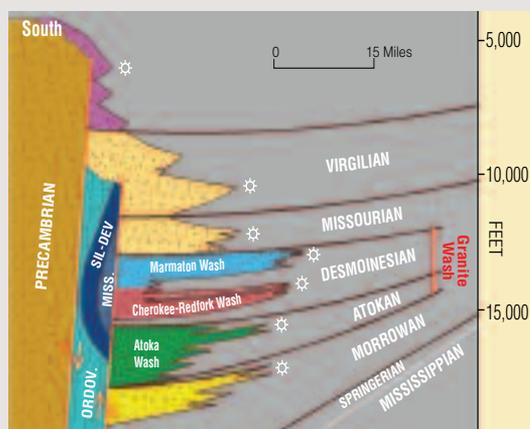
Much of the tremendous slab of sediment resides solidly in the unconventional realm, however, with poor reservoir characteristics but whopping volumes of gas-in-place.

Likewise, pressure regimes vary from noticeably underpressured to gradients as high as 0.7 psi per foot.

To further complicate matters, Upper Granite Wash zones are much oilier than lower zones. In the Texas Panhandle, liquid yields can vary from 60 to 70 barrels per million in the upper part of the sequence to eight to 10 barrels below. The entire package of agglomerated wedge-shaped Wash deposits carries hydrocarbons, but water production from some zones can be onerous.

And, the Granite Wash play presents both areas with thick amalgamations of stacked zones and areas of single zones.

"How the Granite Wash is developed—vertically, horizontally or with a combination of both—is not a trivial choice," says Ed LoCricchio, senior geologist, for Denver-based Cordillera Energy Partners. "It's highly dependent on where you are within the play, and what you see in your particular slice of the Granite Wash."



Thicket of opportunity

An operator in the thick of the Granite Wash is Forest Oil Corp. The Denver-based independent bought into the play in 2005.

"We were attracted to the play because the Granite Wash had a known producing history," says J.C. Ridens, executive vice president and chief operating officer. "We love tight-gas sands, and it was a chance for us to get a good position in the Texas Panhandle."

Forest's initial efforts post-acquisition were directed at improving techniques for vertical wells. The company used frac mapping and extensive production-logging techniques to hone its stimulations.

It also gathered data to support a horizontal program. The operator was drilling horizontal Cotton Valley wells in East Texas, and the two plays shared similarities. "At the same time, we were doing bolt-on leasing and taking farmouts in the Panhandle," says Ridens.

The company anticipated horizontal development in the Wash. In new sections, it switched to drilling vertical wells in the corners and leaving interiors available for laterals. "The corner wells gave us data on the thickness of zones, and we did production logging," says Ridens. "That was our transition to horizontal wells."

Forest also participated in eight nonoperated horizontal wells that posted average initial rates of 8 million equivalent per day. "The horizontals are in the best portion of the reservoir, and the frac is concentrated," he says. "We contact good-quality reservoir rock very effectively and limit contact with rock we want to avoid."

Earlier this year, Forest's first operated horizontal well tested 17 million equivalent per day. "A third of that came in the form of associated liquids, condensates and NGLs," says Ridens. The #5-7H Zybach, in Wheeler County, was fractured in eight stages in a 3,600-foot lateral.

"The well exceeded our expectations. We ran our economics on the medium case, 6.5 Bcfe, and the well is performing on the high side."

Now, the company exclusively drills horizontals in the play. Its targets are the liquids-rich zones in the upper Granite Wash; it is saving the deeper, dry-gas zones for the future.

At \$3 Nymex gas and \$55 crude, Forest can still make an attractive rate of return in the Granite Wash. "The liquids component really makes this work for us," he says. "The NGLs sell at 40% to 50% of Nymex crude, and that juices the economics."

This year, Forest is keeping a company-owned rig busy, staffed with company employees. It is forecasting drilling and completion costs of \$5.5 million, for TVDs of 13,000 feet and measured depths of approximately 17,000 feet. "It's relatively uncomplicated drilling, and drilling conditions are not difficult," he says.

In the first quarter of 2009, Forest produced 91 million net a day from the Buffalo Wallow area. Last year, it purchased Cordillera Energy

Partners II, which further pumped up its Granite Wash position. It currently holds 120,000 gross acres in the Texas portion of the Panhandle, and some acreage in Oklahoma operated by others.

"We're in the budget-preparation cycle, but given the results we've seen to date we may step up activity in 2010 compared to 2009," says Ridens. "This play is one of the top economic performers in the company."

And, Forest is looking hard into more technical advances. The opportunity to stack laterals off the same pad or even stack laterals out of a single wellbore could reduce costs further. "This is an area where we can run multiple rigs for multiple years and hammer the efficiencies."

Sooner side

Horizontal Granite Wash drilling also extends into Oklahoma, and one firm enjoying excellent results there is Radnor, Pennsylvania-based Penn Virginia Corp.

The firm bought into the Granite Wash in Washita County, Oklahoma, via a 2006 acquisition. "The seller had drilled a handful of vertical wells, and after we drilled a few verticals we concluded the play was marginal," says Baird Whitehead, executive vice president and chief operating officer, and president of Penn Virginia's oil and gas unit.

However, Chesapeake Energy was working its Colony West project to the west of Penn Virginia's holdings. The Oklahoma City operator bought into some of the same acreage held by Penn Virginia.

Chesapeake proposed several horizontal wells. "We got our feet wet and realized the results of the horizontal wells were much better," says Whitehead. From that point on, the two companies have partnered in an area of mutual interest (AMI) to develop the Granite Wash via horizontal wells. Penn Virginia operates approximately a third of the AMI and Chesapeake operates the remainder; Penn Virginia holds about a 40% interest across the project.

Results have been compelling. On the initial 23 wells, the average rate for the first 30 days of production is 8.2 million cubic feet equivalent per day, and the average EUR is 6.2 Bcfe. And the reservoir is loaded with liquids: 40% of the production is crude oil, and the gas is 1,200 Btu.

"These wells will make at least 90 barrels per million," says Whitehead. "Some of the better wells make more than 1,000 barrels of oil per day at the wellhead, not including the processed NGLs we get from the high-Btu gas."

That makes the economics very strong. Finding costs are \$1.43 per thousand cubic feet, and the after-tax rate of return is close to 70%. "It's pretty difficult to find such economic opportunities in today's market."

In Washita County, some 70 miles from the activity in the Panhandle's Stiles Ranch area, the Granite Wash generally presents just one interval for drilling. The Granite Wash B is the

target, reaching up to 50 feet thick. Occasionally, the C zone can be developed as well.

The TVDs for the Washita County wells are 11,500 to 12,000 feet; laterals generally stretch 3,500 to 4,000 feet. The reservoir is overpressured, between 0.6 and 0.65 psi per foot, so mud weights push 12 pounds per gallon in the lateral.

The partners set 7-inch casing on top of the Granite Wash and cement liners in the lateral. Four to five stages are treated with slickwater jobs. "We don't need as many stages as in a shale reservoir, because the Wash has some porosity and permeability," says Whitehead. "That helps keep our costs down."

Per-well prices are \$6.25 million at present. As in other parts of the Patch, the combination of falling service costs and increased efficiencies has slashed costs almost 20%: last year, the Washita County wells ran \$7.7 million each.

To date, Penn Virginia has participated in 23 gross wells, and its net production from the play is 25 million equivalent per day. The Granite Wash now accounts for a majority of its Midcontinent production.

In 2009, the company will drill six net wells in its venture with Chesapeake. Currently, the partners have one Chesapeake-operated rig at work on the AMI acreage, which has room for more than 90 additional horizontal wells.

Penn Virginia is also expanding its position outside of Washita County, acquiring acreage on internally generated prospects.

"The Granite Wash is one of our three core plays," says Whitehead. "The rate of return is so high, we will spend as much money as we can in the Granite Wash, both in our Chesapeake venture and for our own account. We don't see a lot of risk."

Vertical player

The Granite Wash has been a friendly locale for three cycles of privately-held, Denver-based Cordillera Energy Partners. The company's staff has rich experience in the Wash: through the end of 2008, Cordillera entities had drilled 84 vertical and four horizontal wells in the play. (The first two Cordilleras were sold, one to Patina Oil & Gas Corp. in mid-2003 and the other to Forest Oil Corp. in mid-2008.)

The current Cordillera III has again dug deep into the Texas Panhandle's Wash reservoirs. Cordillera III has accumulated about 80,000 net (more than 100,000 gross) acres of leases, mainly in the portions of the play basinward from Buffalo Wallow, Hemphill and Mendota fields in Hemphill County. Here, the Granite Wash is some 1,500 feet thick, very fine-grained and underpressured. Cordillera estimates the resource potential to be on the order of 42 to 49 Bcfe of recoverable gas per section.

This year, it plans 18 to 22 vertical wells on its acreage. "We have one rig running now and we feel confident we can raise that to two rigs next year, assuming no further deterioration in gas prices," says Kamil Tazi, vice president, engineering and planning.



To date, Cordillera has developed its Granite Wash position with vertical wells. The company has an inventory of more than 950 Granite Wash locations, primarily on 20-acre spacing. "We think verticals are the most efficient way to develop our particular area of the Granite Wash," says Tazi. Cordillera's Hemphill County wells average 1.3 Bcfe at an initial rate of 2.5 million a day and are solidly economic.

"Right now, using the strip price deck, we are getting 27% rate of return and our finding cost is \$1.23 per thousand cubic feet."

The strong economics are the result of better and cheaper wells. "In the program we started last year, we have improved our average initial rate by 100% and our EURs by more than 20%," says Ed LoCricchio, senior geologist.

A contributing factor is the company's use of velocity strings. "We found that velocity strings allow us to evacuate water from the wellbore and improve gas production," says LoCricchio. "The higher rates are sustained longer, and that

Top right, Cactus Drilling Rig #139 is making a bit trip in the lateral in Newfield Exploration's #4-5H D. Britt, also in Wheeler County. Bottom right, the driller on Cactus Rig #138 sits at the control console during drilling of the Newfield-operated #7-9H Britt.



“We think verticals are the most efficient way to develop our particular area of the Granite Wash,” says Kamil Tazi, top, vice president, Cordillera Energy Partners. Vertical wells in Cordillera’s Hemphill County program deliver strong economics, thanks to better and cheaper wells, says Ed LoCricchio, bottom, senior geologist. Right, Cordillera is keeping a rig running in the Granite Wash this year.

At right and facing page: A MarkWest Oklahoma Gas Co. facility in Wheeler County, Texas, handles Newfield Exploration’s Granite Wash production. The facility can process 80 million cubic feet of gas per day.



PHOTO COURTESY OF CORDILLERA ENERGY PARTNERS

translates into better EURs.”

At the same time, the company has pushed well costs down in the range of \$1.5- to \$1.6 million apiece, for a 13,300-foot hole with four to five fracs. The plunge in price has been swift and dramatic: in July 2008, when Cordillera was running seven rigs in the play, a vertical Granite Wash well cost \$2.5 million.

Drilling costs were shrunk through a number of efficiencies and renegotiations with vendors, and the use of better rigs and better bit programs. “The lower well costs are key to what has allowed us to continue to drill and complete the vertical Granite Wash wells,” says Tazi.

An essential consideration for Cordillera is its interest in building proved reserves. The company looks at capital efficiency—the dollars in the ground that are required to develop proved reserves.

Under present SEC rules, a vertical well proves up eight offset locations, but a horizontal well proves up just two parallel offsets. That means a \$1.6-million vertical well proves up 11.7 Bcfe, at a cost of about \$0.14 per Mcfe. By comparison, one \$7.5-million horizontal well proves up about 16.5 Bcfe, at a cost of \$0.45 per Mcfe.

“Vertical drilling is a very efficient way to prove up reserves,” says Tazi. “But we fully understand why other operators take the horizontal approach. The high rates of return from the high-rate horizontal completions are quite attractive for different reasons.”

Certainly, Cordillera will continue its vertical development program in Hemphill County and use horizontals where appropriate on its other

leasehold positions. It constantly evaluates the metrics of the play, and will add in horizontals if those completions can meet its internal geologic and economic criteria.

“This has been a great play for us, and with the added success of the horizontals it is getting better.”

MLP attraction

As an upstream MLP, Houston-based Linn Energy LLC has a different business model than the straight E&P companies, says Mark Ellis, president and chief operating officer. Linn focuses on acquiring mature assets and optimizing those assets through sound engineering and geologic development.

“We do not do exploration,” he says. “We invest in stable, mature assets and we use commodity hedging to reduce price volatility.”

Prime targets are plays that deliver predictable cash-flow streams, and that’s what Linn was after when it entered the Granite Wash in mid-2007. It acquired 38,000 net acres in the trend as part of a \$2.05-billion purchase of Midcontinent assets.

The fit was good for Linn. It and its predecessors have drilled 368 vertical Granite Wash wells, on 70,000 gross acres spread across an area 70 miles long and 25 miles wide, from Lard Ranch in Roberts County to Stiles Ranch in Wheeler County.

It is a sizeable position in a very good neighborhood.

“We’ve continued development with vertical wells, and results have been very repeatable in areas of the trend,” says Ellis. Generally, its vertical Wash wells are completed in up to eight intervals and recover 1.5 to 2 Bcfe each. Initial rates are 1.5- to 3 million a day.



Last year, Linn drilled almost 100 Granite Wash wells and had five operated and five non-operated rigs running across the play. Currently, its daily net Granite Wash production is approximately 50 million equivalent, almost a quarter of its total volume.

Linn's Granite Wash properties hold 900 vertical locations, and the company counts some 710 Bcfe of PUDs and nonproven inventory, about 40% of its company-wide total. "It's a key play for us, and the results other operators are reporting have certainly raised the value of that inventory."

This year, Linn has considerably scaled back drilling to preserve capital, spend within cash flow, and focus activity on the most attractive returns. It ran two rigs in the Wash during the first half of the year and has now scaled back to one. "We are in drill-and-suspend mode," says Ellis. "We have suspended all Granite Wash completions until gas prices recover."

Linn is considering horizontal drilling in 2010. "There is horizontal activity all around us, and we are very encouraged by that," he says. Indeed, its position includes about 13,500 net acres in red-hot Stiles Ranch, which could support some 40 horizontal spacing units, and multiple wells in each unit.

"Our biggest challenge is to find the best way to extract the most value possible from this play for our unit holders."

The company would like to see some price improvement before it jumps into horizontal Granite Wash drilling. "The horizontal wells produce a significant portion of their reserves in their first 18 months, and we want to preserve this potential for a higher commodity-price environment. It's a tremendous play, but with substantially all of our acreage held by produc-

tion, it makes sense to wait."

Engendered by the Wash

Finally, one young private firm is pursuing the Granite Wash. Its principals are intimately familiar with the reservoir, as they played pivotal roles in introducing it to horizontal drilling.

Brandon Hussing is vice president of geoscience and managing partner in Great Plains Operating LLC, a Grapevine, Texas-based independent. Great Plains was formed in October 2007 with funding from Kayne Anderson Capital Advisors, and has since been steadily picking up Panhandle acreage. Currently, it holds some 17,000 gross acres in the horizontal Granite Wash and Cleveland plays.

Great Plains has focused on Roberts and Hemphill counties for the Granite Wash. "We've got a large acreage block in and amongst some vertical Granite Wash wells within various fields," says Hussing. "But we'd like to see some natural gas price improvement before we drill. The good news is we have fairly long term on our leases, so we can afford to wait."

Hussing was a limited partner and exploration manager in Grayhawk Energy Inc., which was acquired by Chesapeake Energy in 2007. Grayhawk, funded by Natural Gas Partners, was the first company to attempt and successfully drill horizontal wells in the Granite Wash.

"We are working toward emulating Grayhawk's success by our own efforts in horizontal drilling in the Atoka and Cherokee Granite Wash," says Hussing. Great Plains is also looking at horizontal-drilling possibilities in the Morrow and other Pennsylvanian-age plays, and is already participating in Cleveland wells.

The Grayhawk group was headed by Cory



Linn Energy LLC is currently drilling vertical Granite Wash wells, and is considering horizontal drilling in 2010, says Mark Ellis, president and chief operating officer.





Brandon Hussing, vice president and managing partner in Great Plains Operating LLC, says his firm is acquiring acreage in the Granite Wash play but is holding off on drilling until commodity prices improve. Above right, a Halliburton tank awaits a load of cement during drilling operations at one of Newfield's Granite Wash wells.



Richards, president, Randy Hill, chief executive officer, and David Myers, executive vice president. The trio had led a team at a prior entity, Cortez Oil & Gas Inc., which drilled horizontal Red River wells on the Cedar Creek Anticline in the Williston Basin, and horizontal Barnett shale wells in North Texas.

After Cortez was sold to Encore Operating in early 2004, the group looked for a new play where it could leverage its technical experience in horizontal drilling.

The Granite Wash was the ticket.

“We had been watching the Granite Wash vertical play explode, mostly by virtue of the application of the high-volume, high-rate slick-water frac,” says Richards.

The company sought an area with just one package of Granite Wash, and where the target was fairly shallow, and where the zone had lateral continuity.

Grayhawk acquired a six-section acreage block in the Lard Ranch area in Roberts County, at the far western edge of the Granite Wash play. Three 1980s-vintage vertical wells close to the property had cumulative production between 300- and 600 million cubic feet of gas, and were still making minimal volumes.

The Lard Ranch C zone is part of the Atoka series and lies just above the Novi Lime and Atoka shale at a depth of about 8,500 feet. The 90-foot-thick C target consists of multiple, porous clean Granite Wash lenses interbedded with tighter siltstones and shales, typical of the Granite Wash throughout the Anadarko Basin.

“We suspected that, at least in our area, horizontal drilling would work,” says Richards.

Grayhawk sunk its first horizontal Granite Wash well in early 2005, and the first stage came in at more than a million cubic feet a day. After all the stages were completed, the well flowed more than 2 million a day.

“It was tough getting the well through the curve, because to our knowledge no one had

drilled through the shales above the Granite Wash at low to moderate angles before,” says Hussing. “The drill string was stuck numerous times.” The company increased its asphalt-blend oil concentration to 10% to slick up the hole, got the well through the curve and drilled the remaining lateral.

The horizontal completion was strong—it took just a year to make the same volume of gas that the verticals took two decades to produce. Eventually it produced 975 million cubic feet of gas and 18,000 barrels of oil.

Once Grayhawk had established the productivity of the Wash, it concentrated on reducing costs. It experimented with mud and casing programs to figure out the most effective strategy. Indeed, Grayhawk was able to drive its drilling and completion costs from \$3.4 million to approximately \$2.3 million per well, for an 8,000-foot TVD hole with a cemented liner in a 2,100-foot stimulated lateral. And it accomplished that in a time of rising service and supply prices.

During the next two and a half years, Grayhawk drilled 13 Granite Wash horizontals in Roberts County, plus three verticals in the Atoka and Cherokee washes in Hemphill and Roberts counties.

When it sold, Grayhawk was producing 14 million a day gross. Its success inspired other operators to move horizontally in the Granite Wash.

And, the Wash success propelled the former Grayhawk crew into their own ventures. Three companies were founded by ex-Grayhawk people: Hussing, Todd Laney and Jimmy Smith set up Great Plains; Myers and Randy Click launched Cisco Energy to pursue acquisitions; and Richards and partner Rick Stevens started Plano Petroleum LLC.

Plano, based in Plano, has equity backing from Kayne Anderson. The firm focuses on horizontal Tonkawa and other Pennsylvanian plays in the Midcontinent.

“We’re doing the same thing we did at Grayhawk. We’ve selected the Tonkawa sand to try to leverage our technical experience into,” says Richards.

Each of the Grayhawk progeny has secured equity funding, and former partners remain very good friends. “As a management team, we’re proud that we have helped people who were with us go out and set up their own ventures,” he says. “We continue to network and help each other out whenever we can.”

Certainly, there is continued opportunity in the Granite Wash and in other Pennsylvanian sands throughout the Midcontinent. “It’s a matter of timing the execution of the plays and the economics with the market,” says Richards. “That can be challenging, but also very rewarding.”

The Grayhawk story, and the stories of Newfield, Forest, Penn Virginia, Cordillera and Linn, each illustrate the broad reach and beneficial impact of the Granite Wash. □



Celebrating Ten Years

Cordillera Energy Partners III, LLC
8450 East Crescent Parkway, Suite 400
Greenwood Village, Colorado 80111

Granite Operating Company
401 West Birch Street
Canadian, TX 79014

Cordillera Energy Partners is proud to partner with landowners, mineral owners, drilling companies, service companies, suppliers, gatherers, transporters, and all our constituents in the Texas Panhandle to search for new supplies of Natural Gas. We consider

ourselves “Energy Farmers” and respect the land and its opportunity for multiple use. We appreciate our alliance and partnership with you in the Texas Panhandle as well as Western Oklahoma and look forward to continuing the responsible development to find energy for America.

George H. Solich

President
(303) 785-1550
gsolich@cordilleraep.com

Tad R. Herz

Executive Vice President and CFO
(303) 785-1546
therz@cordilleraep.com

R. Steve Fitzgerald

Vice President, Business Development
(817) 343-7566
sfitz@cordilleraep.com

Frank W. Nessinger

Vice President, Land
(303) 785-1549
fnessinger@cordilleraep.com

Kamil B. Tazi

Vice President, Engineering & Planning
(303) 785-1579
ktazi@cordilleraep.com

Joel Hendrickson

Senior Landman
(303) 785-1566
jhendrickson@cordilleraep.com

Mike J. Videtich

Drilling Manager
(303) 785-1556
mvidetich@cordilleraep.com

Cal J. Crawley

Manager of Completions
(303) 785-1554
ccrawley@cordilleraep.com

Barry C. McBride

Manager of Geology
(303) 785-1559
bmcbride@cordilleraep.com

Scott A Goodwin, Jr.

Production Manager
(303) 785-1557
sgoodwin@cordilleraep.com

Recognizing the need for you to reach Cordillera regarding questions, an owner relations phone line has been established. Please call (303) 785-1581 and you will be prompted to leave your message.

It will be helpful to us if you indicate your owner number and the property number when leaving the details of any issue. An initial response to your message will be made within 24 hours.