2008 Tarrant County Barnett Shale Well Revenue Estimate For Neighborhoods

By Gene Powell, *Powell Barnett Shale Newsletter*

Summary

We gave some estimates of the answers to: *what does an average gas well bring in money wise in a 30 day period?* **or** *how much can I expect to receive from one gas well for my tiny interest under my home?* **in our *Powell Barnett Shale Newsletter* of October 15, 2007.** The estimated income for a Tarrant County royalty owner with 25% royalty and .22 acres in a one well 65 acre drilling unit was $2,582 for the first year (about $215 month) and $15,591 over the life of 30 years without refracturing the well. The price of $6 MCF or MMBtu was used and held flat for 30 years.

We have had numerous requests to recalculate the average Tarrant County well under a home in a neighborhood to include a more realistic price for the natural gas to better reflect today's price. We have rerun the 'model' with a price of $10 MCF or MMBtu held flat for 30 years. **All other variables are from the last 'model' estimate are the same.** The estimated income for a Tarrant County royalty owner with 25% royalty and .22 acres in a one well 65 acre drilling unit was $4,304 for the first year (about $358 month) and $25,985 for the life of 30 years without refracturing the well.

We believe most Barnett Shale horizontal wells will be refractured within the first seven years of production, increasing the production back up considerably and increasing our 'model' estimate. **Currently, horizontal wells are expected to recover about 20-25% of the gas-in-place for older wells and up to 30% for wells that are significantly higher than the county average especially those simultaneously fractured in groups of two or more wells.** This will increase the revenue of the 'model' we have estimated to at least double, especially if the cycle of refracturing is continuous through the years. It could double or even triple the life of the wells. This would also double or even triple the estimated income of the 'model' shown.

Another factor which needs to be addressed is that the unit size for a horizontal well continues to drop which increases the income to the average royalty owner. **Simultaneous fracturing of multiple wells has led to wells now being drilled with some laterals less than 400 feet apart in some instances which provides for a much lower unit size than the 65 acre unit size used in our 'model'.** It is easy now to visualize unit sizes where two

or more wells could be in a drilling unit of 65 acres. This would double or even triple the estimated revenue projected in our 'model'.

The development of the Barnett Shale gas will take several more decades of drilling wells to cover Tarrant County. **We just began horizontal drilling in earnest in the county in 2003 with a few wells. At some point in two or three more decades, we will begin to look for 'windows' of gas we have not drained and figure ways to reach them.** The point is that in the future almost all the generations that own minerals with be blessed with the development of their gas to their enrichment and the benefit of our nation. We will see these 'model' estimates of revenues to be very conservative and low.

Discussion

The PBSN staff has created the estimate for an average horizontal well for Tarrant County. It is critical, when evaluating the data from the PBSN Barnett Shale Production & Revenue Estimate, that the many variables involved in such projections be considered for each individual well. Some major variables in production and revenue projections:

- **The technology used to drill and complete the well**
- **Average daily production in the peak production month**
- **A wide fluctuation in the price of gas**
- **The royalty amount**
- **The size of the drilling unit or community lease**
- **The actual well production decline in the first five years vs. projected hyperbolic decline**
- **Ad valorem tax**
- **Severance tax**

Those are just a few of the variables.

The model we have had run is just an estimate based on our choice of parameters and represents nothing that should be used as an expectation or prediction of any well. It is a large ball park estimate, and nothing more.

Although we have performed many of these analyses, we had the basic model run using the Drillinginfo.com OMSYS™ Exploration & Production Economics Report system to calculate the model and the estimate of 25% royalty. PBSN chose all the parameter variables for the production estimate.

The size of recent drilling units for a horizontal well in Tarrant County has been highly variable from 40 acres on up. We used a 65 acre drilling unit in our model. Not much has been

published on the projected unit size. The October 2007 Chesapeake Fort Worth Barnett Shale report[1] projects 60 acre spacing for their projected 2,700 wells. We also recognize smaller and many larger drilling units so we chose 65 acres for the drilling unit size. Numerous larger drilling units are for more than one well therefore will increase in production as more wells are drilled and the model can be multiplied by the number of wells to be drilled. Early results show wells simultaneously fractured (simo-fraced) have significantly higher production than wells individually fractured.

We created one model in this study. A lower royalty would be reduced proportionately and a higher royalty would be increased proportionately. We used a price for natural gas of $10/MCF or MMBtu. **We assumed, for Tarrant County, dry gas therefore little difference exists between $/MCF (dollars per thousand cubic feet) and $/MMBtu (millions of British thermal units). The BTU content of the gas would be 1,000 BTU per SCF (standard cubic feet).** The price was held constant for thirty (30) years and not escalated**, a very conservative approach.**

We used an average home lot size of .22 acres**, between 1/5th acre and 1/4th acre, for Fort Worth in Tarrant County. A larger lot size would increase revenue and smaller lot would decrease revenue.**

Most Barnett Shale wells have a hyperbolic decline in the production rate in the first five years after which it becomes exponential (nearly flat, declining very slowly over time) about 8% - 10% per year. **We have no way of knowing for horizontal wells what the actual decline is after four years as the horizontal wells using 'modern' technology only began producing the first of 2003 therefore are not old enough for us to evaluate. We have several researched decline curves based on many actual wells. Our research is very close to that published by** David Pursell, *Pickering Energy Partners, Inc.* **in February, 2007[2]. It is noted that*, Pickering Energy*** **did not participate in this project although two parameters of *Pickering Energy Partners*** **research were used in the model to make it more objective. The research at** PBSN **in year to year decline in the Barnett Shale and average daily production in peak month is** very close to studies by *Pickering Energy Partners*.

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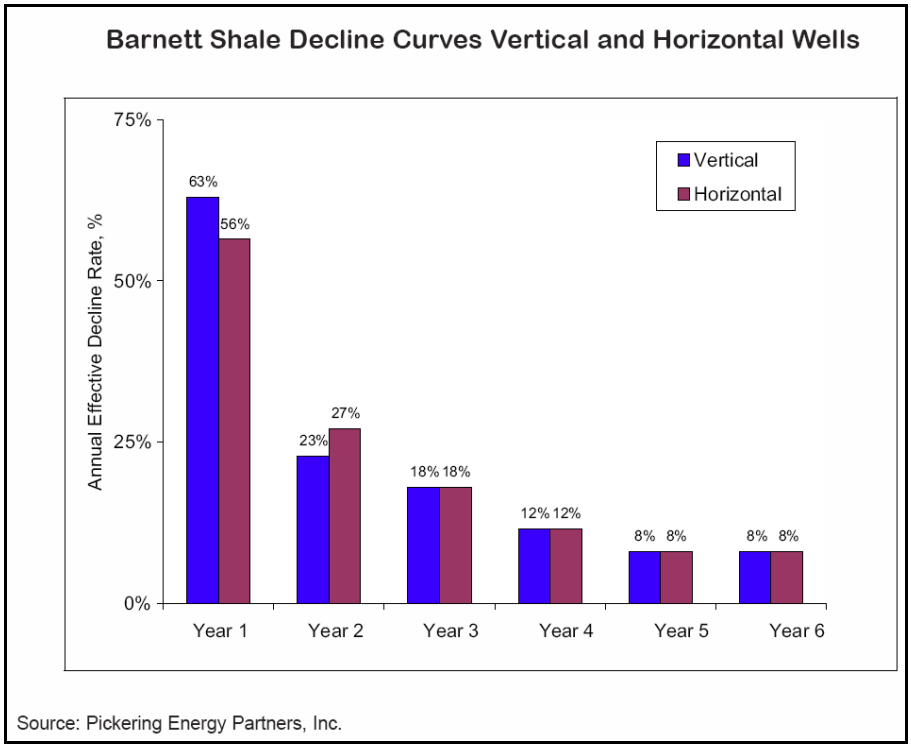
[1] **Chesapeake Energy October 2007 Investor Presentation, page 13 of 42 *Fort Worth Barnett Shale***
http://media.corporate-ir.net/media_files/irol/10/104617/OctobeInvestorPresentation100207.pdf

[2] **Society Of Independent Professional Earth Scientists (SIPES) SIPES QUARTERLY VOLUME XXXXIII NUMBER 3 FEBRUARY 2007 *The Barnett Shale – Still The Hottest Natural Gas Play in the U.S.***
By David Pursell, Pickering Energy Partners, Houston http://sipes.org/Newsletters/newsltrfeb07.pdf



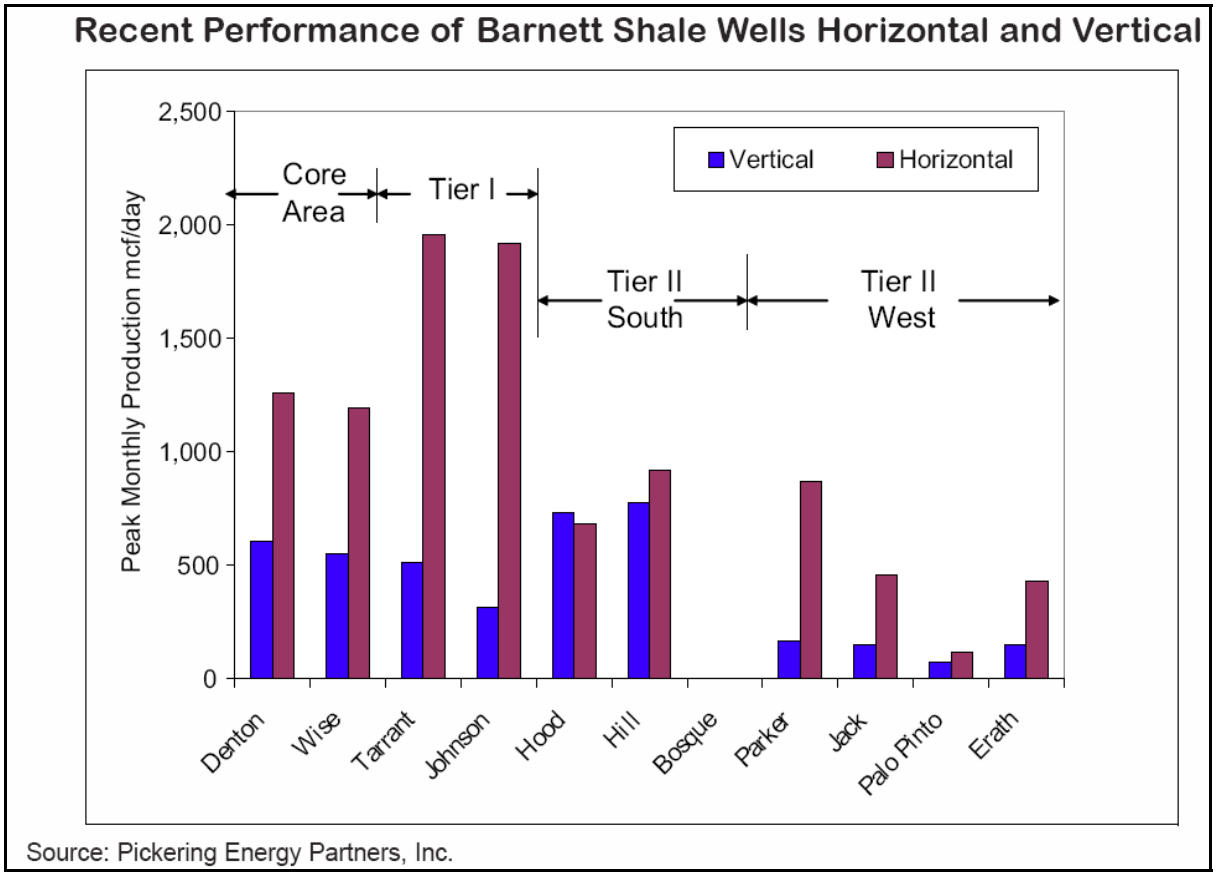
We chose the following production decline for each of the first years and an 8% decline was used for the life of the well thereafter.

- **Year 1 – 56%**
- **Year 2 – 27%**
- **Year 3 – 18%**
- **Year 4 – 10%**
- **Year 5 - 8%**

The average ad valorem tax for oil and gas wells for north Texas is about 2.4% but because many of the wells are in Fort Worth we used a higher estimate of 2.8%. The severance tax value we used was 7.5% but if the operator applies for reduced severance tax under the Tight Gas Designation, as Tarrant County is for the Barnett Shale, then the well will receive a Type 5 Exemption. The severance tax will then be reduced to approximately 5% instead of 7.5% until the operator recoups an amount equal to 50% of the cost of the well when the severance tax will go to 7.5%. The operator must apply for this exemption but the royalty owners participate in the lower severance tax rate period.

We have been evaluating wells by their daily average gas production in their peak month since 2003. We again decided to use the peak month average data from *Pickering Energy Partners* Dave Pursell's information as below and previously cited. Their results mirror our own in Tarrant and Johnson counties. These two leading counties in the Barnett Shale both average about 2,000

MCFGPD (thousand cubic feet of gas per day) which is 2 million cubic feet of gas per day. It varies slightly from month to month. Therefore the base value used in the formula for the daily average of the first month of production was 2,000 MCFGPD.



The royalty for .22 acres in a 65 acre drilling unit @ 25% royalty is .08462% royalty.

0.22 acres ÷ 65 acre drilling unit = 0.003384615 drilling unit acres

0.0033846 acres in drilling unit acres X 25% royalty = 0.0008462 or .08462% drilling unit royalty

We have changed the normal engineering headers for this type analysis to simplify reading the columns for those unfamiliar with industry terms in the following production and revenue estimates.

Informational Purposes Only : Not A Projection

PBSN Barnett Shale Well Production & Revenue Estimate - 25% Royalty

Average Tarrant County Horizontal Well: 2,000 MCFGPD; 0.22 Acres; 65 Acre Drilling Unit

by Powell Barnett Shale Newsletter May 2, 2008

Calendar Year	Oil (BO)	Oil Price $/BBL	Gas (MCF)	Gas Price $/MCF	Gross Revenue 100%	Gross Revenue 25% Royalty	Gross Revenue .08642% Royalty	Net Revenue .08642% Royalty
1	0	$100.00	497,996	$10.00	**$4,979,960**	**$1,244,990**	**$4,304**	**$3,860**
2	0	$100.00	275,598	$10.00	**$2,755,980**	**$688,995**	**$2,382**	**$2,136**
3	0	$100.00	212,699	$10.00	**$2,126,990**	**$531,748**	**$1,838**	**$1,649**
4	0	$100.00	182,508	$10.00	**$1,825,080**	**$456,270**	**$1,577**	**$1,415**
5	0	$100.00	166,044	$10.00	**$1,660,440**	**$415,110**	**$1,435**	**$1,287**
6	0	$100.00	152,760	$10.00	**$1,527,600**	**$381,900**	**$1,320**	**$1,184**
7	0	$100.00	140,539	$10.00	**$1,405,390**	**$351,348**	**$1,215**	**$1,089**
8	0	$100.00	129,296	$10.00	**$1,292,960**	**$323,240**	**$1,117**	**$1,002**
9	0	$100.00	118,953	$10.00	**$1,189,530**	**$297,383**	**$1,028**	**$922**
10	0	$100.00	109,436	$10.00	**$1,094,360**	**$273,590**	**$946**	**$848**
11	0	$100.00	100,681	$10.00	**$1,006,810**	**$251,703**	**$870**	**$780**
12	0	$100.00	92,627	$10.00	**$926,270**	**$231,568**	**$800**	**$718**
13	0	$100.00	85,217	$10.00	**$852,170**	**$213,043**	**$736**	**$661**
14	0	$100.00	78,399	$10.00	**$783,990**	**$195,998**	**$678**	**$608**
15	0	$100.00	72,128	$10.00	**$721,280**	**$180,320**	**$623**	**$559**
16	0	$100.00	66,357	$10.00	**$663,570**	**$165,893**	**$573**	**$514**
17	0	$100.00	61,049	$10.00	**$610,490**	**$152,623**	**$528**	**$473**
18	0	$100.00	56,165	$10.00	**$561,650**	**$140,413**	**$485**	**$435**
19	0	$100.00	51,672	$10.00	**$516,720**	**$129,180**	**$447**	**$401**
20	0	$100.00	47,538	$10.00	**$475,380**	**$118,845**	**$411**	**$369**
21	0	$100.00	43,735	$10.00	**$437,350**	**$109,338**	**$378**	**$339**
22	0	$100.00	40,236	$10.00	**$402,360**	**$100,590**	**$348**	**$312**
23	0	$100.00	37,017	$10.00	**$370,170**	**$92,543**	**$320**	**$287**
24	0	$100.00	34,056	$10.00	**$340,560**	**$85,140**	**$294**	**$264**
25	0	$100.00	31,331	$10.00	**$313,310**	**$78,328**	**$271**	**$243**
26	0	$100.00	28,825	$10.00	**$288,250**	**$72,063**	**$249**	**$223**
27	0	$100.00	26,519	$10.00	**$265,190**	**$66,298**	**$229**	**$206**
28	0	$100.00	24,397	$10.00	**$243,970**	**$60,993**	**$211**	**$189**
29	0	$100.00	22,446	$10.00	**$224,460**	**$56,115**	**$194**	**$174**
30	0	$100.00	20,650	$10.00	**$206,500**	**$51,625**	**$178**	**$160**
Total	0		3,006,872		**$30,068,740**	**$7,517,185**	**$25,985**	**$23,309**

Prepared by PBSN *using* drillinginfo.com *OMSYS™ Exploration & Production Economics Analysis*

Excerpt from May 5, 2008 Powell Barnett Shale Newsletter: *2008 Tarrant County Barnett Shale Gas Well Estimates*