



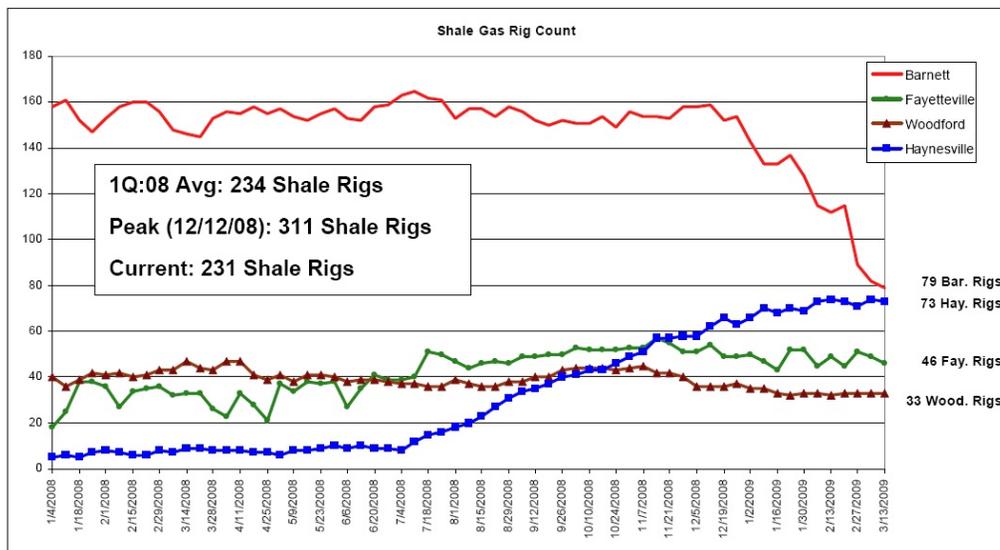
Natural Gas Supply and Demand Balance

Posted by [Nate Hagens](#) on March 30, 2009 - 10:56am

Topic: [Supply/Production](#)

Tags: [johnson rice](#), [natural gas](#) [[list all tags](#)]

The following is a guest post by Jon Friese who has formatted, with comments, excerpts from an excellent recent report by energy research firm Johnson Rice and Co. The post highlights graphically the fact that our natural gas feast or famine due to marginal unit pricing and focus on short term earnings/reserves is currently in the 'feast' stage. When we re-enter NG famine cycle depends on industrial demand, LNG imports and the depth of the coming production decline. Right now, a great deal of our natural gas resource is uneconomic to drill. Thanks to Jon, and the research folks at [Johnson Rice](#).



* Note, our rig counts are usually below other's estimates, as we adjust for geography, orientation and drilling depth

Sources: Company reports, SMITH Stats, JRCO estimates

[Shale directed drilling rig count](#)
 Source: [Johnson Rice & Company](#)
 -[Click to Enlarge](#)

Johnson Rice & Company (JRCO) was kind enough to provide their analysis of the current natural gas price situation. They are predicting a possible rebound in prices in late 2009, depending on the multiple factors they lay out in their analysis. We look into the details below the fold.

Natural Gas Supply and Demand Balance

Falling Production, Falling Demand and LNG

The Johnson Rice & Company (JRCO) constructed a model of production and demand flows and looked at what it will take to balance these flows at higher prices. This is exactly the kind of information and insight we need to build an improved dynamic model. I read the analysis with great interest and rushed to write it up to hear the comments of the TOD contributors.

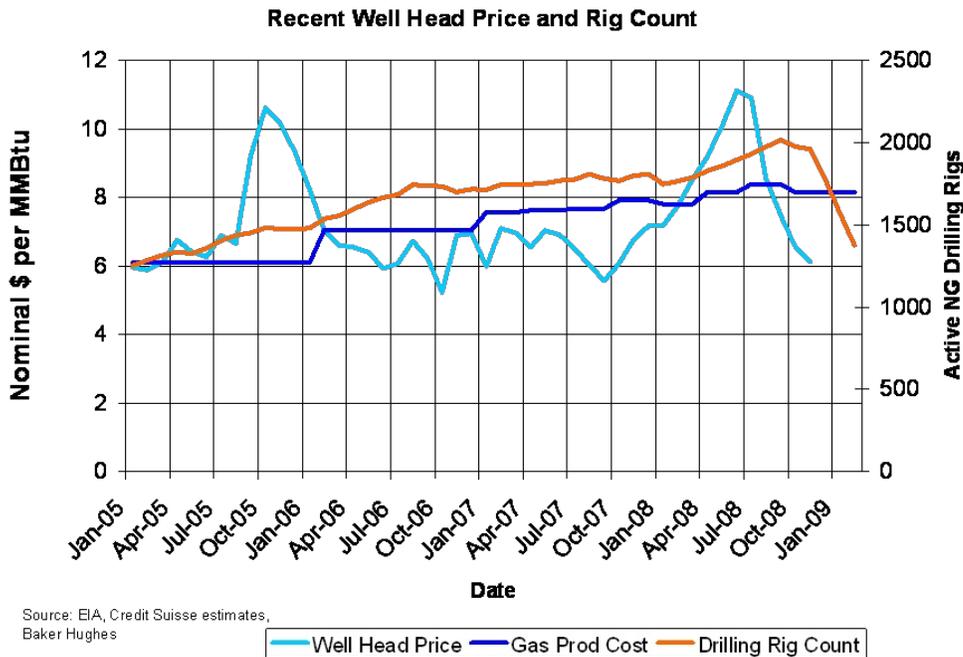
Here is the summary of factors:

Current Oversupply	4.0 Bcf/d
3 Month Rig Lagged Production Effect	-3.6 Bcf/d
Avg. LNG Import Increase	0.5 Bcf/d
Avg. U.S. to Mexico Export Drop	0.5 Bcf/d
Remaining Industrial Demand Drop	1.0 Bcf/d
Canadian Import Drop	-0.9 Bcf/d
GOM Production Return	0.9 Bcf/d
Steepened Decline Curve Effect	-1.3 Bcf/d
Year End 2009 Balance	1.1 Bcf/d

Table 1: Factors in the supply and demand balance

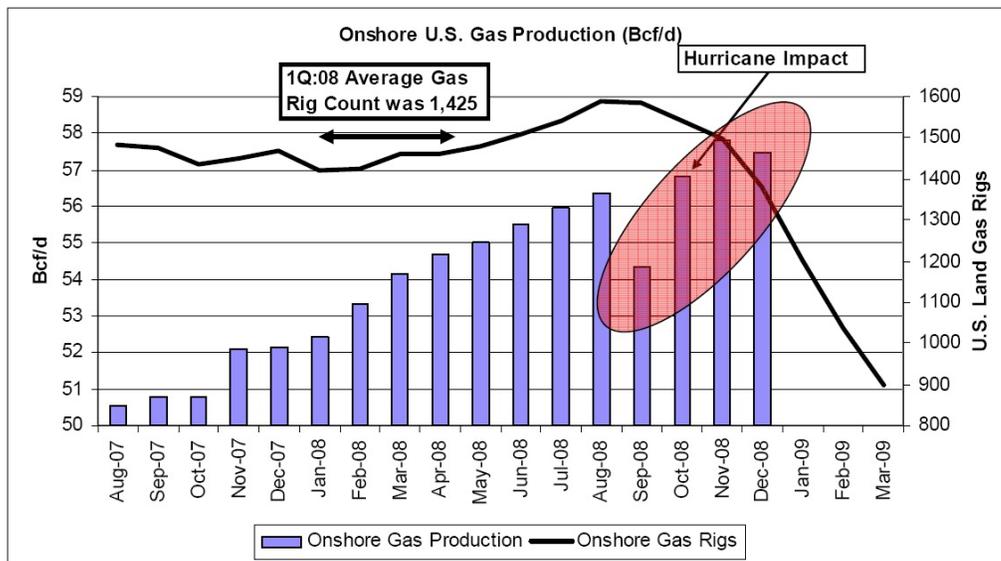
Production Passed Demand in the First Quarter 2008

For context I have added a chart of natural gas prices and rig counts. It is apparent that some time in the first quarter of 2008 production exceeded demand and prices started to tumble. Production continued to climb leading to the current oversupply.



[Figure 1: Natural Gas Prices at the well head](#)
[-Click to Enlarge](#)

The JRCO analysis backs up the production to the first quarter and estimates that the level of over production is 4 Bcf/d (without considering LNG or a drop in demand). Figure 2 shows that production in Q1 08 was about 53 Bcf/d and Dec 08 production was about 57 Bcf/d.

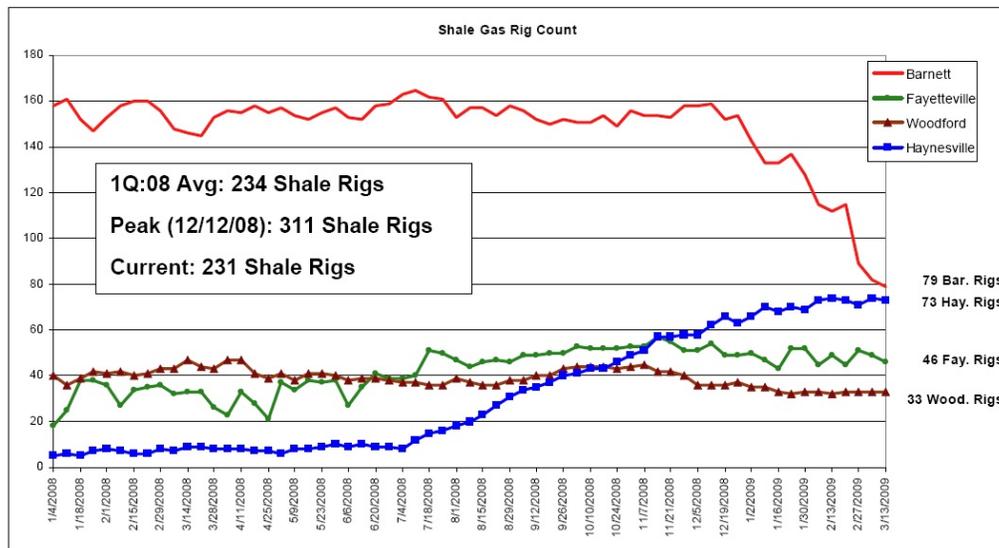


[Figure 2: US Onshore Gas Production](#)
[Source: Johnson Rice & Company](#)
[-Click to Enlarge](#)

Production Reduced by Falling Rig Counts

Drilling rates have been falling very rapidly and rigs are down from a peak of near 1600 to just over 810. However JRCO points out that it was the shale gas wells that caused the

overproduction and that the number of shale gas rigs has only just fallen to the Q1 2008 level. Baker Hughes does not break out the active rigs by target and so I found the following graph fascinating. Most of the pull back in shale drilling has been in Barnett. Haynesville has built rig count despite the fall in prices.



* Note, our rig counts are usually below other's estimates, as we adjust for geography, orientation and drilling depth

Sources: Company reports, SMITH Stats, JRCO estimates

[Figure 3: Falling shale directed rig counts](#)

[Source: Johnson Rice & Company](#)

[-Click to Enlarge](#)

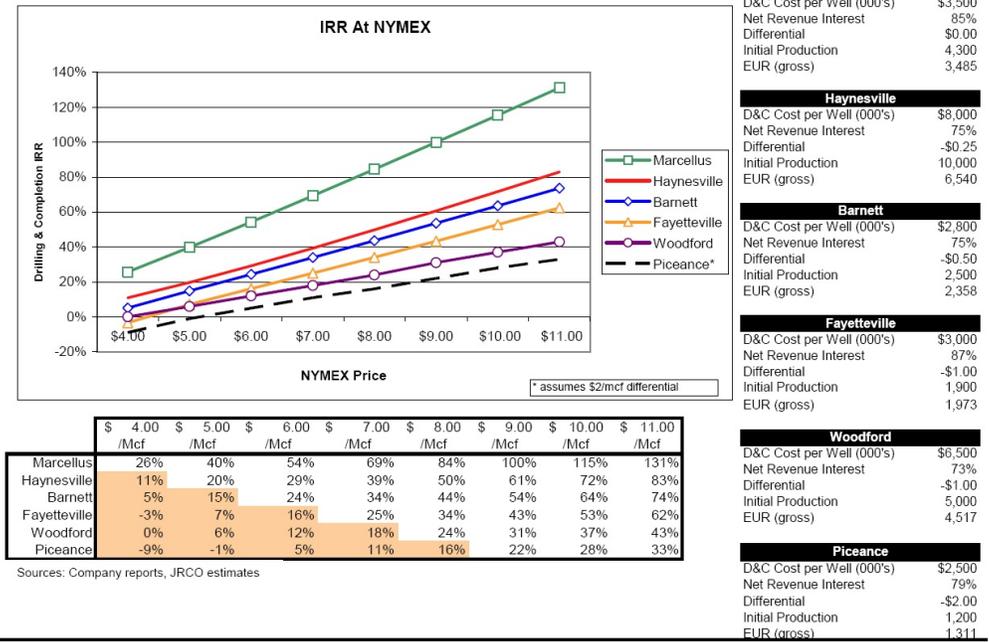
The JRCO analysis makes a point of saying that most of the total rig count reduction has been in non-shale gas. They estimate that a drop of 541 non-shale rigs would have same effect as a drop of 400 shale gas rigs, when adjusted for well performance. The shale rig count is only down 3 rigs over Q1 2008

JRCO provided the following Internal Rate of Return graph. It clearly shows how the tight gas sands in the Piceance Basin are not competitive against the shale plays, but it is less clear to me why the Barnett shale should be dropping rigs rapidly and not Woodford or Fayetteville.

(Chesapeake has made a clear distinction between the "shale haves" and the "shale have nots" in their March 2009 Investor Report that we will examine in another post.)

2A, APPENDIX: Shale/Rockies (Piceance) Returns and Assumptions

- Looking at the graph below it is easy to understand why rigs have been slower to come off shale plays and continue to build in the Haynesville

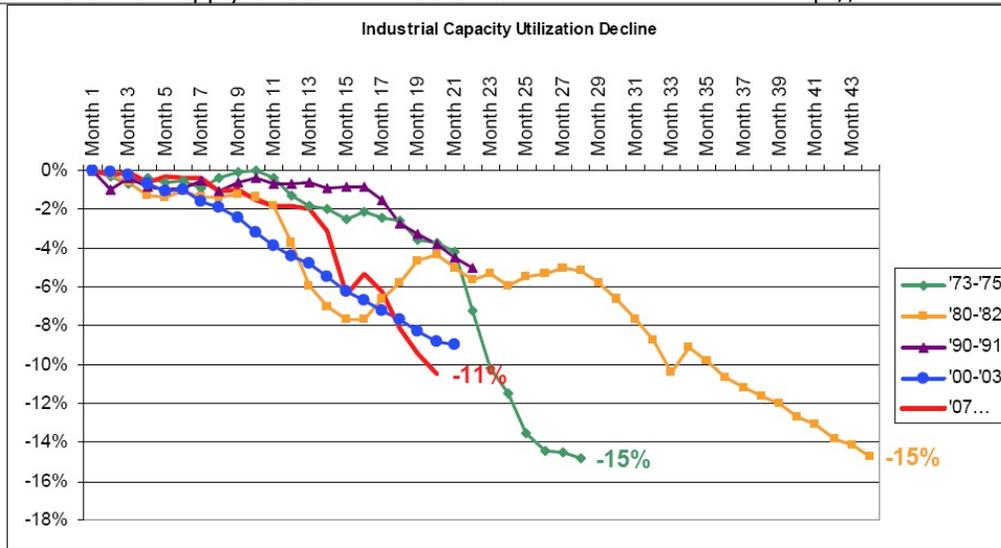


[Figure 4: Comparison of IRR for several natural gas plays](#)
 Source: Johnson Rice & Company
[-Click to Enlarge](#)

The total reduction in rigs (as of March 20th when the report was published) is expected to low supply by 3.6 Bcf/d in late 2009. However there are many complicating factors, such as the declining economy and increasing LNG supply.

Further Drop Expected in Industrial Demand

One of the largest unknowns is the current state of the economy. Are we in for a rebound or further declines? The JRCO analysis predicts further declines by examining past recessions and how they impacted industrial utilization. As you can see in Figure 5 that if the current recession matches the severity of either the '73 or '80 recessions that we still have about a 4% decline in industrial utilization left to go.



Sources: Bloomberg, JRCO estimates

Figure 5: Comparison of industrial utilization during past recessions
 Source: Johnson Rice & Company
[-Click to Enlarge](#)

They predict that this further decline in industrial utilization will translate into a drop in natural gas demand of 1 Bcf/d.

(There are some very interesting relationships between natural gas usage, industrial utilization, and GDP noted in the analysis that I hope to explore later).

LNG Imports Expected to Increase

One area that has been keenly discussed on TOD lately is how much new LNG will come on line this year and how much of that LNG will make it to the US.

The JRCO analysis offers several insights. First is Table 2 of major LNG projects coming on line 2009 (mostly late 2009) showing the expected supply and primary market (mostly long term contracts).

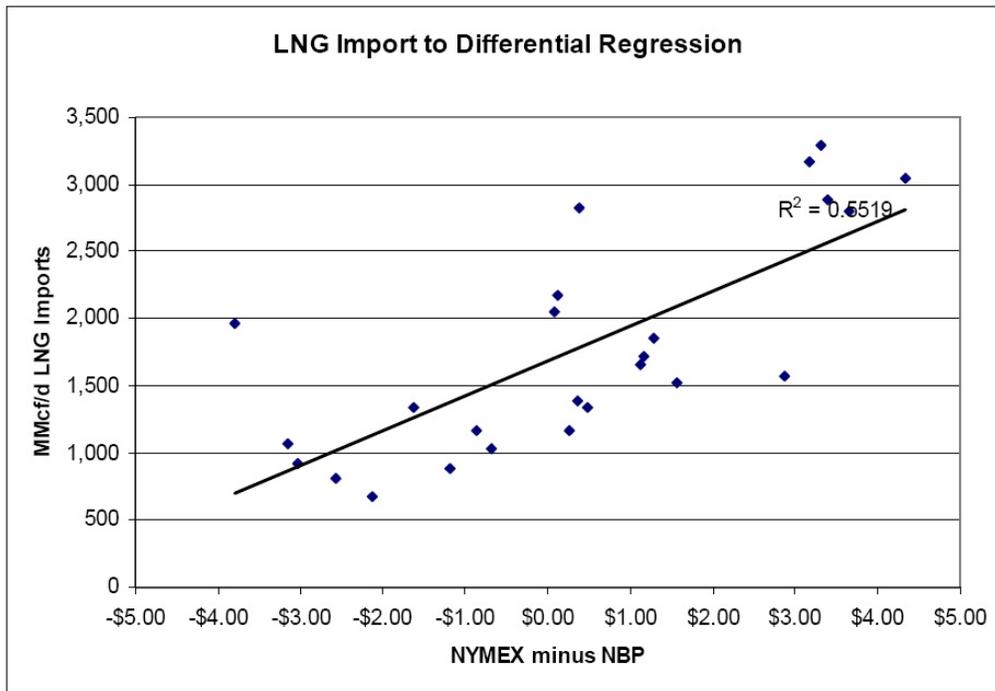
Yemen LNG	0.85 Bcf/d	U.S. & Mexico on 20 year contracts
Tangguh Trains 1 & 2	1.0 Bcf/d	Pacific Basin but some to Mexico
Qatargas-2 Train-1	1.0 Bcf/d	Mostly Japan
Rasgas-2	1.0 Bcf/d	Mostly Europe (South Hook)
Sakhalin-2	0.625 Bcf/d	Pacific Basin

Table 2: New LNG Supplies, capacity and primary market

All told, about 5.1 Bcf/d is coming onto the market. (Just for context, U.S. gas demand is over 50 Bcf/d and the oversupply is 4 Bcf/d). However most of that natural gas is destined for other locations on long term contract. The LNG slated for Mexico will reduce U.S. exports and thus must be counted.

JRCO also provided this regression which I found very helpful. It looks at the price differential between the UK National Balancing Point price and NYMEX. The correlation is rough, but still

useful. (It would be very helpful if someone explored other relationships and tried to identify the factors that explain the outliers).



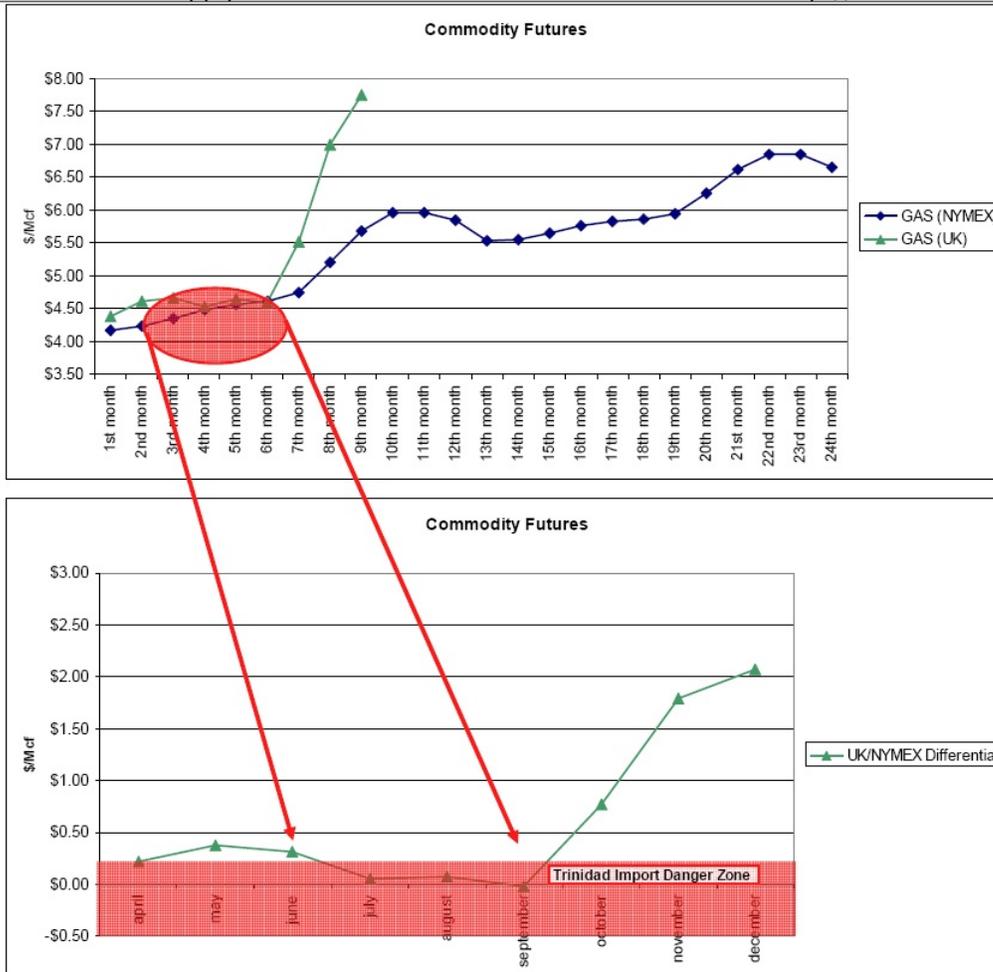
Sources: EIA, JRCO estimates

[Figure 6: LNG Imports seem to rise as NYMEX increase above UK NBP price](#)

[Source: Johnson Rice & Company](#)

[-Click to Enlarge](#)

Trinidad supplies about 2 Bcf/d of natural gas to the Atlantic region. The cost to ship to Europe is about \$0.25 per Mcf over the U.S. So when the NYMEX price is very close to the UK price, there is a good chance the cargos will be diverted to the U.S. JRCO use NYMEX and NBP futures to estimate when that might happen. It looks like there is possible window for Trinidad LNG to come to the US this summer.



[Figure 7: Futures price window for Trinidad LNG to direct to U.S.](#)
 Source: Johnson Rice & Company
[-Click to Enlarge](#)

In total, they estimate that the U.S. will receive an increased 0.5 Bcf/d supply of LNG. They also estimate LNG arriving in Mexico will cause drop exports an additional 0.5 Bcf/d of supply.

Additional Reduction Needed

Table 1 summarized the expected supply and demand balance. The total oversupply is expected to shrink to 1.1 Bcf/d. A larger reduction in drilling rigs will be needed to balance the market and bring prices back up. JRCO estimates that it will take shutting down another 45 conventional rigs and 45 Rockies rigs to take 1.2 Bcf/d off the market by the end of 2009 (Figure 8). Since the report was published on March 20, Baker Hughes reports that the natural gas rig count has fallen another 88 rigs, which is nearly the number to reach balance.

Cumulative Effect of Loss of Conventional Wells		Cumulative Effect of Loss of Rockies Wells		Cumulative Effect of Loss of Shale Wells	
Total Rigs	(45)	Total Rigs	(45)	Total Rigs	-
Wells/Rig-Year	15	Wells/Rig-Year	20	Wells/Rig-Year	20
Total Wells/Year	(670)	Total Wells/Year	(922)	Total Wells/Year	-
IP/well (Mcf/d)	1,000	IP/well (Mcf/d)	1,200	IP/well (Mcf/d)	2,500
Decline Rate	70%	Decline Rate	45%	Decline Rate	75%
Avg. 1st Year Prod (Mcf/d)	533	Avg. 1st Year Prod (Mcf/d)	840	Avg. 1st Year Prod (Mcf/d)	1,250
Total Avg. 1st Year Prod. (Bcf/d)	(0.4)	Total Avg. 1st Year Prod. (Bcf/d)	(0.8)	Total Avg. 1st Year Prod. (Bcf/d)	-
<small>* Totals may not add due to rounding</small>		<small>* Totals may not add due to rounding</small>		<small>* Totals may not add due to rounding</small>	
		<small>** Based on Pricessence</small>			

[Figure 8: Supply reductions from shutting down drilling rigs](#)
 Source: Johnson Rice & Company

[-Click to Enlarge](#)

Since prices are still low, it is probable that rig counts will continue to fall. This may well cause an overshoot condition and supply will fall below demand and cause a price spike. It will be interesting to watch if the drop in rig count begins to slow or just continues on down.

Watch List

Johnson Rice Company provides the following watch list of indicators that will be helpful for tracking what is happening with prices as the summer unfolds:

"What are we looking for to signal a turn around in Natural Gas pricing?:

- 1) Continued reduction in onshore gas rig count, and ultimately falling production*
- 2) A rebound in industrial utilization, signaling a rebound in industrial natural gas demand*
- 3) LNG imports to start dropping (end of Summer?), with the UK/NYMEX differential being the leading indicator"*

"WATCH LIST:

Every Thursday: Natural Gas Injection Numbers

Every Friday: BHI & SMITH Rig Counts

Every Friday: Bloomberg LNG Tanker Destination Report"



This work is licensed under a [Creative Commons Attribution-Share Alike 3.0 United States License](#).