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Arthur Berman talks about Shale Gas

Posted by Gail the Actuary on July 28, 2010 - 10:40am
Topic: Supply/Production
Tags: shale gas [list all tags]

Recently, ASPO-USA's newsletter printed an interview (Part 1 and Part 2) with Oil Drum staff member Art Berman (aeberman). Art is a geological consultant whose specialties are subsurface petroleum geology, seismic interpretation, and database design and management. The people doing the interview are members of the "Peak Oil Review Team," abbreviated POR in the text below. This is the shale gas portion of the interview.

***POR**: Can you give us your latest updated perspective on the shale gas story?*

Art Berman: You have to acknowledge that shale gas is a relatively new and significant contribution to North American supply. But I don't believe it's anywhere near the magnitude that is commonly discussed and cited in the press. There are a couple of key points here. First the reserves have been substantially overstated. In fact I think the resource number has been overstated.

If you investigate the origin of this supposed 100-year supply of natural gas...where does this come from? If you go back to the Potential Gas Committee's [PGC] report, which is where I believe it comes from, and if you look at the magnitude of the technically recoverable resource they describe and you divide it by annual US consumption, you come up with 90 years, not 100. Some would say that's splitting hairs, yet 10% is 10%. But if you go on and you actually read the report, they say that the probable number-I think they call it the P-2 number-is closer to 450 Tcf as opposed to roughly 1800 Tcf. What they're saying is that if you pin this thing down where there have actually been some wells drilled that have actually produced some gas, the technically recoverable resource is closer to 450. And if you divide that by three, which is the component that is shale gas, you get about 150 Tcf and that's about 7 year's worth of US supply from shale. I happen to think that that's a pretty darn realistic estimate. And remember that that's a resource number, not a reserve number; it has nothing to do with commercial extractability. So the gross resource from shale is probably about 7 years worth of supply.

For a project that a colleague and I did for a client, I actually went in and looked at all the shale plays and assigned some kind of a resource number to them. I also used some work that was done by Wendell Medlock at Rice University's Baker Institute. He did an absolutely brilliant job of independently determining what the size of the resource plays in Canada and the US might be.

The resource hasn't been misrepresented but the probable component has not been properly explained as a much smaller component of the total resource; I guess they just didn't read the PGC's report carefully enough. If you take the proved reserves plus the report's probable technically recoverable number, we have something like 25 years of natural gas supply in North America, which is quite a bit. It's a lot. I don't say any of this to give shale gas a bad name.

The other interesting thing about the PGC's report that nobody seems to pay attention is this: they said there is something like 650 Tcf of potential shale gas. Well, there's 1000 Tcf of something else. What's the something else? It's conventional reservoirs plus non-shale/non-coalbed-methane unconventional reservoirs. So there's 70 percent more resource in better quality rocks than shale. It just astonishes me that nobody has paid any attention to that.

So that's the simple view. And then the other thing that we see empirically is that if you look at any of these individual shale-gas plays-whether it's the Haynesville or the Barnett or the Fayetteville-they all contract to a core area that has the potential to be commercial that is on the order of 10 to 20 percent of the geographic area that was originally represented as all being the same. So if you take the resource size that's advertized-say for the Haynesville shale, something like 250 Tcf-and you look at the area that's emerging as the core area, it's less than 10 percent of the total. So is 25 Tcf a reasonable number for the Haynesville shale? Yeah, it probably is. And it's a huge number. But the number sure is not 250 Tcf, and that's the way all of these plays seem to be going. They remain significant. It hasn't been proved to me yet that any of it is commercial, but they're drilling it like mad, there's no doubt about it.

Those are sort of the basic conclusions. And when you look at it probabilistically, which I think is the only intelligent way to look at anything which you have any uncertainty about, what you realize is that the numbers that are being represented by all of these companies as "truth" are probably like the P-5 case, having a 5 percent probability of being true. So they say, "well, our average well in the Haynesville is going to be 7 Bcf," and I say there will certainly will be wells that make 7 Bcf but there's no way that the average is that high. My take is that there will probably be 5 percent of wells that will make 7 Bcf.

I just think everybody is caught up in this. I have a slide where I say, you guys need to get over the love affair and get on with the relationship. You keep talking about how big it is and how great it is, but at some point you have to live together and that's hard work. You have to be honest with yourself and with each other and you have to do some work. I just don't think we've moved past the love affair.

One other important thing is the Barnett shale. We keep coming back to it because it's the only play that has much more than 24 months worth of history. I recently grouped all the Barnett wells by their year of first production. Then I asked, of all the wells that were drilled in each one of those years, how many of them are already at or below their economic limit? It was a stunning exercise because what it showed is that 25-35% of wells drilled during 2004-2006-wells drilled during the early rush and that are on average 5 years old-are already sub-commercial. So if you take the position that we're going to get all these great reserves because these wells are going to last 40-plus years, then you need to explain why one-third of wells drilled 4 and 5 and 6 years ago are already dead.

***POR**: When you say one-third of the wells are already sub-commercial, do you mean they have been shut in, or that they are part of a large pool where no one has sharpened the pencil?*

Berman: Some of them never produced to begin with. No one talks about dry holes in shale plays, but there are bona fide dry holes-maybe 5 or 6 or 7 percent that are operational failures for some reason. So that's included. There are wells that, let's just call them inactive; they produced, and now they're inactive, which means they are no longer producing to sales. They are effectively either shut-in or plugged. Combined, that's probably less than 10 percent of the total wells. But then there are all the wells that are producing a preposterously low amount of gas; my cut-off is 1 million cubic feet a month, which is only 30,000 cubic feet per day. Yet those volumes, at today's gas prices, don't even cover your lease/operating expenses. I say that from personal experience.

I work in a little tiny company that has nowhere near the overhead of Chesapeake Energy or a Devon Energy. I do all the geology and all the geophysics and there's four or five other people, and if we've got a well that's making a million a month, we're going to plug it because we're losing money; it's costing us more to run it than we're getting in revenue.

So why do they keep producing these things? Well, that's part of the whole syndrome. It's all about production numbers. They call these things asset plays or resource plays; that reflects where many are coming from, because they're not profit plays. The interest is more in how big are the reserves, how much are we growing production, and that's what the market rewards. If you're growing production, that's good-the market likes that. The fact that you're growing production and creating a monstrous surplus that's causing the price of gas to go through the floor, which makes everybody effectively lose money….apparently the market doesn't care about that. So that's the goal: to show that they have this huge level of production, and that production is growing.

But are you making any money? The answer to that is…no. Most of these companies are operating at 200 to 300 to 400 percent of cash flow; capital expenditures are significantly higher than their cash flows. So they're not making money. Why the market supports those kinds of activities…we can have all sorts of philosophical discussions about it but we know that's the way it works sometimes. And if you look at the shareholder value in some of these companies, there is either very little, none, or negative. If you take the companies' asset values and you subtract their huge debts, many companies have negative shareholder value. So that's the bottom line on my story. I'm not wishing that shale plays go away, I'm not against them, I'm not disputing their importance. I'm just saying that they haven't demonstrated any sustainable value yet.

POR: *How have analysts and investors responded to your studies and your viewpoints?*

Berman: My biggest clients, for this kind of talk and work, are investment bankers and investment advisory companies. I gave two talks in Calgary over the last week-one to CIBC and the other to Middlefield Capital. I've given multiple talks to energy investment companies. They're the people who are really paying attention to this. The answer is that a significant portion of the investment banking sector takes what I'm saying quite seriously, but what they do with that I can't tell you.

POR: *How has the gas-producing industry responded to your studies and views?*

Berman: The U.S. companies have pretty much chosen to ignore me. Or they've made public statements that I'm a kook or I don't understand or I'm hopelessly wrong. Some them-especially the Canadian companies for some reason-want me to advise them even though my message is not a message that they prefer.

It's a fascinating process. My sense of it is that the level of interest, and whatever notoriety I have, has only increased. I credit the ASPO 2009 peak oil conference in Denver with really kicking that off. That presentation was a tipping point in awareness about the truth of shale gas reserves and economics. After my presentation, I had almost five hours of discussions with analysts that had attended the talk. Associated Press reporter Judith Kohler published an article -Analyst: Gas shale may be next bubble to burst‖ that was distributed to hundreds of outlets in the national press and that brought this topic into the mainstream. U.S. E&P executives responded with a series of *ad hominem* opinion editorials and earnings meeting statements that minimized the fact-based positions that were presented at the ASPO 2009 meeting.

Before that, I spent months making presentations to professional societies of geologists,

geophysicists and engineers throughout the Gulf Coast. These are colleagues who do the work of the petroleum industry that gave me what amounted to a peer review. I know that there were silent people in those audiences who disagreed with me, but the overall response was supportive and enthusiastic. I also got hundreds of e-mails responding to my *World Oil* articles that included testimonials about companies' experience with shale gas wells in the real world.

E&P executives don't have any such base, nor do they know about this experience. In all of my presentations, I acknowledge people that include some of the most respected E&P CEOs, opinion leaders, and experts on oil and gas price formation, reservoir engineering, economic evaluation and risk analysis. In addition, there are also many industry analysts in research companies, financial advisory and fund management firms, and reporters in the energy press that consult and publish opinions about my position on shale gas.

The point is that I am not alone. I have a large community of supporters with impeccable credentials. I am a cautious and somewhat conservative person in my professional work because I advise clients on high-risk and very large bets on wells and investments. My reputation and future income depends on the credibility of my evaluations and the quality of my research. I do not believe that the same can be said for the CEOs of the U.S. public companies that dispute my findings.

I'm a fairly busy guy, and a lot of people want to hear the story; I talk to Bloomberg and Platts and others all the time. If anything, I feel as if I'm sort of slipping into the mainstream, in a weird way. It's a scary thought. I'm now asked to participate in august panel discussions, albeit representing the radical fringe; but a year ago nobody even wanted to talk to me.

I don't know where it's going. It seems inevitable to me that it is sort of a bubble phenomenon; but bubbles can go on for 25 years or so, even though everyone knows that's what's happening. As long a capital markets continue to fund these things it's going to keep on going. I'm not saying that's even a bad thing, though I wouldn't put any money in it, that's for darned sure.

POR: *Back in the 1960's the phrase "too cheap to meter" was introduced, by some promoters, as being the future of nuclear energy. Over time, the reality obviously didn't match the hype. It feels to us that there could be a parallel with the recent 100-year-supply statement...*

Art Berman: It could be a big denial issue...

POR: *Like that early era for atomic power, the shale gas story still seems so new that there are a lot of uncertainties about the shale gas bucking bronco, if you will. How will the industry respond to the uncertainties? How are they responding to the current tough price signals?*

Berman: Not at all right now. I had a whole series of talks that I gave last spring called, "North American Natural Gas: Acknowledging the Uncertainty." That's all I want people to do. Not that they shouldn't drill for it or that I'm right; all I'm saying is acknowledge the uncertainty.

A Few Related Links

Art Berman's Presentation at October 2009 ASPO-USA Meeting Shale Plays: A Time for Critical Thinking

Shale Gas Estimates Perhaps Optimistic - An Interesting and Worrying Talk at ASPO by Heading Out, October 2009

More Natural Gas Controversy by Gail the Actuary, November 2009

ExxonMobil's Acquisition of XTO Energy: The Fallacy of the Manufacturing Model in Shale Plays by Art Berman, February 2010

This is the EIA's Natural Gas forecast from the current Annual Energy Outlook. While shale gas didn't amount to a very large percentage of production through 2008, the forecast they are using is for it to provide a large increase. Without it, US natural gas production would fall.

Shale gas provides largest source of growth in U.S. natural gas supply

Figure 73. Natural gas production by source, 1990-2035 (trillion cubic feet)