

## On The Road To Commercial Production

By *Richard Macedo*

While shale gas resources have successfully been unlocked in the United States, particularly in the Barnett shale of Texas, Canadian producers are just beginning to exploit northern shale gas plays.

In Western Canada, the unquestionable star of the show is British Columbia's Horn River Basin which could see thousands of wells drilled to reach its potential. Although it is very early in the exploration cycle, already some of the big players have estimated a combined resource potential range of 23 tcf to as high as 38 tcf. An independent analysis lead by Robin Mann, CEO of AJM Petroleum Consultants suggest that while the estimated resource potential reaches 308 tcf, the total marketable resource in the Horn River Basin is probably in the 21 - 110 tcf range.

The Basin is tucked in the extreme northeast part of the province covering an area of 1.28 million hectares within the Fort Nelson/Northern Plains area, extending east of the Kledo-Bovie Lake fault system to the Jean Marie shelf edge.

The province's land sale coffers are overflowing as producers have plunked down billions of dollars in land sales, with wallets opening up noticeably in the last year. Bonuses of land sale rights in 2006 were \$630 million. Of that, 20% was directly attributed to interest in shale gas plays. In 2007, land sale activity rose sharply, reaching \$1.05 billion with as much as 89% credited to shale gas activity. So far this year B.C. sales have earned the province \$2.23 billion, including some high-priced Horn River Basin parcels.



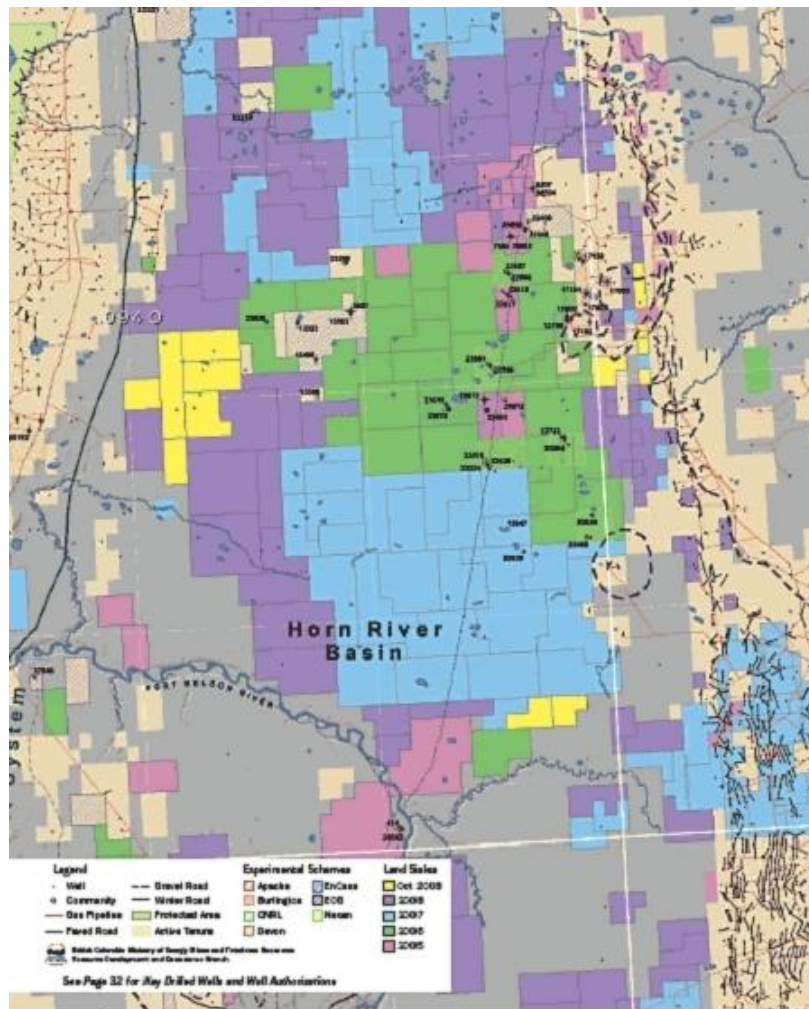
Shale Gas Activity Horn River Basin, B.C. In 2008, B.C. land sales have earned the province \$2.23 billion, including some high-priced Horn River Basin parcels.

Producers have known for years about shale gas in the Horn River Basin but extracting it economically simply wasn't possible. The advent of multi-stage fracturing technology and some experience brought over from the U.S., however, has changed the game.

The pedigree of explorers currently sniffing for Horn River shale gas is strong with EOG Resources Inc., EnCana Corporation, Nexen Inc., Apache Corporation, Devon Energy Corporation, Imperial Oil Limited and Quicksilver Resources Inc. all in the game. Well results have been slowly trickling out throughout the year with winter drilling plans in the early stages.

EnCana and Apache have drilled seven wells so far this year in the Basin, the first three by Apache and the final four by EnCana. EnCana's first three wells were producing two to three mmcf per day after two-and-a-half months while the last of the four wells is not far enough along in development to have production results. EnCana has estimated gas in place on its lands in the region totals 35 tcf but didn't provide any estimate on what percentage of the resource might be recoverable. In April, Apache announced the results of the three horizontal wells it had drilled during the first quarter. The company achieved 24-hour test rates of 5.3, 6.1 and 8.8 mmcf a day, respectively.

EOG recently started sales from its first two shale wells at Horn River. Before assessing per well reserves, however, the company planned to monitor the production profile of the wells and an additional five wells that should be completed by year-end. Quicksilver plans to drill two wells during the upcoming winter drilling season while Devon drilled a three-well pilot project in the Horn River area consisting of two horizontal wells and one vertical well which have been onstream since April. One well was into the Muskwa, the other into the Evie. Devon recently said its Horn River holdings have potential to eventually produce up to 700 mmcf per day and five to eight tcf of reserves.



Since September 2007, Imperial Oil Limited and ExxonMobil Canada Limited have acquired total license holdings of about 115,000 acres at Horn River, with each having a 50% interest. Pius Rolheiser, an Imperial spokesperson, said exploration plans are still under development, but there will be delineation drilling this winter.

The number of dollars being spent on land and some encouraging well results so far point to future success, although there are still some tough hurdles. Industry, for example, is already aware of problems associated with rapid expansion in an area that has a virtually bare infrastructure cupboard.

One problem that has come to light involves electricity. The Fort Nelson area is located within B.C. Hydro's service area in northeast B.C. but is electrically integrated with the Alberta electricity system. The load in the Fort Nelson area is normally met from Hydro's Fort Nelson Generating Station.

B.C. Hydro relies on the interconnection to Alberta to provide backup to the generating station. But according to a B.C. Hydro report, the load in the region has grown to the point that "new resources are required to be able to reliably meet the demand."

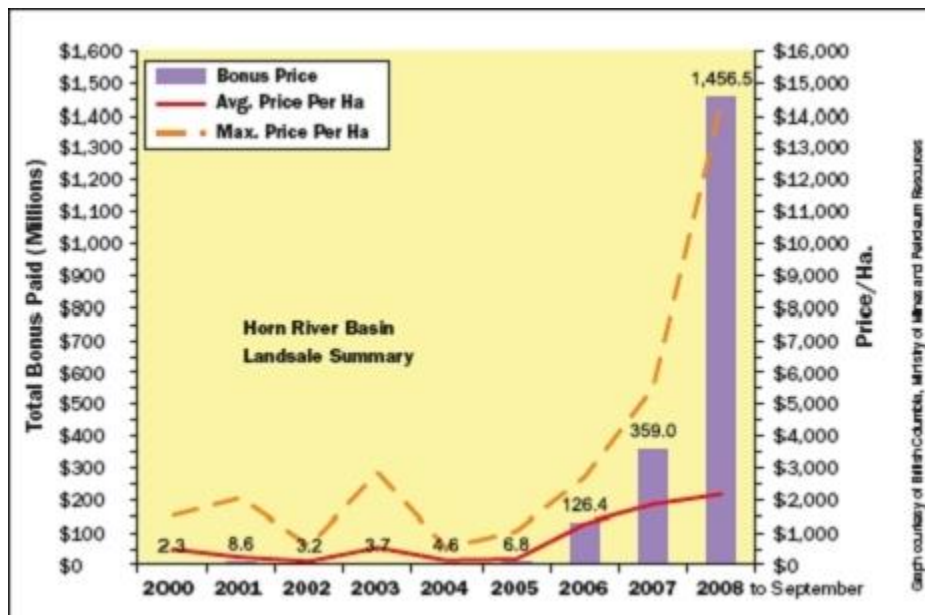
"There is a possibility of a significant increase in industrial demand in the region which, absent new supply resources, B.C. Hydro will not be able to serve," the report noted. "Recent load additions in the region have stretched the system to the point that there are times when firm loads must be served on a curtailable basis." Upgrading the Fort Nelson generating station will add an additional eight to 17 megawatts of firm electricity supply in the Fort Nelson area. The \$59 million project could be operational by March 2012 if B.C. Hydro gets the regulatory nod this fall.

David Pryce of the Canadian Association of Petroleum Producers said industry is working to mitigate the problem. "With the Horn River play developing the way it is, there's actually a joint government/industry

working group looking at developmental issues," he noted. "I know electricity is on the list of things that they're talking about."

Pryce believes industry and government are well enough ahead in the pre-planning stage so it won't be a constraint although he agreed this must be resolved. "In the short-term addressing it might involve gas-fired or onsite or that sort of thing," he said. "In the longer-term, I think, though, that the strategy makes more sense to try and find hydro power coming in."

At a recent Insight Information Pacific Gas Forum in Vancouver, James Reimer, executive vice-president with Result Energy Inc. cautioned Horn River is not as developed in terms of infrastructure and the winters can be harsh. "The road infrastructure is starting to come along but by and large it's winter only access," Reimer said. "We are seeing some all-weather roads built which will allow you to extend activity along those road right-of-ways. You can't get too far off or you're into the muskeg again and that's just not passable in the summer." Another issue is the water needed for fracking. There are huge logistics sourcing the water, storing the water and keep the water from freezing during winter, Reimer noted.



Takeaway and gas plant capacity is also needed to handle future gas volumes and pipeline companies and midstream operators are already testing the waters.

TransCanada Corporation started kicking tires in the summer on two new pipelines to move natural gas from northeast B.C. to Alberta. The company began a non-binding open season for two projects which would see gas flow on the new pipelines from Horn River development and the Montney-Groundbirch gas play. The company received requests exceeding one bcf per day of gas transmission service by 2012 for each of the Montney and Horn River areas with these volumes increasing in subsequent years.

"Western Canada (is in a) steep decline of gas available for export," said Simon Mauger, Ziff Energy Group's director of gas services. "That's a combination of declining conventional gas production and surging oilsands demand. Consequently, TransCanada will have a large amount of empty pipe."

Spectra Energy launched an open season in the spring to solicit participation in the expansion of raw gas transmission capacity in the Fort Nelson area. The company said that the open season was successful and customer interest "strong" but didn't elaborate. Spectra is finalizing customer commitments that will determine the final design scope and timing of facilities expansion.

Fort St. John-based Surerus Pipeline Inc., an installation contractor, also expects big things from Horn River and recently acquired a 6,000 square foot facility in Fort Nelson. "Once (producers have) found, developed, produced and confirmed the volumes, then we're in the pipeline business," said Steve Thorlakson, the company's general manager and former longtime Fort St. John mayor, pointing to the obvious benefit. "We're confident enough in what's happened up there that we actually bought a shop up

there." Company representatives recently met with a producer company in Calgary to discuss developments in the Horn River Basin.

With a population of 4,514 as of the 2006 census, Fort Nelson is poised to reap huge rewards. But Mayor Chris Morey said that while the town is accustomed to oil and gas activity, the sheer size of Horn River development makes careful planning essential. "We view it as a very positive thing for the future of the area," she said. "We've got to look at it from a logistical perspective ... to ensure that we can really service this industry as a service centre."

A sufficient power supply for industrial development and having enough money for infrastructure needs are key requirements. Procuring a "fair share" deal with the province similar to one inked with the Peace River Regional District is a possibility. Municipalities in the PRRD include Fort St. John and Dawson Creek. Fair share is essentially a grant provided to the communities in lieu of access to the industrial tax base and is indexed to growth.

The community is also going to referendum in November, which will ask residents to approve switching to a regional municipality. The town is currently in the Northern Rockies Regional District. If the referendum passes, the new regional municipality would take on the boundaries of the existing regional district, the mayor explained. The regional municipality model is designed to level tax rates for industry across the entire area and remove discrepancies.

Despite all the enthusiasm, however, producers are in the very early stages and still need a better handle on the shale gas play, which will only come from further drilling.

Mike Dawson, president of the Canadian Society for Unconventional Gas, notes that the exploration process in new regions often involves examining baseline information and drawing an analogue to something successful, such as the Barnett shale in Texas. "I don't think all the rock properties, reservoir properties and the geographic issues have been factored into the equation at the present time," he said. "If you look at it from a pure reservoir quality perspective, the shale gas potential of the Horn River Basin has similar characteristics to Barnett type of rocks."

To date, there have only been around 35 true shale wells drilled into Horn River Basin with just 14 of those horizontals, Dawson added. "A lot of those horizontals have been more experimentation," he said. "One of the key elements to achieving commercial success will be to bring your costs down."

A study on the Horn River prepared by Victoria, B.C.-based OnPoint Consulting Inc. noted that at Horn River assuming conventional drilling densities of one well per 259 hectares (640 acres) and 300,000 hectares of surface area, roughly 1,100 wells are expected to be drilled. With few community or archeological disturbances in the area, higher drilling densities of one well per 33 hectares (80 acres) are possible. With higher drilling densities, the Horn River play could result in upwards of 5,000 wells over the next decade.

Recent excitement about resource potential numbers in British Columbia must be tempered by an assessment of the technically recoverable resource potential and actual marketable resource potential, cautioned Mann. "If you add up all the numbers, the natural gas resource potential of hot prospects like the Montney play and the Horn River play in British Columbia currently ranges from 600 to 2000 trillion cubic feet," said Mann. "But, rather than just looking at the estimated resource potential, investors need to focus on the marketable reserve potential of these plays, which while still impressive, isn't as large as the estimated resource potential."

