

British Columbia Oil & Gas Exploration Activity Report 2005



Oil and Gas Division
Resource Development and Geoscience Branch





Ministry of
Energy, Mines and
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BRITISH COLUMBIA OIL & GAS EXPLORATION ACTIVITY REPORT 2005

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TABLE OF CONTENTS

ABSTRACT	2
INTRODUCTION	2
DATA SOURCES	3
2005 OIL AND GAS EXPLORATION ACTIVITY	3
Liard Basin and Fold Belt Region	6
Fort Nelson/Northern Plains Region	6
Fort St. John Region	13
Deep Basin Region	17
Northern Foothills Region	21
Southern Foothills Region	25
INTERIOR BASINS OF BRITISH COLUMBIA	28
COALBED GAS IN BRITISH COLUMBIA	30
CBG Tenure Activity in 2005	30
CBG Drilling Activity in 2005	31
Industry Highlights	31
OUTLOOK	33
REFERENCES	33

BRITISH COLUMBIA OIL & GAS EXPLORATION ACTIVITY REPORT 2005

Chris Adams¹, Mark Hayes², Filippo Ferri¹ and Sachie Morii¹

ABSTRACT

Drilling activity in British Columbia reached another record level in 2005. The number of wells drilled increased by 11% from 2004. Raw natural gas production reached three Bcf per day, and conventional oil production was 31,000 barrels per day. In 2005, raw gas reserves resulting from exploration and development activities were successful in replacing 328% of the year's gas production. The established remaining 2005 raw gas reserves are at 15.8 Tcf, which represents a 14% increase over 2004 year-end reserves. Bonuses collected from the sale of British Columbia's Crown petroleum and natural gas rights in 2005 totalled \$534 million, just short of the record total achieved two years earlier. The average price per hectare of \$922 was the highest ever recorded in the province.

Exploration activity highlights in 2005 are covered for six resource regions in northeastern British Columbia: Laird Basin & Fold Belt; Fort Nelson/Northern Plains; Fort St. John; Northern Foothills; Southern Foothills; and the Deep Basin. The Fort Nelson region, particularly in the areas around Helmet and Gunnell Creek, saw the highest activity in the province as producers focused on Jean Marie development. In the Drake area of the Fort St. John region, strong drilling activity was driven by development of the Notikewin and Gething play trends. The Deep Basin region continued to keep operators busy as they exploited relatively undeveloped tight gas targets such as the Cadomin Formation. Another significant deep gas discovery was made in the Southern Foothills region, where Talisman Energy Inc. drilled a successful Paleozoic well in the Sukunka field.

Land tenure and drilling activity for coalbed gas exploration in 2005 continued throughout the province with a total of \$4 million in bonuses paid to acquire 12,448 hectares of land. Canadian Spirit Resources Inc. successfully acquired petroleum and natural gas rights in the Farrell Creek area near Hudson's Hope. Under the freehold coal tenure agreement, the Elk Valley Coal Partnership secured a 10,359-hectare tenure disposition in the Crowsnest coalfield. Drilling activity during the year was completed near the areas of Hudson's Hope, Elkford, and Sparwood.

Highlights of 2005 results from the third summer of a four-year cooperative program between the Resource Development and Geoscience Branch/Geological Survey of Canada included summer field work carried out in the Nazko and Redstone areas of the Nechako Basin and in the Chilcotin Ranges. Field activities were also carried out in the southern Bowser and Sustut basins to gain a better understanding of the hydrocarbon potential by examining the relationships between the Skeena and Bowser Lake groups.

Adams, C., Hayes, M., Ferri, F., Morii, S., British Columbia Oil & Gas Exploration Activity Report 2005, BC Ministry of Energy, Mines and Petroleum Resources, pages 1-33.

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Keywords: exploration and development, industry activity, northeastern British Columbia, petroleum and natural gas rights, resource region, land sales, drilling, production, reserves, rig releases, coalbed gas, interior basins.

INTRODUCTION

The Province of British Columbia continues to promote the development of conventional, unconventional and frontier oil and gas resource opportunities. Exploration and development activity by the oil and gas industry is a key component of the provincial economy and provides significant

opportunities for British Columbians. Industry drilled a record 1,426 wells in the province in 2005 (OGC, 2006). Direct Crown revenue collected was \$1.9 billion, and capital spending by industry in the province is projected to reach \$4.5 billion¹ in 2005.

The number of wells rig released in the province last year increased by 11% from 2004 (*Figure 1*). Most wells were drilled in the northeastern portion of the

¹ Official number not yet available from the Canadian Association of Petroleum Producers

province but some activity was recorded in the southeastern BC, centering on coalbed gas exploration.

At the end of 2005, raw natural gas production in the province reached 3.0 Bcf per day and oil production was 31,000 barrels per day. The province's established remaining raw gas reserves for 2005 of 15.8 Tcf reached record levels, a 14% increase over 2004 year-end reserves. The industry's exploration and development activities have contributed reserve additions that have more than replaced annual gas production for the last eight years (Figure 2). In addition, the 2005 reserves to production ratio (R/P) of 15.9 years is up again for the third year in a row, after a long period of slow decline (Figure 3).

The generally consistent nature of the R/P ratio over the last decade is a key measure of sustainability. It demonstrates the success that exploration and production companies have in converting BC's undiscovered resources into reserves. To measure how sustainable this trend is, the Resource Development and Geoscience Branch of the BC Ministry of Energy, Mines and Petroleum Resources (EMPR), in collaboration with the National Energy Board (NEB), have recently completed a review of the undiscovered natural gas resource potential for northeastern British Columbia (EMPR/NEB, 2006). This report can be viewed at www.em.gov.bc.ca or at www.neb-one.gc.ca.

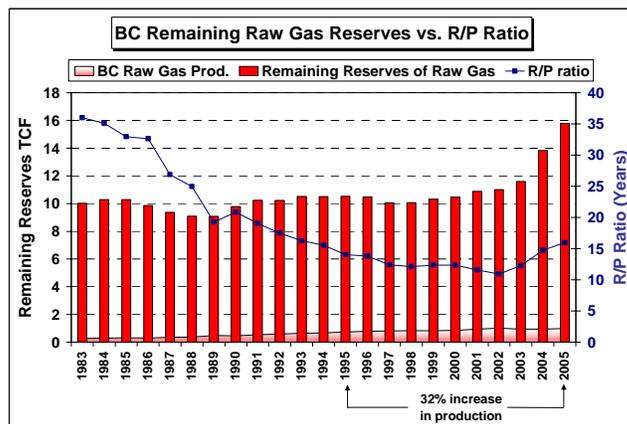


Figure 3: BC's Remaining Raw Gas Reserves to Production Ratio

DATA SOURCES

Since 1998, the BC Oil & Gas Commission (OGC) has been the regulatory agency for oil and gas operations in British Columbia. Basic data and statistics regarding oil and gas activity can be acquired from the OGC website at www.ogc.gov.bc.ca.

The OGC is also responsible for maintaining the provincial reserves database. The most recently published reserve statistics in this report are sourced from the *Hydrocarbon and By-Product Reserves in British Columbia 2005* (OGC, 2006).

Data for this exploration and activity summary has been collected from available public sources. No confidential data or information has been utilized in its preparation.

2005 OIL AND GAS EXPLORATION ACTIVITY

Bonuses collected from the sale of British Columbia's Crown petroleum and natural gas rights in 2005 fell short of 2003's record total of \$647 million, but the average price per hectare of \$922 was highest ever recorded in the province. Bonus payments for the year totalled \$534 million (Figure 4). The largest distribution of those payments went to the Fort St. John resource region, which brought in a total of \$184 million from the purchase of 241,980 hectares (Figure 5).

In 2005, the BC Oil and Gas Commission issued 1,790 well licences (Figure 6). This represents the highest ever annual level of well licences issued in the province. Ninety-five per cent of these well licences listed gas as the objective, while five per cent targeted oil.

For ease of analyses and description, activity in northeastern British Columbia has been broken down by regions, derived from physiographic and geologic attributes as well as previous EMPR competitiveness studies (Figure 7). Exploration activity is discussed for each of these regions in the sections that follow.

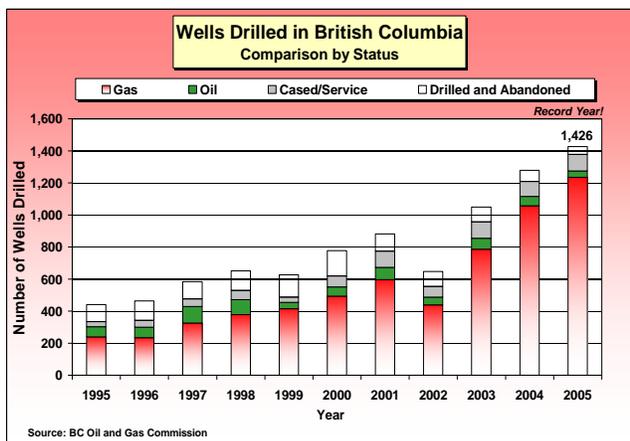


Figure 1: Number of wells drilled in British Columbia

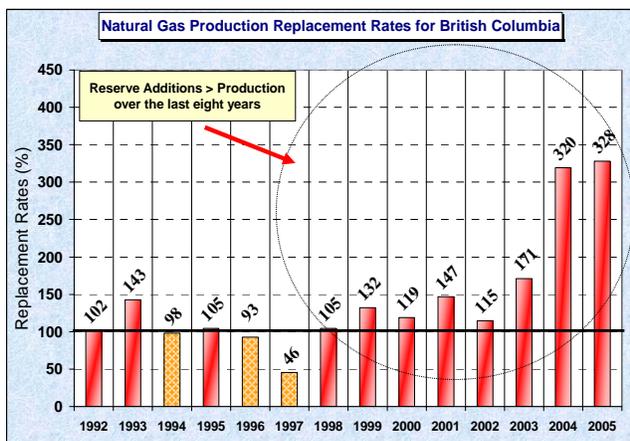


Figure 2: Replacement rates for BC's raw natural gas production

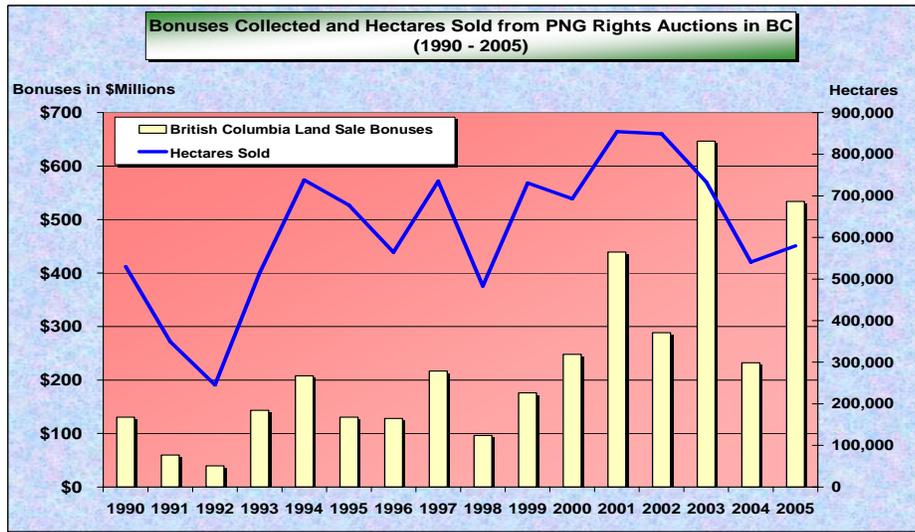


Figure 4. Bonuses collected from Crown PNG rights auctions in British Columbia.

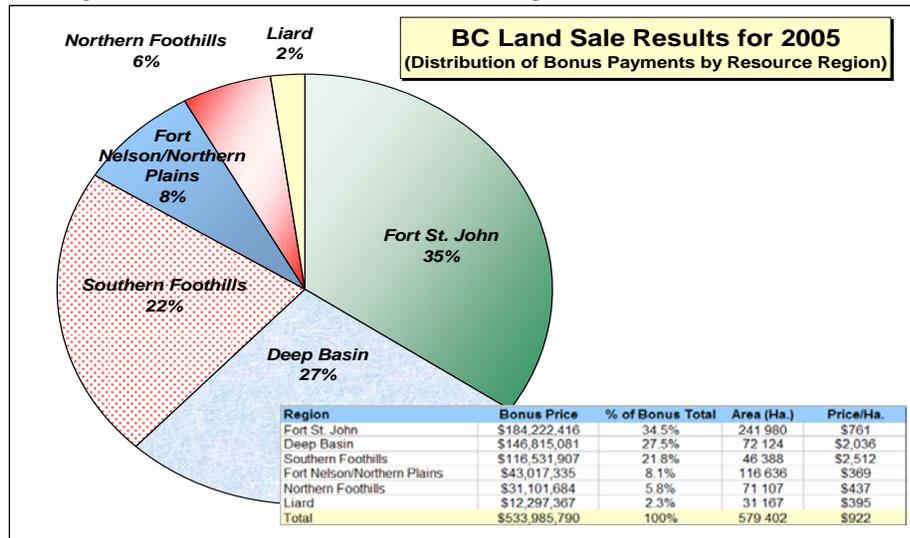


Figure 5. Bonus payments by resource region from BC's 2005 Crown PNG rights auctions.

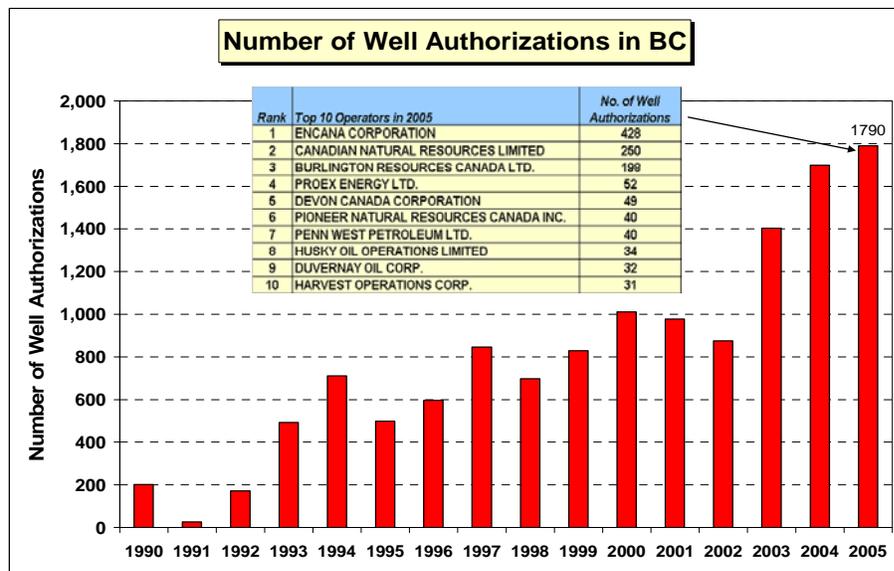


Figure 6. Well licences issued by the BC Oil and Gas Commission (1990 - 2005).

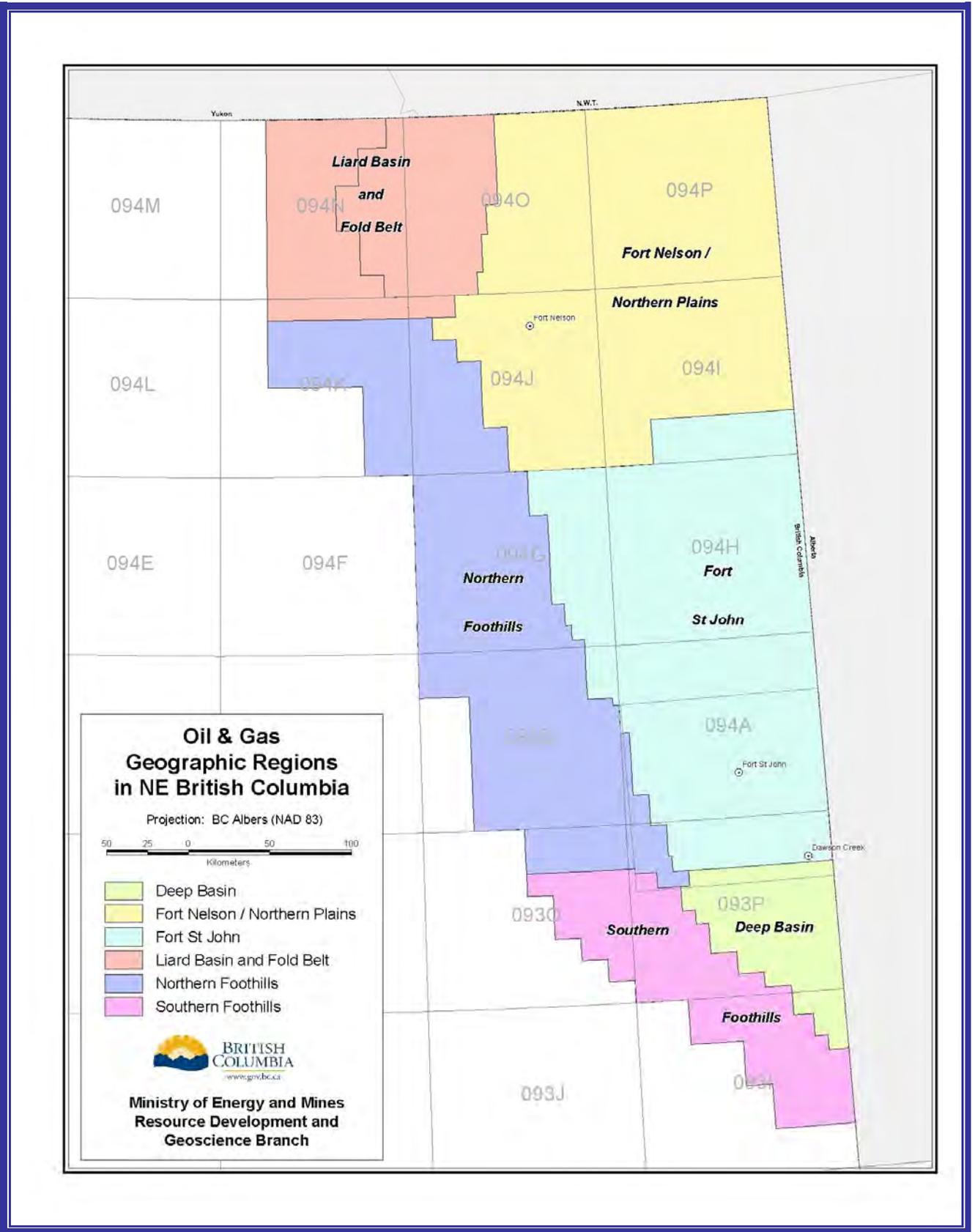


Figure 7. The six oil and gas resource regions of northeastern British Columbia.

Liard Basin and Fold Belt Region

Straddling the Northwest and Yukon Territories with the Province of British Columbia, the Liard Basin and Fold Belt region is a relatively unexplored area situated immediately east of the Cordilleran Fold and Thrust belt. In northeastern British Columbia, the Liard Basin and Fold Belt region cover an area of approximately 1.25 million hectares and contain over five kilometres of sedimentary strata of Cambrian to Upper Cretaceous age. Potential hydrocarbon objectives can occur in the Devonian Dunedin/Nahanni Formation, the Mississippian Banff, Debolt, and Mattson formations, the Permo-Pennsylvanian Kindle and Fantasque formations, the Triassic Toad Formation, and the Cretaceous Chinkeh and Scatter formations. The Nahanni holds significant potential in dolomitized reservoirs in the structural belt. The Debolt, Mattson, Kindle, Fantasque, and possibly the Triassic Grayling and Toad formations are potential objectives in structural closures on the Bovie Lake structure on the margin of the basin. The Banff and Debolt formations are also potential objectives in stratigraphic traps on the platform to the east (Walsh *et al.*, Summary of Activities 2005).

Land Sale Activity

Bonus payments from land sale activity in the Liard Basin in 2005 more than tripled those of 2004. Most petroleum and natural gas rights were sold to land brokers, resulting in \$12.3 million in bonus payments, up from \$3.71 million a year earlier (*Figure 9*). Talisman Energy Inc. was the only producer making a land purchase under its own name. It paid out the highest single bonus payment of the year, spending \$1.9 million to acquire a 2,595-hectare parcel in the Beaver River area (94-N-16). The drilling licence covers rights in all zones from surface to basement.

The most active area for rights sales was in the Sandy area, just west of the Maxhamish field. It accounted for over half of all bonus payments in the Liard Basin. In March of 2005, EnCana Corporation drilled a new field wildcat well in the area. The target zone was unspecified.

Drilling

Drilling activity in the Liard Basin/Fold Belt region lagged well behind other resource regions in the province, but it remained active in 2005 as producers continued to target resources in the sandstones of the Cretaceous Chinkeh and the Mississippian Mattson. EnCana Corporation was again the most active operator; it drilled five wells south of the Maxhamish area and one in the Sandy area. The other active operator was Questerre Energy Corporation. It continued with its development program in the Beaver River area, targeting production from the shallow Mattson sands (*Figure 10*).

Production

Only one of the eight wells rig released in the Liard Basin/Fold Belt region recorded production in 2005. A Maxhamish area well produced 138 mcf from the Cretaceous Chinkeh.

Oil and Gas Exploration Highlights

Questerre Energy Corporation has successfully completed its work program in the **Beaver River** area. The two-phase project, managed by **High Arctic Energy Services**, involved the re-entry and re-completion of four existing wells that target gas production from the Mississippian Mattson sands and the deeper Nahanni structure. The results of the project were encouraging; they indicated the potential of further gas recovery in the Nahanni and of higher than expected pressures in the low permeability Mattson sands. One of the re-completed Mattson wells was recently tied in to an existing gas gathering system as its production was processed at Duke Energy's Fort Nelson plant.

EnCana Corporation drilled a total of six wells in the Liard Basin in 2005. All the wells targeted the Lower Cretaceous Chinkeh sandstone formation. One well was rig released in the **Sandy** area (c-60-E/94-O-14). The remaining five were drilled just south of the **Maxhamish** area along the Kledo-Bovie Lake Fault (map sheet 94-O-6 & 94-O-11). The Maxhamish wells were likely drilled to evaluate offsetting land sales from 2003 and 2004. Three of the wells are listed with a gas potential status. The b-90-J/94-O-6 well recorded first quarter production of 138 mcf after 43 hours.

Fort Nelson/Northern Plains Region

Located in the northeast corner of British Columbia, the Fort Nelson/Northern Plains region covers an area of 3.85 million hectares. The region has been active in oil and gas exploration since the 1960's, with the search for natural gas dominated by the Middle Devonian Keg River, Pine Point, and Slave Point carbonates. These plays have high reserves and deliverability, and they include BC's largest recognized gas accumulation at Clarke Lake (3.7 Tcf OGIP). Within the last 10 years, however, the Upper Devonian Jean Marie has become the major target for operators. Natural gas from this interval now dominates new production from the region.

Other potential hydrocarbon objectives in the Fort Nelson/Northern Plains region are the Debolt, Pekisko, and Shunda subcrop edges. Cretaceous targets include a detrital lag at the top of the Mississippian and the Bluesky. New conceptual gas opportunities may also be found in Tertiary sediments similar to the Sousa play in northwest Alberta.

In addition, the region is a major contributor to the province's oil production stream. There is continued development of the Hay River Bluesky heavy oil pools along with the revival of the Desan Pekisko and Shunda oil pools.

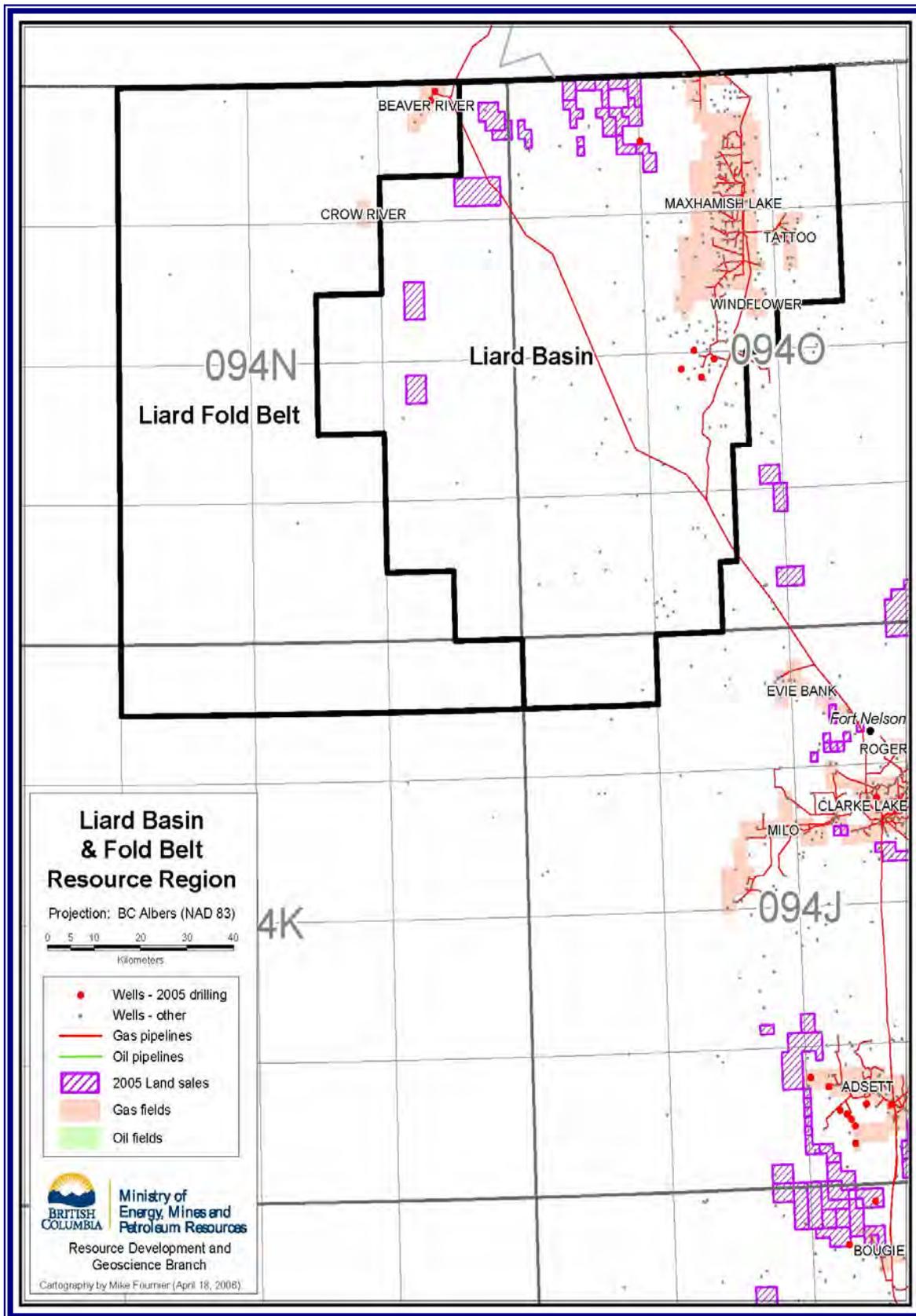


Figure 8. Land sale and drilling activity in the Liard Basin and Fold Belt region of NEBC in 2005.

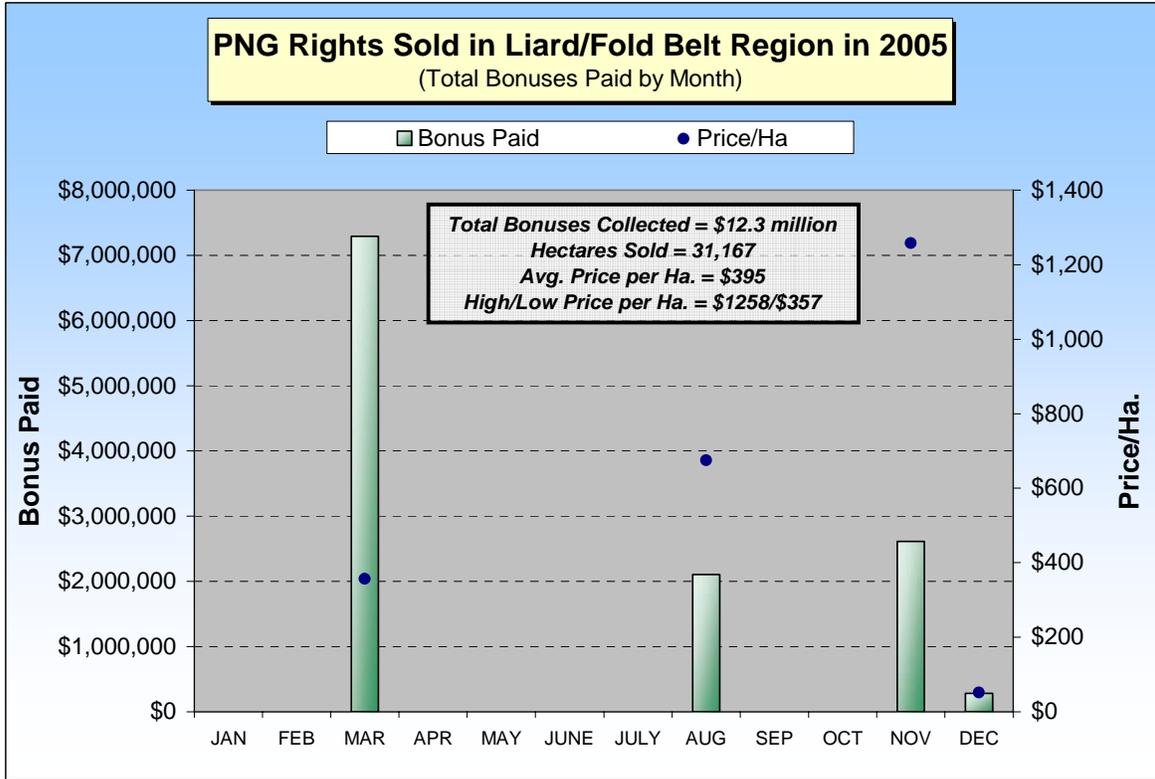


Figure 9. PNG rights sales in the Liard Basin/Fold Belt region in 2005.

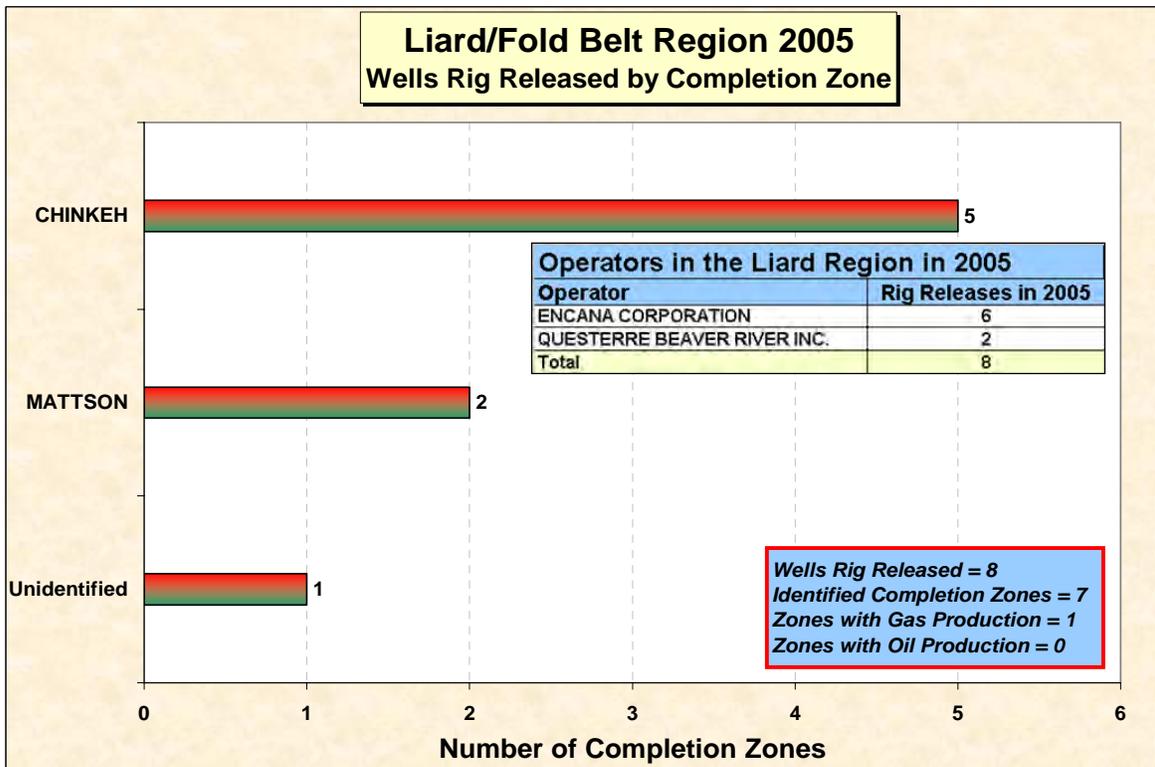


Figure 10. Target zones from wells rig released in the Liard Basin/Fold Belt region in 2005

Drilling

A total of 343 wells were rig released in the Fort Nelson region in 2005. More than half of all rig releases occurred in areas along the Jean Marie reef margin and to the east in the Jean Marie platform. Drilling activity was also high in the Bivouac, Ekwan, and Hay River areas along the BC/Alberta border. The Jean Marie Formation accounted for 77% of all identified target zones in the Fort Nelson region. EnCana Corporation was the most active operator with 160 rig releases (Figure 14).

Production

The distribution of production from wells rig released in the Fort Nelson region in 2005 is shown in Figure 15.

Land Sales

The Fort Nelson/Northern Plains region captured eight per cent of the province's 2005 land sale bonuses. Although the bonus totals more than doubled those of 2004, the region's share of the year's provincial bonus total remained unchanged. A total of \$43 million was spent by land brokers and producers to acquire 116,636 hectares for an average price of \$369 per hectare (Figure 13). Land sale activity was highest in the areas of Adsett, Ootla, Shekilie, and Snake River (Figure 12). The highest bonus collected in the region in 2005 was at the July PNG rights auction; \$5.6 million was spent for a 4,425-hectare drilling licence in the Shekilie area, along the BC/Alberta border (94-I-16).

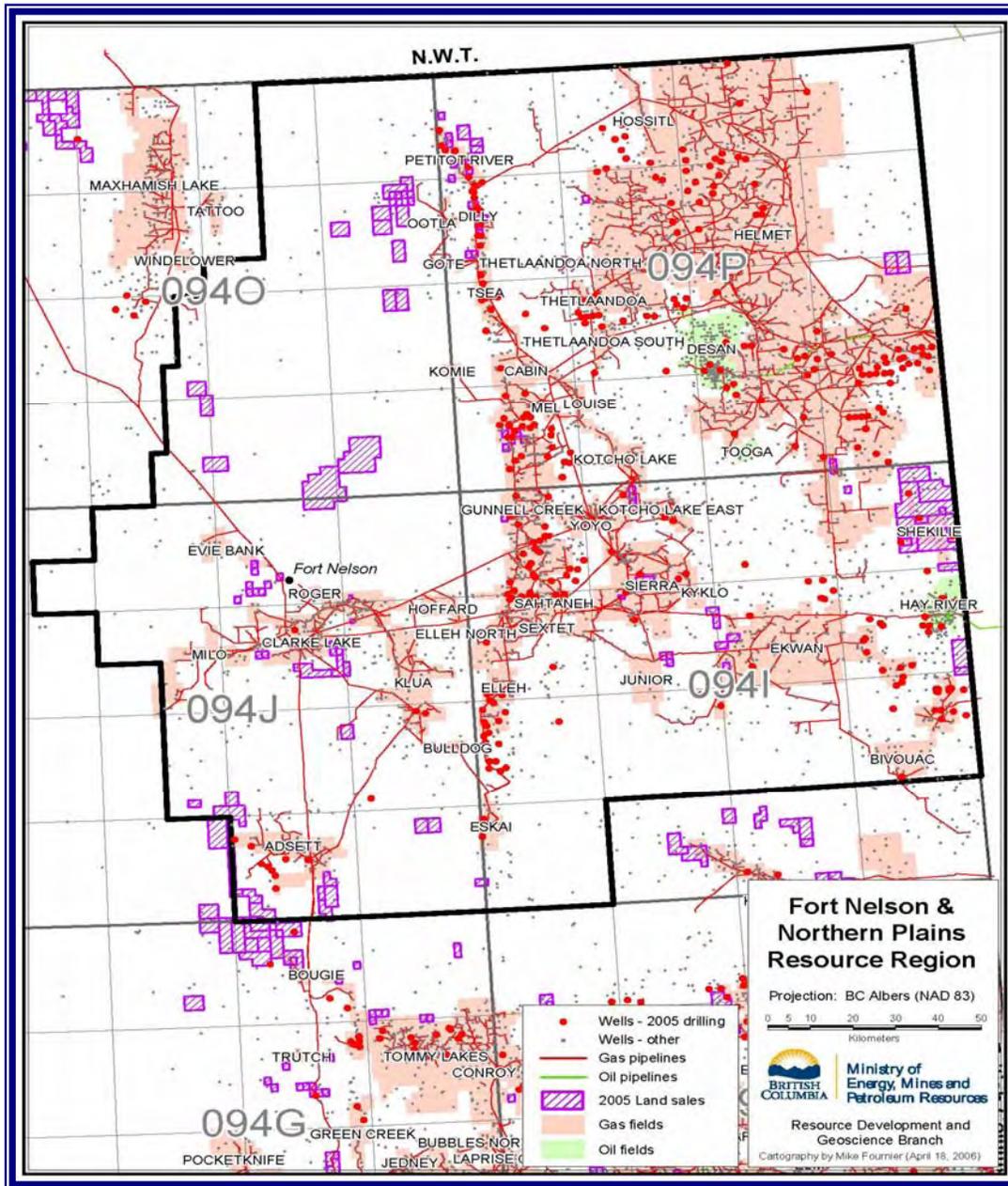


Figure 12. Land sale and drilling activity in the Fort Nelson and Northern Plains region of NEBC in 2005.

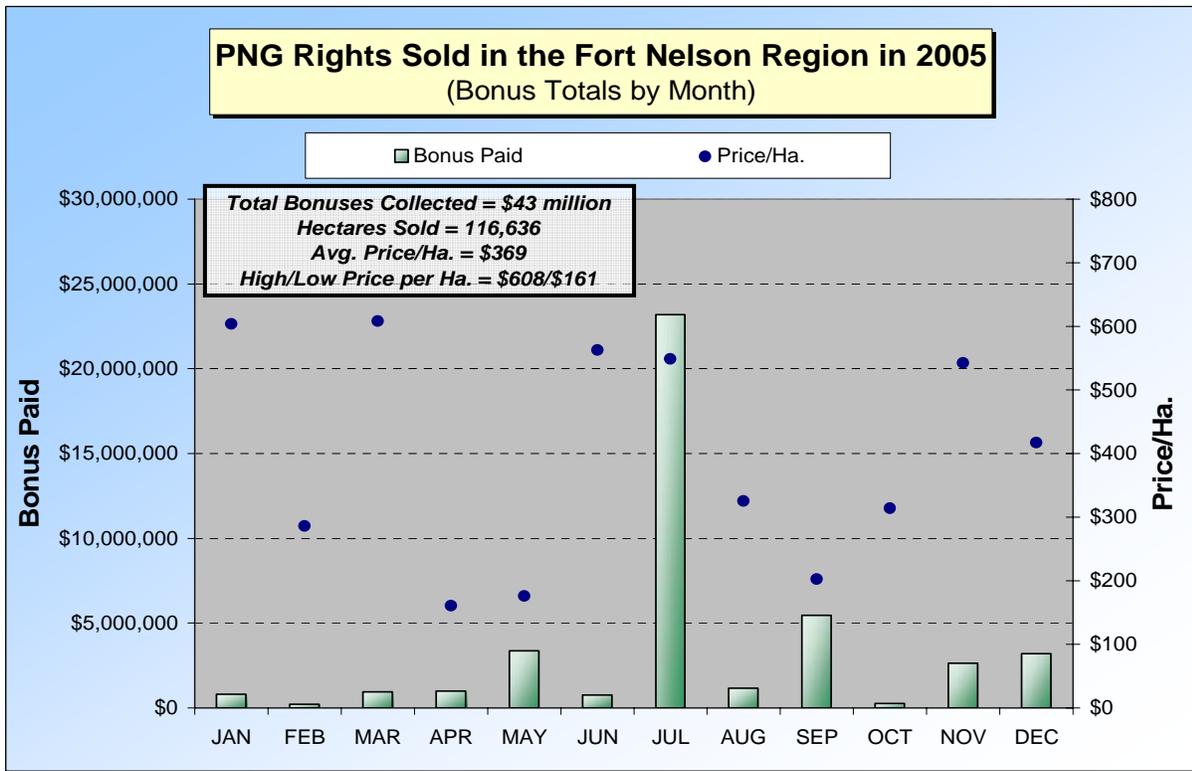


Figure 13. PNG rights sales in the Fort Nelson region in 2005.

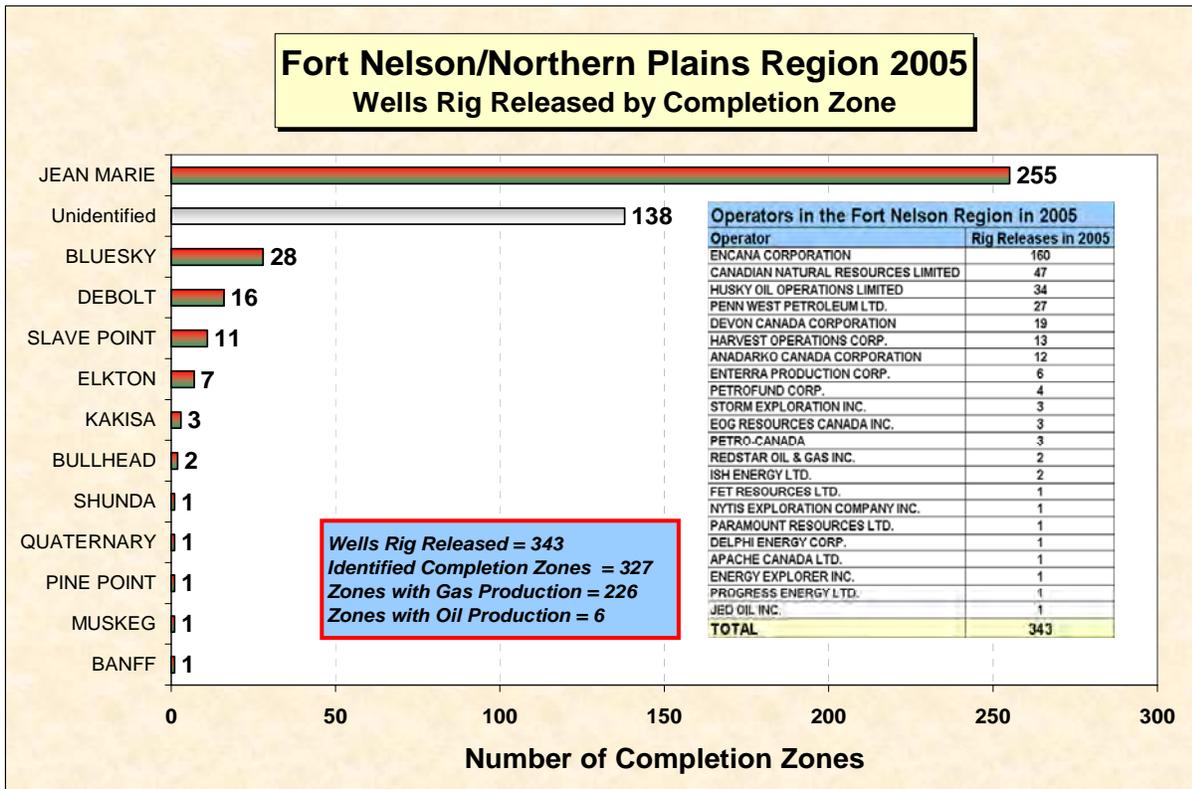


Figure 14. Target zones from wells rig released in Fort Nelson region in 2005.

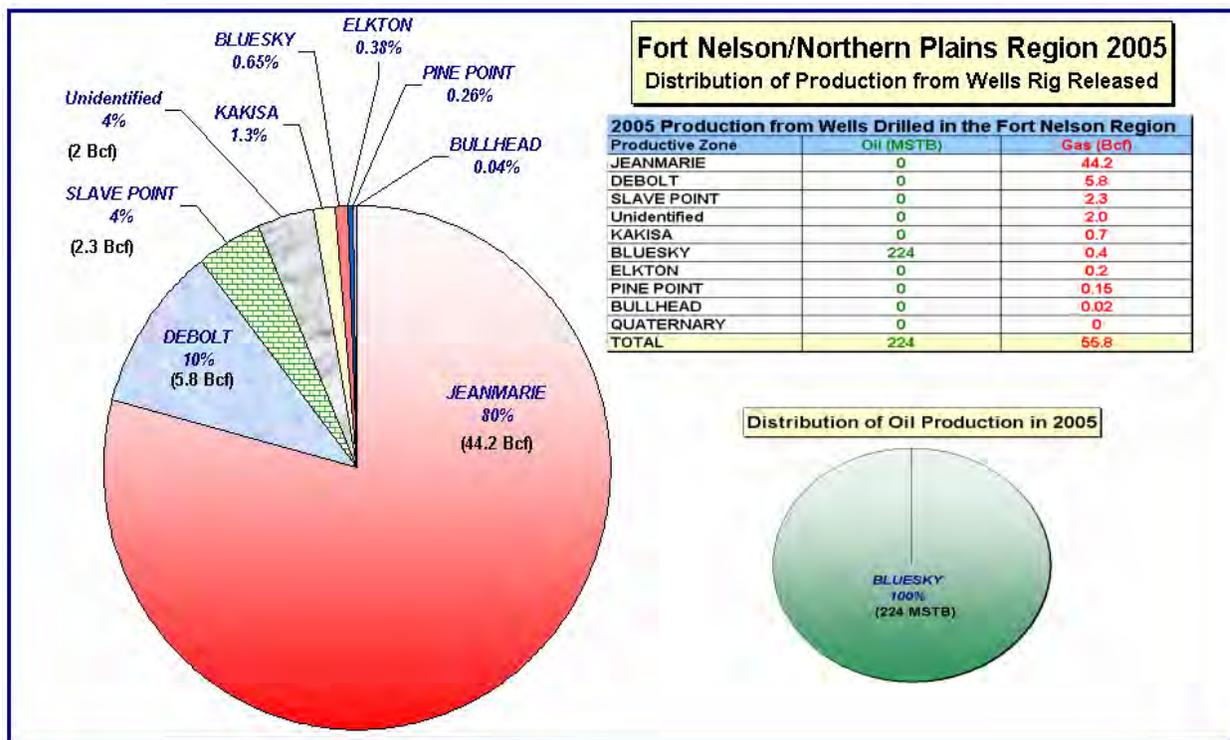


Figure 15. Distribution of production from wells rig released in the Fort Nelson region in 2005.

Oil & Gas Exploration Highlights

The **Helmet** area witnessed the highest number of rig releases in 2005. In fact, it was the most active area in the province. Eighty-nine wells were drilled, and nearly all focused on Jean Marie development. **Canadian Natural Resources Limited** was listed as the most active operator with 44 rig releases. **Devon Canada Corporation** was second with 15 wells.

Gunnell Creek was another area focussing on Jean Marie development. It had 68 rig releases, the second highest number in 2005. **EnCana Corporation** was listed as the operator for all but two of the wells. Over two thirds of EnCana's wells had reported gas production. The other two wells drilled in the area were operated by **Red Star Oil & Gas Inc.** In September 2005, Red Star optioned an extensive land base in northeast BC, accessing approximately 1.12 million net hectares of prospective lands, providing multi-year potential for reserve and production additions.

Northeast BC is an emerging region for **Bear Ridge Resources Ltd.** The company acquired **Veteran Resources Inc.** in November of 2005. As a result, Bear Ridge expanded its position in the Greater Sierra region. The company also entered into a joint venture with a major independent covering 20,639 hectares in the **Helmet** area. This offset the company's **Gunnell Creek** property, where five successful Jean Marie horizontal gas wells were drilled this past winter. Also, this past winter, Bear Ridge recorded a 67-square-kilometre, 3-D seismic program to evaluate a portion of the joint venture lands in the Helmet area, where it plans to conduct a horizontal drilling program in 2006.

Anadarko Canada Ltd. managed an early start to its winter exploration program in 2004/2005. The company continued to search for productive Slave Point plays in the winter-only access areas of **Adsett and Petitot River**. Nine exploration wells were drilled in the Adsett area during the first quarter. Three of those produced gas from the Slave Point at a combined gross rate of 14 mmcf per day. One of the Petitot River area wells (b-99-D/94-P-13) began production in March at a daily rate of 1.0 mmcf per day. Gas production is from the Slave Point C pool. In the third quarter of 2005, Anadarko added 5,140 hectares to its land position in the Adsett and Petitot River areas.

Canadian Natural Resources Ltd. (CNRL) continued to be the most active operator in the northeast section of the Fort Nelson region. It was responsible for 47 rig releases, mostly in the **Helmet** area. Thirty-two of these wells have natural gas production from the Jean Marie, with associated water and condensate production. CNRL has also been drilling in the **Shekilie** area (94-I-16). At the July 2005 PNG rights auction, land brokers paid \$15.9 million to acquire 22,090 hectares in the area. The land sale area is a relatively undrilled tract with fewer than a dozen wells scattered over a 12-kilometre radius. On March 6, 2005, CNRL rig released a new pool wildcat near one of the sale parcels at a-89-B/94-I-16, targeting an undisclosed formation at 500 metres. A week later, the company rig released an outpost well at b-42-G/94-I-16, targeting an undisclosed zone at 580 metres. On March 25, CNRL rig released a second outpost well at c-82-A/94-I-16. The Lower Mississippian Shunda is listed as the target zone.

Within British Columbia, the **Hay River** field has seen production of eight Bcf of gas and 13 million

barrels of oil, mostly from the Bluesky 'A' and 'B' pools. Drilling in the area began in earnest in the late 1990's. **Harvest Operations Corp.** completed 13 wells in its multi-leg horizontal well program in the Hay River area in early 2005. One of the multi-leg wells reported oil production of 96,197 barrels over 10 months. The field is a winter-only access site along the northwestern Alberta and northeastern British Columbia border. The original operator of these wells was **Nexen Canada Ltd.** Harvest Operations Corp. completed its acquisition of Nexen's Hay River area properties in August of 2005. The Hay River property has an estimated 180 million barrels of original oil in place with forecast total recovery of 17%. Only 5.6% of the original oil in place has been recovered to date. Harvest believes it is possible to increase this forecast recovery through development drilling and production optimization.

The **Bivouac** and **Ekwan** areas were active in 2005 with 22 and 18 wells drilled, respectively. **Husky Oil Operations Ltd.** continued to operate wells in the two areas with its successful Jean Marie/Mississippian exploration program. In the Bivouac area, Husky drilled a total of 15 wells; 13 reported gas production from the Jean Marie. At Ekwan, the producer drilled 19 wells, 13 of which reported gas production from a variety of zones, including the Bluesky, Bullhead, Elkton, and Jean Marie.

In late November, **Delphi Energy Corp.** entered into a farm-in agreement with a major producer to jointly develop a natural gas resource play in the **Bigfoot** area (south of **Eskai**). Delphi estimated that initial 2006 production from the joint venture would range from 750 to 1,000 net barrels of oil equivalent (BOE) per day. The arrangement calls for Delphi to shoot 3-D seismic in the area, drill development wells, and jointly construct a 12-inch, 30-kilometre, natural gas transmission line. The arrangement involves more than 51,800 gross hectares of land (200 sections) with two blocks having successfully tested long-life natural gas reserves in the Jean Marie Formation. Jean Marie wells on the reef edge have historically been characterized with initial production rates of approximately two mmcf per day and ultimate recoveries of two Bcf of gas. Exploration potential in other horizons has also been identified and will be pursued. Over the next two years, the Jean Marie joint venture at Bigfoot will provide Delphi with more than 300 drilling locations. Drilling activity is expected to be year-round in the area for the next five to 10 years.

In 2005, **EnCana Corporation** and **Penn West Petroleum Ltd.** continued as the two key producers operating in the **Thetlaandoa** and **Thetlaandoa South** areas. The producers drilled a combined total of 13 wells in the area, each targeting gas in the Mississippian's Rundle Group (Debolt, Shunda, and Pekisko) and the Upper Devonian Jean Marie (further north, near the Helmet area). Of the 13 wells drilled, 11 produced 4.7 Bcf of gas from the Debolt. The Debolt is composed of dolomitized shelf carbonates and clastic, transgressive sands of the overlying Bluesky Formation.

Three of the Penn West wells and one EnCana well showed gas production from the Debolt.

Storm Exploration Inc. saw drilling success at its **Cabin-Kotcho-Junior** core areas. Over the past winter, Storm recorded two 3-D seismic programs covering 80 square kilometres and drilled three wells (1.2 net) targeting the potentially high gas impact Slave Point Formation with 100% success. All three wells have been tied in and are producing 2.3 mmcf per day of sales gas net to Storm. Two of the wells are each producing at gross rates of 1.5 mmcf per day. The third well (0.5 net), which recently began producing, is being rate restricted to a gross rate of 3.5 mmcf per day. Plans for next winter will include drilling up to five wells: two step-out wells in the same pool, another two step-out wells targeting pool extensions recently recorded in 3-D surveys, and one well targeting a potential new pool.

Tenergy Ltd. drilled three Slave Point wells in the winter of 2004-05. The wells, which were placed on production in April 2005 and have surpassed production forecasts, are producing from three separate Slave Point gas pools. The three wells are currently producing an aggregate of approximately 16 mmcf per day of sales gas or 900 barrels of oil equivalent per day net. Tenergy plans to drill another three Slave Point wells in the first quarter of 2006. Construction of an ice bridge in the Tenaka area provides access to these wellsites.

Zenas Energy Corp. conducted a \$35-million drilling program in northeastern British Columbia this past winter. Zenas, which was created after **Blizzard Energy Inc.** was sold to **Shiningbank Income Trust**, received a small production base in the **Thetlaandoa** area, plus land earned last winter. It also received a farm-in agreement that gave the company access to 40,470 hectares of prospective land in the **Elleh** area. The company's 2005-2006 program entailed drilling two wells at Thetlaandoa and 18 wells at Elleh. The Elleh wells included nine exploratory wells, one targeting the Debolt Formation, and eight targeting the Jean Marie Formation. The other nine were development wells, each targeting the Jean Marie Formation.

Fort St. John Region

The Fort St. John region, which covers an area of 3.7 million hectares, continued to be the hub of activity and production for the province. The region has a variety of geologic settings, which combine to offer good quality, low-risk gas and oil prospects with stacked, multi-zone potential. The deep Slave Point play, which is 2,800 to 3,200 metres true vertical depth along the Hotchkiss Embayment, continues to entice exploration since the discovery of Ladyfern (760 Bcf OGIP) in 2000. Deeper conceptual plays also occur in the Middle Devonian clastics and Keg River carbonates. On the western side of the area, Laramide-induced folding and structural trapping provides opportunity for Debolt, Halfway, Charlie Lake, Baldonnel, and various Cretaceous sands. The Fort St. John Graben houses numerous structural and stratigraphic objectives, ranging from hydrothermal dolomites in the Wabamun to sands in the Mississippian Kiskatinaw and Permian Belloy. Traditional targets in the region have been the Triassic stratigraphic and erosional edge plays in the Montney, Doig, Halfway, numerous Charlie Lake members, and the Baldonnel. Lower Cretaceous clastics have also been sought after in the region with the Dunlevy, Gething, and Bluesky as major production horizons. Recently, both the tighter Gething sands in erosional valley systems and the lowstand Notikewin sands have been the subject of developmental focus north of the Peace River Block.

Land Sales

Land brokers and producers spent over \$184,000 in 2005 to acquire PNG rights in the Fort St. John region (*Figure 17*). The distribution of bonus payments compared to other resource regions in northeast BC was down from 2004, but the average price per hectare almost doubled, reaching \$761 per hectare. Land sale activity was scattered throughout the resource region with several areas garnering more attention than others.

In the northern section of the Fort St. John region, the Kahntah River and Gutah areas were the most active for land purchases. Industry activity in those areas centered on productive Bluesky-Gething-Montney gas.

Burlington Resources Canada Ltd. operates almost exclusively in this area. The Conroy Creek area also saw a number of successful bids for parcels. The area saw gas production from the Gething and is now part of a drilling program conducted by Apache Canada Ltd. The western section of the region saw some of the highest bonus money spent in 2005 for two parcels near the Blair area. The parcels were acquired by Kereco Energy Ltd. at the September 2005 land sale. The purchased lands are contiguous and complementary to Kereco's existing Blair area assets, which yielded recent exploration successes in the Bluesky, Gething, and Cadomin formations. In the southeastern region, a concentration of purchases occurred in the Dawson Creek and Sunrise areas. Cinch Energy Corp. developed a new exploration program in the Dawson Creek area. There, it has a joint venture in the drilling of two wildcat exploration wells, one of which was completed as a gas well. More seismic work and drilling are being considered for 2006. Cinch holds an interest in 2,350 net hectares in this multi-zone area, where the Montney, Doig, Kiskatinaw, and Notikewin formations are considered primary targets.

Drilling

Canadian Natural Resources Limited (CNRL) dominated all operators in the number of wells drilled in the Fort St. John region in 2005 (*Figure 18*). The producer was responsible for 182 rig releases in the region, 41% more than in 2004. Over a third of CNRL's activity focused on the Buick Creek and Drake areas. Burlington Resources Ltd. took the second highest ranking with 70 rig releases; almost half of these were completed in the Gutah area. These two major producers accounted for one third of the 761 rig releases in the region.

Production

The distribution of production from wells rig released in the Fort St. John region in 2005 is shown in *Figure 19*.

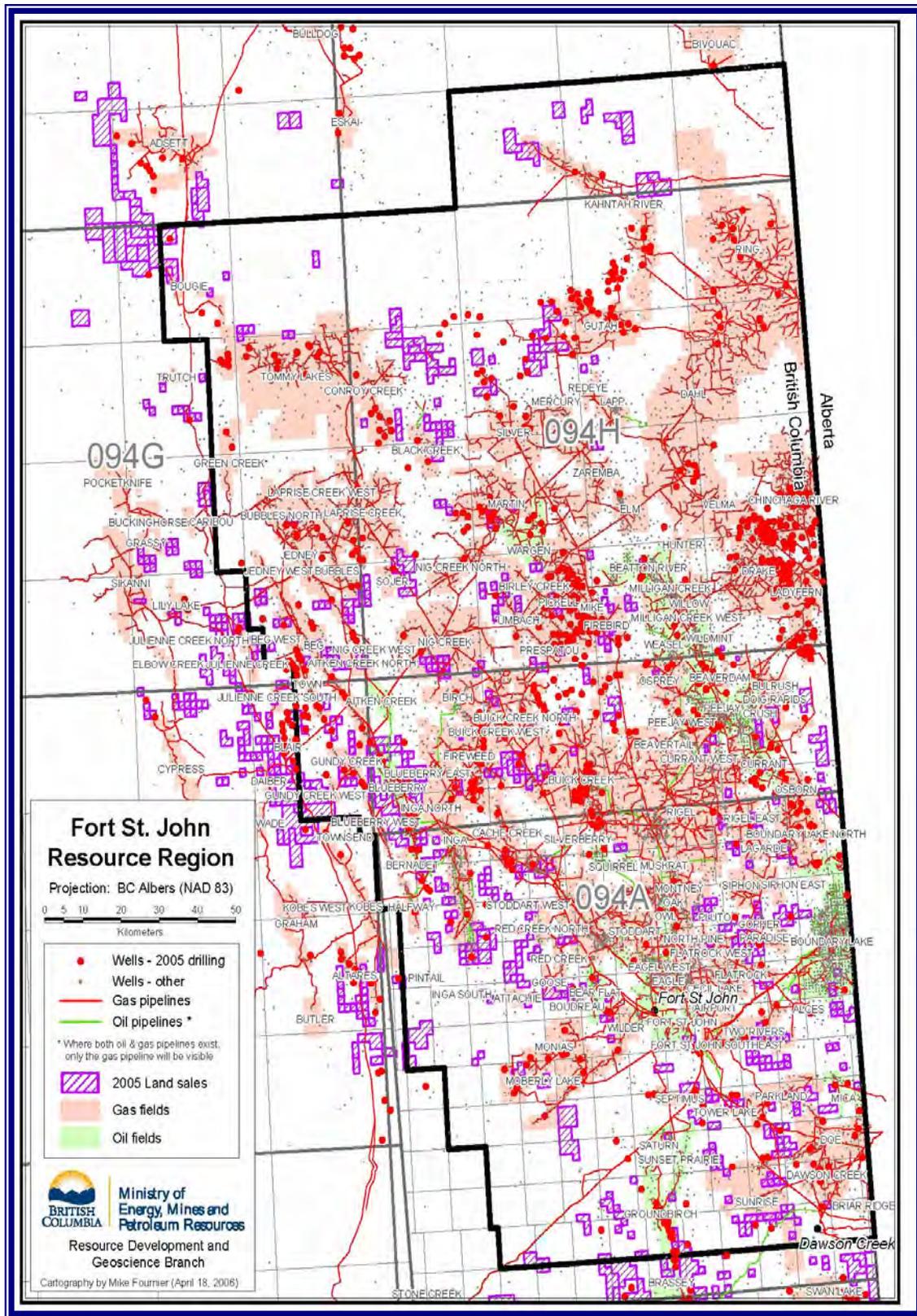


Figure 16. Land sale and drilling activity in the Fort St. John region of NEBC in 2005.

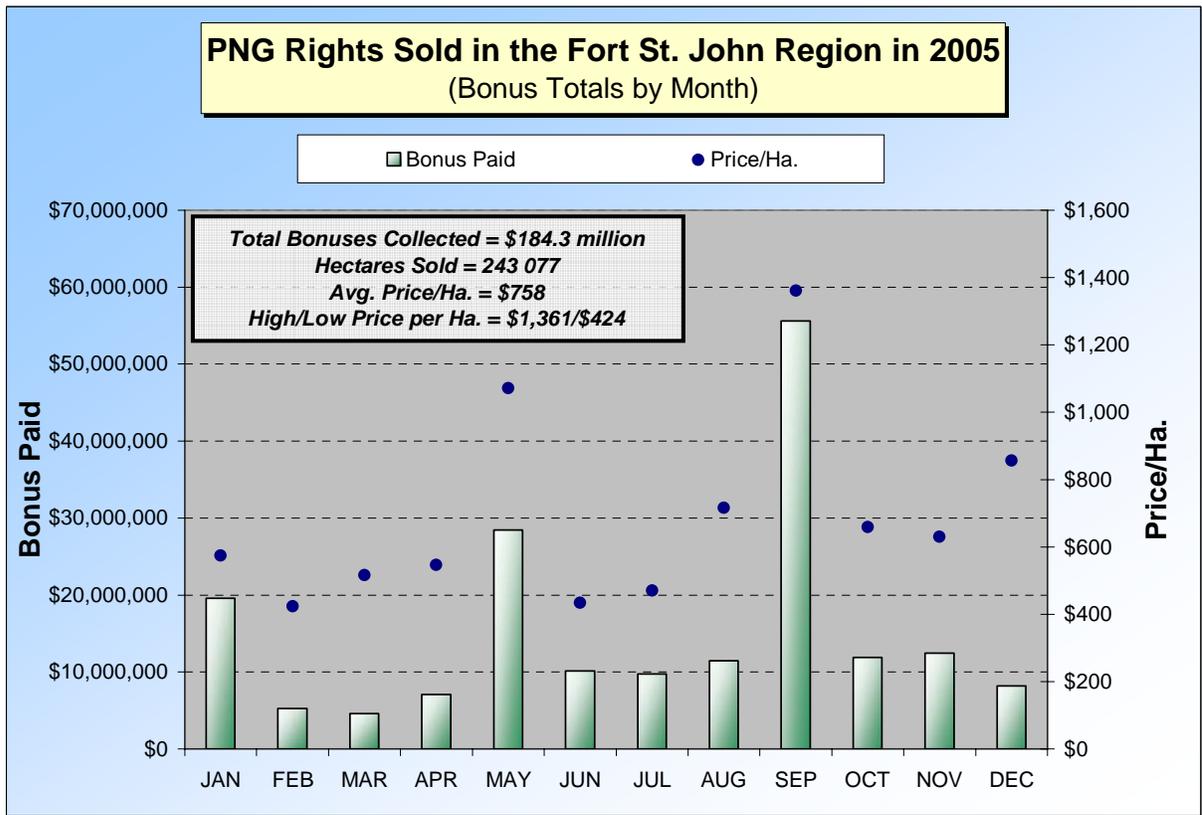


Figure 17. PNG rights sales in the Fort St. John region in 2005.

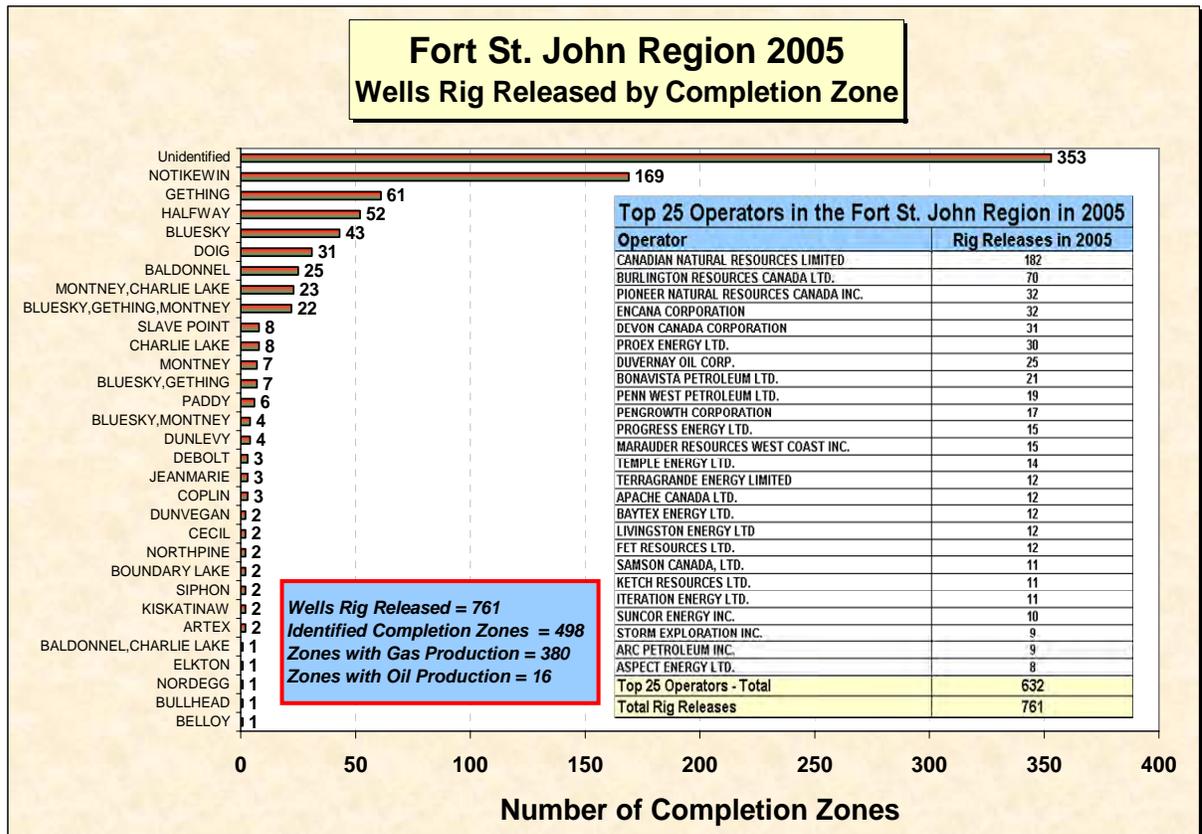


Figure 18. Target zones from wells rig released in Fort St. John region in 2005.

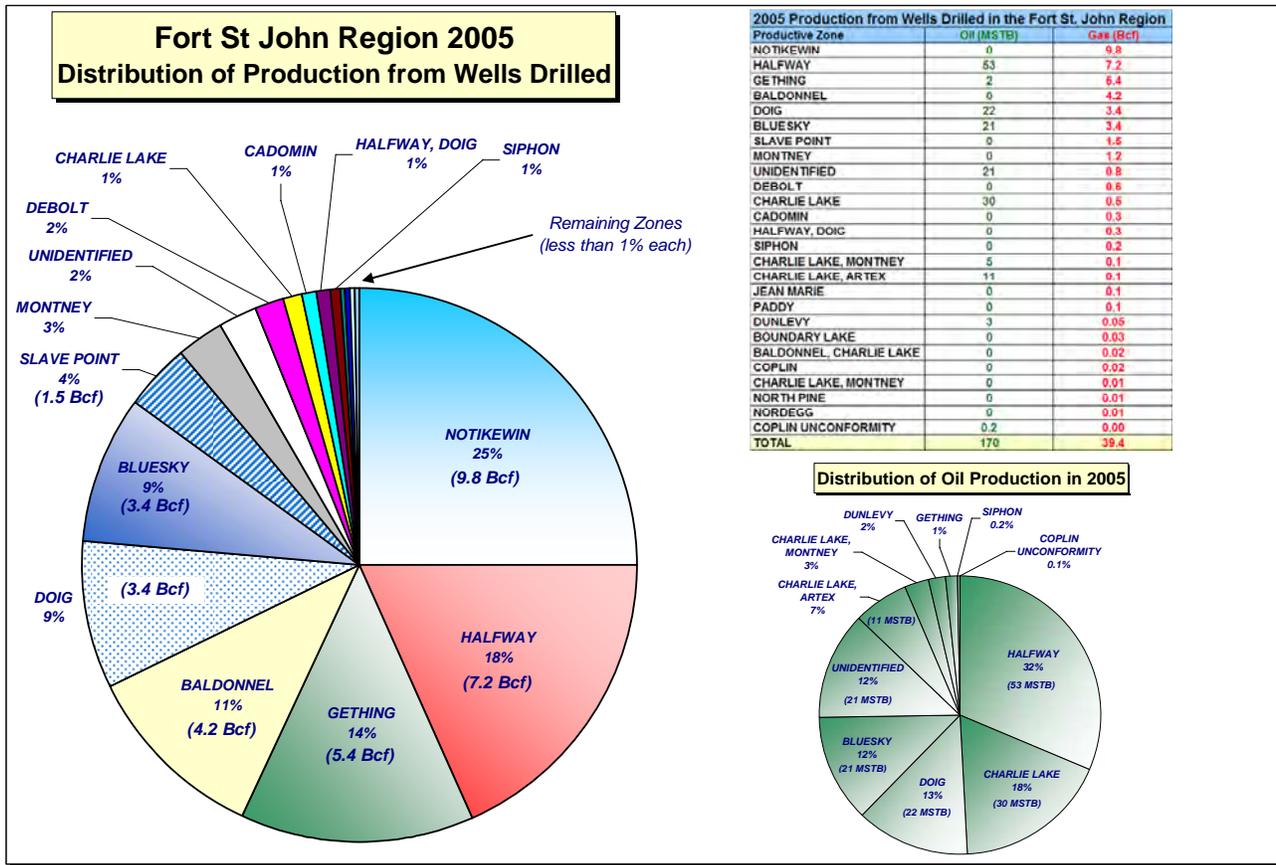


Figure 19. Distribution of production from wells rig released in the Fort St. John region in 2005.

Oil & Gas Exploration Highlights

The most active area for drilling activity in the Fort St. John region was the **Drake** area. Sixty-five wells were rig released, yielding gas production of 4.8 Bcf for the year. Most wells drilled in the area were targeting the Notikewin Formation. Among the five producers operating in the area in 2005, **Canadian Natural Resources Limited (CNRL)** drilled the most wells, 41. The **Buick Creek** area also saw high activity with 44 rig releases, yielding gas production of just under one Bcf. CNRL drilled 33 wells which targeted a number of zones, including the Halfway, Notikewin, and Slave Point. The **Pickell** area saw a high share of activity with 42 rig releases and 3.9 Bcf of gas production in 2005. Producers such as **Apache Canada Ltd.** and **Penn West Petroleum Ltd.** targeted gas from the Notikewin, and **Canada Southern Petroleum Limited** looked for production from the Slave Point. **Burlington Resources Canada Energy Ltd.** rig released over half of its wells in the **Gutah** area of the Fort St. John region. A total of 33 wells were drilled in the area in early 2005; all targeted the Bluesky-Gething-Montney zone with total depths averaging around 1,000 metres. Gas production for the year totalled 602 mmcf.

The **Chinchaga River** area on the eastern edge of the Fort St. John region saw steady winter drilling activity in early 2005. Thirty rig releases took place in the winter-access area during the year; **Pioneer**

Natural Resources Canada Ltd. was the lead operator with 23 of those. Almost 80% of Pioneer’s activity at Chinchaga targeted production from the Lower Charlie Lake-Montney ‘A’ Pool at an average depth of 1,044 metres. Pioneer has retained the Chinchaga River area as one of its key development regions in northeast BC. In April of 2005, the company announced that its Canadian subsidiary had signed an agreement for the sale of its **Martin Creek, Conroy Creek, and Black** area properties to Ketch Resources Trust.

ProEx Energy Ltd. continued to build its undeveloped land position in the BC Foothills. The young exploration and development company added over 10,000 hectares through a combination of asset purchases, crown purchases, and farm-ins. Also, in its first full year of operation, ProEx more than doubled its proved reserves to 11.8 million barrels of oil equivalent per day, 64.4 Bcf of proved gas. In 2005, ProEx participated in 45 wells; 29 (22.5 net) were located in the Foothills and 16 (6.1 net) in the Fort St. John Plains area. The company drilled successful wells in the **Beg, Gundy Creek, and Town** areas. With the results from its 2005 drilling and seismic programs, ProEx has developed extensive knowledge of the subsurface. It now has the opportunity to expand the Triassic Halfway tight gas play and to develop new concepts in the Cretaceous section. Plans for 2006 include 17 net wells in the first quarter, focusing on exploratory tests.

Duvernay Oil Corp. continued to discover and develop tight gas from the Triassic Doig Formation in the **Groundbirch** area. Duvernay's activity at Groundbirch, which is in northeast BC's Peace River Block, is part of an 80-kilometre long and 3-kilometre wide fairway with additional potential in formations above and below the Doig. The Doig gas at Groundbirch is interpreted to be in a distal shelf sandstone unit. The basal portion is notable for its phosphate zone, which is one of the best source rocks in the Western Canada Sedimentary Basin and may house a potential shale gas target. In 2005, Duvernay drilled 22 wells in the area targeting Doig gas. Recognized proved, plus probable, reserves in the original Groundbirch Doig discovery grew to 98.9 Bcf to year-end 2005.

Progress Energy Trust continued to build on the success of its drilling programs in the Fort St. John region. In 2005, it nearly doubled its land position through a combination of land acquisitions, farm-ins, and extensive 3-D seismic shoots. The trust drilled 23 gross wells (9.5 net) with a program success rate of 100%. This drilling included a new pool discovery in the Belloy Formation of the **Stoddart** area (04-25-85-19W6) and two successful development wells in subsequent follow-up. In the **Two Rivers** area, Progress drilled two successful horizontal wells to further delineate the Siphon oil pool. In the first quarter of 2006, the trust will participate in the shooting of over 200 square kilometres of 3-D seismic data. With the exploration drilling results from the winter program and additional seismic data, the technical team at Progress will continue to expand its drilling inventory.

It should be another growth year for **Terra Energy Corp.** in 2006. The company made significant additions to its reserves and undeveloped land holdings in 2005, positioning it for growth through a combination of exploration and development opportunities in the Fort St. John region. Its Fort St. John core areas include **Boudreau, Mica, Parkland, Septimus, Tower Lake, and Wilder**. Terra Energy recently announced its intention to construct a six-inch gas pipeline commencing at the company's 15-34-81-19W6 gas well in the Septimus area and extending to the Wilder gas plant, its compression and dehydration plant (10-34-82-20W6). The project is known as the Septimus pipeline, as it connects Terra's gas wells in the Septimus field to the company's Wilder gas plant.

Deep Basin Region

The Deep Basin region comprises an area of 692 000 hectares and offers thick sequences of stacked, regionally extensive, gas-saturated, Mesozoic clastic reservoirs. Traditionally, exploration has focused on identifying stratigraphic sweet spots that feature conventional reservoir quality in the Cadotte and Falher. In fact, some of these conglomeratic reservoirs continue to offer some of the highest initial deliverability rates in the province. The tight gas component of the Deep Basin, however, offers a huge potential resource that is

beginning to be exploited. In the *Exploration Assessment of Tight Gas Plays Northeast British Columbia* (BC EMPR, 2003), the gross OGIP resource is estimated at 70 to 200 Tcf. Potential Deep Basin tight gas targets include the Cardium, Dunvegan, Cadotte, Bluesky, Cadomin, Nikanassin, Halfway, Doig, and Montney. Development of the Cadomin was initiated in 2004, and production continues to come on stream in 2005.

Land Sales

Land brokers and producers spent \$146.8 million acquiring PNG rights in the Deep Basin region in 2005, almost tripling what was spent in 2004 (*Figure 21*). Although the second highest yearly total on record, it was down appreciably from the record year of 2003 when almost \$430 million in bonuses were paid out (*Figure 22*). Land buying activity was heaviest in the central part of the region, which includes the Jackpine, Noel, Sundown, and Tupper Creek areas; but activity was also seen further north in the Brassey area. The Hiding Creek area in the southern region was home to some of the most expensive parcels sold in 2005. The priciest purchase was made by Shell Canada Ltd., which paid \$16.24 million for a 2,692-hectare license at Hiding. The parcel covers rights to the base of the Cadomin-Dunlevy-Nikanassin zone to about 3,020 metres, while a portion covers rights from the base of the Notikewin-Fahler-Wilrich zones to the base of the Cadomin. This purchase by Shell indicates its intention to compete with other notable players, such as EnCana and Burlington, for major gas reserves and long-life production in the Deep Basin's Cadomin gas play.

Drilling

A total of 232 wells were rig released in the Deep Basin region in 2005. Burlington Resources Canada Ltd. and EnCana Corporation were responsible for over 90% of well activity in the region (210 rig releases combined). The major target interval for operators was the Cadomin, with 131 zones so far identified (*Figure 23*). Gas production from these Cadomin zones came in at 18.2 Bcf for the year (*Figure 24*). Twenty-three wells identified the Doig/Montney as the objective, particularly in the Swan Lake area. Gas production for the year from the Doig/Montney was 2.7 Bcf. Only five wells rig released listed the Cadotte as the target zone, but gas production from those wells totalled 5.3 Bcf. Over three quarters of that production can be attributed to a Burlington development well drilled in early February that produced 4.1 Bcf of gas from the Cadotte. Other potentially productive zones drilled in the Deep Basin region were the Falher, Bluesky, and Nikanassin.

Production

The distribution of production from wells rig released in the Deep Basin region in 2005 is shown in *Figure 24*.

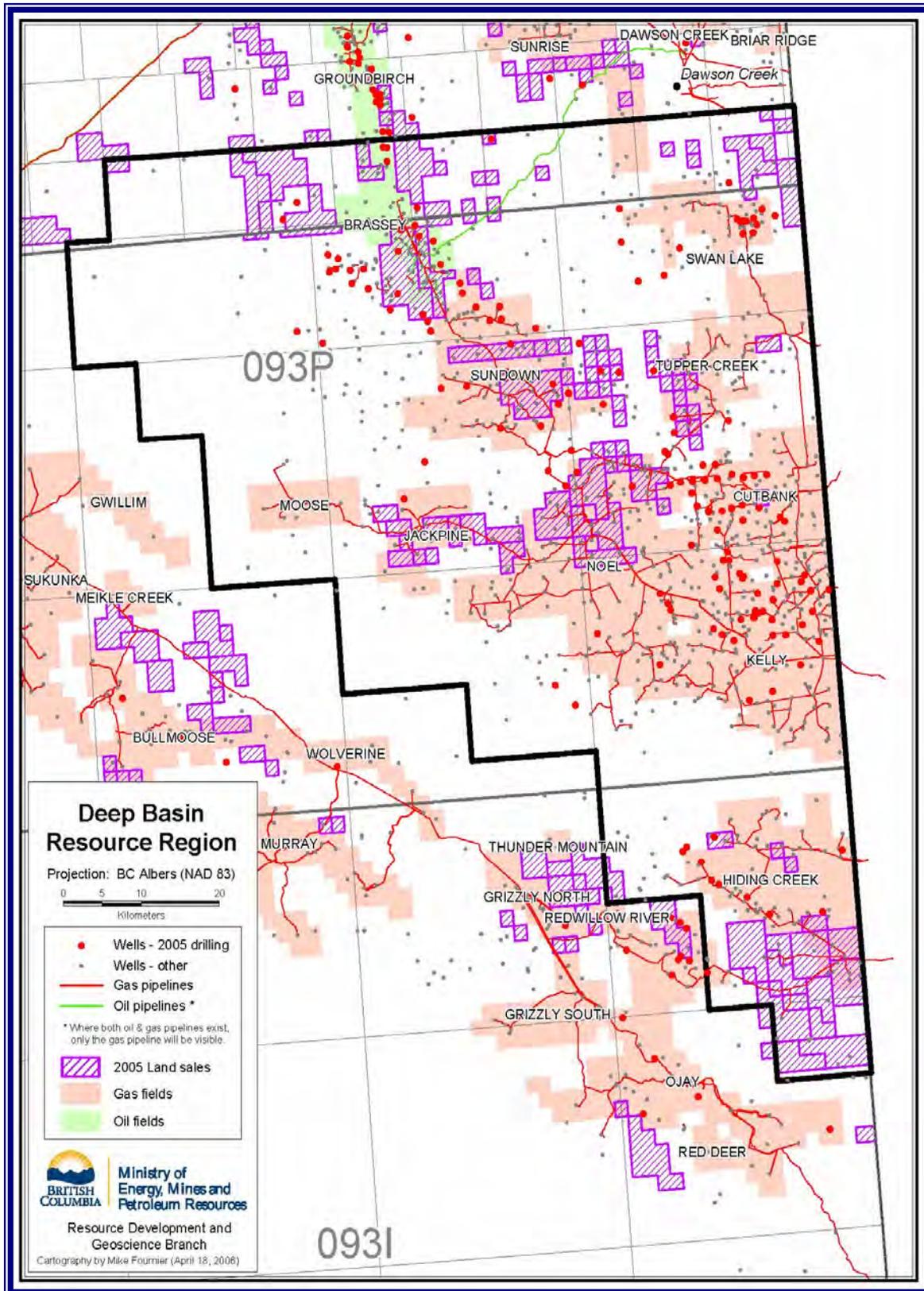


Figure 20. Land sale and drilling activity in the Deep Basin region of NEBC in 2005.

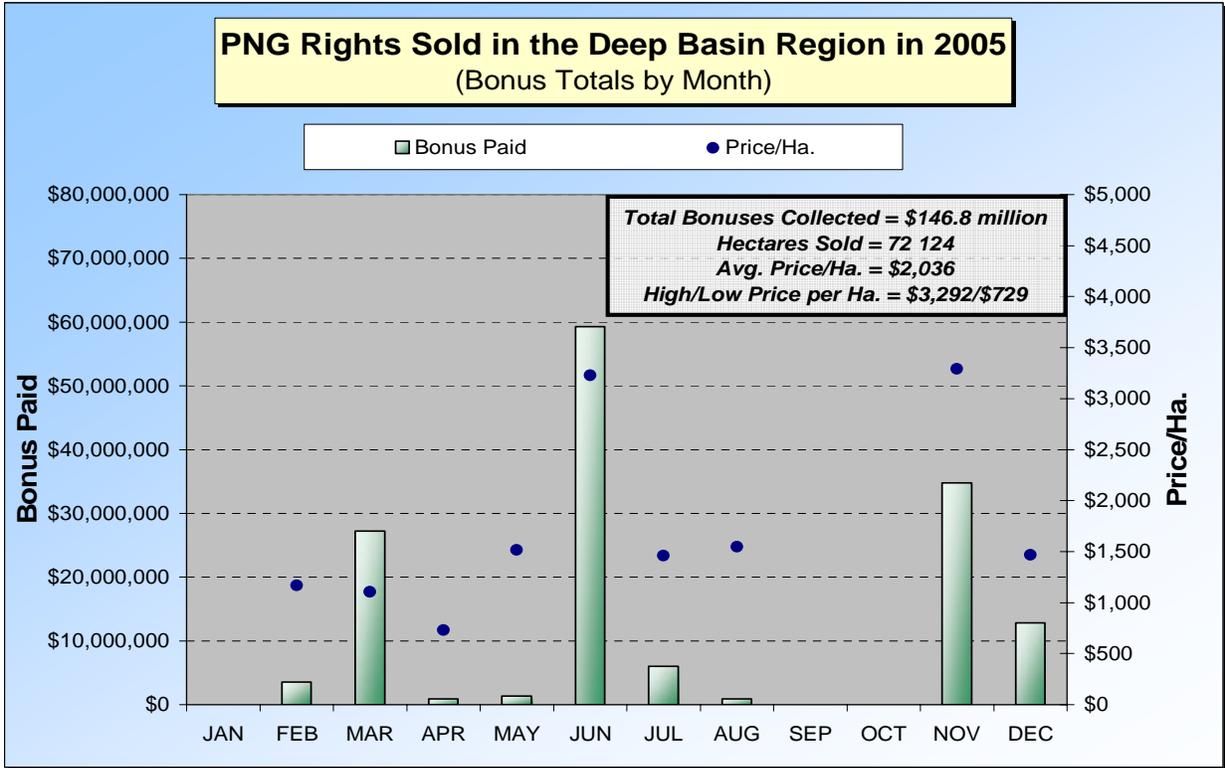


Figure 21. PNG rights sales in the Deep Basin region in 2005.

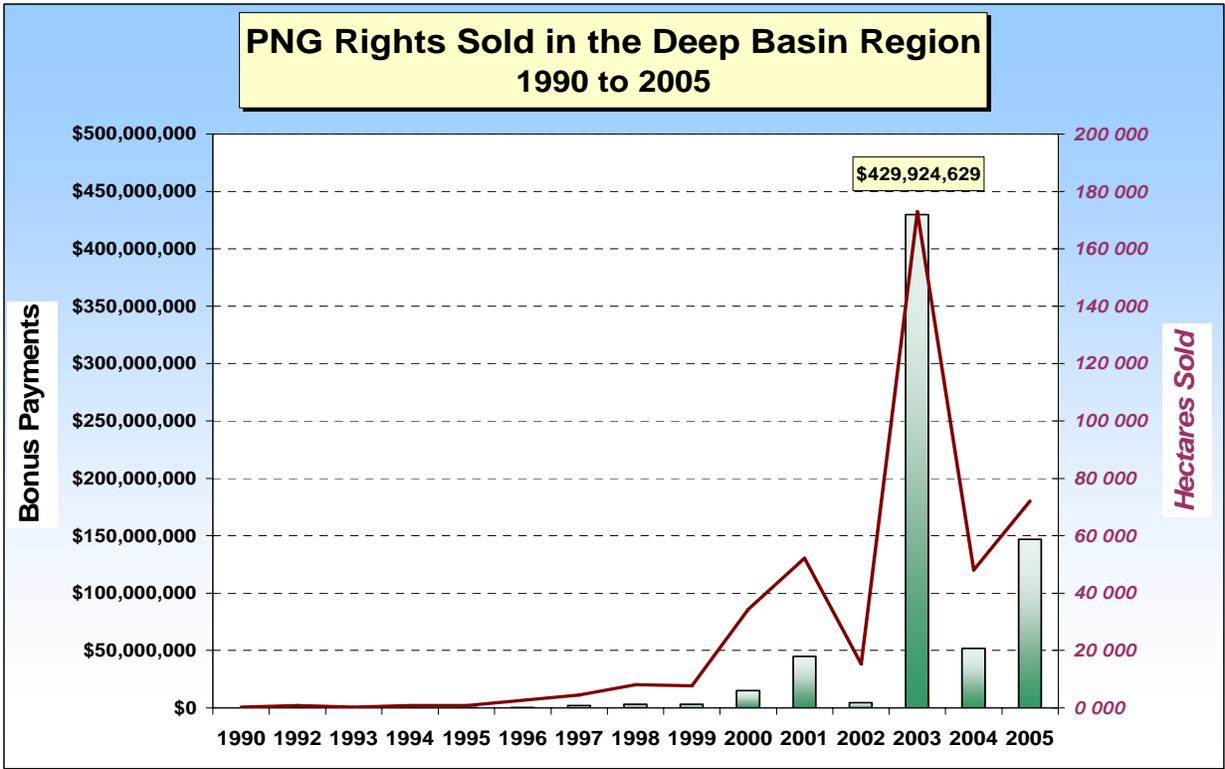


Figure 22. PNG rights sales in the Deep Basin region from 1990 to 2005.

Deep Basin Region 2005 Wells Rig Released by Completion Zone

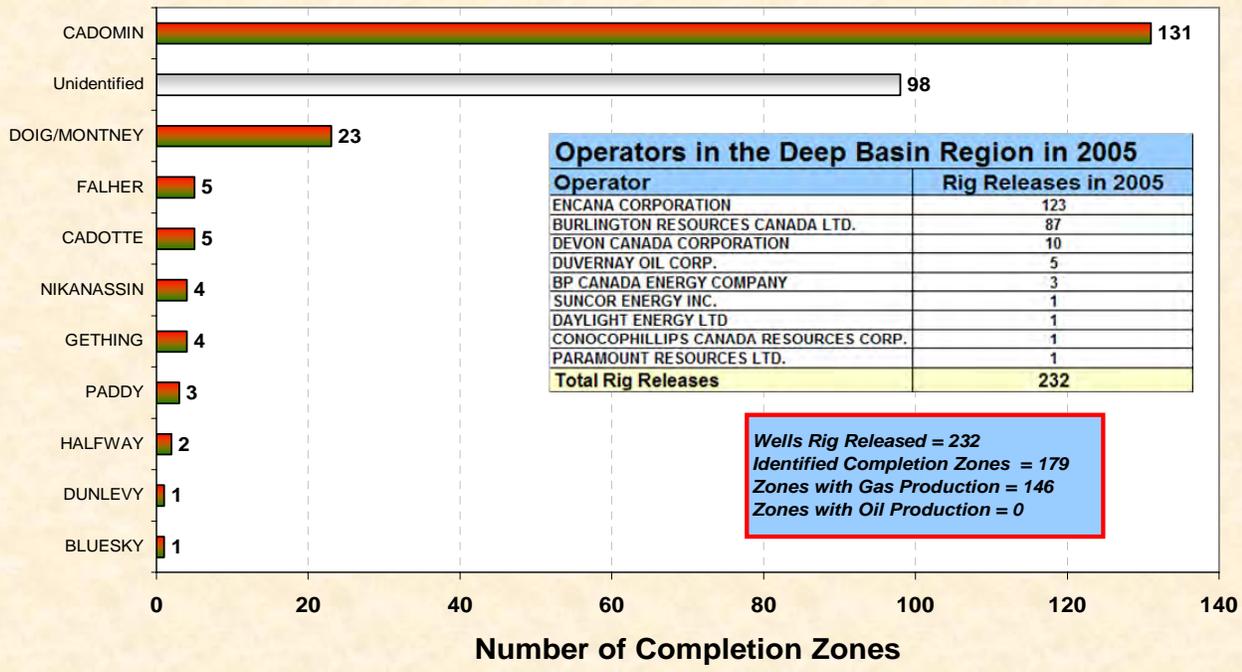
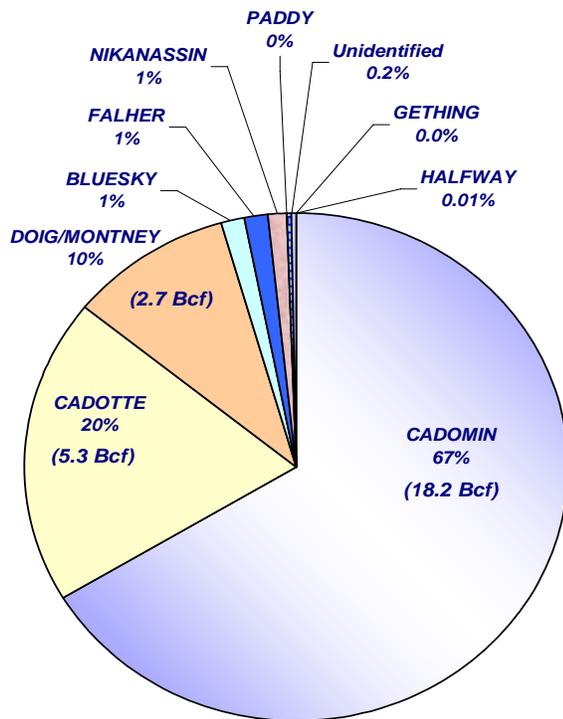


Figure 23. Target zones from wells rig released in the Deep Basin region in 2005.

Deep Basin Region 2005 Distribution of Production from Wells Rig Released



2005 Production from Wells Drilled in the Deep Basin Region		
Productive Zone	Oil (MSTB)	Gas (Bcf)
CADOMIN	0	18.2
CADOTTE	0	5.3
DOIG/MONTNEY	0	2.7
BLUESKY	0	0.4
FALHER	0	0.4
NIKANASSIN	0	0.3
PADDY	0	0.1
Unidentified	0	0.0
GETHING	0	0.01
HALFWAY	0	0.00
TOTAL	0	27.5

Figure 24. Distribution of production from wells rig released in the Deep Basin region in 2005.

Oil & Gas Exploration Activity

The **Brassey** area witnessed the highest activity in 2005 with 56 wells rig released. Of those wells, **Burlington Resources Canada Ltd.** drilled 43, virtually all of which targeted the Lower Cretaceous Cadomin Formation. Twenty-two of Burlington's Cadomin wells recorded gas production totalling 1.2 Bcf. Further north in the Brassey area, the producer drilled two productive Doig wells. Burlington shifted from a focus on developing short-life productive sands to exploiting longer life resource plays in the Deep Basin. In the Brassey area, the company took a more targeted approach to acquiring land by using proprietary geological and facies modeling to better identify plays. **EnCana Corporation** was also active in the Brassey area, drilling nine Cadomin wells. **Duvernay Oil Corp.**, with four wells drilled, continued to expand and accelerate its development of a Brassey-Groundbirch Cadomin gas pool it discovered in 2005. Duvernay expects to have 20 Cadomin wells drilled and tested by the middle of 2006.

The **Cutbank, Kelly, and Noel** areas, with 105 rig releases, accounted for 45% of all drilling activity in the Deep Basin region in 2005. **EnCana Corporation**, by far the busiest operator, drilled 84 wells. The remaining 21 were drilled by **BP Canada Energy Company, Burlington Resources Canada Ltd., Devon Canada Corporation, Paramount Resources Ltd. and Suncor Energy Inc.** The primary objective for producers in these areas was the Cadomin, but other prospective zones such as the Lower Cretaceous Paddy and Falher as well as the Triassic Doig were targets. One of the higher producing wells drilled in the Kelly area this year was drilled by EnCana Corporation. The well, b-13-J/93-P-1, was placed on production in September and is producing at an average rate of 5.6 mmcf per day from the Triassic Doig. EnCana estimates that this new Doig discovery contains 350 to 500 Bcf of original gas in place.

At **Sundown**, a total of 34 wells were rig released. **Burlington Resources Canada Ltd.** led the way with 21 wells, followed by **EnCana Corporation** with nine. The remaining wells were spread out between **ConocoPhillips Canada Resources Corp., Devon Canada Ltd. and Duvernay Oil Corp.** Identified target zones included the Cadotte, Cadomin, and Gething.

EnCana Corporation has just received approval from the **BC Oil and Gas Commission** to build a \$60-million gas processing plant at **Steepprock**, located about 50 kilometres south of Dawson Creek. Start-up and commissioning is slated for October 2006 and the plant is scheduled to be on-line a month later. The plant will enable EnCana to process 198 mmcf per day of gas from the **Bisette, Cutbank, and Kelly** areas.

EnCana Corporation was the only producer operating in the **Bisette/Swan Lake** area in 2005. The company continued to develop Triassic shale gas potential from the Montney turbidites in the area. Fourteen wells were rig released in the area, 12 of which showed gas production totalling 1.1 Bcf.

Northern Foothills Region

The Northern Foothills region incorporates an area of 2.9 million hectares and covers mostly foothills and mountainous terrain. Laramide-aged structures provide the opportunity for structural traps where natural gas may accumulate. Prospective intervals include Cretaceous clastics, but traditional targets are the Triassic Baldonnel, Charlie Lake, and Halfway formations, and the Mississippian Debolt Formation. The western boundary of the Triassic play is constrained by outcrop and subsequent breaching of any trap. The Mississippian type play is typified by the Sikanni and Pocketknife fields where natural gas is trapped in linear northwest trending thrust-fault related structural features. In addition, Devonian-aged rocks outside of the region are hosts to very significant hydrocarbon accumulations. While subsurface well control is limited within the region, there remains significant undiscovered potential. The Devonian Keg River and Slave Point formations host major natural gas accumulations in northeastern BC such as Clarke Lake. These occur in ancient barrier reef complexes and atolls that can be mapped trending into the region. These rocks are prospective in areas that have been uplifted. Optimum positioning of reservoir rock, in a structurally high position, may result in the creation of very large pools. The western limit for Devonian-play types is defined by a line about five to 10 kilometres west of the outcrop belt of Devonian or older sediments. This five-to-ten kilometre band accounts for the possibility of encountering second-sheet Devonian reservoir in an overthrust scenario.

Land Sales

Six per cent of the province's land sale bonuses in 2005 were collected from PNG rights sold in the Northern Foothills region (*Figure 27*). A total of \$31.1 million was spent on 71,107 hectares at an average price per hectare of \$437 (*Figure 28*). Most of the PNG rights purchases occurred along the eastern edges of the resource region in the areas of the Julienne Creek, Blair, Daiber, and further south in the Altares area. In the northern section of the region, land sale activity occurred to the southwest of Adsett and northwest of Bougie.

Drilling

A total of 46 wells were rig released in the Northern Foothills region in 2005 (*Figure 29*). The Altares, Blair, and Julienne Creek areas saw the highest well activity. These areas within the Foothills region are structurally complex and include such exploration targets as the Triassic Baldonnel, Triassic Halfway, Mississippian Debolt, and the minor/secondary Cretaceous Bluesky. Emerging plays in the area include the Jurassic Nikanassin, Triassic Doig, and the Devonian carbonates. The lead operator in the Northern Foothills region was ProEx Energy Ltd., with nine wells drilled (five at Altares), followed by Petro-Canada with eight wells completed.

Production

The distribution of production from wells rig released in the Northern Foothills region in 2005 is shown in *Figure 30*.

Oil & Gas Exploration Activity

ProEx Energy Ltd. more than doubled its proved reserves in its first full year of operation as an indisputable northeast BC exploration and development company. In 2005, ProEx participated in 29 wells in the Foothills region. Drilling in the Northern Foothills region was directed to exploring for and producing natural gas from the Triassic Halfway reservoir and Cretaceous targets (Bluesky/Gething sands). The company drilled successful wells in the **Julienne Creek** and **Town** areas and further to the south at **Altares**. Activity in these areas will set up ProEx Energy's 2006 exploration and development program as it seeks growth through the drill bit. The company is planning to drill a Julienne Creek area exploratory well that targets the Mississippian Debolt this spring.

Kereco Energy Ltd. drilled five wells in the **Blair Creek** area, focusing on a potentially commercial shale gas play (Cadomin). The company increased its undeveloped land position in the area to over 29,000 gross hectares and is conducting a large 3-D seismic program. Kereco's Blair Creek assets also yielded recent exploration successes in the Lower Cretaceous Bluesky/Gething formations. An outpost well drilled in September of 2005 (a-50-F/94-B-16) produced at an initial rate of 3.9 mmcf per day from the Gething. Priorities for 2006 are to evaluate, test, and develop the Blair Creek Cretaceous gas play on its recently purchased land using newly acquired seismic data.

Innova Exploration Ltd. acquired land in its northeast BC core area in 2005. At the September 2005 PNG Rights auction, the company announced that it successfully acquired three large parcels of exploration land in its core **Chowade/Blair Creek** project area. Innova says the Chowade/Blair Creek area is a multizone, medium depth, sweet natural gas and liquids exploration and development project. In late December, Innova began shooting and gathering field data from a 150-square-mile 3-D seismic program at Blair Creek. Innova has so far participated in the drilling of 17 wells, nine gas wells and eight wells standing. Average first-year productivity for these gas wells is estimated to be approximately 1.5 mmcf per day. The company said it is in the process of designing a program to test horizontal drilling in these wells, the first of which will be drilled after spring break-up in 2006. Horizontal drilling has been used successfully by other companies in producing similar tight gas reservoirs in the area.

Canadian Spirit Resource Inc. (CSRI) holds a high interest land position in Northern Foothills region.

Since October 2003, it has assembled a total undeveloped land position of 16,000 hectares in the province. Almost 94% of this total is located in the **Farrell Creek** area. The Farrell Creek program includes the staged stimulation and production testing of the Gething Formation coals, interbedded sands, and Bluesky tight gas. In 2005, a test hole was drilled to gather data on shale gas potential in the area. The company expects that the Bluesky Formation is present on most of the Farrell Creek lands and is therefore worthy of further evaluation. CSRI also announced that two test holes, located at c-83-H/94-B-1 and b-92-H/94-B-1, were fracture stimulated in the Gething Formation and are now producing natural gas at 300 mcf per day and 35 mcf per day, respectively. The company said it will continue to pump water and produce natural gas from both test holes in order to more accurately measure longer-term production rates. Based on this production data, and subject to regulatory approval, the company is developing a pilot plan to drill and complete additional test holes located nearby. Additional preliminary work on deeper prospects in the Farrell Creek area has indicated both conventional and unconventional prospective horizons.

In the **Graham** area, **Anadarko Canada Corporation** reached total depth on two exploratory wells in 2005. One of the wells at b-11-I/94-B-7, which is 100% Anadarko, was drilled to a depth of 2,100 metres into the Mississippian. The well was completed during the fourth quarter and tested over eight mmcf a day from an undisclosed zone. The well is expected to be on production in the first quarter of 2006.

Keyera Facilities Income Fund is going to meet the demand for gas gathering infrastructure in the developing areas of **Trutch** and **Green Creek** (north of the Buckinghorse River). Work will begin early in 2006 on a 48-kilometre, six-inch diameter, sour natural gas gathering pipeline. Keyera is also planning to expand processing capacity at its Caribou gas plant from the current 40 mmcf to 65 mmcf per day. The new gas gathering system and plant expansion will help increase the capture area by about 1,000 kilometres. The winter-access area saw increased levels of land and drilling activity as producers chased a number of zones. Producers are looking to connect discovered gas reserves and would like to proceed with future drilling and land acquisition planning. In 2004, **Anadarko Canada Corporation** brought in stranded gas discoveries from the north side of the Buckinghorse River through an innovative gas transportation system known as the "chunnel" pipeline connection. The Caribou plant, which has been operating at close to full capacity over the last year, is able to handle both sweet and sour gas processing.

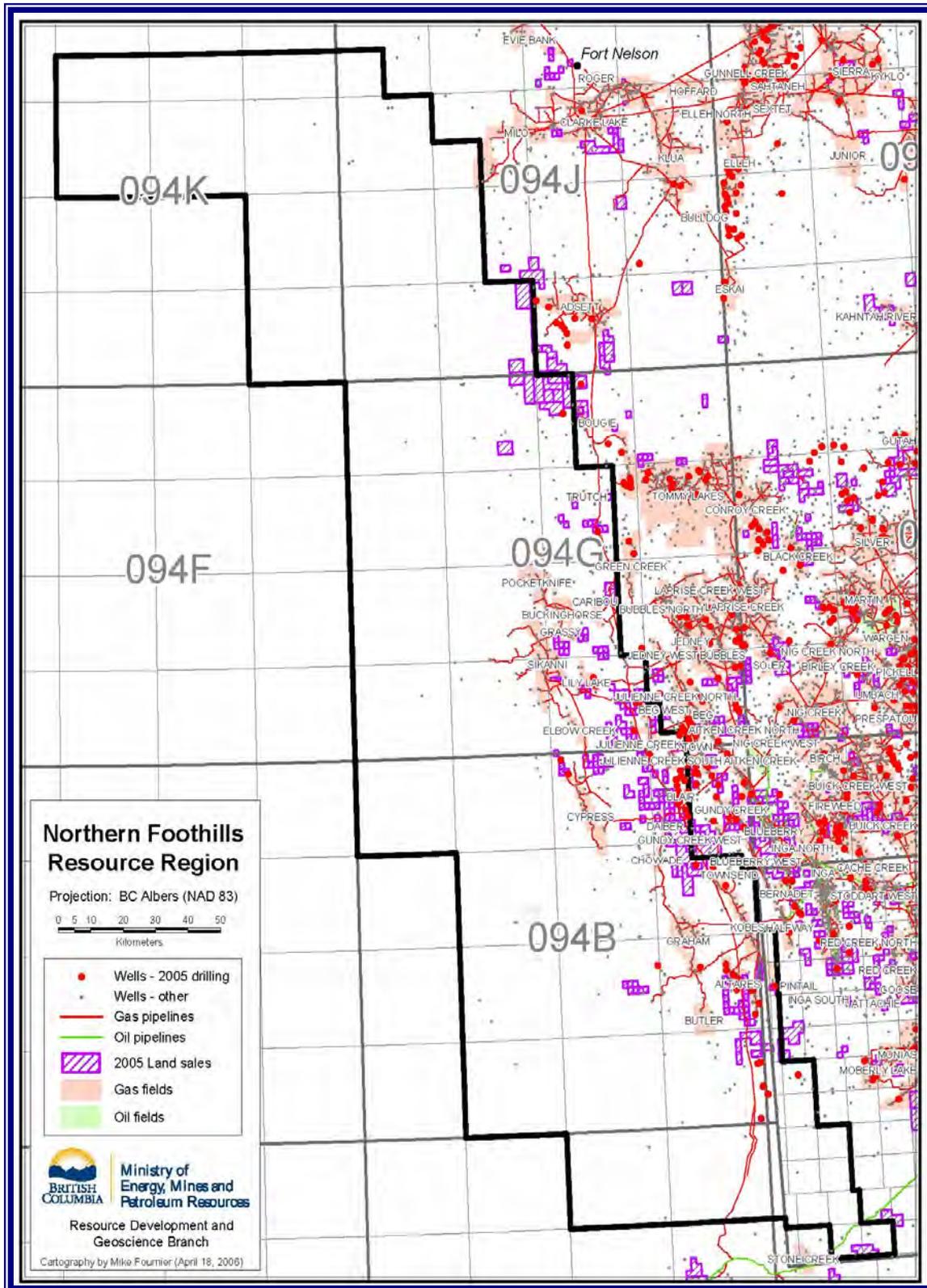


Figure 27. Land sale and drilling activity in the Northern Foothills region of NEBC in 2005.

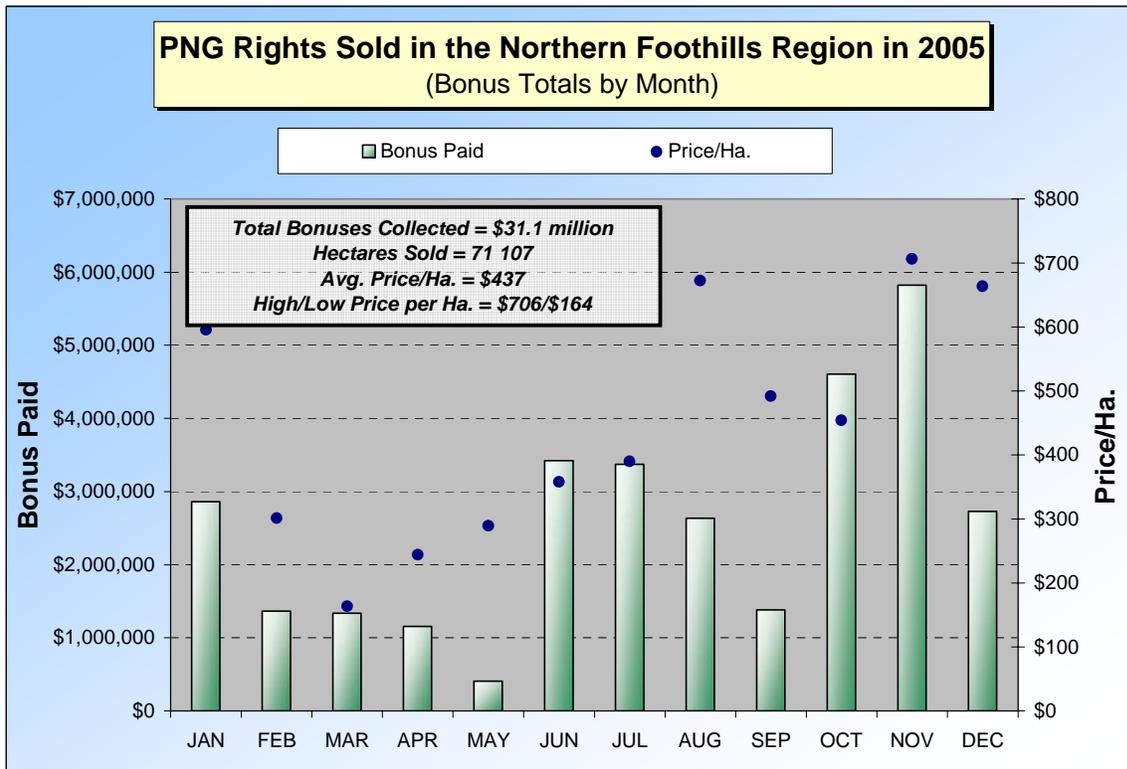


Figure 28. PNG rights sales in the Northern Foothills region in 2005.

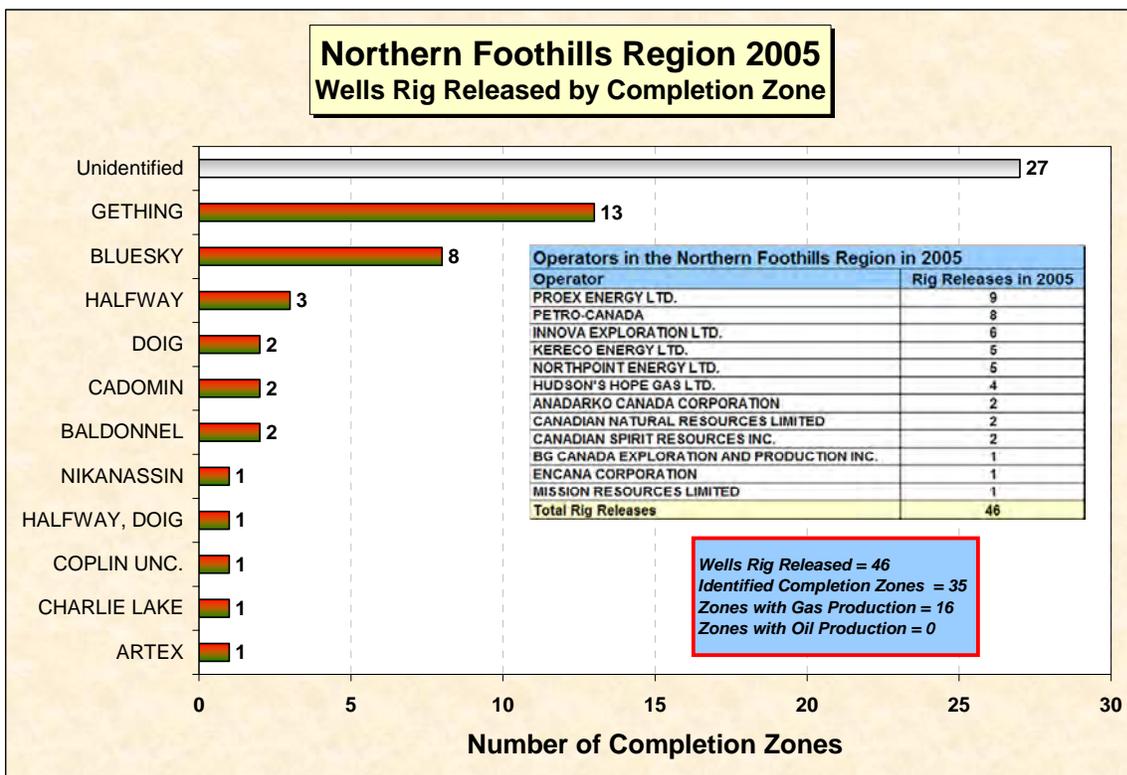


Figure 29. Target zones from wells rig released in the Northern Foothills region in 2005.

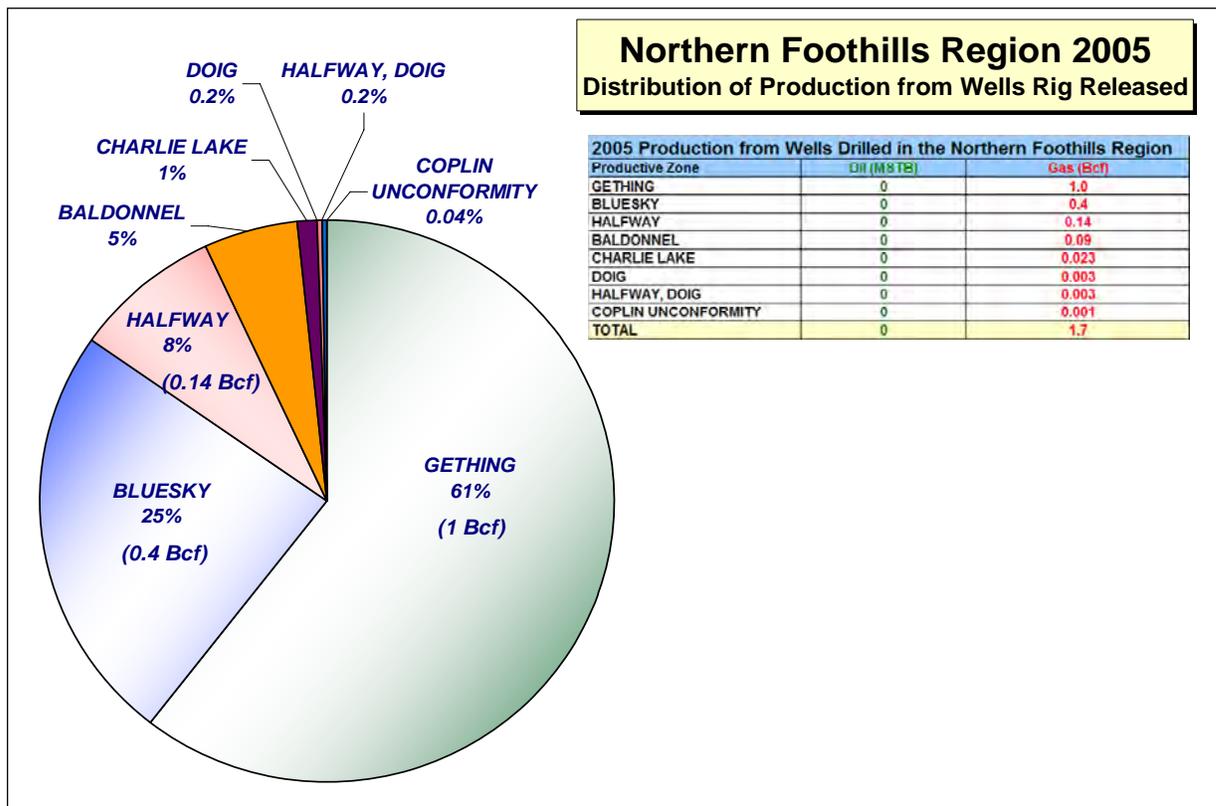


Figure 30. Distribution of production from wells rig released in the Northern Foothills region in 2005.

Southern Foothills Region

The Southern Foothills region of northeastern British Columbia covers an area of 1.2 million hectares. The region has varied topography, ranging from low rolling hills in the east to anticlinal hills and relief of 1,800 metres in the western region. This topography reflects the structure of underlying bedrock, which consists of Paleozoic age in the southwest to Upper Cretaceous in the northeast. Exploration for natural gas in the Southern Foothills region tends to hold a moderate to high associated risk along with relatively high capital costs. But hydrocarbon traps found within these folded and faulted structures can contain large reserves of natural gas, occasionally with extraordinary productivity. Faulted Triassic Baldonnell and Charlie Lake formations are the principal exploration targets in the region.

Land Sales

In 2005, industry paid \$116.5 million to acquire PNG rights in the Southern Foothills region (Figure 32). A total of 46,388 hectares was sold at an average price of \$2,512, more than doubling the average price per hectare in 2004. Land purchasing activity was distributed throughout the region with most PNG rights

acquired in the Boulder area to the northwest, the Bullmoose area in the central region, and the Grizzly North and Ojay areas to the southwest. The most costly purchase was made by Shell Canada Ltd., which paid \$15.55 million for a 3,286-hectare license northwest of the Ojay area. The parcel covers rights to the base of the Cadomin-Dunlevy-Nikanassin zone, while a portion covers rights from the base of the Notikewin-Fahler-Wilrich zones to the base of the Cadomin.

Drilling

A total of 21 wells were rig released in the Southern Foothills region in 2005 (Figure 33). The busiest areas for drilling activity were the fields of Ojay, with 13 wells, and Bullmoose, with four. The lead drilling operators in the region were Talisman Energy Inc., BG Canada Exploration and Production Inc., and Burlington Resources Canada Ltd., with five wells each.

Production

The distribution of production from wells rig released in the Southern Foothills region in 2005 is shown in Figure 34.

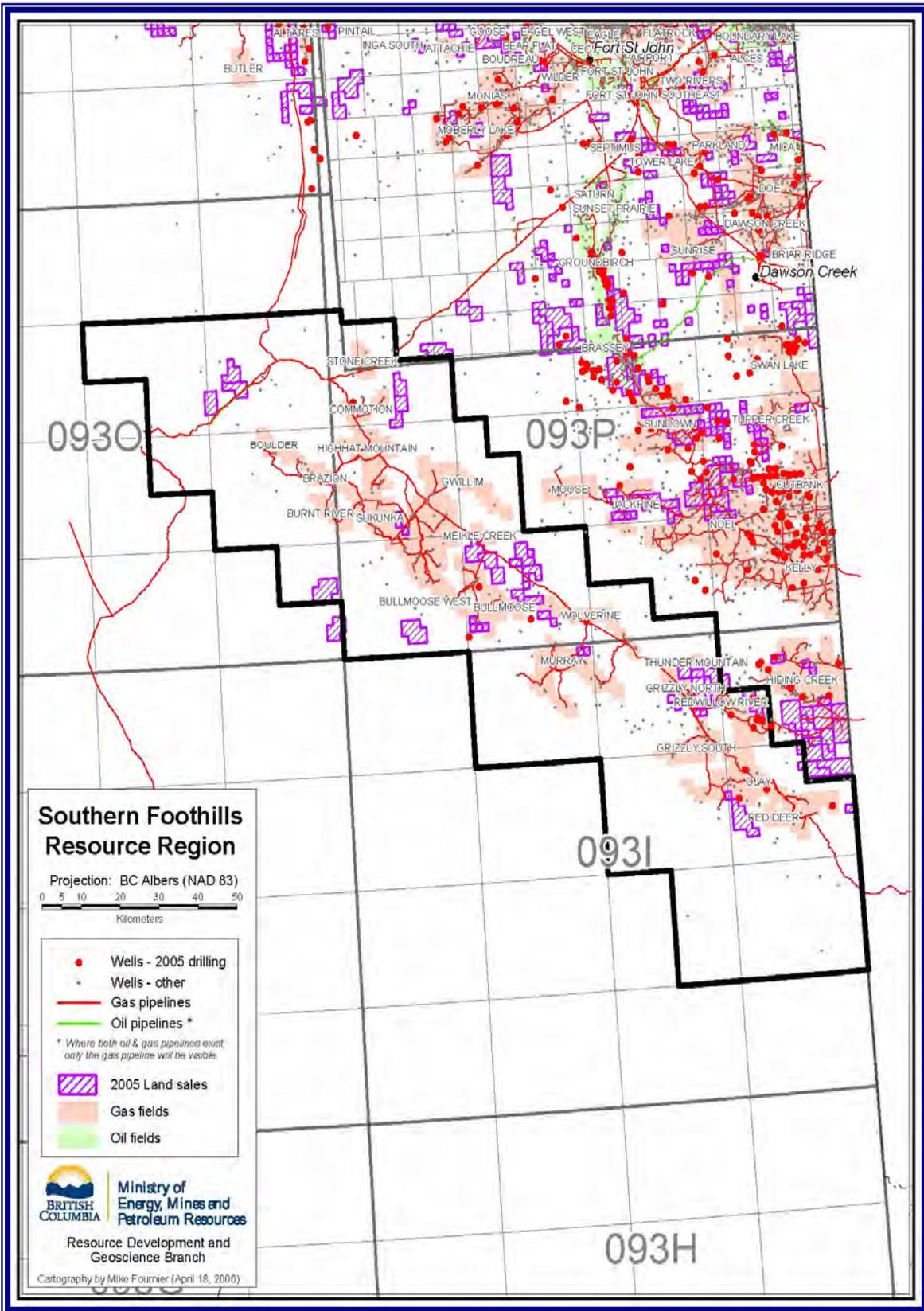


Figure 31. Land sale and drilling activity in the Southern Foothills region of NEBC in 2005.

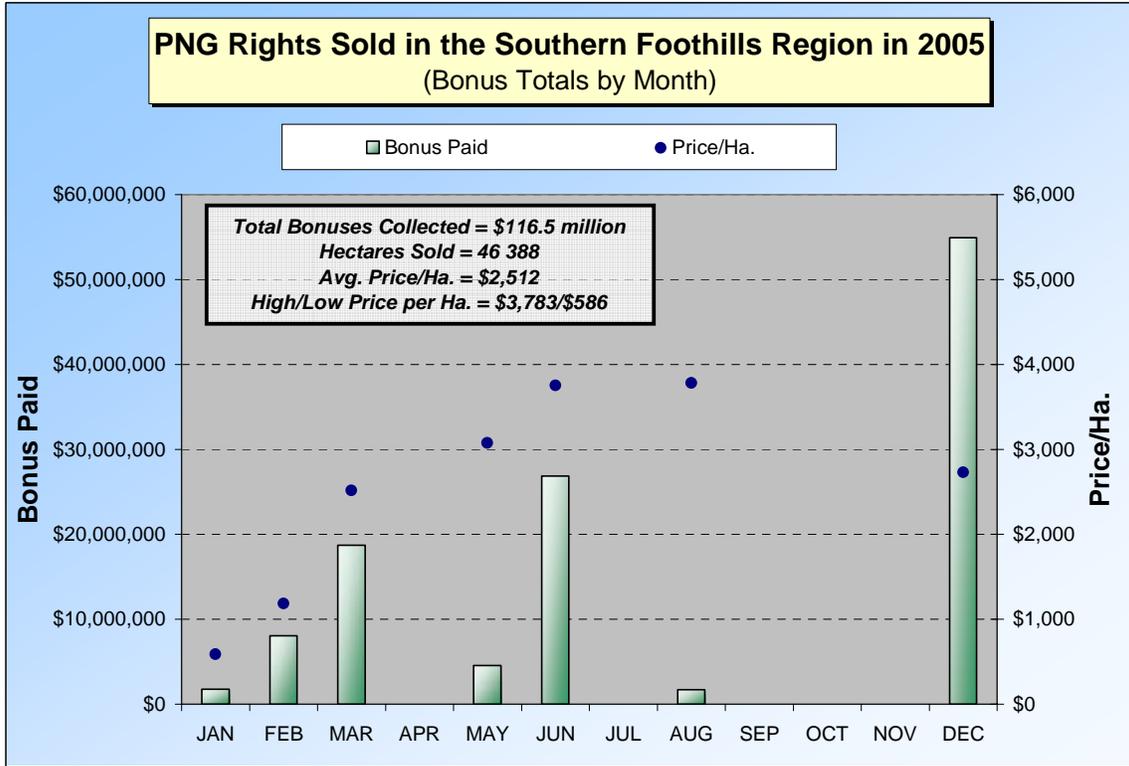


Figure 32. PNG rights sales in the Southern Foothills region in 2005.

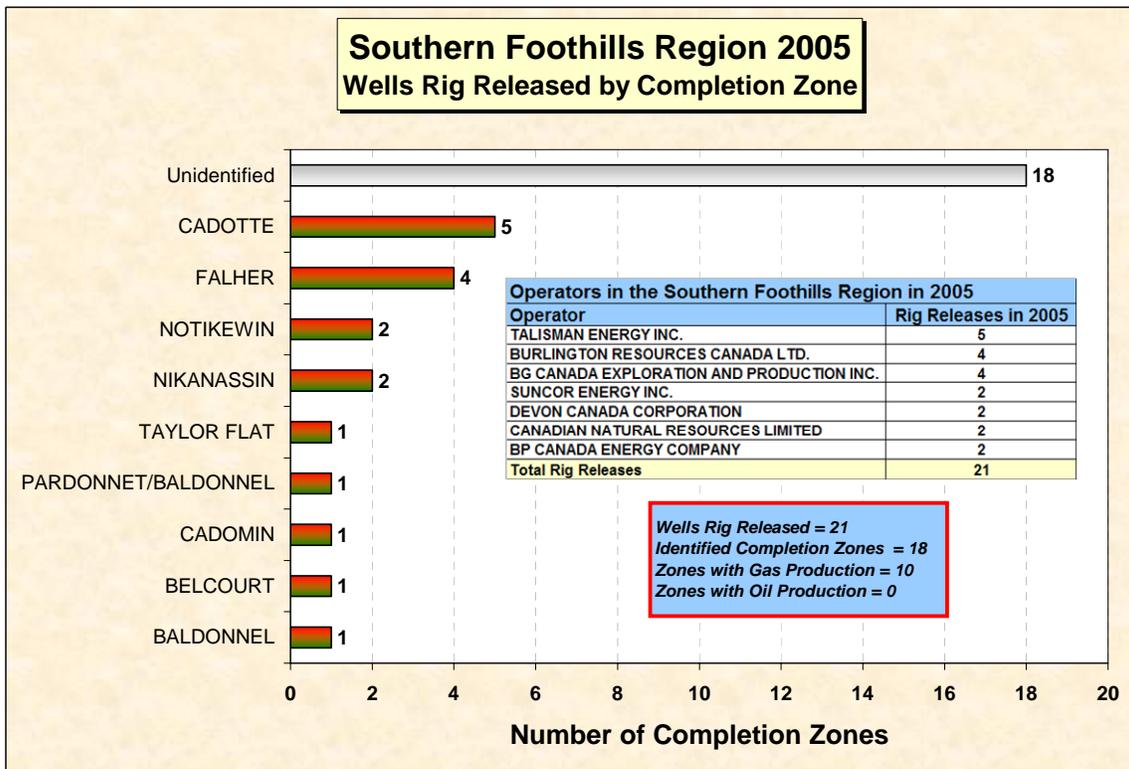


Figure 33. Target zones from wells rig released in the Southern Foothills region in 2005.

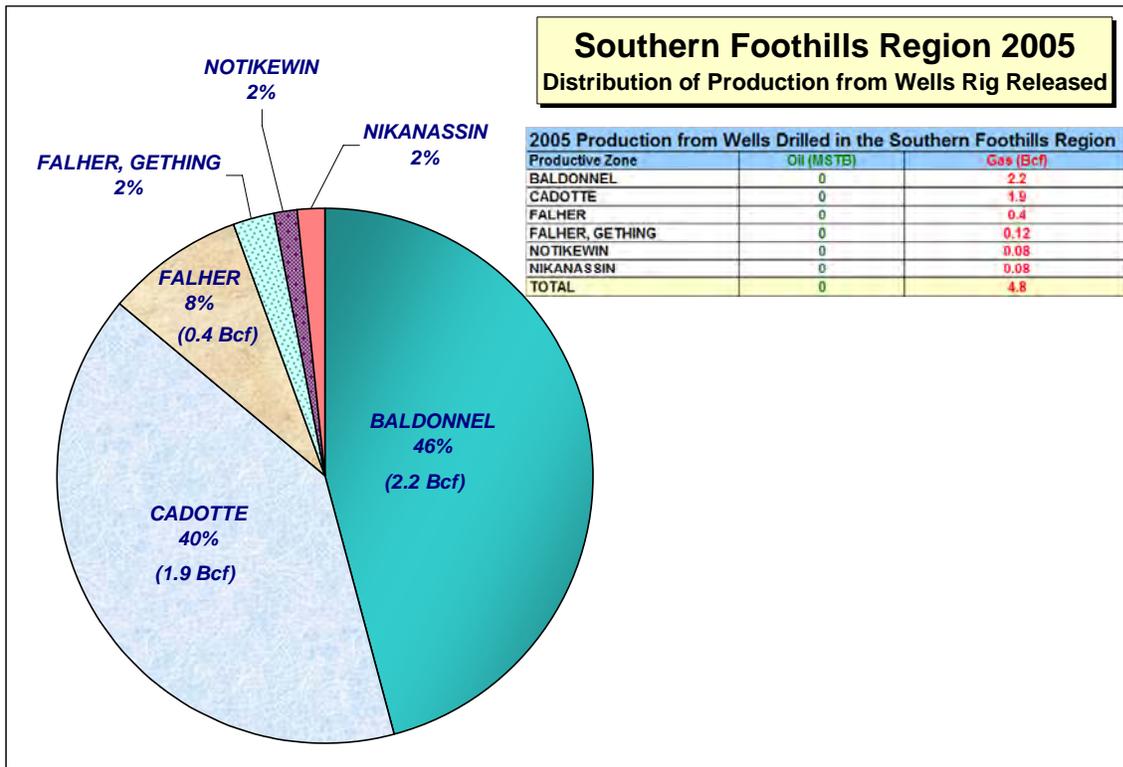


Figure 34. Distribution of production from wells rig released in the Southern Foothills region in 2005.

Oil & Gas Exploration Activity

The highest drilling activity in the Southern Foothills occurred in the **Ojay** area. There, **BG Canada Exploration and Production Inc.** drilled four wells, with one development well showing multiple zone production from the Lower Cretaceous Cadotte and the Falher. The productive well at d-68-C/93-I-16 lists gas production from the Cadotte averaging 4.8 mmcf per day and from the Falher 'C' sand at an average rate of 1.7 mmcf per day. Results from the other rig release (c-95-D/93-I-16) reveal identical productive zones but yield much lower production rates over the same period.

The **Bullmoose** area was the second most active in terms of 2005 rig releases. All four Triassic wells drilled in the area were operated by **Talisman Energy Inc.** but have yet to be tied in for production. The company has tested two of the wells. The first well, with 50% interest to Talisman, tested at a gross raw rate of 26 mmcf per day of gas and is a follow-up to a new pool discovery. The well is expected to be tied in for production by the fourth quarter of 2006. The second Triassic well, which is 44% Talisman, tested at a gross raw rate of 16 mmcf per day and will be tied in to facilities early in 2006.

Talisman Energy Inc. continues to look at the Southern Foothills region as a key area to carry out its deep gas strategy. The company recently announced another successful deep Paleozoic well in the **Sukunka** area. The Talisman Seneca Sukunka well at a-93-D/93-

P-5 has just been placed on production at a gross raw rate of 42 mmcf per day. The well comes on the heels of Talisman's enormously successful well drilled in the nearby Brazion area in 2004. That Paleozoic well is currently producing at approximately 50 mmcf per day of sales gas. Talisman has drawn over two Tcf of gas from the Triassic play in the Southern Foothills region over the years and hopes that the new Paleozoic play will prove to be just as prolific as previous finds.

Canadian Natural Resources Limited rig released a well (b-27-H/93-I-15) in the **Grizzly North** area that is producing gas from multiple zones. The well was placed on production in September 2005 and has produced almost 500 mmcf from the Lower Cretaceous Cadotte, Falher, and the Jura-Cretaceous Nikanassin. Exploration targets in the Grizzly North area include Lower Cretaceous and Triassic reservoirs, which produce gas on a trend to the southeast of the Ojay area and outboard to the southwest at Grizzly North. The other major operator in the area is Burlington Resources Canada Ltd.

INTERIOR BASINS OF BRITISH COLUMBIA

In 2005, the Resource Development and Geoscience Branch (RDGB) refocused its resources towards determining the petroleum potential of the Nechako Basin. This is one of several Intermontane basins within British Columbia, and it occupies the central and southern part of the Interior (*Figure 35*).

Research has been focused within the southern part of the basin, where subsurface data is available through past exploration efforts. Activity during the 2005 field season was carried out in the Nazko and Redstone areas, and in the Chilcotin Ranges. This research included examining key stratigraphic sections and sampling prospective source bed horizons. It is believed that rocks of the Tyaughton-Methow Basin in the Chilcotin Ranges probably correlate with subsurface sections in the southern Nechako Basin. From reference collections donated by Burlington Resources Canada Limited, subsurface samples were collected to enhance understanding of the stratigraphic age of the units. This would then imply correlation with known surface sections, allowing a better understanding of the depositional sequence. In addition, subsurface samples were obtained to provide constraints of the thermal maturation of these sections and for source bed analysis of specific horizons (Ferri and Riddell, Summary of

Activities 2006). Surface and subsurface samples were also acquired for apatite fission track thermochronology to improve comprehension of the burial and uplift history of these rocks.

The Geological Survey of Canada, Simon Fraser University, and the University of Alberta continued research activities to develop understanding of the hydrocarbon potential of the Bowser and Sustut basins. The RDGB was only indirectly involved in this project by funding a Simon Fraser University graduate student who is examining relationships between the Skeena and Bowser Lake groups. During the 2005 field season, field activities were in the southern Bowser and Sustut basins. These activities focused on differentiating the Skeena and Bowser Lake groups and on sampling for thermal maturation and apatite fission track thermochronology.

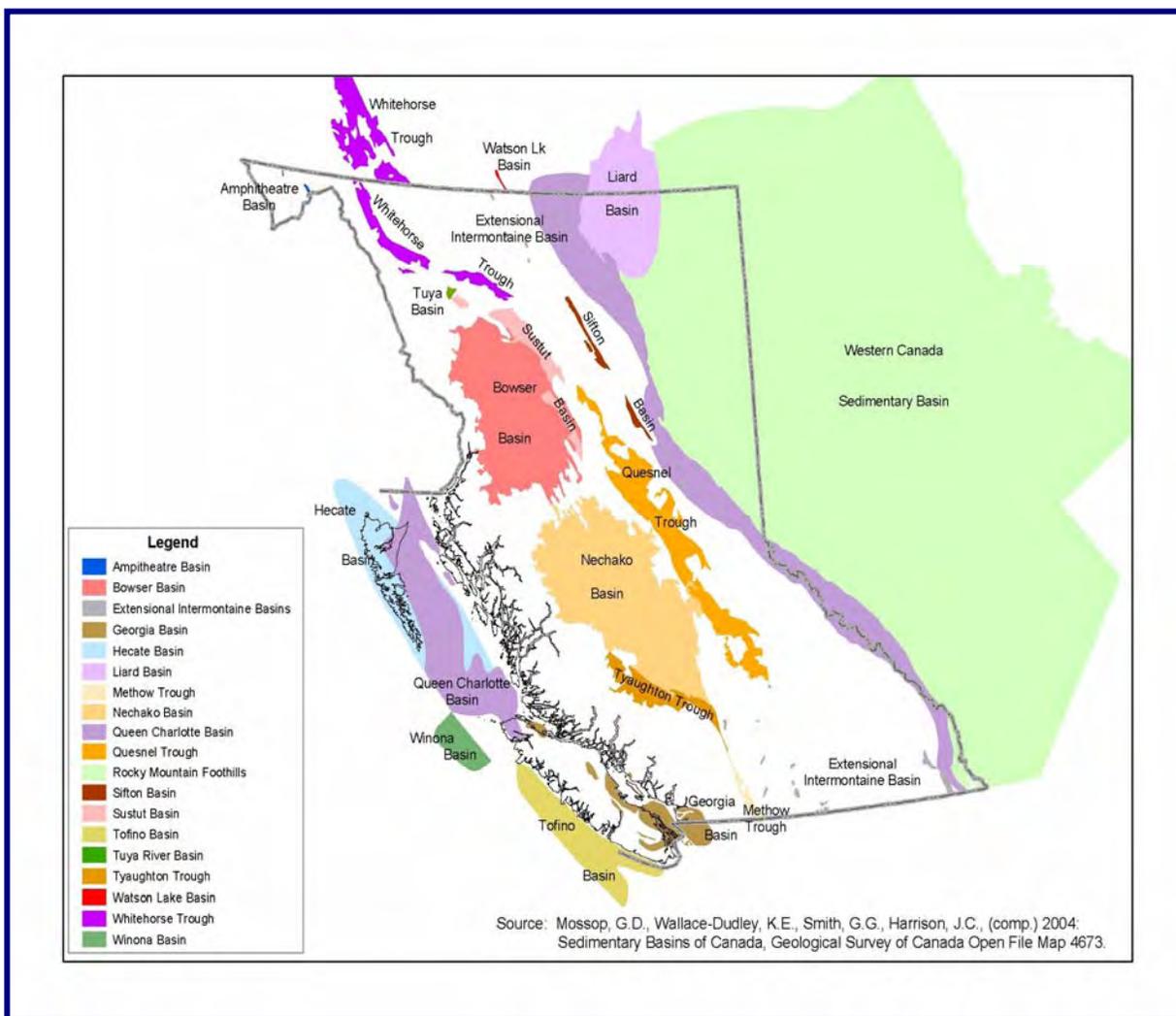


Figure 35. The interior basins of British Columbia.

COALBED GAS IN BRITISH COLUMBIA

British Columbia is still in the early stages of coalbed gas (CBG) exploration and evaluation, but its potential for becoming a new source of gas supply is increasingly significant. The province has an estimated resource of 84 Tcf of coalbed gas. The resource is

distributed throughout the province and is generally close to markets and infrastructure (*Figure 36*). There has been no commercial production to date; however, industry has been acquiring petroleum and natural gas rights over the past few years and has spent over \$50 million on various evaluation projects. First commercial production would likely come from the Peace River Coalfield. There have been 75 wells drilled in the province to date that are identified as coalbed gas wells. Nine wells were drilled in 2005.

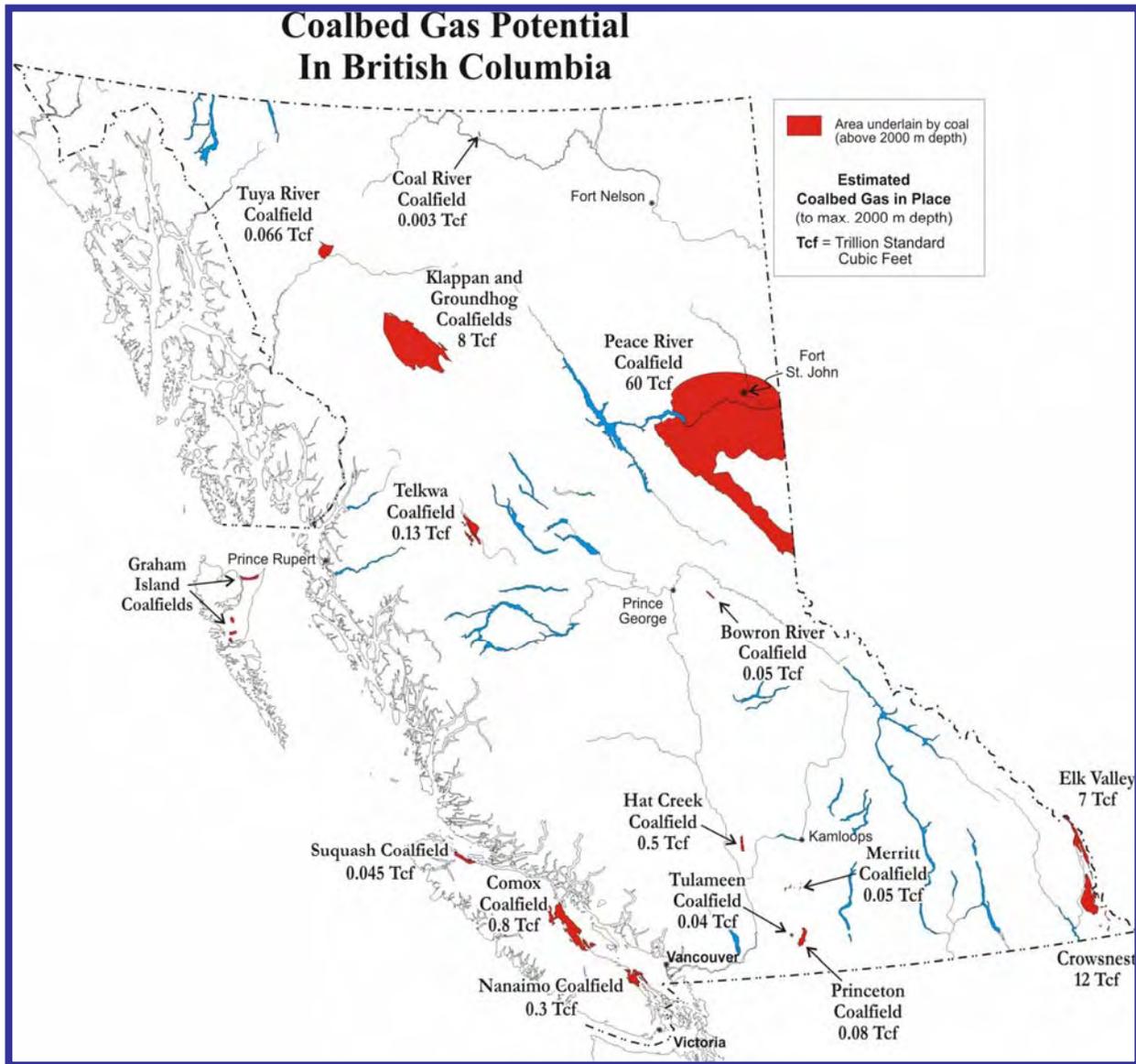


Figure 36. Areas of coalbed gas (CBG) potential in British Columbia.

CBG Tenure Activity in 2005

In British Columbia, coalbed gas (CBG) is developed and regulated in much the same way as

natural gas. A company must obtain petroleum and natural gas tenure rights in order to develop CBG. In 2005, a total of \$4 million in bonuses were paid to acquire 12,448 hectares of Crown rights for CBG exploration (*Table 1*).

Year	Hectares Sold (all or some attributed to CBG)	Bonus Bid Revenues (\$million attributed to CBG)
2002	81,563	\$7.7
2003	16,467	\$4.0
2004	19,499	\$9.2
2005	12,448	\$4.0

TABLE 1. COALBED GAS TENURE ACTIVITY 2002 - 2005

Canadian Spirit Resources Inc. acquired additional PNG rights in the **Farrell Creek** area at British Columbia crown sales in 2005. The lands acquired are adjacent to the company's existing 7,689 hectare contiguous block held in the area and add to the material size of its coalbed gas project. The Farrell Creek program includes the staged stimulation and production testing of the Gething Formation coals.

In the **Crowsnest** coalfield, part of the East Kootney coalfields in southeast BC, a tenure disposition to the **Elk Valley Coal Partnership (EVCP)** was confirmed in March 2005 for 10,359 hectares. This disposition was made under the freehold coal tenure agreement. The EVCP has established a relationship with Shell Canada Ltd. to explore on its CBG rights. Coal and surface ownership in the Crowsnest coalfield is a combination of provincial, freehold, and federal land.

No other tenures (PNG rights) sold in 2005 were known to be targeting coalbed gas. The following are other tenure requests related to the freehold coal owners.

Quinsam Coal has initiated a request for 4,124 hectares in the **Comox** coalfield. Quinsam Coal has

formed a liaison with **Texas Canadian Ventures Inc.** to evaluate the coalbed gas resource on its freehold properties near Campbell River. No date for the tenure referral has been determined.

Weldwood of Canada Ltd., now West Fraser Timber Co. Ltd, has initiated a request for 5,252 hectares in the **Comox** coalfield. Weldwood/West Fraser has an alliance with **VWVulcan Energy of Canada** to explore for coalbed gas on its freehold properties near Tsable River. No date for the tenure referral has been determined.

Tembec has initiated a request for approximately 2,245 hectares in the **Crowsnest** coalfield in southeast BC. No date for tenure referral has been determined.

CBG Drilling Activity in 2005

The BC Oil and Gas Commission (OGC) approved 28 applications for CBG test holes in 2005. Nine wells were drilled in the areas of Hudson's Hope, Crowsnest/Sparwood and Elk Valley (*Table 2*).

Year	Authorized Test Holes	Authorized CBG Wells	TOTAL	Test Holes and Wells Drilled
1985 - 2000	10	9	19	17
2000	4	21	25	11
2001	12	1	13	17
2002	1	1	2	2
2003	5	6	11	7
2004	13	6	19	12
2005	28	0	28	9

TABLE 2. COALBED GAS DRILLING ACTIVITY 1985 - 2005

The OGC approved 12 applications from **Shell Canada Limited** for CBG test holes in the **Klappan** area in northern BC. None of the test holes were drilled in 2005. The OGC approved another six CBG test hole applications from Shell Canada in the **Crowsnest Pass** area of southeastern BC. Two test holes were drilled in October.

The OGC approved five applications from **Hudson's Hope Gas Ltd.** for CBG test holes in the **Hudson's Hope** area of northeast BC.

Three wells were drilled. Also in the Hudson's Hope area, five CBG test hole applications were approved for **Canadian Spirit Resources Inc.** Two of the test holes were drilled.

The OGC has not received any Evaluation, Feasibility, or Production Plan applications. The new plans are part of a phased application process that has replaced Experimental Schemes.

Industry Highlights

Northwest BC

Canadian Spirit Resources Inc. (CRSI) has evaluated an additional four test holes in the past 12 months in the **Farrell Creek** prospect, located north of Hudson's Hope, for a total of six wells. On March 15, 2006, CSRI announced that it was producing natural gas from two of its test holes. Flow rate for one well is

stabilized at 250 to 300 mcf per day and for the other is 35 mcf per day and increasing. CSRI has indicated their interest to drill additional wells in 2006.

In 2004, **GeoMet, Inc.** set up **Hudson's Hope Gas Ltd.** as its Canadian operating company in the **Peace River Project** to assume operation of the existing **Peace River Corporation (PRC)** wells. Under a joint exploration and development agreement with PRC, GeoMet earns an interest in the drilling licenses and existing wells drilled by PRC. PRC holds licenses on approximately 13,355 hectares in the **Hudson's Hope** area. Approximately one third of the licenses are south of the Peace River in the **Peace Moberly Tract**. All of the 13,555 hectares lie within the boundaries of the Hudson's Hope District Municipality. Between Peace River Corporation and Hudson's Hope Gas Ltd., five production test wells, two wireline coreholes, and a re-entry well for additional testing have been completed. If both companies are satisfied with the results of testing, they would like to drill additional test wells later in 2006. If results of the additional wells are favourable, they would propose their first stage of development drilling for commercial production in late 2006 or 2007. GeoMet has requested posting of additional tenure in the area.

Southeast BC

EnCana Corporation is working with its new joint venture partner, **Storm Cat Energy Corp.**, to reactivate the **Elk Valley** area pilot program of 2000-2004, which resulted in the drilling of 17 exploratory and stratigraphic wells. EnCana has analyzed over 370 water samples from the surface watershed wells, treatment facilities inlets, and discharges. It has also analyzed over 30 soil samples in the receiving environment. In July 2005, EnCana received approval from the BC Ministry of Environment and the OGC to discharge water from one well in its west pilot under the new Code of Practice for Water Produced from Coalbed Gas Operations. EnCana announced that it would share water composition and quality data with the public.

In June 2005, **Storm Cat Energy Corp.** entered into a farm-in and joint venture agreement with **EnCana Corporation** on 31,475 gross hectares in the **Elk Valley** area. Storm Cat re-activated three wells in EnCana's Elk Valley western pilot program, adding a new coal interval to the completion in two of the three wells. The three wells are producing at a combined rate of 150 mcf per day. Storm Cat drilled and completed two new wells north of the pilot project that encountered thick, gas-charged coal seams from the shallower section of the Jura-Cretaceous Mist Mountain Formation. One well was on production for 16 days (production rate between 124 mcf/d to 204 mcf/d). The other well produced for five days at 75 mcf per day until experiencing downhole pump failure. Storm Cat has submitted an additional five well applications and a pipeline application to the OGC. EnCana has also initiated a Feasibility Plan, although it has not yet been reviewed by the OGC.

Shell Canada Limited and **Elk Valley Coal Corporation (EVCC)** entered into an agreement in 2004 to determine the potential for CBG production from coal seams on EVCC freehold property in the **Elk Valley** area. In the fall of 2004, Shell Canada received regulatory approval from the OGC to drill four test wells on lands owned by EVCC southeast of Sparwood. The drilling of two wells in the **Robert** and **Fir** areas was completed, as were site preparations in the Wheeler area. However, due to weather conditions, further drilling was suspended. In November and December 2005, Shell drilled two additional wells in the **Carbon** and **Wheeler** areas. In addition to this drilling activity, well testing was undertaken at three locations: Wheeler, Robert and Fir. For these sites, produced water was transported to an approved deep disposal well in Alberta. Shell was not able to acquire a sample of water from the coal seams due to low gas productivity. Shell recently announced to the communities that it would not continue further exploration activities in the area due to discouraging results from 2004/05 drilling. Shell has already begun and will continue its reclamation work on the five well leases built in 2004/2005.

Northwest BC

In August of 2004, **Shell Canada Limited** acquired approximately 412,000 hectares of petroleum and natural gas rights in **Klappan** coalfield through an Order-in-Council. Three test holes were drilled and 84 kilometres of seismic were conducted later that year. In 2005, Shell submitted applications for one air-borne geophysical survey and 12 test holes in the Klappan area. The OGC approved the air-borne geophysical survey and two test holes at the existing well sites, but deferred approval of the remaining test holes. On August 19, 2005, Shell informed the BC Ministry of Energy, Mines and Petroleum Resources (EMPR) and the OGC that it would be deferring its proposed 2005 exploration program in the Klappan until First Nations issues between the **Tahltan Central Council** and **Iskut** in the Province are resolved. About a month earlier, a group of Iskut First Nation members blocked the Ealue Lake access road into the Mt. Klappan area. Shell requires use of this road to transport drilling equipment. Shell kept its Dease Lake office open, continued funding the traditional use knowledge project with the Tahltan Central Council, and did some reclamation activity and environmental work for the remainder of 2005. On March 21, 2006, the OGC issued approval to Shell's test hole applications and informed communities. Shell may drill these wells in the fall or winter of 2006.

In December 2003, the BC Ministry of Energy, Mines and Petroleum Resources (EMPR) released a Call for Proposals (CFP) to develop coalbed gas resource in the **Tuya River, Klappan-Groundhog** and **Telkwa** coalfields. In January 2004, the successful proponent in the Telkwa coalfield was identified as **Norwest Corporation**, which is now partnered with **Outrider Energy Ltd.** As the Ministry's CFP was an open competitive process, the Ministry has initiated discussions with the proponent on the specific content of tenure agreement. The agreement will be subject to

approval by Order-in-council under Section 72 of the Petroleum and Natural Gas Act. Disposition of this tenure is subject to First Nation consultation, community engagement tenure referral, and the successful negotiation of tenure terms. Both EMPR and Outrider Energy have initiated community and First Nation engagement in February 2006 to prepare for tenure referral planned in summer 2006.

Central BC

Late in 2004, **Petrobank Energy and Resources Ltd.** drilled a CBG well in the **Princeton** area. As operator, Petrobank holds a 60% working interest in the land position. The exploratory well encountered thick coals containing high gas saturations. After completion and fracture treatment, the well flowed free methane with only minor amounts of fresh water. Petrobank and partners are planning for future exploration activities. No applications have been received by the OGC.

Compliance Energy Corp. partnered with **Richards Oil and Gas Ltd.** announced that they would drill three exploratory wells at their **Tulameen Basin** property at **Princeton** by September. No applications have been received by the OGC.

Vancouver Island

Quinsam Coal has an alliance with **CornerStone Gas** (formerly Texas Canadian Ventures) to explore for coalbed gas on its freehold properties near **Campbell River**. It has initiated a tenure request for 4,124 hectares in the **Comox** coalfield. The target referral is in 2007.

West Fraser Timber Co. Ltd., formerly Weldwood of Canada, has formed an alliance with **VWVulcan** to explore for coalbed gas on its freehold properties in the **Comox** coalfield. Weldwood has initiated a tenure request for 5,252 hectares under the freehold coal agreement. The target referral is in 2007.

OUTLOOK

British Columbia is the second largest natural gas producer in Canada at 1.1 Tcf of gas per year and the fourth largest crude oil producer at 11 million barrels per year. It is one of the few jurisdictions in North America where annual marketable natural gas production is increasing (32% over the last 10 years). Strong commodity prices continue to give producers the incentive to increase spending on new exploration projects, but the cost of adding reserves for Canadian and independent US producers is high. A key challenge for operators in British Columbia has always been obtaining access to resource regions, particularly in the far north. To meet this challenge, the Ministry of Energy, Mines and Petroleum Resources continues to refine the Oil and Gas Development Strategy (OGDS) developed in 2002. To date, this strategy has taken specific measures to develop targeted royalty incentives,

improve access roads, support service sector growth through marketing strategies and skills development, and to raise the industry's profile at trade schools and educational institutions.

On the strength of high natural gas prices, promising discoveries, and the successful implementation of the Ministry of Energy, Mines and Petroleum Resources Oil and Gas Development Strategy, new permits for drilling in British Columbia have been on the rise for the past four years. Continued interest in natural gas prospects, and the trend towards both conventional and unconventional resource play development, should help push well permits to a new high. The Petroleum Services Association of Canada is estimating that a record 1,600 wells will be drilled in British Columbia by the end of 2006. Projections are for industry capital investment levels to reach \$4.7 billion* in 2006 and for provincial oil and gas revenue to reach of \$2.8 billion in fiscal 2006/2007.

One of the goals of the 2006/07 Ministry of Energy, Mines and Petroleum Resources Oil and Gas Division service plan is "a thriving and competitive energy, mineral and petroleum resource sector in British Columbia". The Ministry continues to make strides towards a fiscal-friendly and non-prescriptive energy regime that offers major initiatives in streamlining regulation, advocating a competitive fiscal environment, ensuring road infrastructure development, and engaging in meaningful stakeholder relations.

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* Canadian Association of Petroleum Producers' estimate



For more information:
Ministry of Energy, Mines and Petroleum Resources
Oil and Gas Division
Resource Development and Geoscience Branch