

Horn River Basin Status Report for 2009/10

About the BC Oil and Gas Commission

The BC Oil and Gas Commission (Commission) is an independent, single-window regulatory agency with responsibilities for overseeing oil and gas operations in British Columbia, including exploration, development, pipeline transportation and reclamation.

The Commission's core roles include reviewing and assessing applications for industry activity, consulting with First Nations, ensuring industry complies with provincial legislation and cooperating with partner agencies. The public interest is protected through the objectives of ensuring public safety, protecting the environment, conserving petroleum resources and ensuring equitable participation in production.

Table of Contents

1. Executive Summary	Page 5
2. Overview of the Horn River Basin	Page 6
2.1 Geography and Geology	Page 6
2.2 Shale Gas Recovery Techniques	Page 7
3. First Nations Consultation	Page 8
4. Oil and Gas Exploration	Page 9
4.1 Geophysical Exploration	Page 9
4.2 Road Construction	Page 10
5. Well Activity	Page 11
5.1 Well Approvals	Page 11
5.2 Wells Drilled	Page 13
5.3 Well Pads	Page 13
5.4 Well Production	Page 14
6. Pipeline and Facility Activity	Page 17
7. Stewardship	Page 19
7.1 Borrow Pits	Page 19
7.2 Water	Page 19
7.3 Oil and Gas Footprint Analysis	Page 20
8. Resource Development Unit	Page 21
9. Conclusion	Page 22

1. Executive Summary

The BC Oil and Gas Commission (Commission) regulates oil and gas activities in British Columbia, including exploration, development, pipeline transportation, facilities and reclamation. To summarize oil and gas activities and the Commission's role in the Horn River Basin (HRB), the Horn River Basin Status Report was developed. This report provides an overview of oil and gas permitting, operational activities and First Nation consultation from the 2009/2010 fiscal year within the HRB.

The HRB encompasses approximately 1.1 million hectares of land in northeastern British Columbia, north of Fort Nelson and south of the Northwest Territories border (Figure 1). Estimates of the total amount of shale gas resource in the HRB vary, but average approximately 500 trillion cubic feet (TCF). The portion of the resource that is recoverable is dependent on technology, drilling density and effectiveness of hydraulic fracturing (fracking) stimulations.

As with all natural gas exploration over the past two years, activity within the HRB has been affected by pricing. As this report shows, the number of wells authorized by the Commission within the HRB fell by 18 per cent between the 2008/09 and 2009/10 fiscal years.

Natural gas exploration and development occurring in the HRB over the past few years has been unconventional in nature. The advent of horizontal drilling combined with multi-stage hydraulic fracturing is the technology that unlocked the potential of shale gas. During the 2009/10 fiscal year, 80 per cent of wells drilled within the HRB targeted shale formations. Over three-quarters of the wells authorized during the 2009/10 fiscal year were approved to be directionally drilled. Also, approximately 60 per cent of wells authorized were approved as secondary wells (wells located on existing well pads) during the fiscal year.

An increase in unconventional recovery techniques and multi-well pads has had limiting effects on the oil and gas footprint in the HRB. Within the HRB, there are a total of five well pads with at least 10 wellheads approved at the conclusion of the 2009/10 fiscal year. These well pads reduce the overall impact on the landscape, as the disturbance per wellhead is less than 25 per cent of the disturbance of a conventional well pad.

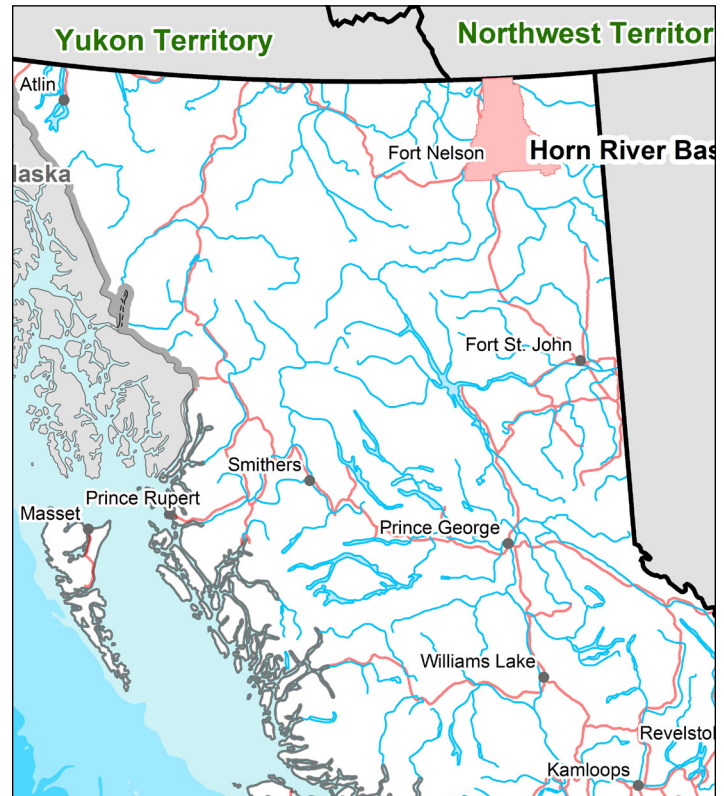


Figure 1: Geographic overview of Horn River Basin

Natural gas pricing effects have not hindered infrastructure within the HRB, as the number of facilities approved during the 2009/10 fiscal year remained stable. This trend shows how capacity is being expanded to prepare for an increase in the price of natural gas.

The Commission has been involved in initiatives integral to the rational development and reduction of the oil and gas footprint in the HRB, such as aiding in development of the Horn River Basin Producers Group (HRBPG), developing geophysical program requirements, encouraging use of sub-surface water and limiting borrow pit/aggregate operation size.

The HRBPG created a development plan for the HRB to ensure common corridors are utilized to maximum potential. Methods such as planning and utilizing common infrastructure were also implemented in regard to construction of roads, facilities and pipelines to reduce the overall footprint in the HRB. The Commission's oil and gas footprint analysis included in this report suggests successes in these methods – the total oil and gas disturbance represents less than one per cent of the entire HRB area.

2. Overview of the Horn River Basin

2.1 Geography and Geology

The Horn River Basin encompasses approximately 1.1 million hectares of land in northeastern British Columbia, north of Fort Nelson and south of the Northwest Territories border. Figure 2 provides an overview of the main shale layers within the HRB – the Muskwa, Otter Park and Evie formations. These formations are sandwiched between the Fort Simpson, a thick sequence of ductile shales, and the Keg River, a low permeable carbonate formation.

Key characteristics of these shale formations include:

- Depth: The shale formations are approximately 2,500 metres below surface.
- Thickness: The aggregate thickness of the formations varies, but is thicker than 200 metres in central portions

of the HRB.

- Temperature: At the depths of the shale formation, the temperature varies, but can be as high as 140C.
- Permeability: The measure of the ability of shale to transmit fluids. Horn River shales have a permeability ranging between 100 and 300 nanodarcies, several order of magnitude less permeable than a conventional reservoir (generally greater than 0.1 millidarcy¹).
- Geomechanical properties: Horn River shales have high quartz content, making the shale gas retrievable through hydraulic fracturing.

Estimates of the total amount of shale gas resource in the HRB vary but average approximately 500 trillion cubic feet (TCF). The portion of recoverable resource is dependent on technology,

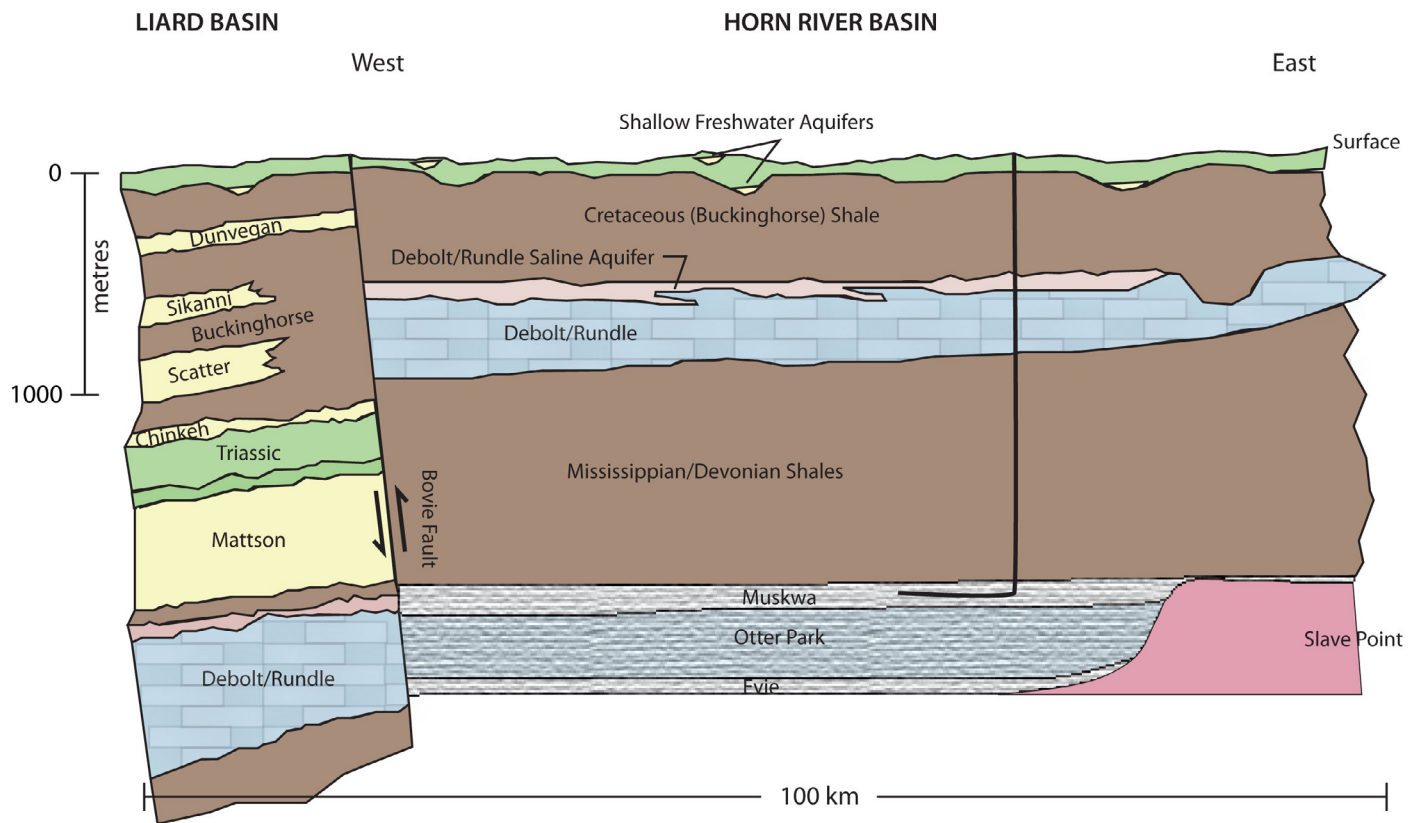


Figure 2: Schematic stratigraphic cross-section of the Horn River Basin and adjacent Liard Basin (modified from Petrel Robertson)

¹ 1 A darcy is a unit of permeability, equivalent to the passage of one cubic centimetre of fluid of one centipose viscosity flowing in one second under a pressure of one atmosphere through a porous medium having a cross-sectional area of one square centimetre and a length on one centimetre. A millidarcy is equal to 0.001 darcies and 100 nanodarcies is equal to 0.0001 millidarcies.

drilling density and the effectiveness of hydraulic fracturing stimulations.

2.2 Shale Gas Recovery Techniques

True shale gas reservoirs like the HRB have permeabilities that do not permit significant gas flow or production without stimulation. In the HRB, it has been known for some time that mud gas levels were elevated when drilling through the shale package, particularly where natural fractures were encountered. Conventional tests and completions of the Horn River shale sequence in vertical wells yielded uneconomic gas flows, confirming the presence of gas but not sufficient to encourage commercial development.

The advent of horizontal drilling combined with multi-stage fracturing is the technology that unlocked the potential of shale gas. HRB shales are brittle due to high quartz content. The “resource density” of the HRB shales is very high, with over one billion cubic feet (BCF) of gas per meter of reservoir per square mile anticipated.

Currently, operators in the HRB are drilling multiple horizontal wells from a common pad, usually in two dominant, opposing directions. Individual wellheads may be as close as 10 metres apart and the offset between horizontal well bores is between 150 and 500 metres. Because of the thickness of the shale package, most areas of the HRB will likely require two horizontal well bores placed in the upper and lower shales to facilitate adequate drainage of the gas.

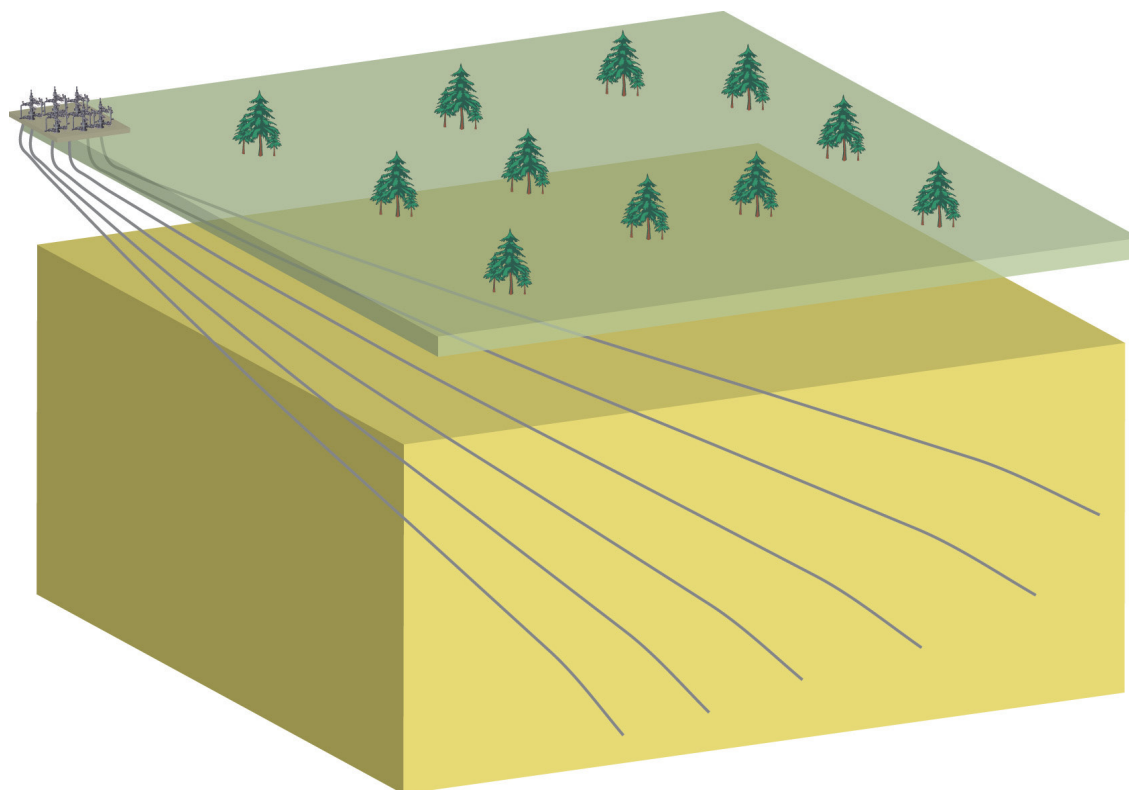


Figure 3: Multiple Horizontal Wells from a Common Well Pad

3. First Nations Consultation

The HRB lies within the administrative area of Fort Nelson First Nation (FNFN). The Commission consulted with FNFN as per the Consultation Process Agreement on each of the 615 applications or application amendments within the area. Table 1 displays the number of consultations with the FNFN by oil and gas activity type.

Table 1: First Nations Consultations

Activity Type	Number of Consultations
Geophysical	68
Wells	311
Pipeline	78
Facility	25
Petroleum Development Roads	22
Other	111
Total	615

In addition to consulting, the Commission worked with FNFN on strategies to build relationships and share information. These included promoting linkages between FNFN and industry; coordinating FNFN input into a moose inventory; coordinating and collaborating with FNFN and industry on an annual gathering to focus on exchange of cultural learning, industry practices and government processes; engaging in information sessions between FNFN, the Fort Nelson Regional Municipality and government, and hosting ride-alongs and field excursions with the Commission’s compliance and enforcement division to gain knowledge of on-the-ground operational aspects and the regulatory regime related to shale gas development.

4. Oil and Gas Exploration

4.1 Geophysical Exploration

Oil and gas companies conduct geophysical exploration through the principles of seismology to map the subsurface structure of rock formations from reflected seismic waves. Energy sources, such as dynamite or vibroseis, send sound energy waves into the earth, where the different layers of Earth's crust reflect this energy back. These reflected energy waves are recorded over a pre-determined time period with geophones. Once data is recorded onto tape, it can be processed using special software, resulting in processed seismic profiles being produced. These profiles or data sets can then be interpreted for possible hydrocarbon reserves.

In January 2009, the Commission introduced geophysical program requirements within the HRB to identify how seismic programs can be planned and implemented in a manner that minimizes disturbance of ecosystems within the HRB³. Applications that depart from the following criteria require a justification that is reviewed by Commission technical staff:

- No geophysical programs are to overlap unless applicants commit to using common source and receiver lines in the area of overlap, with no new or additional clearing.
- Source lines are a maximum of three metres in width with meandering avoidance techniques and sight line

- screens (moose blinds) at least every 200 metres.
- Receiver lines are a maximum of two metres in width with meandering avoidance techniques and sightline screens (moose blinds) at least every 200 metres. If necessary, for access or safety reasons, every fourth receiver line may be widened to a maximum of three metres.
- Lines must be hand-cut within areas identified by the Commission.
- Orient source and receiver lines to follow existing or planned seismic survey lines to minimize the need for additional clearing for future seismic projects.
- Distance between source lines must be greater than 200 metres.

For overlapping geophysical programs within the HRB, the Commission contacts both applicants to provide contact information, enabling each to coordinate their programs with others in the same location.

The Commission approved 14 geophysical programs, nine for three-dimensional (3D) seismic, four for two-dimensional (2D) seismic⁴ and one microseismic program within the HRB over the 2009/10 fiscal year. Table 2 summarizes geophysical exploration activities associated with the 13 2D/3D seismic projects.

Table 2: Geophysical Activity

Statistic	Quantity
Programs approved	14
Average Approval Time ⁵	29.38
Average Approval Time Range	3-50
Programs Completed or in progress	10
Average Area Covered (km ²)	200.75
Average Area Range (km ²)	6.10-744.30

3 The Commission released its Horn River Basin Geophysical Requirements in Information Letter #OGC 09-03 on January 14, 2009.
4 Three-dimensional seismic requires the deployment of geophones in a two-dimensional array together with a two-dimensional pattern of source points, resulting in a three-dimensional image of the geology beneath the array. Two-dimensional seismic operations deploy geophones in one-dimensional lines, resulting in a cross-section of the geology below.
5 Reported in working days (excludes weekends and statutory holidays).

4.2 Road Construction

Access to the HRB generally occurs from the Liard Highway in the west and the Sierra Yoyo Desan Road in the east. Some Forest Service Roads exist in the area, but Petroleum Development Roads (PDR) have been approved to allow wellsite access.

During the 2009/10 fiscal year, the Commission approved six new PDRs in the HRB, and amended or extended an additional three existing PDRs. Table 3 summarizes new PDR activity for the 2009/10 fiscal year.

Table 3: Petroleum Development Roads⁶

Statistic	Quantity
New PDRs Approved	6
Average Approval Time ⁷	9.50
Approval Time Range	2-28
PDR Average Length (km)	16.25
PDR Length Range (km)	1.36-53.92

⁶ One PDR approved by the Commission was an existing Forest Service Road that was converted to a PDR. This road has a length of 53.92 kilometres of existing disturbance and was approved in two working days, and is included in this analysis.

⁷ Reported in working days (excludes weekends and statutory holidays).

5. Well Activity

Wells have been drilled within the area known as the HRB as far back as 1955 for conventional resources. The presence of natural gas within the shale layers has been known for decades, but recent technological advances in horizontal drilling and fracking have made the HRB play more economical, allowing operators to extract hydrocarbons from the shale.

5.1 Well Approvals

The Commission approved a total of 164 wells within the HRB during the 2009/10 fiscal year, an 18 per cent decrease from the previous fiscal year. The 164 wells approved brings the total number of well approvals within the area to 1,314. Not all wells approved by the Commission targeted HRB shale formations. Of the 164 wells approved, 140 targeted HRB shale formations. Table 4 provides descriptive statistics on well approvals issued in the 2009/10 fiscal year and the previous four years.

Table 4: Well Approval Statistics

Statistic	Fiscal Year				
	2005/06	2006/07	2007/08	2008/09	2009/10
Number of wells approved	88	95	86	200	164
Number approved targeting shale formations	3	13	25	128	140
Average approval time ⁸	21.02	20.41	11.93	10.21	14.76
Approval time range	1-96	1-60	1-27	1-32	1-53

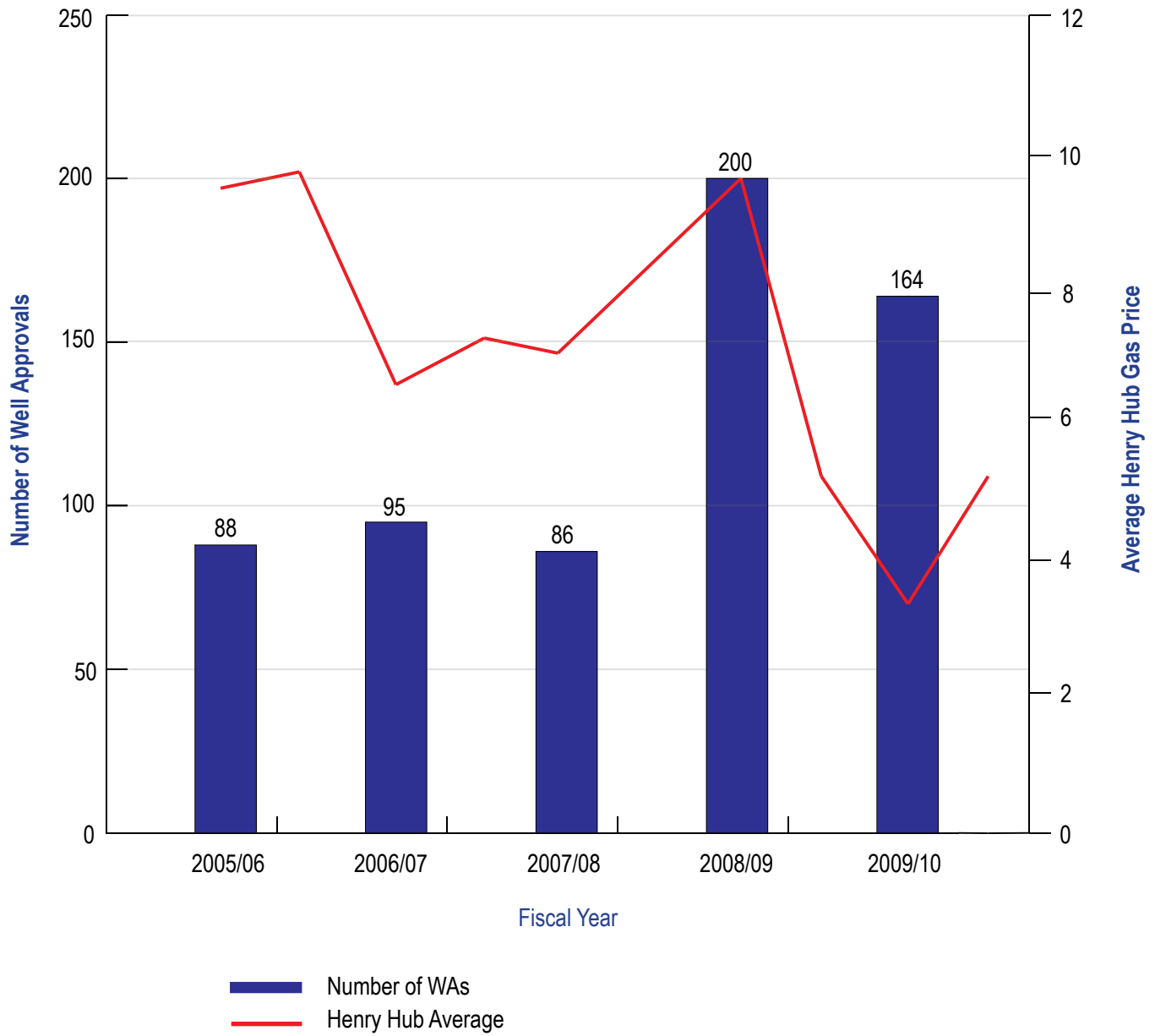
Figure 4 (next page) displays the number of wells approved within the HRB over the past five years⁹ plotted against the Henry Hub¹⁰ natural gas price. The inclusion of the biannual average natural gas price shows a positive correlation between the number of applications and natural gas prices. When average natural gas prices peaked during the first half of 2008/09, the Commission experienced its highest application activity.

⁸ Reported in working days (excludes weekends and statutory holidays).

⁹ Natural gas prices, from Henry Hub, obtained from GO-TECH at octane.nmt.edu/gotech/Marketplace/year_prices.aspx?year2010.

¹⁰ Henry Hub is the pricing point for natural gas future contracts traded on the New York Mercantile Exchange.

Figure 4: Well Approvals in the Horn River Basin



5.2 Wells Drilled

Not all wells approved by the Commission end up drilled. If permission to drill has not been exercised within two years of well

authorization, the Commission will cancel the well authorization. Table 5 summarizes wells drilled within the Basin, and shows that the proportion of wells drilled targeting the shale formations has increased substantially over the past three fiscal years.

Table 5: Wells Drilled in the Horn River Basin

Statistic	Fiscal Year				
	2005/06	2006/07	2007/08	2008/09	2009/10
Number of wells drilled	73	59	72	101	95
Number approved targeting shale formations	3	2	9	34	76
Percentage targeting shale	4%	3%	13%	34%	80%

5.3 Well Pads

The transition from conventional well pads containing a single wellhead to gas recovery techniques requiring multi-well pads has been evident in the HRB. The 450 wells approved by the Commission over the past three fiscal years have been on a total

of 219 well pads. Table 6 compares the characteristics of wells approved within the HRB to those approved in the remainder of British Columbia. The higher proportion of directional and secondary wells¹¹ within the HRB show the unconventional nature of the shale gas play.

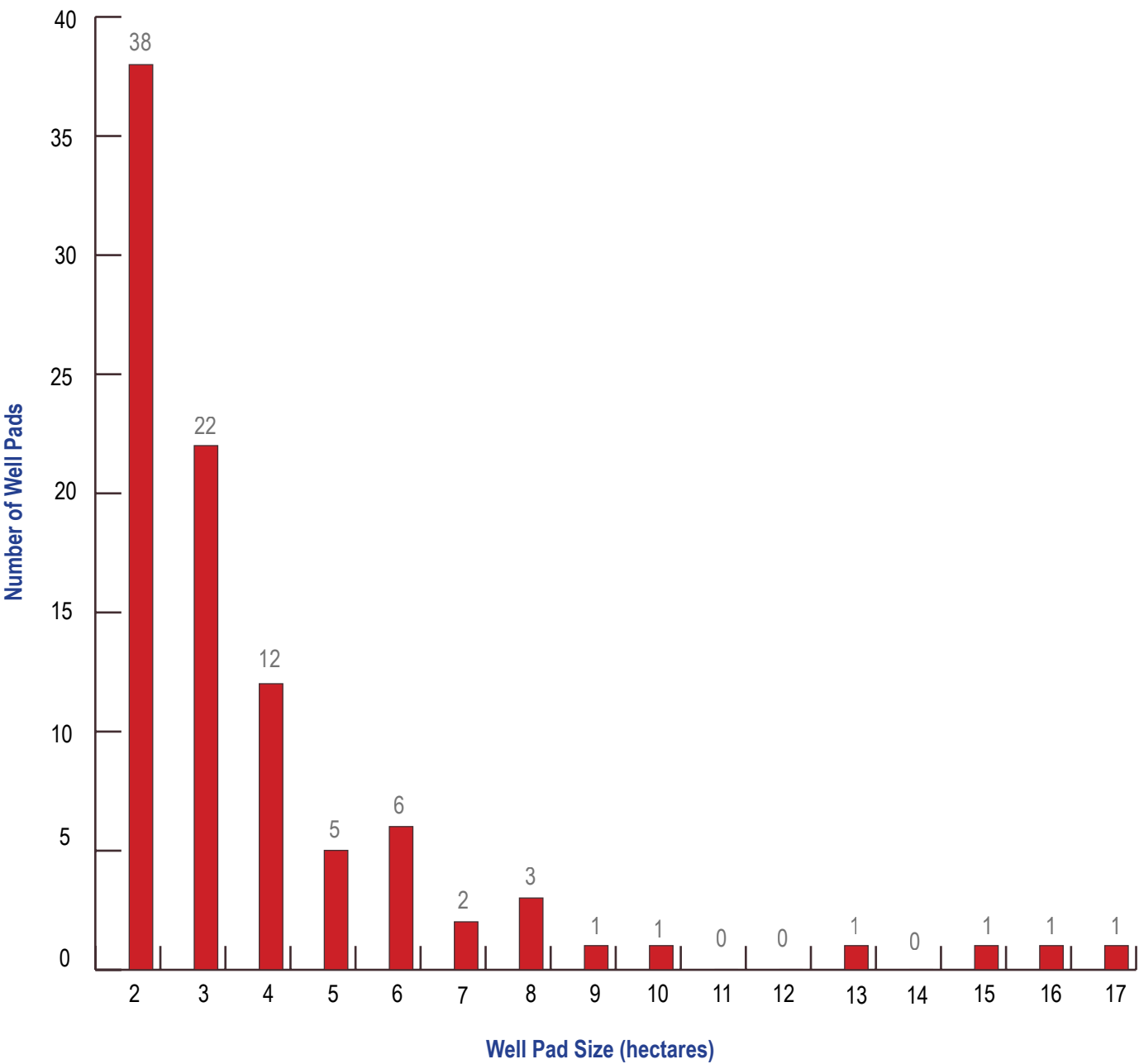
Table 6: Comparison of Well Characteristics

Fiscal Year	Quantity approved in HRB	Quantity approved outside HRB	Approved to be directionally drilled in HRB (%)	Approved to be directionally drilled outside HRB (%)	Approved as a secondary well in HRB (%)	Approved as secondary well outside HRB
2009/10	164	684	76.83	81.29	57.93	59.80
2008/09	200	1,177	83.00	69.07	63.50	37.04
2007/08	86	1,026	84.88	59.84	56.98	28.85

¹¹ A primary well represents the first well approved on a well pad. A secondary well is a subsequent well approved on the same well pad.

The trend towards multi-well pads is shown in Figure 5, where the distribution of wellhead density is reported for wells approved over the past three fiscal years. Of the 219 well pads, 125 had single wellheads approved; the remaining 94 well pads are plotted on Figure 5.

Figure 5: Distribution of wellsite density



Within the HRB, there are a total of five well pads with at least 10 wellheads approved at the end of the 2009/10 fiscal year. The characteristics of these well pads are provided in Table 7. The disturbance associated with these multi-well pads ranges from 3.60 to 4.85 hectares, and an average disturbance of 0.31 hectares/wellhead. This figure is substantially less than the conventional 1.44 hectare well pad disturbance¹².

Table 7: Well Pad Footprint Analysis

Number of approved wellheads on well pad	Total pad size (hectares)	Hectares per wellhead
10	3.60	0.36
13	3.60	0.28
15	4.85	0.32
16	4.54	0.28
17	4.85	0.29

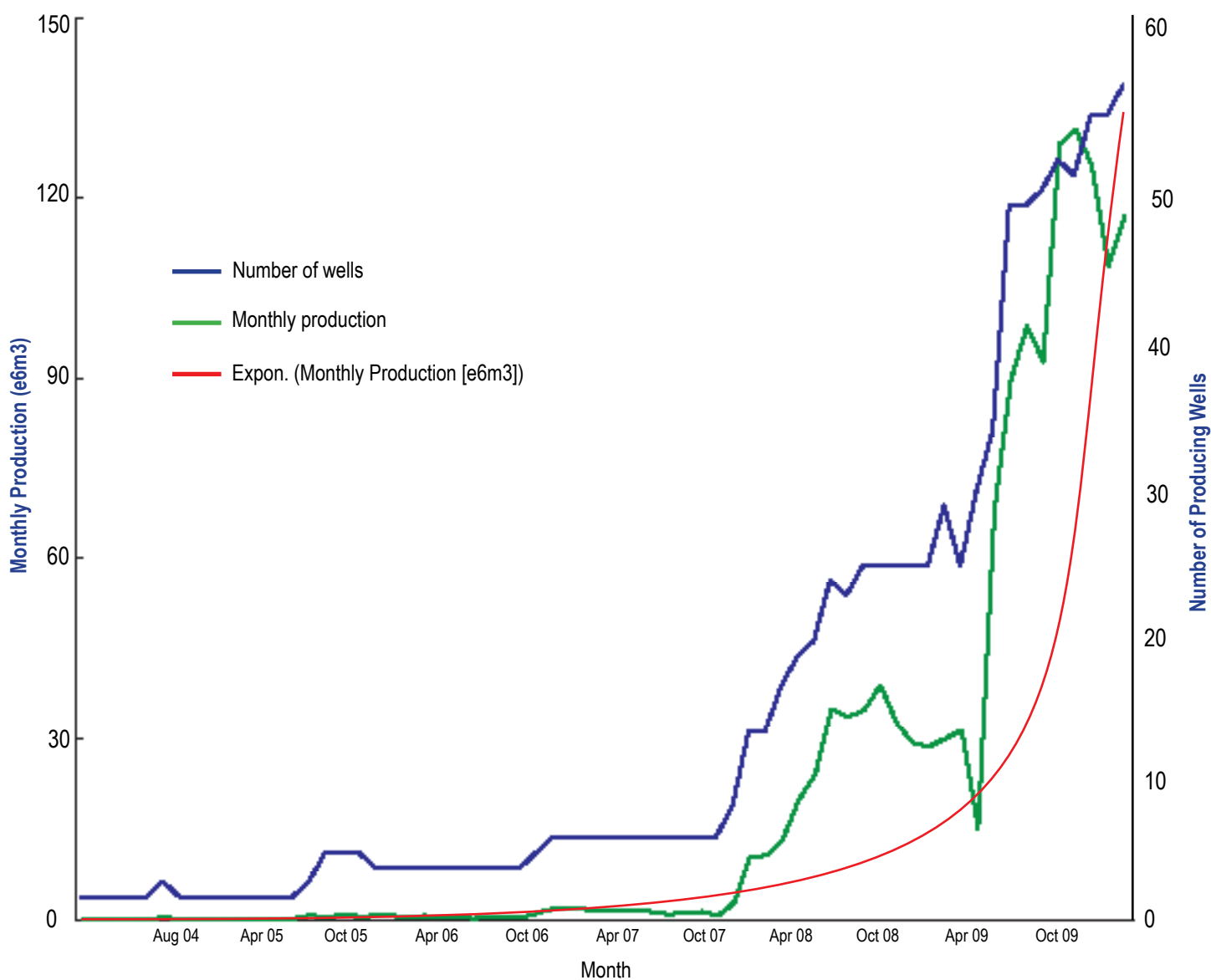
¹² Ancillary site disturbances, such as borrow pits and remote sumps, are not included in this analysis for either unconventional or conventional well site disturbance calculations.

5.4 Well Production

Of the wells drilled within the HRB targeting shale formations, the Commission has a total of 55 wells with production on record at the conclusion of the fiscal year. Figure 6 plots the number of

producing wells and monthly production since 2004. The HRB has less than one per cent of producing gas wells within British Columbia, but supplies approximately four per cent of production. Figure 6 plots the history of wells producing from Horn River shales and monthly production (in million standard cubic metres).

Figure 6: Horn River Basin Production



6. Pipeline and Facility Activity

Table 8 summarizes pipeline activities in the HRB over the past three fiscal years. The number of pipelines approved during the 2009/10 fiscal year fell with the number of wells and the natural gas price.

Table 8: Pipeline Approval and Construction Overview

Statistic	Fiscal Year		
	2007/08	2008/09	2009/10
Number of pipelines approved	26	46	22
Average approval time ¹³	21.35	20.13	19.45
Approval time range	5-37	2-77	3-37
Number of pipelines constructed ¹⁴	26	32	7

Table 9 summarizes facility activities within the HRB. Unlike wells and pipeline approvals, the number of facilities approved in the 2009/10 fiscal year did not decline. This investment in infrastructure allows for significant production capacity when natural gas prices increase.

Table 9: Facility Approval and Construction Overview

Statistic	Fiscal Year		
	2007/08	2008/09	2009/10
Number of facilities approved	6	12	12
Average approval time ¹⁵	23.83	21.50	28.92
Approval time range	4-47	4-50	2-161
Number of approved constructed ¹⁶	2	10	3

¹³ Reported in working days.

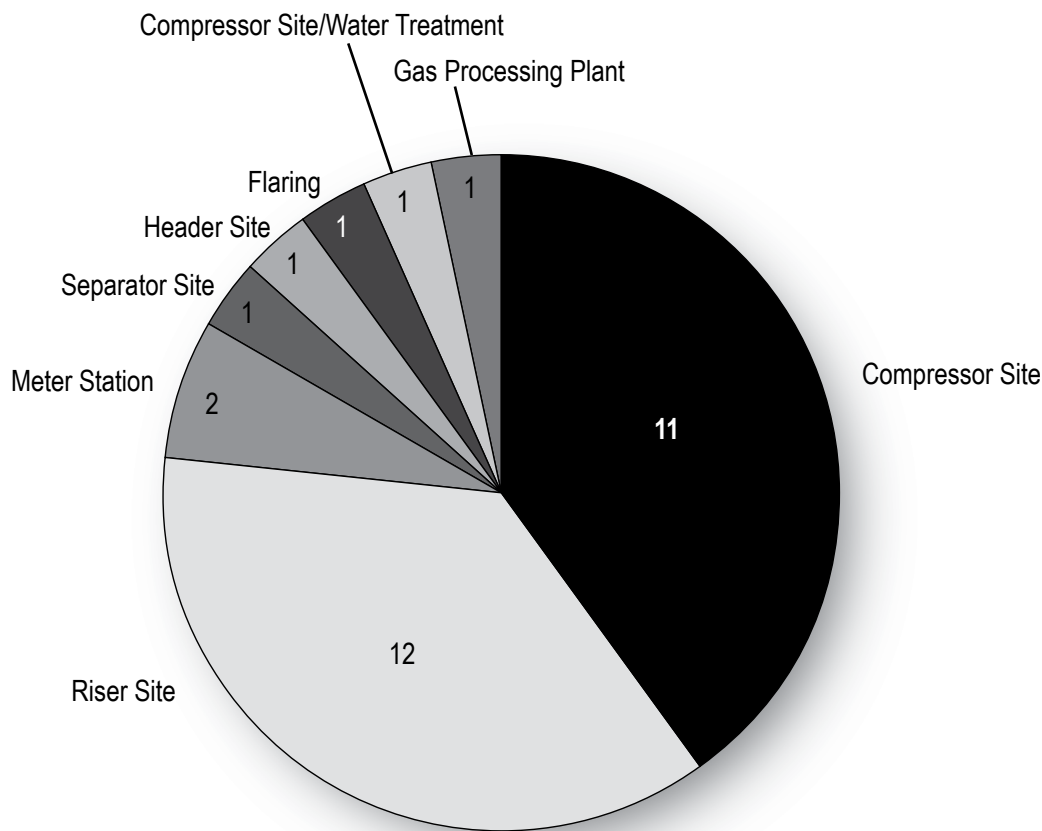
¹⁴ The number of pipelines constructed is the proportion of pipelines that have leave-to-open status.

¹⁵ Reported in working days.

¹⁶ The number of facilities constructed is the proportion of pipelines that have a leave-to-open status.

Facilities approved within the HRB also have a number of purposes. Figure 7 categorizes the facilities approved over the past three fiscal years by purpose.

Figure 7: Facility Purposes



During the 2009/10 fiscal year, the Commission approved EnCana Corporation’s Cabin Gas Plant after the BC Environmental Assessment Office granted an Environmental Assessment Certificate on January 28, 2010. EnCana has applied for and received approval for two phases of construction, each phase having a capacity of $1.1326 \times 10^7 \text{m}^3$ per day. The first phase is expected to be completed in the second half of 2012.

7. Stewardship

The HRBPG involves 11 companies and was created as a joint initiative to responsibly develop the HRB shale gas play. In conjunction with the Commission and other Crown resource management agencies, objectives were developed for the HRBPG. Identified values included a need to collaborate in order to facilitate open communication in the region by collectively understanding stakeholder and First Nation concerns, minimizing environmental impacts and maximizing benefits to the region.

Currently, the HRBPG consists of the following operators:

- Apache Canada Ltd.
- Nexen Inc.
- ConocoPhillips Canada
- Pengrowth Corporation
- Devon Canada Corporation
- Quicksilver Resources Canada Inc.
- EnCana Corporation
- Stone Mountain Resources Ltd.
- EOG Resources Canada Inc.
- Suncor Energy Inc.
- Imperial Oil Resources

The HRBPG meets regularly to discuss aspects of responsible development. Each company is represented by a senior manager on a HRBPG steering committee, which, along with several sub-committees, meets regularly to ensure a coordinated approach to a variety of activities and initiatives in the community.

Upon development of the HRBPG, the Commission collected and made available all existing scientific information applicable to the HRB. This served to aid the HRBPG in making informed decisions with regard to oil and gas development in the area. In addition, the Commission developed and provided geospatial data held by corporate-level government indicating land and resource values that could be affected by oil and gas activity. This information was used by the HRBPG to develop area operating protocols for the HRB. Furthermore, geospatial data has been used to create and maintain an area-based map showing the group's current and planned activities, which is a necessary tool in land planning between the group members in order to reduce footprint.

7.1 Borrow Pits

The Commission and MEMPR entered into a Memorandum of Understanding (MOU) clarifying the administration of aggregate and borrow pit operations to be used by the oil and gas sector. Criteria have been set to distinguish the qualifiers to an application to the Commission and a Mines Act permit issued by MEMPR. The MOU defines the parameters of a borrow pit or an aggregate operation for Commission review, and a Mines Act permit for MEMPR review. In addition, the MOU limits extraction to a maximum of 250,000 tonnes per year per operation, and outlines requirements and criteria for aggregate operation design and reclamation planning.

7.2 Water

The Commission has delegated authorities under Section 8 of the Water Act to issue permits for the Short Term Use of Water. Applicants requiring the use of water for a longer duration of time must apply to the Ministry of Environment for a water license.

Review of applications for the short term use of water by the Commission is conducted with transparency and accountability while conserving the environment and supporting resource development. In addition to base data required in all short term use of water applications, the Commission reserves the right, at its discretion, to request additional data in order to properly assess the scope of the application. Additional information may include hydrological data, bathometric data, fish assessments and any other data the Commission deems pertinent to the application.

In 2009/10, the Commission approved 58 applications for the Short Term Use of Water within the HRB from 17 applicants.

In addition to permitting water withdrawal, the Commission has encouraged and supported industry in minimizing its footprint by reducing the use of surface water and minimizing the impact on potable water through investigating use of alternative sources of water. The development of non-potable groundwater for the use of oil and gas minimizes the use of surface water while

utilizing waters that are toxic in their natural state due to naturally occurring contaminants such as H₂S. These groundwaters often require significant treatment to reach a state where they can be used for drilling purposes.

To date, the Commission has approved 13 groundwater wells, including a water treatment facility. The water treatment facility is in testing stages and is expected to be in production soon.

7.3 Oil and Gas Footprint Analysis

Maintaining land and resource values, including a reduced footprint wherever possible, is a priority for the Commission, its stakeholders, First Nations and the public. Successful land resource planning is key to effective management of the HRB. The Commission led initiatives integral to the reduction of oil and gas footprint in the HRB, such as aiding in development of the HRBPG, developing geophysical requirements, encouraging

the use of sub-surface water and limiting borrow pit/aggregate operation size.

A primary objective identified when the Commission facilitated the formation of the HRBPG was to ensure rational development of the HRB. The HRBPG has developed and presented a development plan of the HRB to ensure common corridors are utilized to maximum potential. Methods such as planning and utilizing common infrastructure were also implemented with regard to the construction of roads, facilities and pipelines to reduce the overall footprint in the HRB.

Table 10 summarizes the total disturbance created by constructed activities within the HRB. Based on this analysis, the total oil and gas disturbance represents less than one per cent of the entire HRB area.

Table 10: Total Disturbance

Activity	Area (hectares)
Wells	1,008.77
Access Roads	586.45
Facilities	16.90
Development Roads	1,353.82
Miscellaneous	2,362.38
Pipelines	1,841.57
Geophysical	3,801.64
Total area of Horn River Basin projects constructed	10,971.53
Total area of Horn River Basin	1,145,988.92
Oil and gas footprint percentage	0.96

8. Resource Development Unit

The Commission is responsible for ensuring sound resource development in British Columbia, and the newly formed Resource Development Unit will work to accomplish this in the province's defined basins.

The unit, comprised of surface and subsurface specialists and analysts, will review and assess industrial activity by developing surface and subsurface expertise for defined basins. The initial basins that will see tactical strategies include the HRB, Montney, Cordova Embayment, Liard Basin and Mist Mountain.

The staff of the unit will manage each major basin at a tactical level, working in conjunction with expertise from across the Commission. Tasks include:

- Collate all surface and subsurface data relevant to oil and gas development in a defined basin, including activity by other industrial sectors.
- Manage the flow of information and recommend basin-wide development scenarios for analysis.
- Report out regularly on oil and gas activity in the basins.
- Establish a baseline ecological footprint for the basins.
- Analyze resilience of the basin vis-a-vis extraction of hydrocarbon resources (surface and subsurface).
- Geological and engineering evaluations at the basin level.
- Oil reserve analysis.
- Inventory and map hydrocarbons.
- Well evaluation.
- Liaise with client groups on basin specific issues.
- Report out to the Commission Board and executive, other government agencies, First Nations, stakeholders and the public on topics related to defined basins.

9. CONCLUSION

This report summarizes oil and gas permitting and operation activities, First Nation consultation and the Commission's role as the regulator within the HRB for the 2009/10 fiscal year. Even with record setting land sales within the HRB over the last few years, oil and gas exploration has been limited due to factors such as natural gas pricing.

The natural gas exploration and development that has occurred in the HRB over the past few years has been unconventional in nature. The advent of horizontal drilling combined with multi-stage fracking is the technology that unlocked the potential of shale gas.

The proportion of wells approved to be directionally drilled and located on an existing pad has been shown to be higher in the HRB. In fact, the region has five well pads with 10 or more wellheads. These well pads reduce the overall impact on the landscape, as the disturbance per wellhead is less than 25 per cent of the disturbance of a conventional well pad.

Natural gas pricing factors have not drastically affected infrastructure within the area, as the number of facilities approved

did not decline over the 2009/10 fiscal year. This trend shows how capacity is being expanded to prepare for an increase in the price of natural gas.

The Commission led initiatives integral to the rational development and reduction of the potential oil and gas footprint in the HRB, such as aiding in development of the HRBPG, developing geophysical program requirements, encouraging use of sub-surface water and limiting borrow pit/aggregate operation size.

The HRBPG developed and presented a development plan of the HRB to ensure common corridors are utilized to maximum potential. Methods such as planning and utilizing common infrastructure were also implemented with regard to construction of roads, facilities and pipelines to reduce the overall footprint in the HRB. The Commission's oil and gas footprint analysis suggests successes in these methods; the total oil and gas disturbance represents less than one per cent of the entire HRB area.

