

**Coalbed Gas (CBG) opportunities in
Crowsnest coalfield**

- Information package for potential investors -

November 12, 2003

**The Government of BC
Ministry of Energy and Mines
Oil and Gas Division
Oil and Gas Emerging Opportunities & Geosciences Branch**

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Barry D. Ryan, PhD, P.Geo
August 2003

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1 Introduction

The BC government has taken initiatives to make CBG resource more attractive to potential developers and investors. The Ministry of Energy and Mines (MEM) is leading the CBG Strategy, in collaboration with the Oil and Gas Commission, (OGC) to facilitate and stimulate CBG projects across the province. The goal of the MEM is to work together with industry, the federal government and other stakeholders to promote responsible oil and gas development activities in BC.

MEM's CBG strategies:

- Provide information and assistance to proponents interested in exploring and/or developing CBG projects in BC coal basins
- CBG is a key component of Oil and Gas Division's strategy
- CBG legislation enacted to clarify ownership issues and more effectively manage operational issues
- Royalty regime revised to more effectively deal with CBG
- CBG reports, maps and other information made available to industry and public

This information package is intended to provide a general background of CBG development opportunities in Crowsnest coalfield so as to assist in decision-making by potential investors and developers. An outline of the coal resource and geology, historical Exploration and Production (E&P) activities, regulatory process and other useful information for potential investors are provided in the following chapters.

2 Executive Summary

The Crowsnest coalfield is part of the East Kootenay coalfields in southeast BC. Located between the Elk River and the Alberta-BC border, it extends from southeast of Fernie to north of Sparwood. The coal seams occur within the Jura-Cretaceous Mist Mountain Formation. World-class coal resources (nearly 27.7 billion tonnes) are contained in this coalfield and CBG in-place resource in the area is estimated up to 12 Tcf.

Coal and surface ownership in the Crowsnest coalfield is a combination of provincial, freehold and federal land. Currently, the province owns the petroleum and natural gas (P&NG) rights in the coalfield almost exclusively, including in the Dominion Coal Blocks (DCBs).

CBG in-place resource in the Crowsnest coalfield is estimated at 12 Tcf, with over 6 Tcf being within the DCBs. However, the geological complexity of the Crowsnest coalfield must be considered when projecting how much of the CBG may be recoverable. B. Ryan considered this geological complexity and estimated total resource in the area where the Provincial Crown has both coal and P&NG titles to be approximately 2.78 Tcf.

Coal has been mined in the east Kootenays for over 100 years. Until the 1960's, most coal mines were underground coal mines, located close to the rail line along the western side of the coalfield. Coal at all these mines contained methane.

The oil and gas industry has long been interested in this area and during the 1990's, three companies drilled CBG exploration holes in the field and demonstrated mixed results. However, for a number of reasons, the data obtained during these tests have not been considered as representative of CBG potential in the Crowsnest coalfield. CBG exploration projects were also conducted in Elk Valley, Greenhills and several Alberta Foothills locations.

Potential CBG markets include BC, Alberta and the US along with local markets for residential and industrial users. There are TransCanada main pipeline with Terasen's local distribution systems along with extensive electricity transmission systems, a major highway and a number of logging roads available in the area.

The MEM is leading the CBG strategy, in collaboration with the OGC, to facilitate and stimulate CBG projects across the province. The BC government provides policies supportive of oil and gas development, a competitive fiscal regime and one-stop regulatory approval. BC itself offers ready access to Canadian and US markets as well as a skilled service sector.

3 Resource & Geology

3.1 Location and Size of Basin

The Crowsnest coalfield is part of the East Kootenay coalfields in southeast BC. Located between the Elk River and the Alberta-BC border, it extends from southeast of Fernie to north of Sparwood ([Map 1](#)). The field is 10-20 km wide, nearly 60 km long and occupies an area of about 60,000 ha (600 km²). The area is within the Rocky Mountains and includes portions of the MacDonald and Taylor Ranges. Elevations vary from approximately 1000 m in the Elk River valley to 2300 m in the MacDonald Ranges ([Map 2](#)).

3.2 Coal Resource

The coal seams occur within the Jura-Cretaceous Mist Mountain Formation in a geological basin bounded by the Borgeau thrust fault on the west and in part by the Flathead fault on the east. Total coal thicknesses in the Mist Mountain Formation vary from an average of about 30 m on the east to 60 m on the west. The coal rank varies from low-to-high volatile bituminous, increasing to the southwest and down dip into the center of the coalfield.

The Crowsnest coalfield has a total estimated coal resource of nearly 27.7 billion tonnes (Johnson and Smith; 1991); approximately 22.6 billion tonnes is within 1000 m of surface (Dolmage and Campbell; 1975). Estimates of the total coal resource of the basin have been made by projecting the volume of Mist Mountain Formation and the cumulative amount of coal in the section. These estimates include coal at unmineable depths.

It is estimated that less than 4 billion tonnes of the total coal resource (28 billion tonnes) may be mineable, of which only 100 million tonnes may be surface mineable. Much of the surface mineable potential occurs in DCB Parcel 73 (76 million tonnes). DCB Parcel 82 has an underground mineable potential of 230 million tonnes. More information on the coal resource estimations and potential mineable resources can be found in the references attached with this document.

3.3 CBG Resource Potential

The combination of area and cumulative coal indicates a large resource of CBG, which has been estimated at 12 Tcf (Johnson and Smith; 1991). CBG resource potential in the DCB is estimated to be 6.57 Tcf to the depth of 1000 m (Dawson et al., 1998; 0.65 Tcf for block 73 and 5.92 Tcf for block 82). Dawson et al., 1998 used estimated gas contents of 16-18 cc/g for all seams although they considered gas contents to vary from 10.9 to 20.1 cc/gm (350-650 scf/t).

However, the geological complexity of the Crowsnest coalfield must be considered when projecting how much of the CBG may be recoverable. The coalfield forms part of the Lewis thrust sheet and therefore had a protracted deformational history. Initial thrusting was followed by folding in the late Jura-Cretaceous and extension on north trending major faults in the Tertiary. The thrusting caused shearing within some seams that is unrelated to the amount subsequent folding. This has possibly impacted permeability and generates fine coal that may make CBG production more difficult.

Successful production will rely on understanding the interplay between deformation coal quality and the location of specific geologic structure. With these caveats in mind the more prospective area may be where the Mist Mountain Formation is in the depth window of approximately 200 to 1000 m. The total resource in the area where the Crown has both coal and P&NG titles ([Map 5 & 6](#)) is estimated in very general terms to be 2.78 Tcf (B. Ryan; 2003).

Companies interested in fine-tuning estimates of the resource potential in the coalfield should use the process outlined in the latest B. Ryan paper ([Appendix 1](#)) and other references attached as a guide and complete their own assessment. In terms of the recoverable resource, this will depend on the presence of permeability and on the number of seams in the section that can be economically drained of gas. Appendix 1 also contains a number of ideas relating structure coal quality and CBG that may help explorationists locate favorable areas. In addition, more information on BC coal geology and CBG resource can be found by contacting the MEM, Oil and Gas Division, Oil & Gas Emerging Opportunities & Geosciences Branch (Barry Ryan – Coal and Coalbed Methane Specialist; 250-952-0418).

3.4 Previous E&P Activities in Area

3.4.1 Coal Mining

Coal has been mined in the east Kootenays for over 100 years. Until the 1960's, most coal mines were underground coal mines, located close to the rail line along the western side of the Crowsnest coalfield. These included: the Coal Creek Colliery, which opened in 1897, 6 km east of Fernie; Michel Colliery, 28 km north of Fernie; the Morrissey Colliery, 16 km southeast of Fernie and a CPR mine at Hosmer, 11 km north of Fernie. Coal at all these mines contained methane. The coal at Morrissey generally contained more gas than other mines in the area because it was lower in the section and below the regional water table. Since 1970, mining has centered on large open pit mines in both the Elk View and Coal Mountain coal mines.

3.4.2 Conventional Petroleum

The area also has a long history of petroleum exploration. Drilling began in the early 1900's and resulted in some minor oil production. Later, 600 billion cubic feet (Bcf) of CO₂-rich gas were discovered in Paleozoic reservoirs in the Flathead

area, similar to those hosting large gas reserves in adjacent parts of Alberta. The area, which comprises over 6000 km², has significant potential yet only 20 wells have been drilled since 1950.

3.4.3 Coalbed Gas

Three companies drilled CBG exploration holes in the field in the 1990's (Mobil/Chevron drilled 2, Gulf Canada drilled 2, Saskoil drilled 4) and demonstrated mixed results. However, for a number of reasons, the data obtained during these tests have not been considered as representative of CBG potential in the Crowsnest coalfield.

Based on these test hole results, a best curve fit to all desorption data from the coalfield indicates a total resource of 6.7 Tcf. Gas contents for the wells ranged from less than 1 cc/g up to 16.56 cc/g. The low gas contents in some of the wells may be due to their being spudded high above the valley floor and perhaps being in coals above the water table. Permeability tests results were performed for some, but results were ambiguous or indicated low to moderate permeability. In most wells the gas content (dry ash free basis) decreased for the lowest seams. This can be explained by changes in petrography with the lower seams being richer in inert macerals, which adsorb less gas. It can also be explained by assuming that all the seams were initially under saturated and those closer to surface were later recharged with biogenic methane. There are indications that biogenic methane is present in the Elk Valley coalfield as well.

CBG exploration projects conducted at nearby areas include:

- Test wells drilled by Fording, Norcen and Suncor in the Elk Valley in the 1990s
- CBG exploration projects were undertaken in the foothills area of Alberta.

The result of these CBG projects can be found at the following reference:

- F.M. Dawson, D.L. Marchioni, T.C. Anderson and W.J. McDougall (2000): An assessment of Coalbed methane exploration projects in Canada, *Geological Survey of Canada Bulletin 549*.

There was also an extensive CBG exploratory project done at Greenhills in September 2000. The information of these test holes will be available to the public 3 years after the project date.

There is little public information available on CBG exploration costs in the Crowsnest coalfield. Proponents should be aware that the complexity of coal geology would dramatically affect the exploration costs. Therefore the selection of drilling locations is critical to economic viability of CBG projects.

4 Potential Market & Logistics

4.1 Potential Market

CBG produced in Crowsnest coalfield could be transported via TransCanada’s BC pipeline system or Terasen’s local pipeline system distribution to BC, Alberta and the US markets ([Map 3](#)). TransCanada’s BC pipeline system extends 200 km from Alberta’s western border through BC to the US border, serving markets in BC, the Pacific Northwest, California and Nevada.

There are also local market opportunities including both industrial and residential end users. Terasen’s local distribution pipeline system comes off Trans Canada’s main line, serving the towns of Sparwood, Elkford and some of the mines. Potential industrial end users include major coal mining and forest operating in the area.

- Fording Canadian Coal Trust (www.fording.ca)
 - Fording Inc. – Elk View coal mine operator
 - TeckCominco (www.teckcominco.com) – Coal Mountain coal mine operator
- Tembec (www.tebec.ca) – Forestry operator

Fernie and Sparwood are the closest residential areas with a population of 3,812 and 4,611 respectively (Statistics Canada Y2001). The population for the East Kootenay Regional District covering 27,560.48 square km is 56,291.

4.2 Pipeline and Electricity Transmission Systems

The information on TransCanada’s BC pipeline system and Terasen’s local distribution system are summarized below. Further inquiries on these pipelines can be directed to TransCanada Pipeline or Terasen Gas.

	BC Systems (TransCanada)	Foding Coal Lateral (Terasen Gas)	Fernie Lateral (Terasen Gas)
Total Volume Delivered	855 Bcf (2001)	NA (Contact Terasen Gas for details)	NA (Contact Terasen Gas for details)
Diameter	36"	8" – First 34 km 6" – Next 45 km	3"
Pressure Rating (MOP)	6280 kPa	6280 kPa	6280 kPa
Lengths	200 km (170 km of Right of Way)	79 km	24 km
Destination Markets	British Columbia, Pacific Northwest, California, Nevada	Sparwood and Elkford (Fording coal mine)	Farnie

- Terasen Gas (www.terasen.com)
- TransCanada Pipeline (www.transcanada.com)

There are also extensive electricity transmission systems available in the area. Regional load is served from 60 kV to 230 kV transmission systems centered at Cranbrook substations. Transmission lines run from Cranbrook to Fernie, Fernie to Sparwood and Sparwood to Alberta. East Kootenay area is a part of the South Interior bulk transmission system which enables energy interchanges and emergency support with Alberta across one 500 kV line run between BC Hydro's Cranbrook Substation and Alberta's Langdon Substation, near Calgary. Further information on these transmission systems could be directed to BC Transmission Corporation, a subsidiary of BC Hydro.

- British Columbia Transmission Corporation (www.bctransco.com)

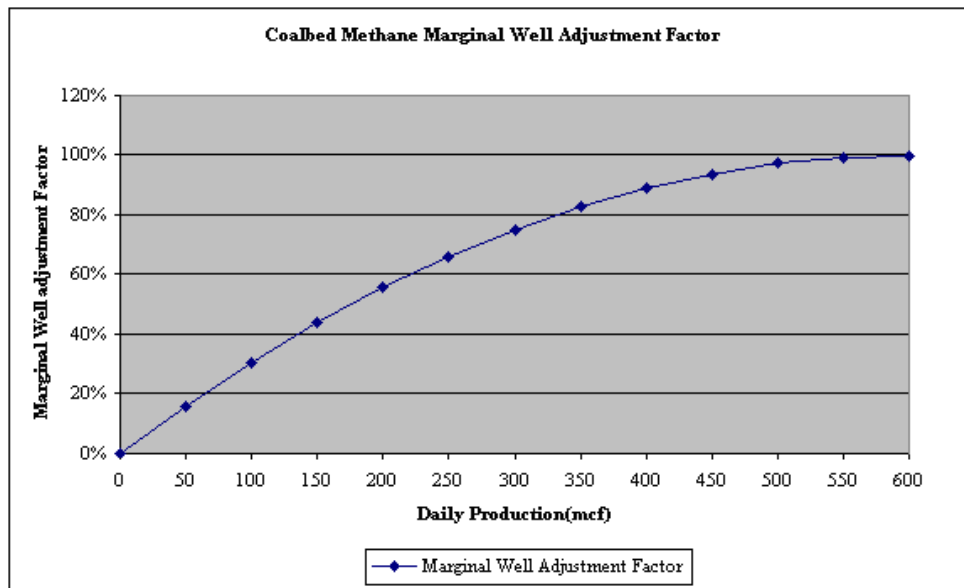
4.3 Surface Access

A major highway (Crowsnest Pass highway Number 3) follows the western margin of the coalfield and a number of logging roads traverse the coalfield. An extensive railway system is available to connect active coal mines and nearby cities.

5 Regulatory Process and Policies

5.1 Royalties

- A new Royalty regime (Amendments to the Petroleum and Natural Gas Royalty and Freehold Production Tax Regulation), introduced in March 2002, reflects the unique development and production characteristics of CBG resource and allows a reasonable return to natural gas producers ([Appendix 3](#)).
 - Produced-water handling costs are included in the producer cost of service allowance to address the added water management costs
 - A royalty bank was created to collect excess allowance to be used against future assessed CBG royalties
 - Increasing the marginal well adjustment factor threshold to 600,000 cubic feet per day from 180,000 cubic feet per day to address the lower production rates.
 - Providing a \$50,000 royalty credit for CBG wells drilled before Feb 29, 2004. This royalty credit will be most likely extended for wells drilled after March 2004.



- The new Summer Royalty Program, introduced in June 2003, allows producers to deduct a summer drilling deduction amount from its total royalty payable to the province if they have one or more interests in a well ([Appendix 4](#)).

5.2 Mineral Rights Clarification

- The new *Coalbed Gas Act*, enacted in April 2003, clarifies CBG ownership. CBG is natural gas and is owned by the owner of the natural gas estate in BC ([Appendix 2 & 5](#)).
- The “Mineral Ownership Determination Project” is currently undertaken by the Ministry’s taskforce to identify and confirm the ownership of minerals originally included in Crown grants. The project will initially focus on the Crowsnest coalfield and Vancouver Island. In conjunction with this project, MEM intends to introduce legislation in 2004 to confirm the identified mineral ownership.

5.3 *Efficient and Responsible Regulatory System*

- OGC, a Crown corporation created in October 1998, provides an efficient, single-window approach to the regulatory process by effectively streamlining approvals while maintaining provincial environmental standards ([Appendix 7](#)).
- *Guidelines for Coalbed Methane Projects in BC*, prepared by OGC in October 2002, clarifies for project proponents and operators the existing regulatory requirements for CBG developments in the province. It is a draft and is subject to revision to reflect the lessons learned as the industry develops in the province ([Appendix 9](#)).
- *CBM Produced Water Guideline*, currently being prepared by OGC and Ministry of Water, Land, and Air Protection (WLAP), clarifies the requirements for disposal of water produced from CBG wells. For further information on *CBM Produced Water Guideline*, please contact MEM, Oil and Gas Division (Vic Levson – Quaternary Geologist, 250-952-0391).

There are guidelines for public involvement and surface rights available through OGC ([Appendix 10 & 11](#)). Further general inquiries and questions on BC CBG development opportunities, regulatory process and policies could be addressed to the MEM, Oil and Gas Division, Oil & Gas Emerging Opportunities & Geosciences Branch (Mary Coward – CBG Project Manager; 250-356-9827).

6 Tenure & Mineral titles ownership

6.1 Mineral Ownership Determination Project

MEM has a project underway to clarify the mineral rights title status for most of the Crowsnest coalfield and is expected to complete the project by December 2003. General information on rights ownership is provided below.

6.2 Coal and Gas Ownerships in the Crowsnest Coalfield

Coal and surface ownership in the Crowsnest coalfield is a combination of provincial, freehold (25,275 ha by TeckCominco; 11,230 ha by Tembec) and federal land ([Map 4 & 5](#)). Most of the freehold lands are located in the northern part of the coalfield. Tembec is the surface owner under which the Province is the coal owner in a further 22,200 ha. DCBs is federal land, which contains two parcels (parcel 73 and 82) an area of about 20,000 ha (200 km²) in total.

- Freehold
 - TeckCominco - approximately 25,275 hectares
 - Tembec – approximately 11,230 hectares
- Federal land (DCB)
 - Parcel 73 – 2,023 hectares
 - Parcel 82 -18,211 hectares
- Crown land
 - The rest of the coalfield

Except for approximately 2,600 – 4,100 ha which is owned by Shell Canada, the province owns the petroleum and natural gas (P&NG) rights in the coalfield, including in the DCB ([Map 6](#)). However, the Provincial Crown P&NG tenure may be acquired by the freehold coal owners ([Appendix 6](#)).

To clarify ownership of interested project locations, proponents are encouraged to contact the MEM, Titles Division at the earliest stage of decision-making (Colin Magee – Director, Oil and Gas Titles; 250-952-0335). Titles Division will assist you with pre-tenure planning and petroleum titles information.

6.3 Opportunities For Permitting Multiple Sites Under General Development Permit

Proponents have opportunities to apply for multiple sites under a General Development Permit (GDP) for land tenure in Crowsnest coalfield ([Appendix 12](#)). A GDP is an application tool that allows for project level review, consultation and approval in principle for works in a given project area. This process will allow for enhanced First Nations consultation, improved cumulative impact management and reduced processing times for permits and authorizations. A GDP is best suited to development fields on Crown land where multiple wells and pipelines are anticipated during a given drilling season and a high likelihood of drilling

CBG opportunities in Crowsnest coalfield

success exists. More information can be found by contacting the Oil and Gas Commission, Applications are located in Ft. St. John (Larry London – Director of Applications and Approvals, Oil and Gas Commission, 250-261-5701)

7 Land Use Issues

7.1 Land Use Plan

The Crowsnest coalfield is contained within the regional Kootenay-Boundary Land-use Plan Implementation Strategy (1997) area. It is also partially within the area covered by the Southern Rocky Mountain Management Plan, a "landscape-level plan" which was recently finalized by the Ministry of Sustainable Resource Management (SRM). These plans apply exclusively to Provincial Crown Lands, and have no influence on private land or the DCB. There are no Special Resource Management (SRM) or Protected Areas in Crowsnest coalfield except parks shown in [Map 7](#). A portion of the northern part of coalfield is designated as Coal Enhanced Resource Development Zones (ERDZ) which signifies a long-term, priority commitment of those areas to coal mining exploration and development. Proponents are encouraged to become familiar with these plans that provide information and guidance on addressing socially and environmentally sensitive values in the area. In addition, proponents should be aware that most of land use conflicts could be mitigated with best management practices.

- Ministry of Sustainable Resource Management – Kootenay-Boundary Regional Land Use Plan
<http://srmwww.gov.bc.ca/rmd/regional/kootenay/index.htm>

Potential land use conflicts:

- Forestry
- Recreation
- Hunting
- Coal extraction

Possible wildlife and other issues:

- Dissection of migratory routes
- Habitat loss
- Increased access for hunting
- Introduction of weeds
- Provision of unnatural vantage points for raptors or hazards to flight (e.g. electrical power lines)
- Disturbance during breeding seasons (e.g. due to noise from drilling or compressor stations)
- Possible impacts on endangered species
- Possible damage to or modification of wetlands and riparian zones
- Possible benefits (e.g. using produced CBG waters to enhance or create waterfowl habitat)

Other possible issues:

- First Nations
- Archaeological sites and cultural resources
- Air quality (e.g. diesel generators)
- Vegetation disturbance
- Soil erosion
- Visual impacts (e.g. powerlines and roads disrupt natural views)
- Noise and lights (from compressors, frac equipment etc.)

7.2 First Nations

The Crowsnest coalfield lies within the asserted traditional territory of the Ktunaxa Nation. The Ktunaxa Nation is in Stage 4 of the BC Treaty Commission negotiation process.

The Province has an obligation to consider aboriginal interests in decision-making processes that could lead to impacts on those interests. This obligation is fulfilled in most instances through consultation.

The MEM and the Treaty Negotiation Office are currently engaging with the Ktunaxa Nation on a series of initiatives that have led to increased understanding for all parties and have allowed the Ktunaxa Nation to gain a greater understanding of oil and gas development ([Appendix 8](#)). The Ktunaxa Nation see environmentally sound oil and gas development as an economic opportunity and have expressed a desire to be involved in the industry from the beginning and through all stages of development. The Province is encouraging all companies wishing to develop CBG resources in the Kootenay to, at the earliest stages, develop a relationship with the Ktunaxa Nation (and other, non-aboriginal communities).

For more information on consultation requirements, please contact the MEM, External Relations, Aboriginal and Community Relations Branch (Trent Jonson – Senior Advisor; 250-952-0820) and also refer to the Provincial Consultation Guidelines available at TNO website.¹

For more information regarding the Ktunaxa Nation, or to set up a meeting, please contact KKTC at Cranbrook (Marion Eunson – Employment Development Officer; 250-489-5762).

7.3 Produced Water Management

The Oil and Gas Commission (OGC) regulates all water produced during oil and gas production. At present, most of the produced water is re-injected into

¹ http://www.gov.bc.ca/tno/down/consultation_policy_fn.pdf

subsurface formations, but some CBG development projects may result in quantities of water suitable for surface discharge. An intraministry task force (MEM, OGC, WLAP) is currently developing guidelines for dealing with CBG produced water issues, focusing on practices for water that may be discharged to the surface. If the water quality meets criteria set by WLAP, then the water may be discharged at the surface. Various treatment processes may be available for waters not meeting the WLAP criteria. Water quality data for the Crowsnest coalfield will be collected before a decision on discharge options is made.

7.4 Groundwater

CBG production requires groundwater removal, which may result in lowering of the local water table. In addition, potential issues may arise if the water is discharged into aquifers. Studies on groundwater flow in the Mist Mountain Formation indicated that groundwater contributes <10% of the total direct flow to the Elk River. Therefore, coal bed depressuring should have little impact on the river (Harrison *et al.*, 2000). However, the deformation of strata in mountainous terrain and the influences of large elevation differences on water table locations and gradients make coal bed aquifer documentation complicated.

Consequently, the groundwater system should be studied further. There are a number of water wells in the Fernie area along the Elk River valley but none of them are in the BC provincial database.

7.5 Water Quality Monitoring

The cumulative impact of future CBG developments is difficult to predict. Although no single CBG project may cause unacceptable impacts, collectively CBG development and production over 2 or 3 decades will add to overall cumulative effects in the Crowsnest region. In addition, CBG development may occur in some areas where water quality may be already impacted from recent or current land-use practices. This suggests the importance of surface water quality monitoring both before and during development.

7.6 Best Management Practices

In other jurisdictions where CBG fields are currently being explored, successful strategies for handling produced water are developed. Proponents are encouraged to utilize these strategies to minimize environmental and social impacts.

- Beneficial uses of CBG waters (e.g. for irrigation, drinking water or wetland enhancement)
- Design of various methods for water treatment, water storage and discharge
- Measures for erosion control
- Monitoring plans

- Evaluation of potential effects on other groundwater users

7.7 *Environmental Assessment Requirements*

Currently, there are no environmental assessment requirements prior to project application. When a proponent submits an application, it is checked for potential impacts on land, fish and wildlife habitat, forest resources, stakeholders, archeology and First Nations. Depending on the project, a CBG application may require assessments for timber harvesting and field, fisheries and habitat and archeological resources as well as First Nations and public consultation. CBG proponents can contact OGC as a single-window approval process where reviews are conducted by interdisciplinary OGC staff, with referrals as needed to other agencies.

Ministry Contacts
 Ministry of Energy and Mines (MEM)
 Oil and Gas Commission (OGC)

<p>General Inquiries on CBG Development Opportunities Mary Coward (MEM) - Victoria Telephone: (250) 356-9827 Fax: (250) 952-0922 Email: Mary.Coward@gems6.gov.bc.ca</p>	<p>Policy & Regulations Ross Curtis (MEM) - Victoria Telephone: (250) 952-0227 Fax: (250) 952-0269 Email: Ross.Curtis@gems9.gov.bc.ca</p>
<p>Coalbed Gas and Coal Geology Barry Ryan (MEM) - Victoria Telephone: (250) 952-0418 Fax: (250) 952-0922 Email: Barry.Ryan@gems4.gov.bc.ca</p>	<p>Royalty David Molinski (MEM) - Victoria Telephone: (250) 952-0518 Fax: (250) 952-0922 Email: David.Molinski@gems1.gov.bc.ca</p>
<p>Oil, Gas and Coal Tenure Gerald German (MEM) - Victoria Telephone: (250) 952-0334 Fax: (250) 952-0541 Email: Gerald.German@gems7.gov.bc.ca</p>	<p>Petroleum Land Titles Colin Magee (MEM) - Victoria Telephone: (250) 952-0335 Fax: (250) 952-0541 Email: Colin.Magee@gems8.gov.bc.ca</p>
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<p>First Nations Trent Jonson (MEM) - Victoria Telephone: (250) 952-0820 Fax: (250) 952-0111 Email: Trent.Jonson@gems2.gov.bc.ca</p>	<p>First Nations (KKTC contact) Marion Eunson Employment Development Officer 7468 Mission Road Cranbrook, BC V1C 7E5 Telephone: (250) 489-5762 Fax: (250) 489-2091 Email: eunson@kktc.bc.ca</p>

Database Information

For selected references to coalfields in BC, coal databases and information concerning coal and CBG visit the BC Geological Survey Branch coal website at: www.em.gov.bc.ca/mining/geolsurv/economicgeology/coal

Ministry of Energy and Mines

Location:
1810 Blanshard St.
Victoria, BC V8W 9N3
Telephone: (250) 952-0320
Fax: (250) 952-0922

Coalfile

The Geological Survey Branch maintains a large library of coal assessment reports in Victoria, dating from 1900 to present - exploration data from the assessment reports have been summarized and stored in a computer information system called COALFILE, which provides a quick and efficient method for handling the large volume of data

Barry Ryan

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Email: Barry.Ryan@gems4.gov.bc.ca

Minfile

Searches and mineral and coal occurrence information for over 12,000 sites in BC available for your PC and on the Internet

www.em.gov.bc.ca/mining/geolsurv/minfile

Larry Jones

Telephone: (250) 952-0386
Fax: (250) 952-0381
Email: Larry.Jones@gems5.gov.bc.ca

ARIS (Assessment Reports)

50 years of exploration records and searchable data on over 26,000 reports. The 85 reports in Crowsnest coalfield, including full versions, are available on 10 CD-ROMs for \$1700 Canadian (Partial reports are available at

http://webmap.em.gov.bc.ca/mapplace/terrain/reports_cn.htm).
www.em.gov.bc.ca/mining/geolsurv/aris

Allan Wilcox

Telephone: (250) 952-0390
Fax: (250) 952-0381
Email: Allan.Wilcox@gems3.gov.bc.ca

The MapPlace and Mineral Potential

The MapPlace provides powerful, interactive map-based access to Ministry databases including mineral and coal tenure

www.em.gov.bc.ca/mapplace

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Ministry Publications

The ministry produces a wide range of documents for public information - some ministry publications are only available by contacting:

Crown Publications

Telephone: (250) 386-4636

Fax: (250) 386-0221

Email: crown@pinc.com

www.crownpub.bc.ca

Energy Data Centre

The depository for geological and geophysical reports submitted by industry plus all other well and test hole data as required by the *Petroleum and Natural Gas Act*.

Location: 6th Floor, 1810 Blanshard Street, Victoria, BC V8W 9N3

Steven Glover

Telephone: (250) 952-0293

Fax: (250) 952-0291

Email: Steven.Glover@gems1.gov.bc.ca

References

Available on MEM Oil and Gas Website:

<http://www.em.gov.bc.ca/subwebs/oilandgas/>

<http://www.em.gov.bc.ca/subwebs/oilandgas/resource/cbg/cbg.htm>

Coalbed Methane in British Columbia
Ministry of Energy and Mines
May 2001

Coalbed Methane Potential in British Columbia (GeoFile 2002-7)
Ministry of Energy and Mines
November 2000

Bibliography on water handling, environmental and land use aspects of coalbed methane development
Ministry of Energy and Mines
February 28, 2002

Selected annotated references on water handling, environmental and land use aspects of coalbed methane development
Ministry of Energy and Mines
February 1, 2002

The Geology and Oil and Gas Potential of the Fernie – Elk Valley Area, Southeastern British Columbia
Dr. Patrick Monahan, P.Geol
November 2001

Coal in British Columbia
Barry D. Ryan, PhD, P.Geol
August 8, 2001

Cleat Development in Some British Columbia Coals
Barry D. Ryan, PhD, P.Geol
2002

Pseudovitrinite: possible implications for gas saturation in coals and surrounding rocks
Barry D. Ryan, PhD, P.Geol
2002

Various BC and regional maps, studies on CBG development opportunities throughout BC and Frequently Asked Questions are also available.

Available on OGC Website:

<http://www.ogc.gov.bc.ca>

- Regulations and Handbook
- Drilling and Production Regulation
 - Oil and Gas Commission Levy Regulation
 - Pipeline Regulation
 - Sour Pipeline Regulation
 - Oil and Gas Waster Regulation
 - Spill Reporting Regulation

- Workers' Compensation Regulations
- Oil and Gas Handbook

Available on Other Ministry Website:

Southern Rocky Mountain Management Plans
Ministry of Sustainable Resource Management, August 2003
<http://srmwww.gov.bc.ca/kor/srmmp/srmmp.htm>

Kootenay-Boundary Land-use Plan Implementation Strategy
Ministry of Sustainable Resource Management, June 1997
<http://srmwww.gov.bc.ca/rmd/regional/kootenay/kblup/toc.htm>

Other References:

Selected References for East Kootenay Coalfields are available at:
<http://www.em.gov.bc.ca/Mining/Geolsurv/coal/coalref.htm>