



National Energy  
Board

Office national  
de l'énergie

# Short-term Canadian Natural Gas Deliverability

**2007-2009**



Appendices

AN ENERGY MARKET ASSESSMENT OCTOBER 2007

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Canada



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Canada

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## APPENDIX A

### Discussion of Major Costs Associated with Developing New Gas Supplies in the WCSB

The major costs associated with developing and producing new gas supplies in the WCSB are Finding and Developing (F&D) Costs, Operating Costs and Royalties. These costs were estimated in this report as described below. All costs are expressed in terms of \$Cdn per GJ of total marketable product. These costs can then be summed and compared to the price to understand the economic environment for developing new gas supplies in past years.

#### F&D Costs in WCSB

Annual capital expenditures for conventional upstream oil and gas development are reported in the CAPP Statistical Handbook. The capital expenditures are categorized into costs associated with Drilling, Field Equipment, Gas Plants, Geology and Geophysical, Land and Enhanced Oil Recovery. To obtain an estimate of capital expenditures applying to conventional gas development in the WCSB, the capital expenditures in Alberta, B.C. and Saskatchewan from CAPP were used as follows:

For each Year and in Each Province:

$$\text{Gas-Intent CAPEX} = \{([\text{Drilling CAPEX}] + [\text{Field Equipment CAPEX}] + [\text{Land CAPEX}] + [\text{Geol. \& Geoph. CAPEX}]) * [\text{Conventional Gas-Intent Fraction of total Drill Days}] + [\text{Gas Plant Capex}]\}$$

The [Conventional Gas-Intent Fraction of total Drill Days] was calculated for each year and province based on Board analysis of GeoScout well data, and excludes drilling associated with CBM. The Gas-Intent CAPEX for the WCSB is simply the sum of the Gas-Intent CAPEX calculated for Alberta, B.C. and Saskatchewan.

The amount of gas associated with the WCSB gas-intent CAPEX can be had from the results of the production decline analysis work done in this EMA (see Appendix B for details). The production decline analysis work done in this EMA provides estimates of ultimate recoverable gas for groupings of gas wells for each year from 1996 through 2006. Using an estimate of gas composition applicable to each grouping, the total amount of recoverable energy associated with conventional gas connections made in each year was made. The ratio of conventional gas-intent CAPEX to energy recovery associated with annual conventional gas connections gives the F&D Costs for conventional gas for each year, as shown in Table A.1.

**TABLE A.1**

**NEB Estimate of Annual F&D Costs for Conventional Gas in WCSB, 1996 – 2006**

Year	Conventional Gas-Intent CAPEX, Million \$Cdn	Estimated Energy Recovery from Annual Conventional Gas Connections, Million GJ	F&D Costs, \$Cdn/GJ
1996	\$5,326	4,922	\$1.08
1997	\$7,800	5,896	\$1.32
1998	\$8,302	5,926	\$1.40
1999	\$7,599	5,613	\$1.35
2000	\$11,189	6,054	\$1.85
2001	\$14,304	6,458	\$2.22
2002	\$11,667	5,629	\$2.07
2003	\$15,873	6,168	\$2.57
2004	\$18,464	6,771	\$2.73
2005	\$23,339	6,043	\$3.86
2006	\$25,785	5,725	\$4.50

Source: NEB Analysis of CAPP Stats for Gas-Intent CAPEX, and NEB production decline analysis for estimated energy recovery from annual connections.

F&D costs have risen dramatically over the past few years driven by both rising costs for upstream services, and lower gas supplies developed per drilling effort.

## Operating Costs in WCSB

Operating Costs are the ongoing costs associated with gas production operations. Operating costs vary widely across the basin, being impacted by variances such as:

- raw gas composition—sweet or sour, high NGL content or dry.
- ownership of gas processing facilities— gas processing facilities may be owned by the producer or the producer may require custom processing.
- proximity and availability of gas processing capacity.

Various industry sources have indicated in consultations that current operating costs are in the range of \$1.00 per GJ. Table A.2 below, presents an approximation of operating costs in the WCSB since 1996.

The numbers shown in table A.2 were calculated using the following procedure:

- from CAPP Statistics, the annual volume for all products, excluding oil sands production, (all liquids and marketable gas) was gathered for Alberta, B.C. and Saskatchewan.
- The annual volume for each product was multiplied by the following conversion factors to obtain an estimate of total annual energy production for the WCSB for each year between 1996 and 2006.
  - Marketable Gas: 37.9 GJ per 10<sup>3</sup>m<sup>3</sup> of gas
  - Ethane: 18.36 GJ per m<sup>3</sup> of liquid
  - Propane: 25.53 GJ per m<sup>3</sup> of liquid
  - Butanes: 28.62 GJ per m<sup>3</sup> of liquid
  - Condensate and Pentanes Plus: 35.17 GJ per m<sup>3</sup> of liquid
  - Crude Oil: 38.51 GJ per m<sup>3</sup> of liquid

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**TABLE A.2****NEB Estimate of Annual Average Operating Costs in WCSB  
(excluding oil sands operations), 1996 – 2006**

Year	Annual Energy Production, GJ	Annual Operating Costs, million \$Cdn	Annual Unit Operating Costs, \$/GJ
1996	9,946,000,000	\$6,228	\$0.63
1997	10,108,000,000	\$6,273	\$0.62
1998	10,157,000,000	\$6,170	\$0.61
1999	10,140,000,000	\$6,488	\$0.64
2000	10,258,000,000	\$7,434	\$0.72
2001	10,166,000,000	\$8,239	\$0.81
2002	10,023,000,000	\$8,753	\$0.87
2003	9,724,000,000	\$9,288	\$0.96
2004	9,769,000,000	\$9,798	\$1.00
2005	9,735,000,000	\$11,196	\$1.15
2006	9,740,000,000	\$12,561	\$1.29

Source: NEB Analysis of CAPP Stats

- From CAPP Statistics, the annual operating costs, excluding oil sands operations, in Alberta, B.C. and Saskatchewan were gathered.
- Dividing total annual operating expenditures by total annual energy production, an average operating cost is obtained.

The operating costs derived for the WCSB from the above procedure is a rough approximation, and represent average operating costs for both oil wells and gas wells. As gas wells are the source of roughly three quarters of the conventional energy production in the WCSB, the operating costs calculated for the total energy production are deemed to be reasonably close to the costs that apply specifically to gas production operations. Thus the Board considers that the overall unit operating costs shown in Table A.2 are a reasonable proxy for operating costs that relate only to gas production.

## Royalties

Royalties applicable to new gas developments in the WCSB are another major cost applied over the producing life of a well. Royalties are a percentage of well production that belongs to the owner of the resource, which is the province in most cases.

Rigorous determination of historical royalties that apply to historical production is a large undertaking, and one that is not done in this report. Nevertheless, royalties are one of the major costs, and an approximation of this quantity is useful to illustrate the economic situation in the WCSB. In this analysis, the approximate royalty costs per GJ in the WCSB were taken as 20 percent of the historical average annual Alberta Gas Reference Price for each year from 1996 through 2006.

Table A.3 shows the approximate royalty costs (\$Cdn/GJ) over time in the WCSB using the simple procedure described above.

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**TABLE A.3**

**Approximate Royalty Costs in the WCSB, 1996 – 2006 (assuming constant 20% Royalty Rate)**

Year	Annual Average Alberta Gas Reference Price, \$/GJ	Royalty Rate, percent (Approximate)	Approximate Royalties, \$/GJ
1996	\$1.54	20%	\$0.31
1997	\$1.87	20%	\$0.37
1998	\$1.84	20%	\$0.37
1999	\$2.35	20%	\$0.47
2000	\$4.27	20%	\$0.85
2001	\$5.12	20%	\$1.02
2002	\$3.68	20%	\$0.74
2003	\$5.81	20%	\$1.16
2004	\$5.98	20%	\$1.20
2005	\$7.87	20%	\$1.57
2006	\$6.22	20%	\$1.24

Source: Alberta monthly Reference Price Calculations

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# APPENDIX B

## Appendix B.1 – METHODOLOGY (DETAILED DESCRIPTION)

### **Appendix Contents**

#### B1.1 WCSB Gas Supply

##### B1.1.1 Gas Connections (Conventional) and CBM Connections

###### B1.1.1.1 Groupings for Production Decline Analysis

###### B1.1.1.2 Methodology for Existing Connections- Production Decline Analysis

###### B1.1.1.3 Methodology for Future Connections

###### B1.1.1.3.1 Performance of Future Connections

###### B1.1.1.3.2 Number of Future Connections

##### B1.1.2 Solution Gas

##### B1.1.3 Yukon and Northwest Territories

#### B1.2 Atlantic Canada

#### B1.3 Other Canadian Production

#### B1.4 Canadian Deliverability and Canadian Demand

### **METHODOLOGY (DETAILED DESCRIPTION)**

Canadian natural gas deliverability over the projection period will consist of conventional gas supply from the WCSB with contributions from Atlantic Canada and growing CBM production from Alberta. In this report, trends in well production characteristics and resource development expectations are assessed to determine parameters that define future natural gas deliverability from the WCSB. A different approach is used for Atlantic Canada where production is sourced from a very small number of wells.



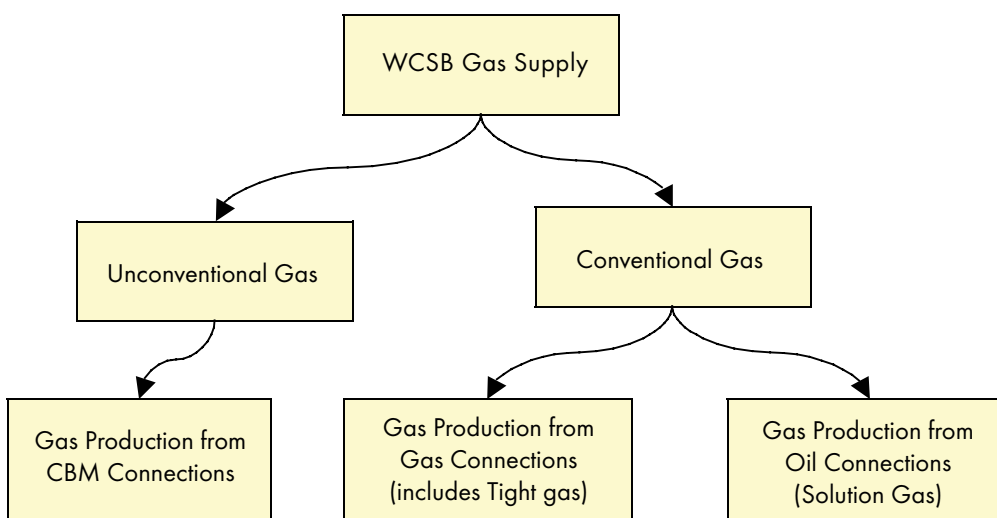
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## B1.1 WCSB Gas Supply

To assess gas deliverability for the WCSB, gas production was split into three major categories as shown in Figure B.1.1.

**FIGURE B.1.1**

### **WCSB Major Gas Supply Categories for Deliverability Assessment**



The methodology to determine gas deliverability associated with Gas Connections (conventional) and CBM Connections is largely the same, and is described in section 1.1 below. Tight gas is again reported as conventional gas in this report, due to the lack of clear and widely recognized criteria that would enable the segregation of tight gas connections. The methodology to determine gas deliverability associated with Oil Connections (Solution Gas) is less detailed and is described in section 1.2 of this appendix.

### **B1.1.1 Gas Connections (Conventional) and CBM Connections**

The methodology used to assess deliverability is substantially the same for conventional gas connections and CBM connections. Production decline analysis on historical production data was used to determine parameters that define future performance. In the case of CBM, historical data is more limited so the views gathered in consultations with industry played a larger role in establishing the performance parameters.

#### **B1.1.1.1 Groupings for Production Decline Analysis**

Different groupings of conventional gas connections and CBM connections were made to assess well performance characteristics. Conventional gas connections were grouped geographically on the basis of the study areas in Alberta, B.C. and Saskatchewan described in Chapter 2. There is no grouping of conventional gas connections for Southeast Saskatchewan as practically all production from that area is solution gas. Conventional gas connections are not grouped by zone.

Within each study area, conventional gas connections were also grouped by connection year, with all connections made prior to 1996 forming a single grouping and separate groupings for each year from 1996 through 2006.

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CBM Connections in Alberta were grouped primarily by zone into three categories:

- Horseshoe Canyon Main Play
- Mannville CBM, and
- Other CBM

For the projection period, almost all CBM development is expected to occur in Alberta. Criteria for these CBM groupings are described in more detail in Chapter 2.

Within each of the three categories of CBM resources, connections were also grouped by connection year. Due to the relatively short period of commercial production, there are fewer connection year groupings. For the Horseshoe Canyon Main Play and Other CBM categories, there is a single grouping for all connections made prior to 2003, and separate groupings for each year from 2003 through 2006. For Mannville CBM, a single grouping was made for all connections made prior to 2005, and separate groupings for each of 2005 and 2006.

### **Existing Connections vs. Future Connections**

In this report, “existing connections” are connections brought on production prior to January 1, 2007, and “future connections” are connections brought on production after January 1, 2007. The methodology applied to make the gas deliverability projections for existing connections is substantially different from what is done to assess deliverability for future connections.

#### ***B1.1.1.2 Methodology for Existing Connections***

For existing connections, production decline analysis on historical production data was done on each grouping (Gas Type/study area/connection year) to develop two sets of parameters:

- group deliverability parameters-- describing deliverability expectations for the entire gas resource grouping, and
- average connection deliverability parameters-- describing deliverability expectations for the average gas connection in the grouping (Note—these only apply when the grouping represents a specific connection year).

The methodology for this production decline analysis is described below. The group deliverability parameters and average connection deliverability parameters resulting from this analysis are contained in Appendices B.3 and B.4 respectively. In the deliverability model, the group deliverability parameters are used to make the deliverability projection for existing connections.

### **Production Decline Analysis Methodology**

The production decline analysis procedure described here applies mainly to conventional gas connections and CBM in the WCSB.

Conventional gas connections are grouped by study area and connection year. CBM connections in Alberta are grouped by producing zone and connection year. For each of these groupings, a data set of group marketable production history was created and, where the grouping represents a specific connection year, a data set of average connection marketable production history was also generated.

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The data sets for group marketable production were generated as follows:

- raw well production for gas connections in each grouping is summed by calendar month getting total group raw production by calendar month.
- The total group raw production by calendar month is multiplied by an average shrinkage factor that applies to the grouping and divided by the number of days in each month to get total monthly marketable gas production and marketable gas production rate (MMcf/d) for each calendar month.
- Using this data set, plots of total daily marketable production rate vs total cumulative marketable production were generated for each grouping.

The data sets for average connection production history were created as follows:

- the raw well production by month for each connection in the grouping was put in a data base
- for each entry of production month for each connection, a value of normalized production month was calculated as the number of months between the month the connection began producing and the actual production month (this is the normalized production month).
- The raw production for connections in the grouping was summed by normalized production month and then multiplied by the average shrinkage factor that applies to the grouping, giving total marketable production by normalized production month.
- The total marketable production by normalized production month was then divided by the total number of connections in the grouping to get marketable production for the average connection by normalized production month.
- The marketable production for normalized production month was then divided by 30.4375, giving the production rate for the average connection in the grouping by normalized production month (Note: due to the different number of production months for connections in the grouping coming on stream at different times of the year, some production data could not be used in calculation of average connection production rate).
- Using this data set, plots of average connection daily marketable production rate versus average connection cumulative marketable production were generated for each grouping.

For conventional gas connections, the following procedures were applied in performing production decline analysis using the group and average connection historical production data sets:

- **Do Production Decline Analysis for the Pre-1996 Connections)**

In each study area the group rate versus cumulative production plot for the grouping of gas connections on production prior to 1996 was first to be evaluated. In all study areas, a stable exponential decline for the past several years was exhibited. The group plot for the all connections prior to 1996 yielded a current marketable production rate, a stable decline rate applicable to future production, and a terminal decline that might be applicable to later connection year groupings for the study area.

- **Evaluate Connection Year 1996 through 2006**

After the initial aggregate connection year was evaluated for a study area, each connection year was evaluated in sequence, from 1996 through 2006.

a. **Do Production Decline Analysis for the Average Connection:**

For each connection year, the rate versus cumulative production plot for the average connection was evaluated first to establish the following parameters that describe the production profile of the average connection over the entire productive life:

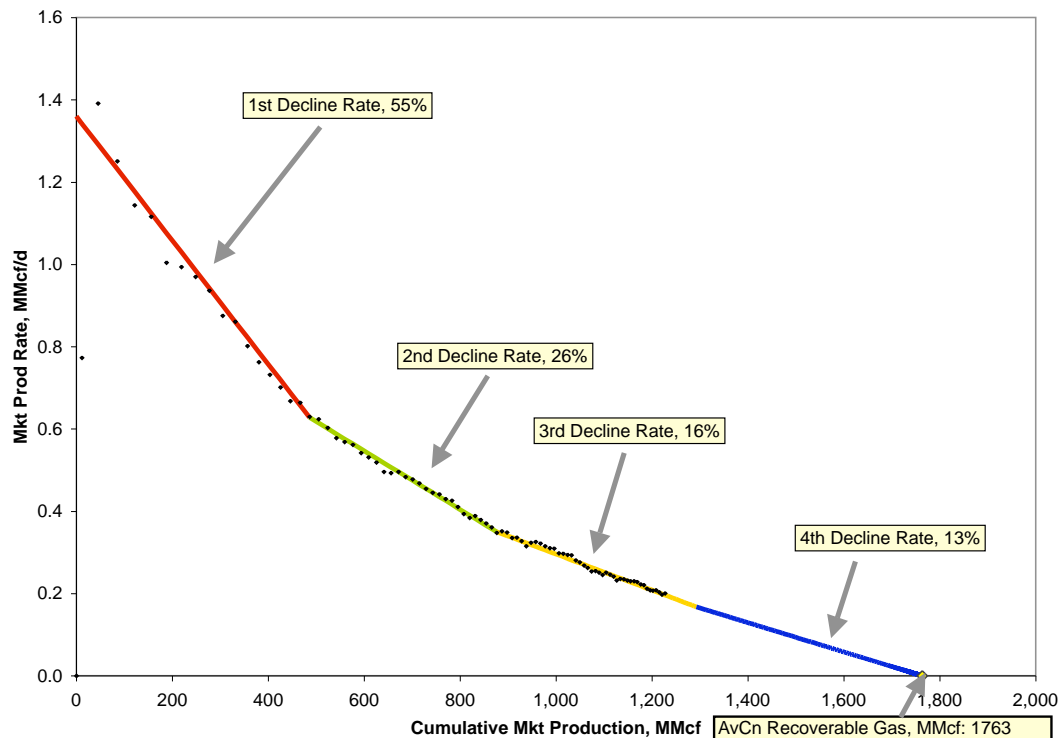
- Initial Production Rate,
- First Decline Rate,
- Second Decline Rate
- Months to Second Decline Rate- usually around 18 months
- Third Decline Rate
- Months to Third Decline Rate- usually around 45 months
- Fourth Decline Rate, and
- Months to Fourth Decline Rate- usually around 100 months.

Figure B.1.2 shows an example of the plots used in evaluation of average connection performance, and the different decline rates that are applied to describe the production.

For the earlier connection years, the available data was usually sufficient to establish all of the above parameters. As the evaluated connection years became more recent, the duration of historical production data gets smaller and the parameters describing

**FIGURE B.1.2**

**Example of Average Connection Production Decline Analysis Plot, Conventional Gas Connections, Alberta Foothills Front, 1999 Connection Year**



Source: NEB analysis of GeoScout well production data

the later life decline performance must be taken from what was determined for earlier connection years. In the example shown in Figure B.1.2, the available data is sufficient to determine parameters defining the first, second and third decline periods for the connection, but the parameters defining the fourth decline period were assumed based on analysis of earlier connection years.

It was assumed that, unless the historical data for the connection year indicated otherwise, the fourth decline rate would equal the terminal decline rate for the study area established through evaluation of the grouping of all pre-1996 connections, and that period of the terminal decline rate would commence after 120 months of production.

The decline parameters determined in this manner for average connections are available in Appendix B.4.

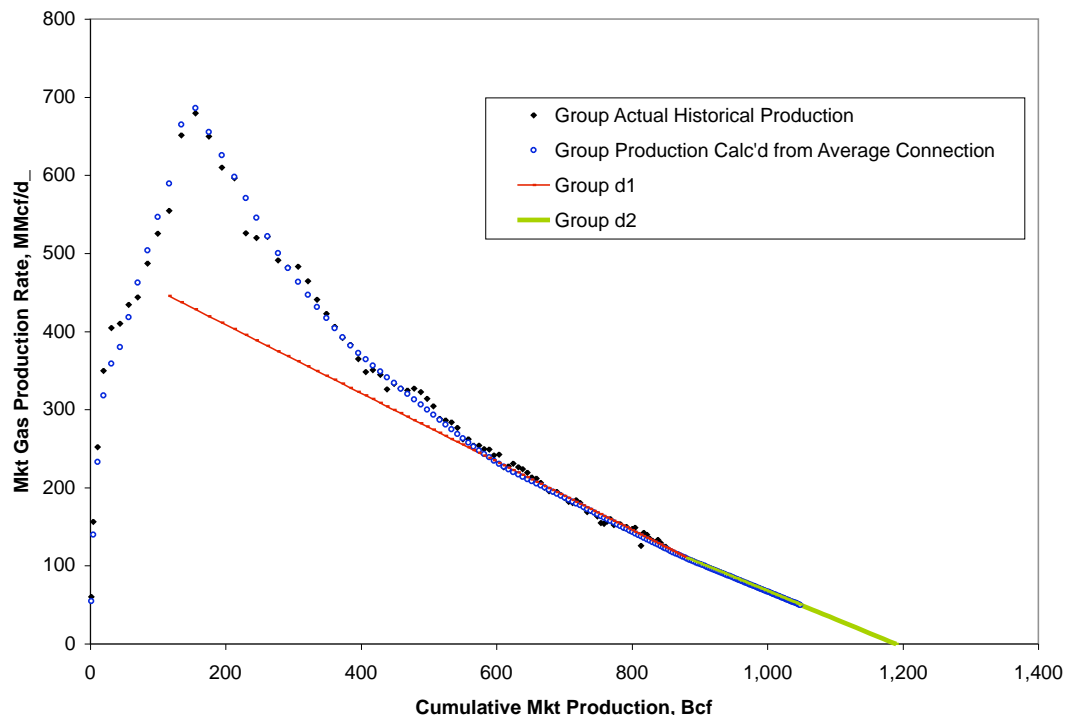
**b. Do Production Decline Analysis for the Group Data:**

Once the performance parameters for the average connection were established, the procedure focused on evaluation of group performance parameters.

As a first step, the average connection performance parameters were combined with the known connection schedule to calculate the expected group performance. This was plotted with the actual group performance data. If the data calculated from average connection performance data did not match well with the actual historical production data for the group, then the average connection parameters might be revised until a good match is obtained between calculated group production data (from average connection data) and actual group production data. An example of the group plots described here is shown in Figure B.1.3.

**FIGURE B.1.3**

**Example of Group Production Decline Analysis Plot, Conventional Gas Connections, Alberta Foothills Front, 1999 Connection Year**



Source: NEB analysis of GeoScout well production data

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The following group performance parameters are determined from the group plot:

- Production Rate as of December 2006,
- First Decline Rate,
- Second Decline Rate (if applicable),
- Months to Second Decline Rate (if applicable),
- Third Decline Rate (if applicable),
- Months to Third Decline Rate (if applicable),
- Fourth Decline Rate (if applicable),
- Months to Fourth Decline Rate (if applicable).

In the earlier connection year groupings (1996, 1997, etc) the actual group data was usually stabilized by the current date at or near the terminal decline rate established via the pre-1996 aggregate grouping. In these cases a single decline rate sufficiently describes the entire remaining productive life of the grouping. In these cases the expected performance calculated from average connection data had little influence over determination of the group parameters.

In later connection years (2006, 2005, etc) actual group production history data could not provide a good basis upon which to project future deliverability. In these cases the expected performance calculated from average connection data was key in establishing the current and future decline rates applicable for the connection year.

Group performance parameters determined in this manner are available in Appendix B.3.

### **Notes Regarding Production Decline Analysis of CBM**

The production decline analysis procedure described above also is applied to the CBM groupings, with the following points in mind:

1. The short production history of CBM in Alberta makes it difficult to establish long term decline rates based on historical data, especially with regard to Mannville CBM. Nevertheless, decline rates that describe the full productive life of CBM connections are still estimated in this EMA, based on industry consultations and on the NEB's view of ultimate gas recovery for the average connections for the different CBM groupings.
2. Mannville CBM connections are very new in the WCSB with commercial development only commencing in 2005. Mannville CBM connections have a different performance profile from the other gas resources in the WCSB. While gas connections for all other groupings can be described by an initial production rate that declines in a relatively predictable manner, Mannville CBM connections go through a dewatering phase where gas production increases over a period of months to a peak rate. After the peak rate is reached decline is expected to occur. Thus a slightly different set of parameters is used to describe performance of the average connection for Mannville CBM, with initial production rate being replaced by "Months to Peak Production" and "Peak Production Rate".

### B1.1.1.3 Methodology for Future Connections

For future connections, deliverability is projected based on the number of future connections and the expected average performance characteristics of those connections. The Board made drilling projections (discussed further below) from which the number of future gas connections was calculated. Historical trends in average connection performance parameters, obtained from production decline analysis of existing gas connections, were used to make estimates of average connection performance parameters for future connection years.

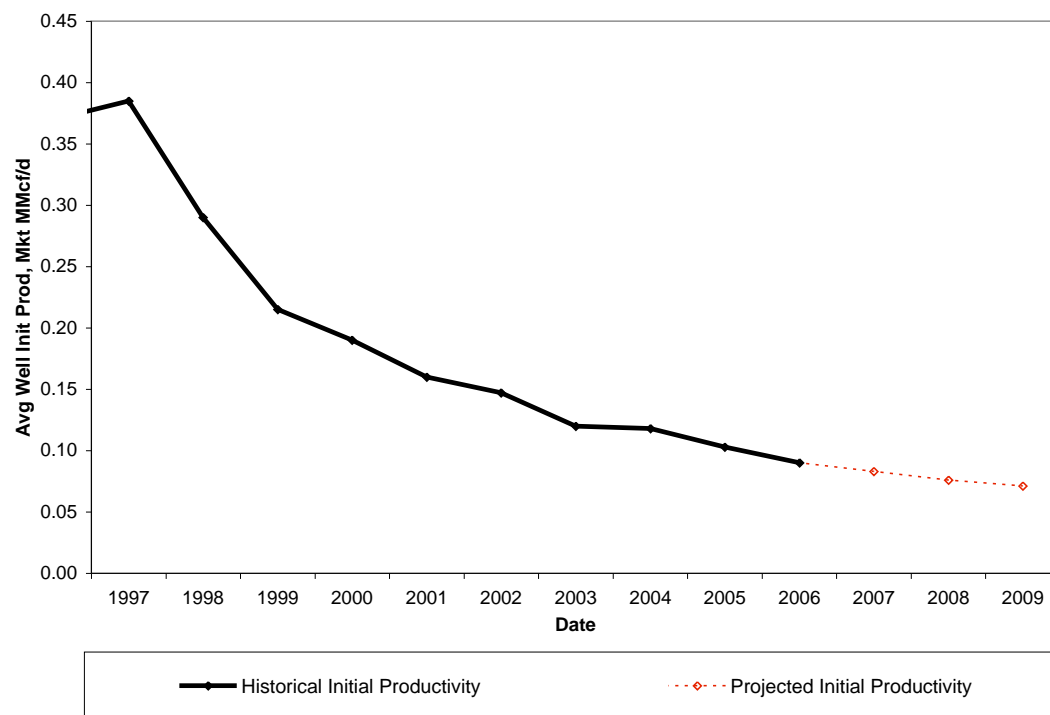
#### B1.1.1.3.1 Performance of Future Connections

The performance of future connections is obtained in each resource grouping by extrapolating the production performance trends for average connections in past connection years. The performance parameters estimated are initial productivity of the average connection and the associated decline rates.

In almost all study areas, there is a trend of decreasing initial productivity for average conventional gas connection with each new connection year. This trend is evident in Figure B.1.4, which shows the Initial Production Rate over time for conventional gas connections in the Alberta- Southeast study area. The Initial Production Rate for future gas connections is estimated by extrapolating the trend in each resource grouping. Historical and projected initial productivity values for the average connection for all gas resource groupings are contained in Appendix B.3.

**FIGURE B.1.4**

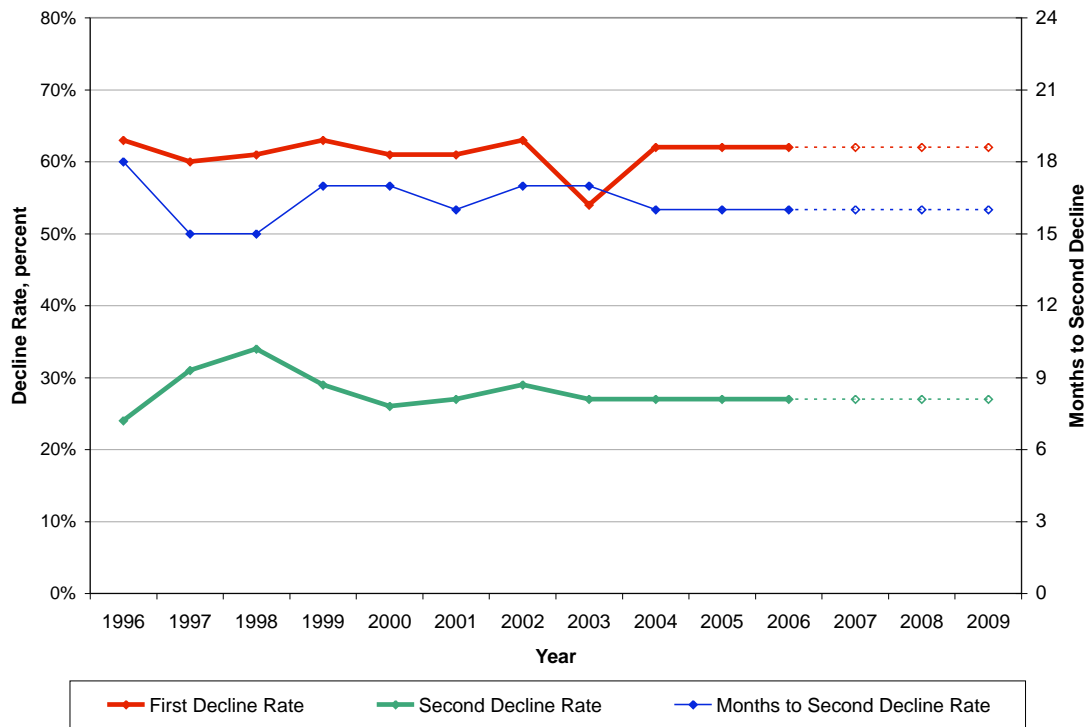
#### **Example of Initial Productivity of Average Connections by Connection Year Conventional Gas in Alberta – Southeast Study Area**



Source: NEB analysis of GeoScout well production data

**FIGURE B.1.5**

**Example of Key Decline Parameters for Average Connections over time, Conventional Gas in Alberta – Southeast Study Area**



The key decline parameters impacting short-term deliverability are first decline rate, second decline rate and months to second decline rate. Figure B.1.5 shows the historical and projected values of these key decline parameters for the average connections for the years 1996 through 2009 for conventional gas connections in the Alberta-Southeast study area. As shown in Figure B.1.5, the key decline parameters have been quite stable in this area for the past many years. This trend holds true for most but not all resource groupings. The trends seen in the key decline parameters in past connection years are used to establish these parameters for future years.

#### B1.1.1.3.2 Number of Future Connections

The number of future connections was estimated by first making a projection of the annual number of gas-intent and CBM-intent wells for each resource grouping and then multiplying by the ratio of annual connections to annual wells.

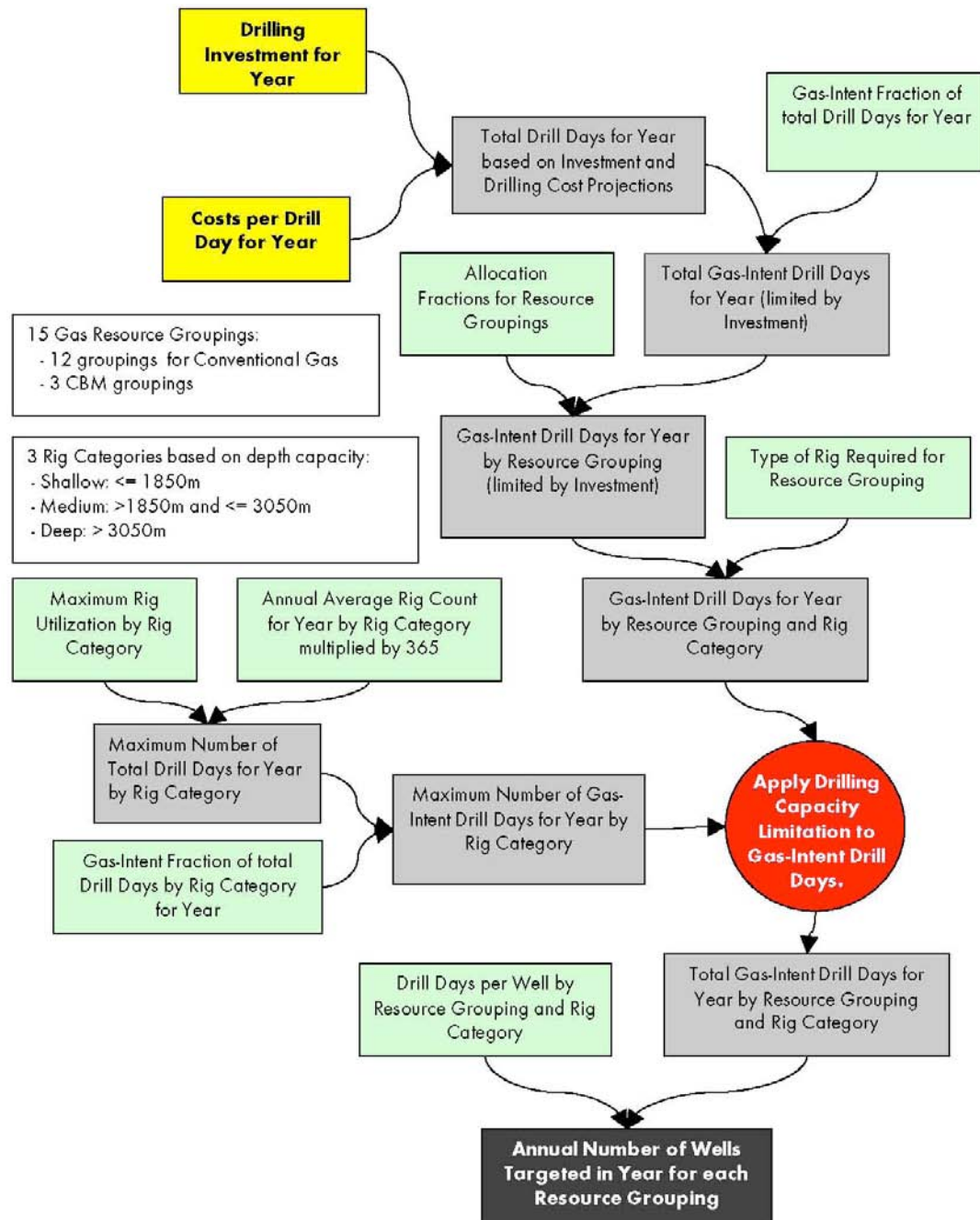
The NEB has created a program that calculates future drilling levels of gas-intent and CBM-intent wells for each year over the projection period. Figure B.1.6 is a chart showing the procedure used by the drilling projection program. The key inputs required by the program are **Annual Drilling Investment** and **Costs per Drill Day**. These two key inputs (shown as yellow boxes in Figure B.1.6) were varied to produce different scenarios of drilling activity in the WCSB. Other inputs required by the procedure are shown as green boxes in Figure B.1.6. The values projected for these other inputs were determined by the NEB based on analysis of historical data.

The drilling program produces a projection of the number of gas-intent wells for each “Resource Grouping”. The Resource Groupings are the study areas used in assessing conventional gas



**FIGURE B.1.6**

**Flowchart of NEB Drilling Projection Methodology**



connections (see Figure 2.2), and the three categories of CBM connections (Horseshoe Canyon main play, Mannville, and Other CBM).

In general, the procedure calculates the number of gas-intent drill days based on specified conditions of [Annual Drilling Investment] and [Costs per Drill Day]. The gas-intent drill days are allocated to the Resource Groupings based on allocation fractions determined by the Board. The allocation fraction are projected on the basis of historical trends and the Board's view of development potential for the resource groupings. The allocation fractions reflect the historical trends of an increasing

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focus on gas drilling in the deeper western side of the basin, and increasing focus on Mannville CBM. Tables of the historical data (drill days and allocation fractions) and the projected allocation fractions are available in Appendix C.1.

After the gas-intent drill days were allocated to the resource groupings, a check was made against drilling capacity to ensure that physical drilling limitations were not exceeded. The number wells for each year is calculated by dividing drill days targeted to each Resource Grouping by the applicable average number of drill days per well.

With the drilling projection in hand, the number of annual gas connections can be calculated for each Resource Grouping. For each Resource Grouping, a “Connection Ratio” (the ratio of annual connections to annual wells drilled targeting a grouping) was estimated based on historical data. The annual number of wells drilled was multiplied by the Connection Ratio to obtain the number of annual connections for each Resource Grouping. The Connection Ratios for each resource grouping can be seen in Appendix C.2. In the deliverability model, the annual number of connections for each resource grouping is allocated to each month of the year in accordance with the established historical connection schedule applicable for each grouping.

### **B1.1.2 Solution Gas**

Solution gas is gas produced from oil connections and accounts for about 9 percent of total marketable gas production from the WCSB. To estimate deliverability of solution gas, oil connections are simply grouped by study area and production decline analysis performed on the entire grouping to obtain current production rate and the decline rate. The deliverability resulting from these parameters is deemed to represent all solution gas deliverability (ie- deliverability from both existing and future connections).

### **B1.1.3 Yukon and Northwest Territories**

In the Yukon and Northwest Territories, conventional gas is produced to the pipeline grid from three southerly areas close to the territorial border at 60 degrees North latitude. These three southerly areas are Kotaneelee, Cameron Hills and the Liard Plateau. Much further to the north, the Ikhil and Norman Wells fields also produce a small amount of gas that serves local purposes and is not tied into the North American pipeline grid. No deliverability from the Mackenzie Delta and along the Mackenzie corridor is included during the projection period.

In this report, gas deliverability of the southerly fields tied in to the pipeline grid is represented as total deliverability from the Yukon and Northwest. With the limited number of producing wells and development activity in these areas, production decline analysis for the existing gas connections is considered to provide a good estimate of future deliverability.

## **B1.2 Atlantic Canada**

For producing wells in the Nova Scotia offshore, production profiles are based on an average of the decline rates in the three original producing fields. No additional infill wells are assumed for the producing fields at this time. Offshore compression was fully in service by May 2007. The parameters used in the compression analysis were based on discussions with industry representatives.

Onshore production from the McCully Field was connected into the regional pipeline system at the end of June 2007. Future development and performance of the field is based on corporate

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development plans and considers the performance of wells that have been in operation since 2003 serving local industrial demand.

Testing of onshore CBM prospects is ongoing in Nova Scotia. Due to the early stage of development, reasonable estimates of onshore CBM productivity can not be developed.

### **B1.3 Other Canadian Production**

Deliverability from the WCSB and Atlantic Canada discussed in the preceding sections of this chapter account for 99.9 percent of total Canadian production. This minor remaining amount of Canadian deliverability comes from central Canada. Deliverability from central Canada is projected simply by extrapolation of the historical production volumes reported by StatsCan.

### **B1.4 Canadian Deliverability and Canadian Demand**

To better understand the role of natural gas deliverability in relation to the Canadian natural gas market, it is useful to compare the Board's outlook for deliverability with current and anticipated Canadian natural gas demand.

Canadian natural gas deliverability is defined as the amount of gas available after field processing. As a result, all estimated gas use prior to the outlet from field processing plants has already been deducted from the deliverability estimate, and likewise is not included in the demand estimate. Gas consumed at the Goldboro processing facility in Nova Scotia is included in this category of field processing and has therefore already been deducted from Atlantic Canada deliverability.

Current and projected Canadian gas demand is divided geographically at the Saskatchewan-Manitoba border into western and eastern Canada demand. Western Canada demand includes gas volumes withdrawn during the recovery of natural gas liquids at straddle plants. Approximately 85 to 90 percent of the gas volumes leaving Alberta are processed through the straddle plants, where much of the ethane and most of the propane and heavier components are extracted.

Western and eastern Canada gas demand includes gas required for pipeline fuel in the respective areas. The Board's projection of western and eastern Canada gas demand is based on historical trends and expected major increments of industrial demand (including oil sands projects) and power generation projects. The demand projection is based on the assumption of average weather conditions. Considerable variability in actual gas demand is possible due to the impact of weather variation on Canada's large space heating needs.

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## **Appendix B.2 - DELIVERABILITY PARAMETERS - RESULTS**

### **Appendix Contents**

#### **B2.1 WCSB**

##### **B2.1.1 Production from Existing Gas Connections (Conventional and CBM) and Solution Gas**

##### **B2.1.2 Future Gas Connections- Conventional and CBM**

###### **B2.1.2.1 Performance Parameters for Future Average Gas Connections**

###### **B2.1.2.2 Number of Future Gas Connections – Conventional and CBM**

#### **B2.2 Atlantic Canada**

### **DELIVERABILITY PARAMETERS - RESULTS**

#### **B2.1 WCSB**

In the NEB methodology, connections in the WCSB are categorized as either gas or oil. Gas connections are further categorized as conventional or CBM. Connections were grouped on the basis of criteria such as study area, producing zone and connection year, with different grouping criteria applied to different types of connections.

In the case of existing gas connections (those on production prior to January 1, 2007), and all oil connections (solution gas), production decline analysis was done to establish parameters that define future deliverability of each grouping. Section 1.1 below provides further discussion of the parameters that have resulted from the production decline analysis.

For future gas connections (those on production after January 1, 2007), the number of expected future connections and the expected production performance of those future connections was estimated to provide a basis for the deliverability projection. Section 1.2 below provides discussion on the parameters determined for projecting deliverability for future gas connections.

##### **B2.1.1 Production from Existing Gas Connections (Conventional and CBM) and Solution Gas**

The future deliverability of the groupings comprising all **EXISTING** gas connections (conventional gas and CBM) and all solution gas was determined via the production decline analysis procedure described in Appendix B.1. There are a total of 170 such groupings:

- 144 groupings for specific connection years for conventional gas connections,
- 13 groupings for specific connection years for CBM gas connections,
- 12 groupings for the solution gas by study area, and
- one grouping for production from the Yukon and Northwest Territories.

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The decline parameters describing the expected future deliverability of each grouping are listed in Appendix B.3.

The deliverability projections for these groupings **ARE NOT** impacted by the different scenarios applied in this report. The different scenarios are applied to reflect uncertainty in future gas drilling activity. The same deliverability projections for these groupings apply in all three scenarios in this report.

The parameters describing future deliverability for all of these groupings are production rate as of December 2006 and as many as four future decline rates that apply in specified time periods in the future. For the older groupings of wells where production appears to have stabilized at a final decline rate, only one future decline rate was needed to describe future group deliverability. For newer well groupings, the decline rate that applies over future months changes as the group performance progresses towards the final stable decline period. For these newer well groupings three or possibly four different decline rates have been determined to describe future performance.

The future deliverability projected for these groupings represents the deliverability that would occur from the WCSB if there were no further gas connections (conventional or CBM) made after the end of 2006. The Board places a high degree of confidence in the deliverability projections made for these groupings, as deliverability projections made in previous reports for these categories of groupings have proved to be very close to actual performance.

The Board's projections show that aggregate production for these groupings will decline by 20.7 percent over 2007, by a further 15.8 percent in 2008 and 14.0 percent in 2009. As of year end 2006, these groupings represent 100% of total WCSB gas deliverability, but due to the declines expected to occur, production from these groupings can be expected to decrease from 474 million m<sup>3</sup>/d (16.7 Bcf/d) in December 2006 to 272 million m<sup>3</sup>/d (9.6 Bcf/d) by December of 2009. Deliverability from future gas connections (conventional and CBM) supplements the declining deliverability from existing connections.

### **B2.1.2 Future Gas Connections- Conventional and CBM**

Deliverability associated with future gas connections is calculated for each resource grouping using estimates for production performance of the average connection and the number of connections in future years. The parameters associated with both of these inputs are discussed in the sections below.

While the deliverability projections for existing gas connections have a high degree of certainty, the certainty associated with the projections for future gas connections is much lower. The key uncertainty is the level of gas drilling that will occur. Three scenarios have been created to address the uncertainty inherent in the gas drilling projections.

The deliverability model used by the Board takes the input parameters and calculates future deliverability. The results obtained from the model for the WCSB, using the input parameters selected by the Board, resulted in a deliverability projection that was slightly lower than actual WCSB production indicated by pipeline field receipts in the first half of 2007. To make a better match with actual production, the model was adjusted slightly by increasing the gas connection ratios by 10% and increasing the initial well productivity by 5% for all resource groupings, which resulted in slightly more connections in 2007, performing at levels slightly higher than expected. The adjustment applies to 2007 only. The rationale for these adjustments is twofold. The 5% bump applied to initial productivity is considered to reflect the high-grading of prospects in the more challenging economic

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situation that exists in 2007. The 10% bump to connection ratio reflects the lag in connection of wells drilled in earlier periods of higher drilling activity.

#### ***B2.1.2.1 Performance Parameters for Future Average Gas Connections***

The production decline analysis procedures described in Appendix B.1 provided the basis for establishing performance parameters for future gas connections. In essence, the trends seen in average connection performance for the various groupings of existing connections were used to make an estimate of performance parameters for future gas connections.

For conventional gas connections, the connections were grouped on the basis of study area and connection year from 1996 to 2006. Eleven connection year groupings were assessed for each study area, providing a good historical data set from which to estimate performance of future wells.

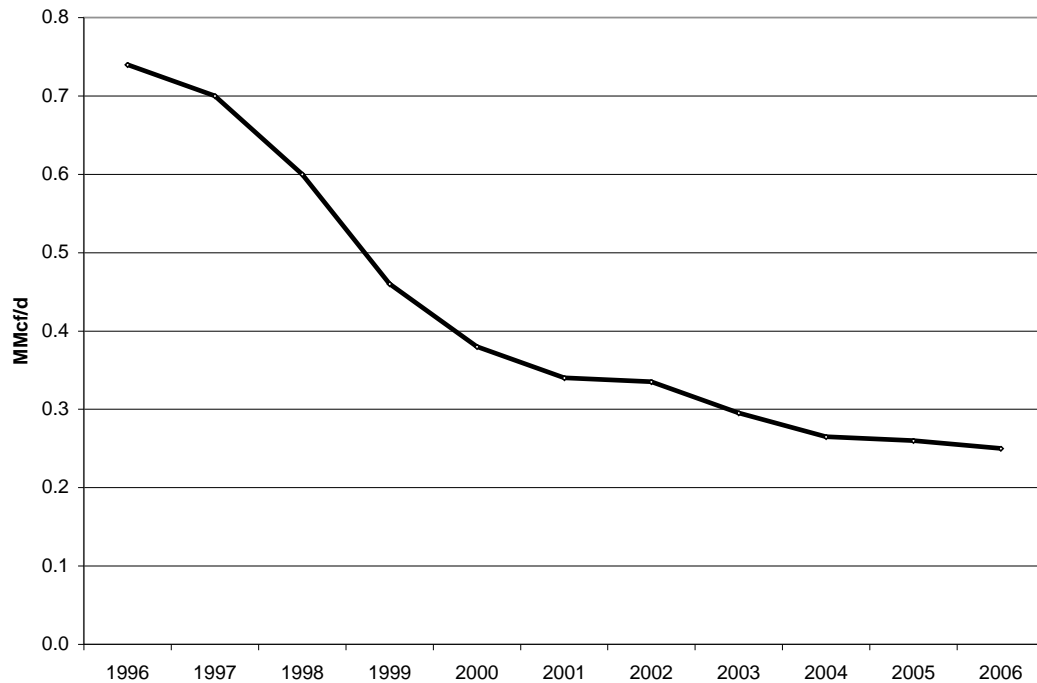
Two trends are apparent in the performance parameters determined for the existing conventional gas connections:

- Decline rates applicable to the average connection are quite stable over the past several connection years
- Initial productivity of the average connection decreases from connection year to connection year.

With respect to initial productivity of the average conventional gas connection, the overall trend for the WCSB is shown in Figure B.2.1. After steep decreases in initial productivity through the latter half of the 1990's, decreases have become progressively smaller. Over the three year period from 1997 to 2000, initial productivity in the basin dropped 46 percent from 0.700 MMcf/d to 0.380 MMcf/d. In the three year period from 2003 to 2006, initial productivity in the basin dropped 15 percent from 0.295 MMcf/d to 0.250 MMcf/d. The trend for decreasing initial productivity still prevails in the WCSB, but initial productivity is levelling off to a large degree, such that decreases in initial productivity for expected future years are much more moderate than what has occurred in the past.

The production decline analysis performed for this report shows that the trend in the WCSB for relatively consistent decline rates between connection year groupings for average conventional gas connections holds true for almost all study areas in the WCSB. An exception to this trend is in the Fort St. John and Fort Nelson areas in northeast B.C., where significantly steeper initial decline rates have occurred since 2003 compared to previous years. This is attributed to the large-scale development of tighter gas plays in those areas over the past four years. Tighter gas resources are usually characterized by steep initial decline rates, followed by a progressive flattening out to very low rates of decline. In these two cases, the decline trends seen over the past four connection years were used to estimate decline rates that will apply to future connection years.

For groupings of CBM gas connections, there is much less historical data available from which to derive performance parameters for the average connection. With large scale commercial development only commencing in 2003 for the Horseshoe Canyon main play and 2005 for Mannville CBM, there are few connection years to assess and they do not provide a long term model of average well performance. Nevertheless, production decline analysis has been performed on the available data for the limited number of CBM connection year groupings. Where historical data was insufficient to define performance parameters, estimates were made based on producer consultations and on the Board's view of ultimate gas recoveries likely to occur.

**FIGURE B.2.1****WCSB Initial Productivity of Average Conventional Gas Connections by Connection Year**

Source: NEB Analysis of GeoScout Well Production Data

In the Horseshoe Canyon main play, production decline analysis on connection groupings 2003 through 2006 indicates initial productivity in the range of 0.080 MMcf/d for each year, with no clear indication of decreasing initial productivity from connection year to connection year. For future Horseshoe Canyon CBM connections the initial productivity is projected to decline slightly year on year over the projection period. Decline rates applied to Horseshoe Canyon CBM connections (shown in Table B.2.1) have been established using the limited production history and input from producer consultations, and thus far have accurately modelled actual production.

Mannville CBM has even less production history to assess than the Horseshoe Canyon. Production decline analysis of horizontal Mannville CBM connections in the Corbett Area provided some basis for estimating initial productivity, but the decline rates could not be reliably determined from the limited history. Decline rates applying to Mannville CBM continue to be estimated based on NEB expectations of ultimate recovery, but there is a high degree of uncertainty in these values.

Table B.2.1 shows the key performance parameters used in this report for the average gas connections that will occur from 2007 through 2009 for all resource groupings (CBM and conventional gas connections). The decline rates are constant for all connection years while, in general, the initial productivity is projected to decrease slightly year on year. Appendix B.4 provides a complete listing of all performance parameters for average connections for both historical and future connection year groupings.

**T A B L E B . 2 . 1**

**Key Production Characteristics for Average Connections by Resource Grouping in 2007, 2008 and 2009**

Resource Grouping	First Decline Rate, fraction	Second Decline Rate Fraction	Months to Second Decline Rate	Initial Productivity, Marketable Gas					
				2007		2008		2009	
				10 <sup>3</sup> m <sup>3</sup> /d	MMcf/d	10 <sup>3</sup> m <sup>3</sup> /d	MMcf/d	10 <sup>3</sup> m <sup>3</sup> /d	MMcf/d
Gas Connections - Conventional									
Alberta - Foothills	0.440	0.170	17	49.58	1.750	47.31	1.67	45.33	1.600
Alberta - Foothills Front	0.550	0.270	17	14.45	0.510	13.60	0.48	13.03	0.460
Alberta - Southeast	0.620	0.270	16	2.35	0.083	2.15	0.076	2.01	0.071
Alberta - East Central	0.600	0.300	18	3.12	0.110	2.75	0.097	2.41	0.085
Alberta - Central	0.650	0.350	17	5.52	0.195	4.76	0.168	4.11	0.145
Alberta - Northeast	0.450	0.300	20	4.19	0.148	3.77	0.133	3.40	0.120
Alberta - Northwest	0.650	0.320	22	11.05	0.390	10.48	0.370	9.92	0.350
B.C. - Fort Nelson	0.750	0.300	14	17.56	0.620	16.43	0.580	15.58	0.550
B.C. - Fort St. John	0.750	0.350	13	20.40	0.720	18.41	0.650	17.00	0.600
B.C. - Foothills	0.450	0.200	30	62.32	2.200	60.91	2.150	59.49	2.100
Saskatchewan - Central	0.750	0.300	22	3.97	0.140	3.540	0.125	3.12	0.110
Saskatchewan - Southwest	0.520	0.250	16	2.12	0.075	1.98	0.07	1.84	0.065
Gas Connections - CBM									
AB - Main HSC	0.050	0.160	12	2.27	0.080	2.21	0.078	2.15	0.076
AB - Mannville CBM	0.300	0.150	24	9.92	0.350	9.92	0.350	9.92	0.350
AB - Other CBM	0.360	0.150	24	1.98	0.070	1.98	0.070	1.98	0.070

Source: NEB analysis of WCSB production decline trends

The average connection performance parameters projected for connection years 2007 through 2009 are the same in all three scenarios assessed in this report. Variance between the scenarios is effected by applying different levels of gas drilling activity as discussed further in section 1.2.2 of this appendix.

**B2.1.2.2 Number of Future Gas Connections – Conventional and CBM**

In this report, the projected number of connections for the year and the projected production performance of the average connections in future years are applied to get deliverability associated with future gas connections. To determine the number of future gas connections, projections of gas-intent drilling are made for each of the resource groupings shown in Table B.2.1. The annual number of wells targeted to each grouping are multiplied by the ratios of annual connections to annual wells to get annual number of connections.

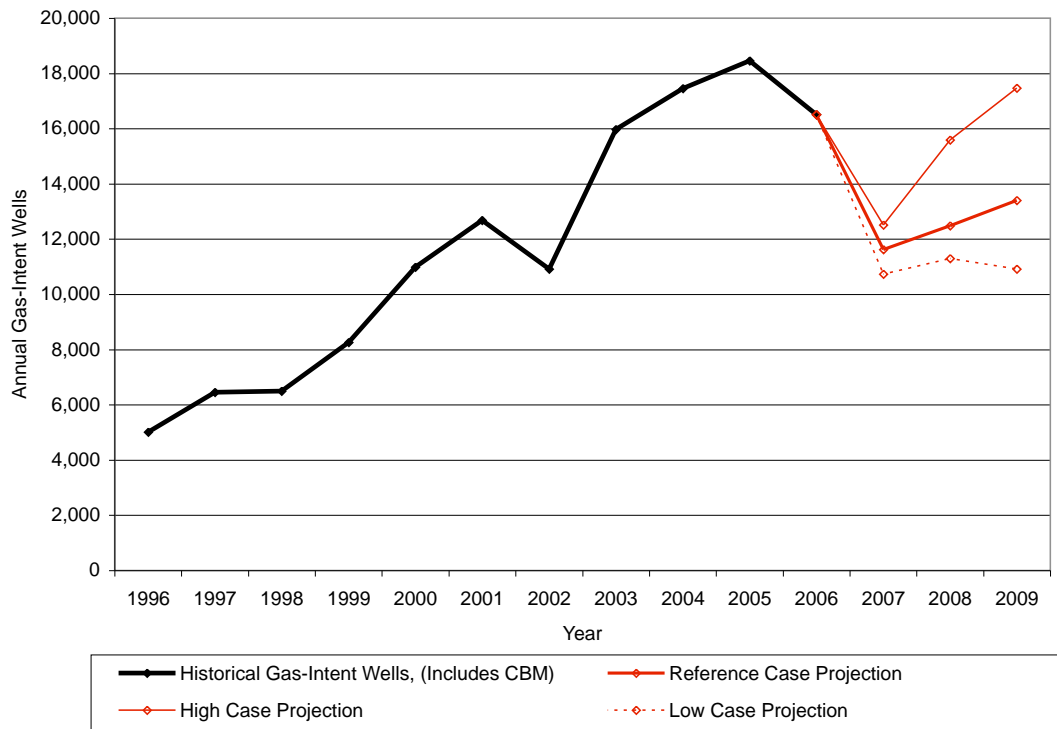
As discussed earlier in this report, volatile and unpredictable market forces are expected to be the primary influence on gas-intent drilling activity. As a result there is a high degree of uncertainty in the gas drilling activity that might occur in the coming years. Three scenarios of drilling activity (Reference, High and Low) have been created to reflect a range of market conditions that may occur over the projection period. Figure B.2.2 shows the number of gas-intent wells, including CBM, that are projected in each scenario.

Detailed tabulations of projected annual gas-intent-wells, connection ratios, and annual connections for each resource grouping for each scenario are provided in Appendix C.2.



**FIGURE B.2.2**

**WCSB Scenarios for Gas-Intent Drilling (Includes CBM)**



## B2.2 Atlantic Canada

For producing wells in the Nova Scotia offshore, production profiles are based on an average of the decline rates in the three original producing fields. No additional infill wells are assumed for the producing fields at this time. Offshore compression was fully in service by April 2007. The parameters used in the compression analysis were based on discussions with industry representatives.

Onshore production from the McCully field was connected into the regional pipeline system at the end of June 2007. Future development and performance of the field is based on corporate development plans and considers the performance of wells that have been in operation since 2003 serving local industrial demand.

Testing of onshore CBM prospects is ongoing in Nova Scotia. Due to the early stage of development, reasonable estimates of onshore CBM productivity can not be developed.

## Appendix B.3- Decline Parameters for Groupings of Existing Gas Connections (Conventional and CBM) and Solution Gas

### Groupings for Gas Connections (Conventional)

#### Resource Grouping: GAS - Conventional, AB - Foothills, All Zones

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-1996	248.0	0.080	N/A	N/A	N/A	N/A	N/A	N/A		
1996	11.0	0.120	0.080	30	N/A	N/A	N/A	N/A	131.5	Avg Conxn Ult Rec * Conxn Ct
1997	17.0	0.100	0.080	40	N/A	N/A	N/A	N/A	161.7	Avg Conxn Ult Rec * Conxn Ct
1998	6.8	0.140	0.130	12	N/A	N/A	N/A	N/A	103.4	Avg Conxn Ult Rec * Conxn Ct
1999	26.5	0.140	0.120	24	0.110	85	N/A	N/A	210.0	Avg Conxn Ult Rec * Conxn Ct
2000	25.5	0.130	0.080	45	N/A	N/A	N/A	N/A	210.8	Avg Conxn Ult Rec * Conxn Ct
2001	36.0	0.150	0.130	28	0.080	55	N/A	N/A	245.2	Avg Conxn Ult Rec * Conxn Ct
2002	72.0	0.170	0.130	30	0.080	68	N/A	N/A	409.7	Avg Conxn Ult Rec * Conxn Ct
2003	70.0	0.170	0.130	35	0.080	80	N/A	N/A	352.5	Avg Conxn Ult Rec * Conxn Ct
2004	105.0	0.170	0.130	50	0.080	80	N/A	N/A	450.7	Avg Conxn Ult Rec * Conxn Ct
2005	55.0	0.220	0.170	7	0.130	60	0.080	120	204.5	Avg Conxn Ult Rec * Conxn Ct
2006	120.0	0.400	0.170	12	0.130	70	0.080	100	296.0	Avg Conxn Ult Rec * Conxn Ct

#### Resource Grouping: GAS - Conventional, AB - Foothills Front, All Zones

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-1996	850.0	0.130	N/A	N/A	N/A	N/A	N/A	N/A		
1996	59.0	0.130	N/A	N/A	N/A	N/A	N/A	N/A	925.8	Avg Conxn Ult Rec * Conxn Ct
1997	108.0	0.130	N/A	N/A	N/A	N/A	N/A	N/A	1,249.2	Avg Conxn Ult Rec * Conxn Ct
1998	135.0	0.130	N/A	N/A	N/A	N/A	N/A	N/A	1,412.7	Avg Conxn Ult Rec * Conxn Ct
1999	129.0	0.160	0.130	12	N/A	N/A	N/A	N/A	1,188.3	Avg Conxn Ult Rec * Conxn Ct
2000	180.0	0.180	0.130	20	N/A	N/A	N/A	N/A	1,377.1	Avg Conxn Ult Rec * Conxn Ct
2001	228.0	0.170	0.130	30	N/A	N/A	N/A	N/A	1,512.8	Avg Conxn Ult Rec * Conxn Ct
2002	238.0	0.170	0.130	40	N/A	N/A	N/A	N/A	1,362.8	Avg Conxn Ult Rec * Conxn Ct
2003	320.0	0.200	0.170	10	0.130	60	N/A	N/A	1,456.2	Avg Conxn Ult Rec * Conxn Ct
2004	421.2	0.270	0.170	15	0.130	70	N/A	N/A	1,500.2	Avg Conxn Ult Rec * Conxn Ct
2005	635.0	0.380	0.270	5	0.170	25	0.130	80	1,657.0	Avg Conxn Ult Rec * Conxn Ct
2006	1030.0	0.500	0.270	12	0.170	38	0.130	90	1,722.6	Avg Conxn Ult Rec * Conxn Ct

#### Resource Grouping: GAS - Conventional, AB - Southeast, All Zones

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-1996	530.0	0.100	N/A	N/A	N/A	N/A	N/A	N/A		
1996	33.0	0.150	N/A	N/A	N/A	N/A	N/A	N/A	470.3	Avg Conxn Ult Rec * Conxn Ct
1997	52.0	0.140	0.120	12	N/A	N/A	N/A	N/A	672.6	Avg Conxn Ult Rec * Conxn Ct
1998	71.0	0.150	0.120	24	N/A	N/A	N/A	N/A	768.3	Avg Conxn Ult Rec * Conxn Ct
1999	100.0	0.150	0.120	45	N/A	N/A	N/A	N/A	890.8	Avg Conxn Ult Rec * Conxn Ct
2000	148.0	0.150	0.120	60	N/A	N/A	N/A	N/A	1,115.3	Avg Conxn Ult Rec * Conxn Ct
2001	156.0	0.150	0.120	70	N/A	N/A	N/A	N/A	1,037.8	Avg Conxn Ult Rec * Conxn Ct
2002	136.0	0.150	0.120	75	N/A	N/A	N/A	N/A	807.1	Avg Conxn Ult Rec * Conxn Ct
2003	215.0	0.240	0.150	5	0.120	80	N/A	N/A	1,018.9	Avg Conxn Ult Rec * Conxn Ct
2004	310.0	0.250	0.150	12	0.120	90	N/A	N/A	1,195.5	Avg Conxn Ult Rec * Conxn Ct
2005	310.0	0.400	0.270	6	0.150	22	0.120	100	850.5	Avg Conxn Ult Rec * Conxn Ct
2006	440.0	0.520	0.270	13	0.150	36	0.120	115	738.6	Avg Conxn Ult Rec * Conxn Ct

#### Resource Grouping: GAS - Conventional, AB - East Central, All Zones

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-1996	137.0	0.130	N/A	N/A	N/A	N/A	N/A	N/A		
1996	10.5	0.160	0.130	10	N/A	N/A	N/A	N/A	169.1	Avg Conxn Ult Rec * Conxn Ct
1997	9.5	0.150	0.130	20	N/A	N/A	N/A	N/A	140.4	Avg Conxn Ult Rec * Conxn Ct
1998	12.5	0.150	0.130	20	N/A	N/A	N/A	N/A	143.7	Avg Conxn Ult Rec * Conxn Ct
1999	14.5	0.200	0.160	18	0.130	50	N/A	N/A	154.0	Avg Conxn Ult Rec * Conxn Ct
2000	13.5	0.210	0.130	30	N/A	N/A	N/A	N/A	124.3	Avg Conxn Ult Rec * Conxn Ct
2001	20.5	0.200	0.130	40	N/A	N/A	N/A	N/A	152.2	Avg Conxn Ult Rec * Conxn Ct
2002	36.0	0.260	0.160	50	N/A	N/A	N/A	N/A	188.3	Avg Conxn Ult Rec * Conxn Ct
2003	35.0	0.250	0.220	8	0.160	50	N/A	N/A	147.1	Avg Conxn Ult Rec * Conxn Ct
2004	44.0	0.320	0.220	8	0.160	70	N/A	N/A	143.9	Avg Conxn Ult Rec * Conxn Ct
2005	60.0	0.350	0.300	10	0.220	25	0.160	80	136.4	Avg Conxn Ult Rec * Conxn Ct
2006	76.0	0.550	0.300	13	0.220	35	0.160	95	104.2	Avg Conxn Ult Rec * Conxn Ct

#### Resource Grouping: GAS - Conventional, AB - Central, All Zones

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-1996	275.0	0.130	N/A	N/A	N/A	N/A	N/A	N/A		
1996	35.0	0.130	N/A	N/A	N/A	N/A	N/A	N/A	614.6	Avg Conxn Ult Rec * Conxn Ct
1997	39.0	0.160	0.130	12	N/A	N/A	N/A	N/A	555.6	Avg Conxn Ult Rec * Conxn Ct
1998	38.0	0.200	0.130	18	N/A	N/A	N/A	N/A	516.2	Avg Conxn Ult Rec * Conxn Ct
1999	43.0	0.170	0.130	20	N/A	N/A	N/A	N/A	474.2	Avg Conxn Ult Rec * Conxn Ct
2000	48.0	0.200	0.130	36	N/A	N/A	N/A	N/A	448.9	Avg Conxn Ult Rec * Conxn Ct
2001	56.0	0.200	0.130	50	N/A	N/A	N/A	N/A	420.0	Avg Conxn Ult Rec * Conxn Ct
2002	54.0	0.200	0.130	60	N/A	N/A	N/A	N/A	321.6	Avg Conxn Ult Rec * Conxn Ct
2003	93.0	0.300	0.200	10	0.130	80	N/A	N/A	410.9	Avg Conxn Ult Rec * Conxn Ct
2004	144.0	0.350	0.200	18	0.130	80	N/A	N/A	459.2	Avg Conxn Ult Rec * Conxn Ct
2005	175.0	0.350	0.200	30	0.130	100	N/A	N/A	403.4	Avg Conxn Ult Rec * Conxn Ct
2006	295.0	0.620	0.350	12	0.200	40	0.130	110	376.1	Avg Conxn Ult Rec * Conxn Ct

**Resource Grouping: GAS - Conventional, AB - Northeast, All Zones**

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-1996	166.0	0.150	N/A	N/A	N/A	N/A	N/A	N/A		
1996	17.5	0.220	N/A	N/A	N/A	N/A	N/A	N/A	346.6	Avg Conxn Ult Rec * Conxn Ct
1997	38.0	0.180	N/A	N/A	N/A	N/A	N/A	N/A	501.9	Avg Conxn Ult Rec * Conxn Ct
1998	39.0	0.210	N/A	N/A	N/A	N/A	N/A	N/A	467.2	Avg Conxn Ult Rec * Conxn Ct
1999	36.0	0.200	N/A	N/A	N/A	N/A	N/A	N/A	341.5	Avg Conxn Ult Rec * Conxn Ct
2000	47.0	0.220	N/A	N/A	N/A	N/A	N/A	N/A	359.1	Avg Conxn Ult Rec * Conxn Ct
2001	56.0	0.190	N/A	N/A	N/A	N/A	N/A	N/A	334.2	Avg Conxn Ult Rec * Conxn Ct
2002	43.0	0.190	N/A	N/A	N/A	N/A	N/A	N/A	212.1	Avg Conxn Ult Rec * Conxn Ct
2003	46.0	0.220	N/A	N/A	N/A	N/A	N/A	N/A	185.5	Avg Conxn Ult Rec * Conxn Ct
2004	45.0	0.200	N/A	N/A	N/A	N/A	N/A	N/A	151.2	Avg Conxn Ult Rec * Conxn Ct
2005	27.5	0.250	0.200	14	N/A	N/A	N/A	N/A	74.3	Avg Conxn Ult Rec * Conxn Ct
2006	59.0	0.470	0.300	13	0.200	22	N/A	N/A	93.7	Avg Conxn Ult Rec * Conxn Ct

**Resource Grouping: GAS - Conventional, AB - Northwest, All Zones**

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-1996	278.0	0.130	N/A	N/A	N/A	N/A	N/A	N/A		
1996	40.0	0.150	N/A	N/A	N/A	N/A	N/A	N/A	777.0	Avg Conxn Ult Rec * Conxn Ct
1997	46.0	0.150	N/A	N/A	N/A	N/A	N/A	N/A	785.4	Avg Conxn Ult Rec * Conxn Ct
1998	56.0	0.150	N/A	N/A	N/A	N/A	N/A	N/A	779.1	Avg Conxn Ult Rec * Conxn Ct
1999	56.0	0.200	0.150	24	N/A	N/A	N/A	N/A	621.5	Avg Conxn Ult Rec * Conxn Ct
2000	67.0	0.200	0.150	20	N/A	N/A	N/A	N/A	617.3	Avg Conxn Ult Rec * Conxn Ct
2001	90.0	0.250	0.200	12	0.150	40	N/A	N/A	689.6	Avg Conxn Ult Rec * Conxn Ct
2002	85.0	0.200	0.150	50	N/A	N/A	N/A	N/A	517.8	Avg Conxn Ult Rec * Conxn Ct
2003	88.0	0.250	0.200	18	0.150	50	N/A	N/A	437.4	Avg Conxn Ult Rec * Conxn Ct
2004	135.0	0.300	0.200	18	0.150	80	N/A	N/A	458.9	Avg Conxn Ult Rec * Conxn Ct
2005	190.0	0.500	0.300	7	0.200	35	0.150	95	454.3	Avg Conxn Ult Rec * Conxn Ct
2006	295.0	0.650	0.320	14	0.200	45	0.150	105	369.9	Avg Conxn Ult Rec * Conxn Ct

**Resource Grouping: GAS - Conventional, BC - Fort St. John, All Zones**

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-1996	231.0	0.120	N/A	N/A	N/A	N/A	N/A	N/A		
1996	19.5	0.120	N/A	N/A	N/A	N/A	N/A	N/A	233.7	Extrap of Group Trend
1997	30.5	0.120	N/A	N/A	N/A	N/A	N/A	N/A	362.7	Avg Conxn Ult Rec * Conxn Ct
1998	33.0	0.120	N/A	N/A	N/A	N/A	N/A	N/A	334.6	Avg Conxn Ult Rec * Conxn Ct
1999	38.5	0.120	N/A	N/A	N/A	N/A	N/A	N/A	369.3	Avg Conxn Ult Rec * Conxn Ct
2000	45.0	0.140	0.120	60	N/A	N/A	N/A	N/A	390.1	Extrap of Group Trend
2001	74.0	0.180	0.120	60	N/A	N/A	N/A	N/A	391.3	Avg Conxn Ult Rec * Conxn Ct
2002	54.0	0.250	0.140	5	0.120	40	0.120	100	401.6	Extrap of Group Trend
2003	89.0	0.300	0.140	18	0.120	80	N/A	N/A	425.4	Avg Conxn Ult Rec * Conxn Ct
2004	153.4	0.290	0.140	30	0.120	90	0.130	100	553.7	Avg Conxn Ult Rec * Conxn Ct
2005	242.0	0.300	0.140	42	0.120	100	N/A	N/A	624.8	Avg Conxn Ult Rec * Conxn Ct
2006	350.0	0.650	0.300	8	0.140	53	0.120	115	537.9	Avg Conxn Ult Rec * Conxn Ct

**Resource Grouping: GAS - Conventional, BC - Fort Nelson, All Zones**

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-1996	130.0	0.120	N/A	N/A	N/A	N/A	N/A	N/A		
1996	13.0	0.140	0.120	12	N/A	N/A	N/A	N/A	205.5	Avg Conxn Ult Rec * Conxn Ct
1997	24.0	0.120	N/A	N/A	N/A	N/A	N/A	N/A	230.9	Avg Conxn Ult Rec * Conxn Ct
1998	11.0	0.120	N/A	N/A	N/A	N/A	N/A	N/A	122.9	Avg Conxn Ult Rec * Conxn Ct
1999	33.0	0.150	0.120	30	N/A	N/A	N/A	N/A	316.8	Avg Conxn Ult Rec * Conxn Ct
2000	27.0	0.120	N/A	N/A	N/A	N/A	N/A	N/A	234.5	Avg Conxn Ult Rec * Conxn Ct
2001	54.0	0.200	0.120	6	N/A	N/A	N/A	N/A	368.7	Avg Conxn Ult Rec * Conxn Ct
2002	39.0	0.140	0.120	15	N/A	N/A	N/A	N/A	264.5	Avg Conxn Ult Rec * Conxn Ct
2003	67.0	0.180	0.120	26	N/A	N/A	N/A	N/A	363.9	Avg Conxn Ult Rec * Conxn Ct
2004	105.0	0.360	0.180	10	0.120	40	N/A	N/A	417.8	Avg Conxn Ult Rec * Conxn Ct
2005	122.0	0.340	0.180	20	0.120	50	N/A	N/A	340.5	Avg Conxn Ult Rec * Conxn Ct
2006	112.0	0.620	0.400	5	0.180	30	0.120	60	189.4	Avg Conxn Ult Rec * Conxn Ct

**Resource Grouping: GAS - Conventional, BC - Foothills, All Zones**

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-1996	68.0	0.150	N/A	N/A	N/A	N/A	N/A	N/A		
1996	14.8	0.140	N/A	N/A	N/A	N/A	N/A	N/A	169.2	Avg Conxn Ult Rec * Conxn Ct
1997	26.0	0.150	N/A	N/A	N/A	N/A	N/A	N/A	259.2	Avg Conxn Ult Rec * Conxn Ct
1998	27.0	0.100	0.150	20	N/A	N/A	N/A	N/A	203.4	Avg Conxn Ult Rec * Conxn Ct
1999	5.5	0.010	0.150	30	N/A	N/A	N/A	N/A	38.3	Avg Conxn Ult Rec * Conxn Ct
2000	10.0	0.200	0.150	40	N/A	N/A	N/A	N/A	87.6	Avg Conxn Ult Rec * Conxn Ct
2001	27.0	0.250	0.150	35	N/A	N/A	N/A	N/A	138.2	Avg Conxn Ult Rec * Conxn Ct
2002	9.5	0.180	0.150	60	N/A	N/A	N/A	N/A	45.4	Avg Conxn Ult Rec * Conxn Ct
2003	43.0	0.180	0.150	60	N/A	N/A	N/A	N/A	179.5	Avg Conxn Ult Rec * Conxn Ct
2004	63.0	0.280	0.200	8	0.150	70	N/A	N/A	202.1	Avg Conxn Ult Rec * Conxn Ct
2005	45.0	0.380	0.200	15	0.150	80	0.150	100	107.6	Avg Conxn Ult Rec * Conxn Ct
2006	120.0	0.450	0.200	24	0.150	85	0.150	100	173.8	Avg Conxn Ult Rec * Conxn Ct

**Resource Grouping: GAS - Conventional, SK - Central, All Zones**

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-1996	33.0	0.130	N/A	N/A	N/A	N/A	N/A	N/A		
1996	3.7	0.160	N/A	N/A	N/A	N/A	N/A	N/A	50.3	Avg Conxn Ult Rec * Conxn Ct
1997	2.2	0.200	N/A	N/A	N/A	N/A	N/A	N/A	33.5	Avg Conxn Ult Rec * Conxn Ct
1998	6.5	0.130	N/A	N/A	N/A	N/A	N/A	N/A	71.5	Avg Conxn Ult Rec * Conxn Ct
1999	3.9	0.150	N/A	N/A	N/A	N/A	N/A	N/A	41.7	Avg Conxn Ult Rec * Conxn Ct
2000	3.3	0.270	N/A	N/A	N/A	N/A	N/A	N/A	32.6	Avg Conxn Ult Rec * Conxn Ct
2001	5.0	0.360	0.270	10	N/A	N/A	N/A	N/A	40.4	Avg Conxn Ult Rec * Conxn Ct
2002	5.5	0.300	0.300	500	N/A	N/A	N/A	N/A	29.3	Avg Conxn Ult Rec * Conxn Ct
2003	6.0	0.400	0.300	8	N/A	N/A	N/A	N/A	29.0	Avg Conxn Ult Rec * Conxn Ct
2004	12.5	0.500	0.300	5	N/A	N/A	N/A	N/A	39.0	Avg Conxn Ult Rec * Conxn Ct
2005	18.5	0.600	0.300	8	N/A	N/A	N/A	N/A	34.5	Avg Conxn Ult Rec * Conxn Ct
2006	27.0	0.700	0.300	17	N/A	N/A	N/A	N/A	25.9	Avg Conxn Ult Rec * Conxn Ct

**Resource Grouping: GAS - Conventional, SK - Southwest, All Zones**

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-1996	84.0	0.130	N/A	N/A	N/A	N/A	N/A	N/A		
1996	9.3	0.120	N/A	N/A	N/A	N/A	N/A	N/A	106.7	Avg Conxn Ult Rec * Conxn Ct
1997	5.5	0.150	N/A	N/A	N/A	N/A	N/A	N/A	66.3	Avg Conxn Ult Rec * Conxn Ct
1998	9.9	0.160	0.140	30	N/A	N/A	N/A	N/A	100.4	Avg Conxn Ult Rec * Conxn Ct
1999	14.7	0.180	0.140	24	N/A	N/A	N/A	N/A	136.9	Avg Conxn Ult Rec * Conxn Ct
2000	20.0	0.180	0.140	30	N/A	N/A	N/A	N/A	151.6	Avg Conxn Ult Rec * Conxn Ct
2001	24.0	0.180	0.140	50	N/A	N/A	N/A	N/A	157.2	Avg Conxn Ult Rec * Conxn Ct
2002	40.0	0.230	0.180	8	0.140	60	N/A	N/A	200.3	Avg Conxn Ult Rec * Conxn Ct
2003	57.0	0.240	0.180	15	0.140	80	N/A	N/A	231.7	Avg Conxn Ult Rec * Conxn Ct
2004	57.5	0.240	0.180	22	0.160	85	0.130	100	182.1	Avg Conxn Ult Rec * Conxn Ct
2005	70.0	0.350	0.250	5	0.180	35	0.140	100	171.6	Avg Conxn Ult Rec * Conxn Ct
2006	86.0	0.450	0.250	12	0.180	50	0.140	110	136.3	Avg Conxn Ult Rec * Conxn Ct

**Resource Grouping: GAS - Conventional, NT - Yukon and Northwest Territories, All Zones**

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
All Years	25.0	0.100	N/A	N/A	N/A	N/A	N/A	N/A		

**Groupings for CBM Connections**

**Resource Grouping: GAS - CBM, AB - Main HSC**

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-2003	16.0	0.100	N/A	N/A	N/A	N/A	N/A	N/A		
2003	27.5	0.150	0.100	22	N/A	N/A	N/A	N/A	185.2	Avg Conxn Ult Rec * Conxn Ct
2004	92.0	0.160	0.100	30	N/A	N/A	N/A	N/A	389.1	Avg Conxn Ult Rec * Conxn Ct
2005	172.0	0.160	0.100	42	N/A	N/A	N/A	N/A	619.6	Avg Conxn Ult Rec * Conxn Ct
2006	224.0	0.100	0.160	7	0.100	52	N/A	N/A	723.3	Avg Conxn Ult Rec * Conxn Ct

**Resource Grouping: GAS - CBM, AB - Other CBM**

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-2003	3.7	0.250	0.100	24	N/A	N/A	N/A	N/A		
2003	5.4	0.220	0.100	20	N/A	N/A	N/A	N/A	27.0	Avg Conxn Ult Rec * Conxn Ct
2004	2.6	0.150	0.100	25	N/A	N/A	N/A	N/A	12.1	Avg Conxn Ult Rec * Conxn Ct
2005	3.3	0.350	0.150	8	0.100	45	N/A	N/A	11.4	Avg Conxn Ult Rec * Conxn Ct
2006	10.5	0.750	0.360	8	0.150	18	0.100	55	20.6	Avg Conxn Ult Rec * Conxn Ct

**Resource Grouping: GAS - CBM, AB - Mannville**

Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
pre-2005	6.5	0.100	N/A	N/A	N/A	N/A	N/A	N/A		
2005	16.0	0.300	0.150	12	0.100	50	N/A	N/A	51.7	Extrap of Group Trend
2006	50.0	0.280	0.150	20	0.100	50	N/A	N/A	111.1	Avg Conxn Ult Rec * Conxn Ct

**Groupings for Solution Gas (Conventional)**

Study Area	Connection Year	q as of Dec. 2006, Mkt MMcf/d	First Decline Rate	Second Decline Rate	Months to Second Decline Rate	Third Decline Rate	Months to Third Decline Rate	Fourth Decline Rate	Months to Fourth Decline Rate	Group Ultimate Recovery, Mkt Bcf	Source of Grp Ultimate Rec
AB - Foothills	All Years	2.7	0.040	N/A	N/A	N/A	N/A	N/A	N/A		
AB - Foothills Front	All Years	390.0	0.020	N/A	N/A	N/A	N/A	N/A	N/A		
AB - Southeast	All Years	145.0	0.050	N/A	N/A	N/A	N/A	N/A	N/A		
AB - East Central	All Years	90.0	0.010	N/A	N/A	N/A	N/A	N/A	N/A		
AB - Central	All Years	390.0	0.030	N/A	N/A	N/A	N/A	N/A	N/A		
AB - Northeast	All Years	62.0	0.030	N/A	N/A	N/A	N/A	N/A	N/A		
AB - Northwest	All Years	255.0	0.030	N/A	N/A	N/A	N/A	N/A	N/A		
BC - Fort St. John	All Years	45.0	0.150	N/A	N/A	N/A	N/A	N/A	N/A		
BC - Fort Nelson	All Years	5.0	0.010	N/A	N/A	N/A	N/A	N/A	N/A		
SK - Central	All Years	40.0	0.010	N/A	N/A	N/A	N/A	N/A	N/A		
SK - Southwest	All Years	22.0	0.030	N/A	N/A	N/A	N/A	N/A	N/A		
SK - Southeast	All Years	36.0	0.010	N/A	N/A	N/A	N/A	N/A	N/A		

## Appendix B.4 - Average Connection Production Performance Parameters, Historical and Projected

### Conventional Gas Connection Groupings

#### Gas Resource Group: GAS - Conventional, AB- Foothills, All Zones

Average Connection Performance Parameters									
Year	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conn Ult Rec Gas, Mkt
1996	5.900	28.0%	15.0%	26	12.0%	75	8.0%	120	14,608
1997	3.800	15.5%	9.0%	40	8.0%	120	8.0%	500	13,473
1998	3.800	2.9%	59.0%	22	28.0%	50	13.0%	70	6,081
1999	2.400	38.0%	17.0%	10	13.0%	75	11.0%	120	5,123
2000	2.000	45.0%	17.5%	15	12.0%	72	8.0%	120	4,134
2001	1.580	23.0%	15.0%	43	13.0%	80	8.0%	120	3,772
2002	2.550	39.0%	16.0%	11	13.0%	75	8.0%	120	6,115
2003	2.250	41.0%	17.0%	17	13.0%	75	8.0%	120	4,700
2004	1.860	27.0%	17.0%	24	13.0%	75	8.0%	120	4,334
2005	1.680	50.0%	17.0%	17	13.0%	75	8.0%	120	3,196
2006	1.950	45.0%	17.0%	17	13.0%	75	8.0%	120	3,844
2007	1.750	44.0%	17.0%	17	13.0%	75	8.0%	120	
2008	1.670	44.0%	17.0%	17	13.0%	75	8.0%	120	
2009	1.600	44.0%	17.0%	17	13.0%	75	8.0%	120	

#### Gas Resource Group: GAS - Conventional, AB- Foothills Front, All Zones

Average Connection Performance Parameters									
Year	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conn Ult Rec Gas, Mkt
1996	1.610	43.0%	24.0%	21	20.0%	45	13.0%	100	2,247
1997	1.340	34.0%	27.0%	23	14.0%	52	13.0%	100	2,150
1998	1.450	42.0%	27.0%	17	17.0%	48	13.0%	90	2,134
1999	1.360	55.0%	26.0%	18	16.0%	45	13.0%	100	1,763
2000	1.010	48.5%	24.0%	17	18.0%	43	13.0%	100	1,436
2001	0.890	51.0%	25.0%	16	17.0%	46	13.0%	100	1,239
2002	1.000	50.0%	27.0%	17	17.0%	45	13.0%	100	1,356
2003	0.720	48.0%	26.0%	18	17.0%	45	13.0%	100	996
2004	0.620	55.0%	27.0%	17	17.0%	45	13.0%	100	795
2005	0.550	55.0%	27.0%	17	17.0%	45	13.0%	100	703
2006	0.520	56.0%	27.0%	17	17.0%	45	13.0%	100	652
2007	0.510	55.0%	27.0%	17	17.0%	45	13.0%	100	
2008	0.480	55.0%	27.0%	17	17.0%	45	13.0%	100	
2009	0.460	55.0%	27.0%	17	17.0%	45	13.0%	100	

#### Gas Resource Group: GAS - Conventional, AB- Southeast, All Zones

Average Connection Performance Parameters									
Year	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conn Ult Rec Gas, Mkt
1996	0.370	63.0%	24.0%	18	15.0%	55	15.0%	500	421
1997	0.385	60.0%	31.0%	15	14.0%	55	12.0%	120	456
1998	0.290	61.0%	34.0%	15	16.0%	42	12.0%	120	341
1999	0.215	63.0%	29.0%	17	15.0%	42	12.0%	120	260
2000	0.190	61.0%	26.0%	17	15.0%	42	12.0%	120	244
2001	0.160	61.0%	27.0%	16	15.0%	42	12.0%	120	206
2002	0.147	63.0%	29.0%	17	15.0%	42	12.0%	120	178
2003	0.120	54.0%	27.0%	17	15.0%	42	12.0%	120	166
2004	0.118	62.0%	27.0%	16	15.0%	42	12.0%	120	152
2005	0.103	62.0%	27.0%	16	15.0%	42	12.0%	120	132
2006	0.090	62.0%	27.0%	16	15.0%	42	12.0%	120	114
2007	0.083	62.0%	27.0%	16	15.0%	42	12.0%	120	
2008	0.076	62.0%	27.0%	16	15.0%	42	12.0%	120	
2009	0.071	62.0%	27.0%	16	15.0%	42	12.0%	120	

#### Gas Resource Group: GAS - Conventional, AB- East Central, All Zones

Average Connection Performance Parameters									
Year	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conn Ult Rec Gas, Mkt
1996	0.540	50.0%	30.0%	19	17.0%	50	13.0%	120	658
1997	0.500	55.0%	32.0%	17	18.0%	58	13.0%	120	544
1998	0.390	65.0%	30.0%	15	20.0%	44	13.0%	85	438
1999	0.325	51.0%	30.0%	16	22.0%	37	13.0%	120	389
2000	0.290	65.0%	45.0%	20	20.0%	33	13.0%	120	269
2001	0.310	68.0%	30.0%	21	20.0%	45	13.0%	120	286
2002	0.260	44.0%	32.0%	16	27.0%	40	16.0%	100	297
2003	0.175	58.0%	28.0%	19	22.0%	40	16.0%	100	186
2004	0.145	59.0%	32.0%	18	22.0%	40	16.0%	100	148
2005	0.139	60.0%	30.0%	18	22.0%	40	16.0%	100	143
2006	0.122	60.0%	30.0%	18	22.0%	40	16.0%	100	126
2007	0.110	60.0%	30.0%	18	22.0%	40	16.0%	100	
2008	0.097	60.0%	30.0%	18	22.0%	40	16.0%	100	
2009	0.085	60.0%	30.0%	18	22.0%	40	16.0%	100	



**Gas Resource Group: GAS - Conventional, AB- Central, All Zones**

	Average Connection Performance Parameters									
Year	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conn Ult Rec Gas, Mkt	
1996	0.730	66.0%	36.0%	18	17.0%	48	13.0%	120	696	
1997	0.680	85.0%	40.0%	12	17.0%	45	13.0%	120	593	
1998	0.610	64.0%	35.0%	16	20.0%	48	13.0%	120	592	
1999	0.560	71.0%	38.0%	17	17.0%	46	13.0%	120	511	
2000	0.500	68.0%	31.0%	23	20.0%	48	13.0%	120	435	
2001	0.400	63.0%	36.0%	18	20.0%	48	13.0%	120	376	
2002	0.375	59.0%	35.0%	18	20.0%	48	13.0%	120	377	
2003	0.320	63.0%	32.0%	18	20.0%	48	13.0%	120	319	
2004	0.280	58.0%	35.0%	16	20.0%	48	13.0%	120	291	
2005	0.220	75.0%	35.0%	15	20.0%	48	13.0%	120	196	
2006	0.210	65.0%	35.0%	17	20.0%	48	13.0%	120	199	
2007	0.195	65.0%	35.0%	17	20.0%	48	13.0%	120		
2008	0.168	65.0%	35.0%	17	20.0%	48	13.0%	120		
2009	0.145	65.0%	35.0%	17	20.0%	48	13.0%	120		

**Gas Resource Group: GAS - Conventional, AB- Northeast, All Zones**

	Average Connection Performance Parameters									
Year	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conn Ult Rec Gas, Mkt	
1996	0.630	37.0%	22.0%	28	22.0%	500	22.0%	500	806	
1997	0.535	32.0%	21.0%	36	18.0%	60	18.0%	500	777	
1998	0.540	41.0%	26.0%	18	21.0%	50	21.0%	500	687	
1999	0.510	34.0%	26.0%	23	20.0%	48	20.0%	500	707	
2000	0.360	27.0%	22.0%	52	22.0%	500	22.0%	500	522	
2001	0.265	28.0%	19.0%	23	19.0%	500	19.0%	500	445	
2002	0.300	29.0%	19.0%	28	19.0%	500	18.0%	500	482	
2003	0.250	29.0%	22.0%	50	22.0%	500	22.0%	500	346	
2004	0.203	32.0%	20.0%	30	20.0%	500	20.0%	500	297	
2005	0.195	62.0%	25.0%	17	20.0%	30	20.0%	500	214	
2006	0.160	47.0%	30.0%	20	20.0%	30	20.0%	500	194	
2007	0.148	45.0%	30.0%	20	20.0%	30	20.0%	500		
2008	0.133	45.0%	30.0%	20	20.0%	30	20.0%	500		
2009	0.120	45.0%	30.0%	20	20.0%	30	20.0%	500		

**Gas Resource Group: GAS - Conventional, AB- Northwest, All Zones**

	Average Connection Performance Parameters								
Year	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conn Ult Rec Gas, Mkt
1996	1.410	35.0%	28.0%	42	22.0%	65	15.0%	110	1,758
1997	1.050	41.0%	31.0%	30	21.0%	65	15.0%	110	1,190
1998	0.990	42.0%	26.0%	36	20.0%	70	15.0%	110	1,121
1999	0.830	46.0%	27.0%	30	20.0%	65	15.0%	120	906
2000	0.650	60.0%	30.0%	21	20.0%	50	15.0%	110	639
2001	0.600	56.0%	31.0%	22	20.0%	60	15.0%	110	594
2002	0.740	82.0%	36.0%	12	20.0%	42	15.0%	110	669
2003	0.530	62.0%	32.0%	24	20.0%	50	15.0%	110	476
2004	0.450	54.0%	30.0%	21	20.0%	50	15.0%	110	476
2005	0.440	63.0%	32.0%	22	20.0%	50	15.0%	110	402
2006	0.420	65.0%	32.0%	22	20.0%	50	15.0%	110	371
2007	0.390	65.0%	32.0%	22	20.0%	50	15.0%	110	
2008	0.370	65.0%	32.0%	22	20.0%	50	15.0%	110	
2009	0.350	65.0%	32.0%	22	20.0%	50	15.0%	110	

**Gas Resource Group: GAS - Conventional, BC- Fort St. John, All Zones**

Average Connection Performance Parameters									
Year	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Consm Ult Rec Gas, Mkt
1996	0.990	40.0%	22.0%	28	12.0%	65	12.0%	500	1,496
1997	1.050	40.0%	17.0%	33	12.0%	80	12.0%	500	1,577
1998	0.850	44.0%	16.0%	25	14.0%	60	12.0%	120	1,349
1999	0.860	44.0%	21.0%	17	12.0%	75	12.0%	500	1,383
2000	0.800	51.0%	21.0%	19	14.0%	60	12.0%	120	1,155
2001	0.760	47.0%	21.0%	22	14.0%	55	12.0%	120	1,118
2002	0.930	50.0%	29.0%	24	14.0%	60	12.0%	120	1,104
2003	1.020	76.0%	30.0%	15	14.0%	60	12.0%	120	1,030
2004	0.740	68.0%	29.0%	14	14.0%	60	12.0%	120	839
2005	0.710	78.0%	30.0%	12	14.0%	60	12.0%	120	761
2006	0.630	78.0%	30.0%	14	14.0%	60	12.0%	120	624
2007	0.620	75.0%	30.0%	14	14.0%	60	12.0%	120	
2008	0.580	75.0%	30.0%	14	14.0%	60	12.0%	120	
2009	0.550	75.0%	30.0%	14	14.0%	60	12.0%	120	

**Gas Resource Group: GAS - Conventional, BC- Fort Nelson, All Zones**

Year	Average Connection Performance Parameters								
	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conon Ult Rec Gas, Mkt
1996	2.640	33.0%	20.0%	45	14.0%	75	12.0%	120	4,029
1997	3.500	30.0%	14.0%	24	12.0%	40	12.0%	500	7,697
1998	1.870	50.0%	18.0%	24	12.0%	80	12.0%	500	2,615
1999	1.550	29.0%	22.0%	45	15.0%	65	12.0%	120	2,597
2000	1.270	59.0%	26.0%	14	12.0%	65	12.0%	500	1,687
2001	1.100	27.0%	20.0%	24	12.0%	70	12.0%	500	2,169
2002	1.440	46.0%	30.0%	22	14.0%	50	12.0%	70	1,974
2003	1.150	72.0%	35.0%	14	18.0%	40	12.0%	70	1,268
2004	1.180	70.0%	36.0%	12	18.0%	40	12.0%	70	1,339
2005	1.000	68.0%	34.0%	13	18.0%	40	12.0%	70	1,170
2006	0.730	80.0%	40.0%	13	18.0%	40	12.0%	70	699
2007	0.720	75.0%	35.0%	13	18.0%	40	12.0%	70	
2008	0.650	75.0%	35.0%	13	18.0%	40	12.0%	70	
2009	0.600	75.0%	35.0%	13	18.0%	40	12.0%	70	

**Gas Resource Group: GAS - Conventional, BC- Foothills, All Zones**

Year	Average Connection Performance Parameters								
	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conon Ult Rec Gas, Mkt
1996	6.400	24.0%	14.0%	24	14.0%	500	14.0%	500	14,096
1997	11.000	0.1%	22.0%	24	15.0%	55	15.0%	500	28,800
1998	5.400	13.0%	8.0%	30	10.0%	70	15.0%	120	16,950
1999	1.830	95.0%	1.0%	18	15.0%	120	15.0%	500	2,944
2000	13.000	40.0%	20.0%	50	15.0%	120	15.0%	500	14,600
2001	6.000	9.0%	25.0%	40	15.0%	100	15.0%	500	13,818
2002	1.700	30.0%	18.0%	20	15.0%	100	15.0%	500	3,027
2003	5.500	28.0%	18.0%	40	15.0%	100	15.0%	500	8,975
2004	3.300	32.0%	20.0%	40	15.0%	100	15.0%	500	4,812
2005	1.950	45.0%	20.0%	30	15.0%	100	15.0%	500	2,391
2006	2.200	45.0%	20.0%	30	15.0%	100	15.0%	500	2,674
2007	2.200	45.0%	20.0%	30	15.0%	100	15.0%	500	
2008	2.150	45.0%	20.0%	30	15.0%	100	15.0%	500	
2009	2.100	45.0%	20.0%	30	15.0%	100	15.0%	500	

**Gas Resource Group: GAS - Conventional, SK-Central, All Zones**

Year	Average Connection Performance Parameters								
	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conon Ult Rec Gas, Mkt
1996	0.400	56.0%	16.0%	22	16.0%	500	16.0%	500	498
1997	0.450	51.0%	26.5%	13	20.0%	90	20.0%	500	524
1998	0.450	39.0%	20.0%	35	13.0%	70	13.0%	500	633
1999	0.410	51.0%	27.0%	23	15.0%	75	15.0%	500	453
2000	0.365	61.0%	31.0%	14	27.0%	90	27.0%	500	333
2001	0.260	53.0%	36.0%	24	27.0%	80	27.0%	80	216
2002	0.230	46.0%	30.0%	35	30.0%	500	30.0%	500	209
2003	0.230	82.0%	40.0%	19	30.0%	50	30.0%	500	141
2004	0.235	63.0%	30.0%	32	30.0%	500	30.0%	500	166
2005	0.190	75.0%	30.0%	22	30.0%	500	30.0%	500	130
2006	0.156	75.0%	30.0%	22	30.0%	500	30.0%	500	107
2007	0.140	75.0%	30.0%	22	30.0%	500	30.0%	500	
2008	0.125	75.0%	30.0%	22	30.0%	500	30.0%	500	
2009	0.110	75.0%	30.0%	22	30.0%	500	30.0%	500	

**Gas Resource Group: GAS - Conventional, SK- Southwest, All Zones**

Year	Average Connection Performance Parameters								
	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conon Ult Rec Gas, Mkt
1996	0.118	41.0%	17.0%	16	12.0%	80	12.0%	500	220
1997	0.135	38.0%	20.0%	28	15.0%	65	15.0%	500	198
1998	0.127	43.0%	25.0%	21	16.0%	50	14.0%	120	179
1999	0.105	61.0%	30.0%	14	18.0%	45	14.0%	120	122
2000	0.081	49.0%	22.0%	16	18.0%	60	14.0%	120	112
2001	0.069	48.0%	27.0%	13	18.0%	52	14.0%	120	93
2002	0.070	38.0%	23.0%	21	18.0%	55	14.0%	120	104
2003	0.089	44.0%	25.0%	15	18.0%	55	14.0%	120	126
2004	0.075	49.0%	24.0%	14	18.0%	55	14.0%	120	104
2005	0.090	54.0%	25.0%	16	18.0%	55	14.0%	120	113
2006	0.080	52.0%	25.0%	16	18.0%	55	14.0%	120	102
2007	0.075	52.0%	25.0%	16	18.0%	55	14.0%	120	
2008	0.070	52.0%	25.0%	16	18.0%	55	14.0%	120	
2009	0.065	52.0%	25.0%	16	18.0%	55	14.0%	120	

## CBM Groupings

### Gas Resource Group: GAS - CBM, AB , Main HSC

	Average Connection Performance Parameters								
Year	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conn Ult. Rec Gas, Mkt
2003	0.095	25.0%	15.0%	12	10.0%	60	10.0%	500	263
2004	0.088	5.0%	16.0%	16	10.0%	60	10.0%	500	291
2005	0.079	5.0%	16.0%	12	10.0%	60	10.0%	500	253
2006	0.086	5.0%	16.0%	12	10.0%	60	10.0%	500	275
2007	0.080	5.0%	16.0%	12	10.0%	60	10.0%	500	
2008	0.078	5.0%	16.0%	12	10.0%	60	10.0%	500	
2009	0.076	5.0%	16.0%	12	10.0%	60	10.0%	500	

### Gas Resource Group: Gas - CBM, AB , Other CBM

	Average Connection Performance Parameters								
Year	Initial Productivity, Mkt	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	Avg Conn Ult. Rec Gas, Mkt
2003	0.155	30.0%	22.0%	30	10.0%	60	10.0%	500	310
2004	0.064	36.0%	15.0%	24	10.0%	60	10.0%	500	134
2005	0.046	35.0%	15.0%	24	10.0%	60	10.0%	500	99
2006	0.090	85.0%	36.0%	12	15.0%	24	10.0%	60	128
2007	0.070	36.0%	15.0%	24	10.0%	60	10.0%	500	
2008	0.070	36.0%	15.0%	24	10.0%	60	10.0%	500	
2009	0.070	36.0%	15.0%	24	10.0%	60	10.0%	500	

### Gas Resource Group: Gas - CBM, AB , Mannville

Year	Average Connection Performance Parameters									Avg Conn Ult Rec Gas, Mkt MMcf
	Months to Peak Production	Peak Production Rate, Mkt MMcf/d	1st Decline Rate	2nd Decline Rate	Months to 2nd Decline Rate	3rd Decline Rate	Months to 3rd Decline Rate	4th Decline Rate	Months to 4th Decline Rate	
2005	4	0.34	30.0%	15.0%	24	10.0%	60	N/A	N/A	846
2006	4	0.52	30.0%	15.0%	24	10.0%	60	N/A	N/A	1,292
2007	2007	0.350	30.0%	15.0%	24	10.0%	60	N/A	N/A	
2008	2008	0.350	30.0%	15.0%	24	10.0%	60	N/A	N/A	
2009	2009	0.350	30.0%	15.0%	24	10.0%	60	N/A	N/A	



# APPENDIX C

## Drilling Projection Details

### Appendix C.1 - Factors for Allocation of Gas-Intent Drill Days to Resource Groupings

*Historical Gas Intent Drill Days by Resource Grouping*

Year	Gas - Conventional										Gas - CBM			Total Gas Intent, Drill Days
	AB-F	AB-FF	AB-SE	AB-EC	AB-C	AB-NE	AB-NW	BC-FSJ	BC-FN	BC-F	SK-W	SK-SW	Main HSC	Other CBM
2000	3,768	24,060	13,506	1,002	5,181	2,617	7,624	6,196	4,494	1,201	241	2,033	413	25
2001	4,451	26,014	13,961	1,273	5,364	3,168	8,488	7,158	6,818	2,471	396	2,121	779	89
2002	3,779	20,654	10,822	1,299	4,297	2,269	7,006	5,909	4,145	2,140	308	3,332	744	201
2003	5,059	27,155	14,921	2,113	6,419	1,806	7,375	9,171	6,607	1,919	764	3,956	1,317	150
2004	6,158	30,869	15,180	2,184	7,654	2,234	7,410	10,611	6,670	2,343	805	3,499	4,506	306
2005	5,359	37,747	14,925	2,184	8,356	2,588	7,997	13,855	6,660	2,761	970	3,580	8,300	339
2006	6,449	39,701	12,706	1,759	6,653	2,883	8,238	14,159	5,593	3,856	740	2,474	6,025	921
														115,688

*Historical Fraction of Total Gas-Intent Drill Days for Resource Grouping*

DrYr	Gas - Conventional										Gas - CBM			Total Gas Intent, frac
	AB-F	AB-FF	AB-SE	AB-EC	AB-C	AB-NE	AB-NW	BC-FSJ	BC-FN	BC-F	SK-W	SK-SW	Main HSC	Other CBM
2000	0.0520	0.3321	0.1864	0.0138	0.0715	0.0361	0.1052	0.0855	0.0620	0.0166	0.0033	0.0281	0.0057	0.0012
2001	0.0537	0.3142	0.1686	0.0154	0.0648	0.0383	0.1025	0.0864	0.0823	0.0298	0.0048	0.0256	0.0094	0.0024
2002	0.0563	0.3079	0.1613	0.0194	0.0641	0.0338	0.1044	0.0881	0.0618	0.0319	0.0046	0.0497	0.0111	0.0022
2003	0.0564	0.3027	0.1663	0.0235	0.0716	0.0201	0.0822	0.1022	0.0737	0.0214	0.0085	0.0441	0.0147	0.0034
2004	0.0610	0.3056	0.1503	0.0216	0.0758	0.0221	0.0734	0.1050	0.0660	0.0232	0.0080	0.0346	0.0034	0.0034
2005	0.0455	0.3204	0.1267	0.0185	0.0709	0.0220	0.0679	0.1176	0.0565	0.0234	0.0082	0.0304	0.0704	0.0078
2006	0.0557	0.3432	0.1098	0.0152	0.0575	0.0249	0.0712	0.1224	0.0483	0.0333	0.0064	0.0214	0.0521	0.0069

*Projected Fraction of Total Gas-Intent Drill Days for Resource Groupings*

DrYr	Gas - Conventional										Gas - CBM			Total Gas Intent, frac
	AB-F	AB-FF	AB-SE	AB-EC	AB-C	AB-NE	AB-NW	BC-FSJ	BC-FN	BC-F	SK-W	SK-SW	Main HSC	Other CBM
2007	0.0665	0.3370	0.1120	0.0120	0.0550	0.0220	0.0630	0.1200	0.0375	0.0375	0.0075	0.0220	0.0450	0.0050
2008	0.0679	0.3655	0.0996	0.0103	0.0528	0.0192	0.0602	0.1230	0.0387	0.0383	0.0068	0.0196	0.0450	0.0050
2009	0.0690	0.3727	0.0904	0.0090	0.0505	0.0171	0.0575	0.1256	0.0397	0.0390	0.0062	0.0178	0.0450	0.0050

## Appendix C.2 - Detailed Gas-Intent Drilling and Gas Connection Projections by Scenario

### Scenario: Reference Case

Resource Grouping	Projected Annual Number of Wells Targeted to Resource Grouping			Connection Ratio	Projected Annual Number of Connections for Resource Grouping		
	2007	2008	2009		2007	2008	2009
Gas Connections - Conventional							
AB - Foothills	73	85	97	0.950	70	81	92
AB - Foothills Front	1,840	1,906	2,178	1.020	1,672	1,944	2,222
AB - Southeast	4,068	4,108	4,178	1.100	4,475	4,519	4,596
AB - East Central	302	294	289	1.450	438	427	419
AB - Central	836	910	977	1.150	961	1,046	1,124
AB - Northeast	434	430	430	0.800	348	344	344
AB - Northwest	782	849	908	0.840	657	713	763
BC - Fort Nelson	615	716	819	0.900	553	644	737
BC - Fort St. John	151	177	204	0.870	132	154	177
BC - Foothills	56	65	74	0.750	42	49	56
SK - Central	180	185	191	1.000	180	185	191
SK - Southwest	850	859	875	1.030	876	885	901
Subtotal: Gas - Conventional	9,987	10,584	11,220		10,403	10,991	11,621
Gas Connections - CBM							
AB - Main HSC	1,344	1,526	1,711	0.950	1,277	1,450	1,625
AB - Mannville CBM	176	252	327	0.750	132	189	245
AB - Other CBM	112	128	143	0.600	67	77	86
Subtotal: Gas - CBM	1,633	1,906	2,181		1,476	1,715	1,957
<b>Total: All Gas</b>	<b>11,620</b>	<b>12,490</b>	<b>13,401</b>		<b>11,879</b>	<b>12,706</b>	<b>13,578</b>

### Scenario: High Case

Resource Grouping	Projected Annual Number of Wells Targeted to Resource Grouping			Connection Ratio	Projected Annual Number of Connections for Resource Grouping		
	2007	2008	2009		2007	2008	2009
Gas Connections - Conventional							
AB - Foothills	79	106	128	0.950	75	101	121
AB - Foothills Front	1,766	2,379	2,789	1.020	1,801	2,426	2,844
AB - Southeast	4,381	5,128	5,505	1.100	4,819	5,641	6,056
AB - East Central	325	367	380	1.450	472	532	551
AB - Central	900	1,136	1,259	1.150	1,035	1,306	1,448
AB - Northeast	468	537	568	0.800	374	430	455
AB - Northwest	842	1,059	1,176	0.840	707	890	988
BC - Fort Nelson	662	893	1,048	0.900	596	804	944
BC - Fort St. John	163	221	257	0.870	142	192	224
BC - Foothills	60	81	95	0.750	45	61	71
SK - Central	194	231	252	1.000	194	231	252
SK - Southwest	916	1,073	1,157	1.030	943	1,105	1,191
Subtotal: Gas - Conventional	10,756	13,212	14,613		11,203	13,720	15,144
Gas Connections - CBM							
AB - Main HSC	1,448	1,905	2,259	0.950	1,375	1,809	2,146
AB - Mannville CBM	190	315	411	0.750	142	236	308
AB - Other CBM	121	159	185	0.600	73	96	111
Subtotal: Gas - CBM	1,759	2,379	2,855		1,590	2,141	2,565
<b>Total: All Gas</b>	<b>12,514</b>	<b>15,591</b>	<b>17,469</b>		<b>12,793</b>	<b>15,861</b>	<b>17,710</b>

### Scenario: Low Case

Resource Grouping	Projected Annual Number of Wells Targeted to Resource Grouping			Connection Ratio	Projected Annual Number of Connections for Resource Grouping		
	2007	2008	2009		2007	2008	2009
Gas Connections - Conventional							
AB - Foothills	68	77	79	0.950	64	73	75
AB - Foothills Front	1,514	1,723	1,776	1.020	1,545	1,757	1,811
AB - Southeast	3,758	3,715	3,406	1.100	4,134	4,086	3,747
AB - East Central	279	266	235	1.450	405	386	341
AB - Central	772	823	797	1.150	888	946	916
AB - Northeast	401	389	350	0.800	321	311	280
AB - Northwest	722	767	740	0.840	607	645	622
BC - Fort Nelson	568	647	668	0.900	511	582	601
BC - Fort St. John	140	160	166	0.870	122	139	145
BC - Foothills	52	59	60	0.750	39	44	45
SK - Central	167	167	156	1.000	167	167	156
SK - Southwest	785	777	713	1.030	809	800	735
Subtotal: Gas - Conventional	9,226	9,570	9,147		9,610	9,938	9,474
Gas Connections - CBM							
AB - Main HSC	1,242	1,380	1,395	0.950	1,180	1,311	1,325
AB - Mannville CBM	163	228	267	0.750	122	171	200
AB - Other CBM	104	115	117	0.600	62	69	70
Subtotal: Gas - CBM	1,508	1,723	1,778		1,364	1,551	1,595
<b>Total: All Gas</b>	<b>10,734</b>	<b>11,293</b>	<b>10,925</b>		<b>10,974</b>	<b>11,489</b>	<b>11,069</b>

# APPENDIX D

## Deliverability Details for High and Low Case Scenarios

### Appendix D.1 – Deliverability Details for HIGH CASE SCENARIO

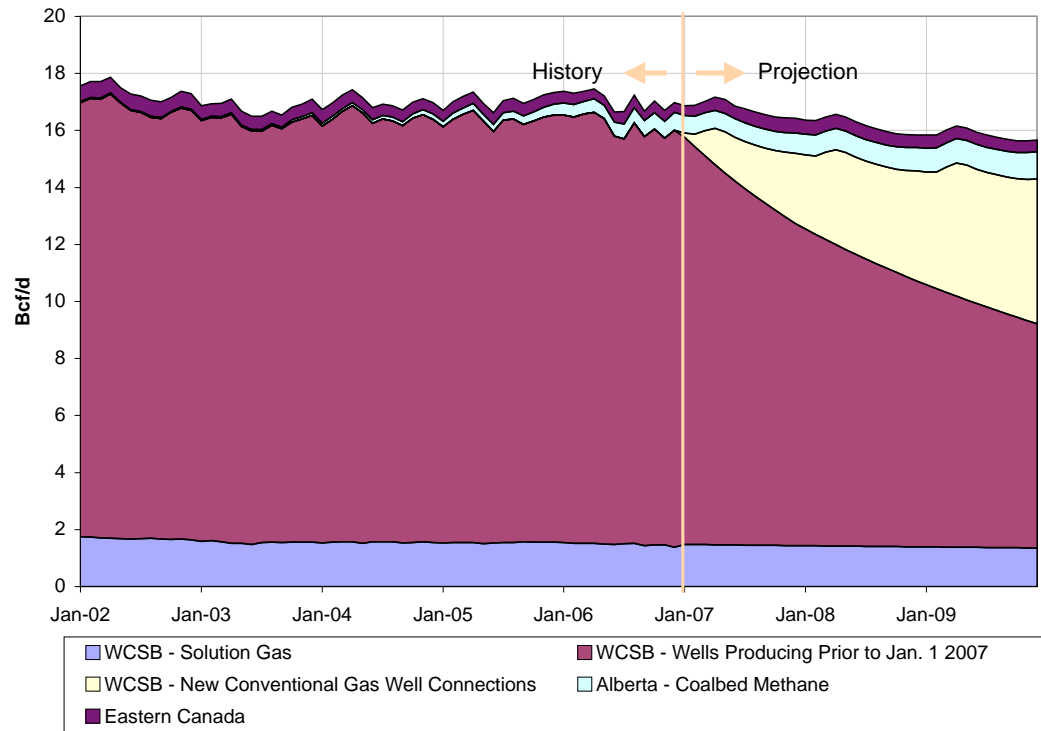
TABLE D.1

#### Canadian Gas Deliverability by Area/Resource - HIGH CASE

	Historical		Projected					
	2006		2007		2008		2009	
	10 <sup>6</sup> m <sup>3</sup> /d	MMcf/d	10 <sup>6</sup> m <sup>3</sup> /d	MMcf/d	10 <sup>6</sup> m <sup>3</sup> /d	MMcf/d	10 <sup>6</sup> m <sup>3</sup> /d	MMcf/d
Alberta - Foothills	22.37	790	22.81	805	23.07	814	23.61	833
Alberta - Foothills Front	131.20	4,631	131.45	4,640	129.73	4,580	130.55	4,608
Alberta - Southeast	74.75	2,639	71.61	2,528	67.94	2,398	64.66	2,283
Alberta - East Central	16.28	575	14.80	522	13.36	471	12.11	427
Alberta - Central	48.14	1,699	44.85	1,583	40.96	1,446	37.90	1,338
Alberta - Northeast	21.11	745	18.63	658	16.63	587	14.93	527
Alberta - Northwest	48.81	1,723	46.46	1,640	43.01	1,518	40.81	1,441
B.C. - Fort St. John	40.12	1,416	40.17	1,418	39.43	1,392	39.50	1,394
B.C. - Fort Nelson	21.92	774	20.23	714	18.40	650	17.33	612
B.C. - Foothills	12.15	429	12.76	450	12.71	448	12.90	455
Saskatchewan - Central	4.95	175	4.46	157	4.15	147	3.88	137
Saskatchewan - Southwest	14.63	516	13.29	469	12.50	441	11.76	415
Saskatchewan - Southeast	0.92	33	1.01	36	1.00	35	0.99	35
Yukon and Northwest Territories	0.77	27	0.67	24	0.61	21	0.55	19
<b>Total WCSB Conventional Gas</b>	<b>458.13</b>	<b>16,172</b>	<b>443.22</b>	<b>15,646</b>	<b>423.51</b>	<b>14,950</b>	<b>411.49</b>	<b>14,526</b>
Alberta CBM - HSC Main Play	12.62	445	15.66	553	17.39	614	19.20	678
Alberta CBM - Mannville	1.30	46	2.29	81	3.46	122	5.08	179
Alberta CBM - Other	0.58	21	0.66	23	0.65	23	0.70	25
<b>Total Alberta CBM</b>	<b>14.50</b>	<b>512</b>	<b>18.61</b>	<b>657</b>	<b>21.51</b>	<b>759</b>	<b>24.98</b>	<b>882</b>
<b>Total WCSB - All Gas</b>	<b>472.63</b>	<b>16,684</b>	<b>461.83</b>	<b>16,303</b>	<b>445.01</b>	<b>15,709</b>	<b>436.47</b>	<b>15,407</b>
Atlantic Canada	9.98	352	12.41	438	13.08	462	11.72	414
Other (Ontario and Quebec)	0.70	25	0.67	24	0.65	23	0.63	22
<b>Total Canada</b>	<b>483.31</b>	<b>17,061</b>	<b>474.91</b>	<b>16,764</b>	<b>458.74</b>	<b>16,193</b>	<b>448.82</b>	<b>15,843</b>

FIGURE D.1

**Outlook for Canadian Gas Deliverability – HIGH CASE SCENARIO**



## Appendix D.2 – Deliverability Details for LOW CASE SCENARIO

**TABLE D.2**

### Canadian Gas Deliverability by Area/Resource - LOW CASE

	Historical		Projected					
	2006		2007		2008		2009	
	10 <sup>6</sup> m <sup>3</sup> /d	MMcf/d	10 <sup>6</sup> m <sup>3</sup> /d	MMcf/d	10 <sup>6</sup> m <sup>3</sup> /d	MMcf/d	10 <sup>6</sup> m <sup>3</sup> /d	MMcf/d
Alberta - Foothills	22.37	790	22.49	794	22.02	777	21.44	757
Alberta - Foothills Front	131.20	4,631	129.45	4,570	129.07	4,344	117.53	4,149
Alberta - Southeast	74.75	2,639	7086	2,501	65.51	2,313	60.22	2,126
Alberta - East Central	16.28	575	14.70	519	13.05	461	11.59	409
Alberta - Central	48.14	1,699	44.45	1,569	39.72	1,402	35.75	1,262
Alberta - Northeast	21.11	745	18.46	652	16.19	571	14.19	501
Alberta - Northwest	48.81	1,723	45.74	1,614	41.00	1,447	37.28	1,316
B.C. - Fort St. John	40.12	1,416	39.29	1,387	36.81	1,299	34.63	1,222
B.C. - Fort Nelson	21.92	774	19.96	705	17.65	623	16.01	565
B.C. - Foothills	12.15	429	12.55	443	11.95	422	11.39	402
Saskatchewan - Central	4.95	175	4.41	156	4.00	141	3.61	128
Saskatchewan - Southwest	14.63	516	13.17	465	12.07	426	10.93	386
Saskatchewan - Southeast	0.92	33	1.01	36	1.00	35	0.99	35
Yukon and Northwest Territories	0.77	27	0.67	24	0.61	21	0.55	19
<b>Total WCSB Conventional Gas</b>	<b>458.13</b>	<b>16,172</b>	<b>437.21</b>	<b>15,433</b>	<b>404.65</b>	<b>14,284</b>	<b>376.10</b>	<b>13,276</b>
Alberta CBM - HSC Main Play	12.62	445	15.42	544	16.40	579	16.96	599
Alberta CBM - Mannville	1.30	46	2.22	78	3.07	108	4.07	144
Alberta CBM - Other	0.58	21	0.65	23	0.61	22	0.62	22
<b>Total Alberta CBM</b>	<b>14.50</b>	<b>512</b>	<b>18.29</b>	<b>646</b>	<b>20.08</b>	<b>709</b>	<b>21.65</b>	<b>764</b>
<b>Total WCSB - All Gas</b>	<b>472.63</b>	<b>16,684</b>	<b>455.50</b>	<b>16,079</b>	<b>424.73</b>	<b>14,993</b>	<b>397.75</b>	<b>14,041</b>
Atlantic Canada	9.98	352	12.41	438	13.08	462	11.72	414
Other (Ontario and Quebec)	0.70	25	0.67	24	0.65	23	0.63	22
<b>Total Canada</b>	<b>483.31</b>	<b>17,061</b>	<b>468.57</b>	<b>16,541</b>	<b>438.46</b>	<b>15,478</b>	<b>410.11</b>	<b>14,477</b>

FIGURE D.2

**Outlook for Canadian Gas Deliverability – LOW CASE SCENARIO**

