CHAPTER 3 - DESIGN FORECAST

3.1 Introduction

This Annual Plan is based on the June 2009 design forecast of gas receipts and deliveries, which in turn is based on supply and market assessments completed in May 2009.

The June 2009 design forecast comprises two principal parts. The first part is the gas delivery forecast (Sections 2.9.4.3 and 3.4), which is a forecast of the natural gas volumes to be delivered at all Delivery Points on the Alberta System. The second part is the receipt forecast, comprised of peak expected flow and average receipts forecasts (Sections 2.9.4.1, 2.9.4.2 and 3.5) for all Receipt Points on the Alberta System.

From a receipt perspective, the forecasts of average receipts and peak expected flow used in this Annual Plan are subject to uncertainties. Producer success in developing new supply, actual levels of new firm transportation Service Agreements and changes in market demand may result in deviations from forecast values. In addition, significant exploration activity focused on unconventional gas has resulted in an expectation of incremental volumes of shale and tight gas entering the Alberta System in the Peace River Project Area in the near future.

From a delivery perspective, the forecast of maximum day delivery at the Export Delivery Points as shown in Section 3.4.2 is equal to the forecast of Firm Transportation-Delivery ("FT-D") contracts at the Export Delivery Points and does not include Short Term Firm Transportation-Delivery ("STFT") or Firm Transportation-Delivery Winter ("FT-DW") contracts. Estimates of FT-D contracts at the Export Delivery Points have become difficult to forecast given the significant

gap between these contracts and the actual gas flows at the major Export Delivery Points, due to increasing use of short-term contracts.

An overview of the June 2009 design forecast was presented at the November 17, 2009 TTFP meeting. This chapter presents a detailed description of the June 2009 design forecast.

The June 2009 design forecast includes winter and summer seasonal forecasts of maximum, average, and minimum day delivery for all Delivery Points and an annual forecast of peak expected flow, and average receipts for all Receipt Points on the Alberta System.

Gas from Storage Facilities remains a significant source of winter supply. Currently connected Storage Facilities have a maximum receipt meter capacity of approximately 168.9 $10^6 m^3/d$ (5.96 Bcf/d). Actual maximum day receipts from storage will be dependent upon market conditions, storage working gas levels, storage compression power, and Alberta System operations. A discussion of the maximum day receipt meter capability associated with Storage Facilities is provided for information purposes in Section 3.6. Refer to Section 2.6.4 for further details on the treatment of storage in the system design.

3.2 Economic Assumptions

3.2.1 General Assumptions

Underlying the forecast of receipts and deliveries are assumptions concerning broader trends in the North American economy and energy markets. These assumptions, developed in January 2009 include:

- North American natural gas demand will slowly recover in the short-term as the U.S. and Canadian economies recover. Longer term, gas demand is expected to

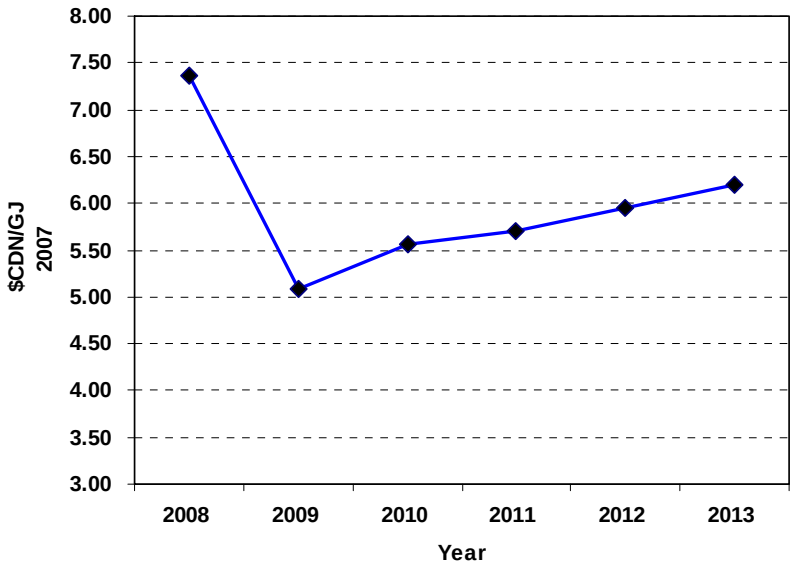
increase with continued economic and population growth in both the U.S. and Canada. U.S. gas demand growth will be predominantly in the electricity generation sector. Western Canadian industrial gas demand is expected to grow significantly, driven by development of the oil sands.

- The North American market will be well supplied with natural gas sourced from North America due to the strength in unconventional gas production, primarily shale gas in the U.S. and Canada. This strong domestic supply growth is now expected to be able to keep pace with the growth in gas demand, leaving a greatly reduced volume of imported LNG required to balance the continental market.
- It is expected that a NYMEX gas price level of $7.00/MMBtu in Real 2007 $US over the forecast period will be sufficient to encourage the development of the extensive unconventional gas resource and to provide adequate returns for the production of the large volumes of conventional gas that will still be required. NYMEX natural gas prices recover over the next few years as the economy and gas demand improve. Prices rise from a 2009 average of $US 5.50/MMBtu or $US 5.32/MMBtu in terms of real 2007 $US to $US 8.10/MMBtu or $US 7.00/MMBtu in real 2007 $US by 2015. This is a long-term equilibrium price that is expected to balance the continental gas market.

3.2.2 Gas Price

A gas price forecast is used to help assess North American gas supply and demand. The gas price represents an Alberta average field price at a point just prior to receipt onto the Alberta System. The gas price forecast, shown in Figure 3.2.2, was developed in January 2009 and reflects the general assumptions from Section 3.2.1.

Figure 3.2.2
NGTL Gas Price Forecast
Alberta Average Field Price (Alberta Reference Price)



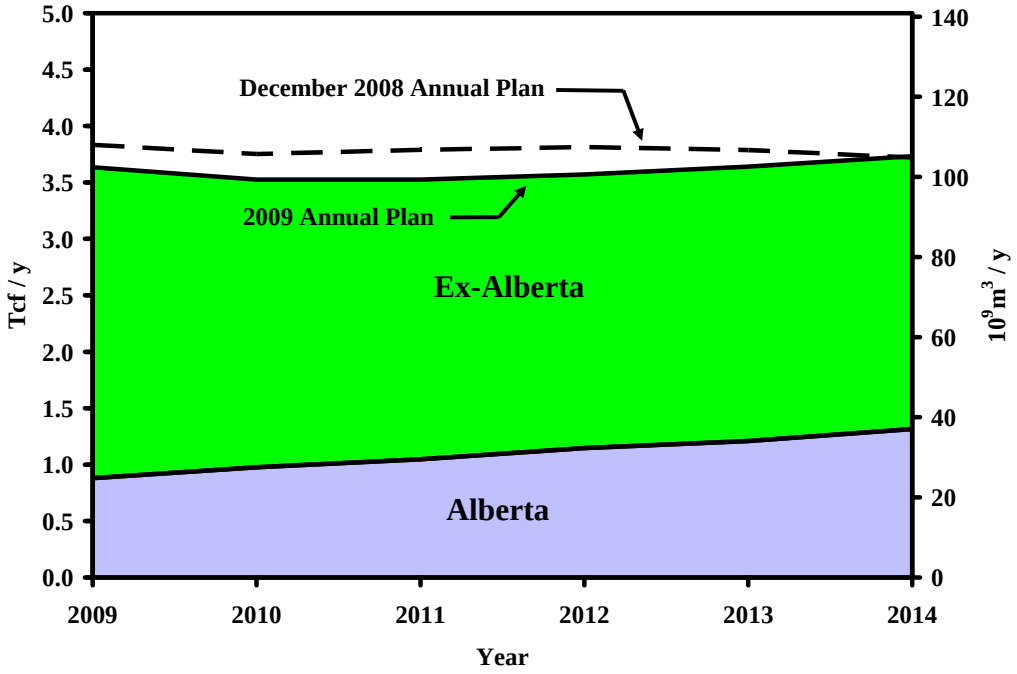
The Alberta average field price (in real 2007 $) is forecast to rise from $5.09 Cdn/GJ in 2009 to the long term equilibrium price of $6.55 Cdn/GJ by 2015.

The gas price forecast affects the receipt and delivery forecast, and is used as input into the economic analysis for new facilities. The level of the gas price affects anticipated producer activity to support continuing production from connected supplies, connection of unconnected reserves, and the activity required to discover and to develop new reserves.

3.3 System Annual Throughput

The forecast of system annual throughput is included for informational purposes. The system annual throughput forecast projects the total amount of gas to be transported on the Alberta System in future years and is shown in Figure 3.3.1.

Figure 3.3.1
System Annual Throughput



3.4 Gas Delivery Forecast

The gas delivery forecast describes one of the two principal components of the June 2009 design forecast. The second component, the receipt forecast, is described in Section 3.5. A breakdown of the system maximum day delivery forecast for both the winter and summer seasons of the Planning Period and by Export Delivery Point is provided in Tables 3.4.2.1 and 3.4.2.2.

3.4.1 System Maximum Day Delivery Forecast

The system maximum day delivery forecast projects aggregate maximum day delivery for the entire Alberta System in each of the winter and summer seasons for the 2009/10 through 2013/14 Gas Years. NGTL does not anticipate delivering the maximum day delivery at all Delivery Points simultaneously, although the maximum day delivery at individual Delivery Points may occur at some time during a season.

3.4.2 Export Delivery Points

The June 2009 design forecast of maximum day delivery at the Export Delivery Points is based on the assumption that it will not exceed the lesser of the capability of the downstream pipeline or the aggregate of firm transportation Service Agreements associated with those delivery points. For this Annual Plan, the forecasted aggregate level of firm transportation Service Agreements is the determining factor at every Export Delivery Point, which in some cases is zero.

Table 3.4.2.1
Winter System Maximum Day Delivery Forecast

	June 2009 Design Forecast				
Gas Year	**09/10**	**10/11**	**11/12**	**12/13**	**13/14**
(Volumes in $10^6 m^3/d$ at 101.325 kPa and 15°C)					
Empress	37.3	30.0	30.0	35.1	34.8
McNeill	14.2	12.7	12.7	13.4	13.4
Alberta/B.C.	62.7	61.2	27.0	23.1	23.2
Boundary Lake	0.0	0.0	0.0	0.0	0.0
Unity	0.0	0.0	0.0	0.0	0.0
Cold Lake	0.0	0.0	0.0	0.0	0.0
Gordondale	0.0	0.0	0.0	0.0	0.0
Alberta/Montana	1.8	2.3	2.3	2.3	2.3
Alberta	140.6	148.4	156.9	167.3	177.6
TOTAL SYSTEM	**256.7**	**254.6**	**228.9**	**241.2**	**251.3**
(Volumes in Bcf/d at 14.73 psia and 60°F)					
Empress	1.32	1.06	1.06	1.24	1.23
McNeill	0.50	0.45	0.45	0.47	0.47
Alberta/B.C.	2.21	2.16	0.95	0.82	0.82
Boundary Lake	0.00	0.00	0.00	0.00	0.00
Unity	0.00	0.00	0.00	0.00	0.00
Cold Lake	0.00	0.00	0.00	0.00	0.00
Gordondale	0.00	0.00	0.00	0.00	0.00
Alberta/Montana	0.07	0.08	0.08	0.08	0.08
Alberta	4.96	5.24	5.54	5.91	6.27
TOTAL SYSTEM	**9.06**	**8.99**	**8.08**	**8.6**	**8.87**

NOTES:
- Delivery volumes shown are not anticipated to occur simultaneously but may occur at some time during the winter season.
- Numbers may not add due to rounding.

Table 3.4.2.2
Summer System Maximum Day Delivery Forecast

	June 2009 Design Forecast				
Gas Year	**09/10**	**10/11**	**11/12**	**12/13**	**13/14**
(Volumes in $10^6 m^3/d$ at 101.325 kPa and 15°C)					
Empress	37.3	30.0	30.0	35.1	34.8
McNeill	12.7	12.7	12.7	13.4	13.4
Alberta/B.C.	62.2	61.2	27.0	23.1	23.2
Boundary Lake	0.0	0.0	0.0	0.0	0.0
Unity	0.0	0.0	0.0	0.0	0.0
Cold Lake	0.0	0.0	0.0	0.0	0.0
Gordondale	0.0	0.0	0.0	0.0	0.0
Alberta/Montana	1.4	2.3	2.3	2.3	2.3
Alberta	109.2	115.9	123.6	132.2	141.4
TOTAL SYSTEM	**222.9**	**222.1**	**195.7**	**206.1**	**215.1**
(Volumes in Bcf/d at 14.73 psia and 60°F)					
Empress	1.32	1.06	1.06	1.24	1.23
McNeill	0.45	0.45	0.45	0.47	0.47
Alberta/B.C.	2.20	2.16	0.95	0.82	0.82
Boundary Lake	0.00	0.00	0.00	0.00	0.00
Unity	0.00	0.00	0.00	0.00	0.00
Cold Lake	0.00	0.00	0.00	0.00	0.00
Gordondale	0.00	0.00	0.00	0.00	0.00
Alberta/Montana	0.05	0.08	0.08	0.08	0.08
Alberta	3.86	4.09	4.36	4.67	4.99
TOTAL SYSTEM	**7.87**	**7.84**	**6.91**	**7.28**	**7.59**

NOTES:
- Delivery volumes shown are not anticipated to occur simultaneously but may occur at some time during the summer season.
- Numbers may not add due to rounding.

3.4.3 Alberta Deliveries

Several sources of information were considered in developing the Alberta maximum day delivery forecast. First, operators of downstream facilities such as connecting pipelines and industrial plant operators were requested to provide a forecast of their maximum, average, and minimum requirements for deliveries from the Alberta System over the next ten years. The forecasts were analyzed and compared to historical flow patterns at the Alberta Delivery Points. In cases where NGTL's analysis differed substantially with the operator's forecast, NGTL contacted the

operator and either the operator's forecast was revised or NGTL adjusted its analysis. In cases where the operator did not provide a forecast, NGTL based its forecast on historical flows and growth rates for specific demand sectors.

A summary of the June 2009 design forecast winter and summer maximum day delivery for Alberta Deliveries by project area is provided in Tables 3.4.3.1 and 3.4.3.2, respectively.

Table 3.4.3.1
Winter Maximum Day Delivery Forecast

Project Area	June 2009 Design Forecast ($10^6 m^3/d$)	
	2009/10	**2010/11**
Peace River	6.7	6.8
North and East	75.4	81.2
Mainline	53.5	55.3
Gas taps	5.0	5.1
TOTAL ALBERTA	**140.6**	**148.4**
Project Area	**June 2009 Design Forecast (Bcf/d)**	
	2009/10	**2010/11**
Peace River	0.24	0.24
North and East	2.66	2.87
Mainline	1.89	1.95
Gas taps	0.18	0.18
TOTAL ALBERTA	**4.96**	**5.24**

NOTES:
- Numbers may not add due to rounding.
- Gas taps are located in all areas of the province.

Table 3.4.3.2

Summer Maximum Day Delivery Forecast

Project Area	June 2009 Design Forecast ($10^6m^3/d$)	
	2009/10	**2010/11**
Peace River	4.5	4.5
North and East	68.7	74.1
Mainline	33.6	35.0
Gas taps	2.3	2.4
TOTAL ALBERTA	**109.2**	**115.9**
Project Area	**June 2009 Design Forecast (Bcf/d)**	
	2009/10	**2010/11**
Peace River	0.16	0.16
North and East	2.43	2.61
Mainline	1.19	1.24
Gas taps	0.08	0.08
TOTAL ALBERTA	**3.86**	**4.09**

NOTES:
- Numbers may not add due to rounding.
- Gas taps are located in all areas of the province.

3.5 Receipt Forecast

The receipt forecast comprises the second principal part of the design forecast.

3.5.1 System Receipt Point Peak Expected Flow Forecast

In updating the Receipt Point peak expected flow for the June 2009 design forecast, three major sources of gas supply were included:

- Connected and Unconnected Reserves - supply from established conventional and unconventional reserves upstream of Receipt Points;
- Reserve Additions - supply from undiscovered resources, including conventional and unconventional resources (coalbed methane, tight gas, shale gas); and
- Interconnections - supply from interconnections with other pipeline systems.

Incremental supply from reserve additions and from the unconnected component of discovered reserves are expected to become available to offset declines in Receipt Point peak expected flow from connected established reserves as economics permit.

In aggregate, the Western Canada Sedimentary Basin ("WCSB") peak expected flow is expected to decrease slightly, and then recover over the forecast period based on the June 2009 design forecast.

Gas supplied from Storage Facilities has not been included in the data presented in this section. Information pertaining to gas supply from Storage is contained in Section 3.6.

Supply from reserve additions was forecast on an area basis, based on resource potential estimates from the Canadian Gas Potential Committee Report "Natural Gas Potential in Canada – 2005", and from expected delivery requirements. The supply from reserve additions was then allocated to each Receipt Point within the forecast area. The allocated supply from reserve additions was combined with the established supply forecast from connected gas and existing economic unconnected gas to provide a forecast of future peak expected flow at each Receipt Point.

3.5.2 System Average Receipts

The system average receipt forecast from the June 2009 design forecast is 272.6 $10^6 m^3/d$ (9.62 Bcf/d) in the 2010/11 Gas Year, which is a slight decrease from the previous year. A summary of system average receipts from the June 2009 design forecast by project area is shown in Table 3.5.2.

Table 3.5.2
System Average Receipts

	June 2009 Design Forecast ($10^6m^3/d$)				
Project Area	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**
Peace River	118.0	124.6	126.3	124.4	127.9
North and East	31.6	27.9	28.1	32.2	34.6
Mainline	124.1	120.0	119.3	122.0	124.0
TOTAL SYSTEM	273.7	272.6	273.7	278.5	286.5
	June 2009 Design Forecast (Bcf/d)				
Project Area	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**
Peace River	4.17	4.40	4.46	4.39	4.51
North and East	1.12	0.99	0.99	1.14	1.22
Mainline	4.38	4.24	4.21	4.30	4.38
TOTAL SYSTEM	9.66	9.62	9.66	9.83	10.11

NOTE:
- Numbers may not add due to rounding.

3.5.3 Established Natural Gas Reserves

Table 3.5.3.1 presents a summary of remaining established gas reserves in Alberta by project area as of October 2008, based on an assessment of available information. The Energy Resources Conservation Board ("ERCB") estimates 1093 10^9m^3 (38.6 Tcf) of CBM and conventional gas reserves at year end 2007. NGTL's estimate is based on the ERCB established reserves which existed at year end 2007 augmented by more recent data provided by customers and by additional reserves discovered as of October 2008. The reserves have been adjusted for production to October 2008.

NGTL's estimate of 1068 10^9m^3 (37.7 Tcf) remaining established gas reserves in Alberta is a decrease of about 23 10^9m^3 (0.8 Tcf), or 2.1 percent, from the 1091.1 10^9m^3 (38.5 Tcf) reported in the December 2008 Annual Plan.

Table 3.5.3.1
Remaining Established Alberta Gas Reserves by Project Area

Project Area	NGTL Estimate (10^9m^3)	NGTL Estimate (Tcf)
Peace River	234.8	8.3
North & East	156.0	5.5
Mainline	457.7	16.2
Other[1]	219.5	7.8
TOTAL[2]	**1068.0**	**37.7**

NOTES:
1 Reserves not directed to NGTL.
2 Numbers may not add due to rounding.

Table 3.5.3.2 presents the estimate of remaining established reserves. For British Columbia and the lower Northwest Territories, the estimate is limited to areas connected or likely to be connected to the Alberta System.

Table 3.5.3.2
Remaining Established Reserves

Reserve Basis	Alberta		B.C. and N.W.T.		Total	
	10^9m^3	Tcf	10^9m^3	Tcf	10^9m^3	Tcf
Remaining Established Reserves connected to the Alberta System [1,2]	848	30.0	141	5.0	989	34.9
Remaining Established Reserves not connected to the Alberta System [3,4,5]	220	7.8	-	-	220	7.8
TOTAL	**1068**	**37.7**	**141**	**5.0**	**1209**	**42.7**

NOTES:
1 The remaining established reserves are those connected and those expected to be connected to the Alberta System and include reserve estimates from NGTL initiated reserve studies.
2 Reserves not connected to the Alberta System are those which would be transported on other systems.
3 Only the estimates of B.C. reserves that are forecast to flow on the Alberta System are provided.
4 Numbers may not add due to rounding.
5 Does not include shale gas.

The history of supply growth in the WCSB is one of continually evolving drilling and completion technologies unlocking new sources of natural gas supply. Today this process is being applied to unconventional shale gas plays, primarily in north eastern British Columbia. It has been clearly demonstrated that the gas in place ("GIP") resource associated with these plays is large. Technology is in the early stages of demonstrating economic recovery of these resources (reserves). As a result, NGTL

has not included any reserves from shale gas plays in the above estimates, but recognizes the potential for these resources to make significant contributions to the WCSB deliverability in the future. Rapidly evolving technologies have the potential to significantly increase this contribution.

3.6 Storage Facilities

There are seven storage facilities presently connected to the Alberta System, as shown in Table 3.6.1, and one (Warwick Southeast Storage) currently under construction. They are located at the AECO 'C', Big Eddy, Carbon, Chancellor, Crossfield East #2, January Creek and Severn Creek Meter Stations (Figure 2.6.4.1). The total deliverability from Storage Facilities is significant when compared to the peak expected flow available from other Receipt Points on the Alberta System.

The receipt meter capacity for each of the connected Storage Facilities for the Planning Period is shown in Table 3.6.1.

Table 3.6.1
Receipt Capacity from Storage Facilities

	Receipt Meter Capacity from Storage Facilities 2010/11	
	$10^6m^3/d$	Bcf/d
AECO C	50.7	1.79
Big Eddy	35.4	1.25
Carbon	13.8	0.49
Chancellor	35.2	1.24
Crossfield East #2	14.1	0.50
January Creek	14.1	0.50
Severn Creek	5.6	0.20
Warwick Southeast	6.1	0.22
TOTAL	**175.0**	**6.18**

NOTES:
- Storage is presently considered as an interruptible supply source. Refer to Section 2.6.4 for details on the treatment of storage in the system design.
- Numbers may not add due to rounding.
- Warwick Southeast under construction