

CHAPTER 5 – MAINLINE FACILITY REQUIREMENTS**5.1 Introduction**

This chapter details the proposed natural gas transportation mainline facilities required to be in-service on the Alberta System to transport the design flow requirements and peak expected flows shown in Chapter 4 for the 2007/08 Gas Year. Included is information regarding size, routes, locations and cost estimates for the proposed facilities together with descriptions of the next best alternative facilities.

An overview of the facilities requirements for the 2007/08 Gas Year was presented at the TTFP meeting on November 21, 2006.

For the purpose of discussing facilities requirements and next best alternative facilities, the material in this chapter is divided into the design areas described in Section 2.3.

For each project area, the design capability is shown as a percentage of design flow requirements and peak expected flows to a maximum of 100%. In project areas where facilities are required, design capability is shown for each design area within the project area. In this Annual Plan, design capability is determined using the design flow requirements and peak expected flows with facilities that are currently in-service and the facilities that are being constructed for the 2006/07 Gas Year. The design capability with proposed facilities is based on the June 2006 design forecast for the 2007/08 Gas Year.

Where new facilities are proposed, a table comparing proposed facilities and next best alternative facilities has been included. Flow schematics, based on design flow requirements for each of the design areas, with and without the proposed facilities, are provided in Appendix 5.

5.2 System Optimization Update

As described in Section 2.8.1 of this Annual Plan, system optimization continues to be an integral part of the regular facility design review and planning to meet the system design flow requirements.

There are no facilities identified for retirement for the 2007/08 Gas Year resulting from the 2006 design review.

5.3 Peace River Project Area

The Peace River Project Area comprises the Peace River Design Area and the Marten Hills Design Area as described in Section 2.3.1. There are no additional facilities required to be placed in-service based on the June 2006 design forecast to transport the 2007/08 design flow requirements and peak expected flows shown in Sections 4.2.1.1 through 4.2.1.3 and 4.2.2 for the Peace River Project Area. Future facilities required beyond the 2007/08 Gas Year for the Northwest Mainline in the Peace River Project Area are described in Section 5.6.

Table 5.3.1 shows the design capability of existing facilities as a percentage of design flow requirements and peak expected flows.

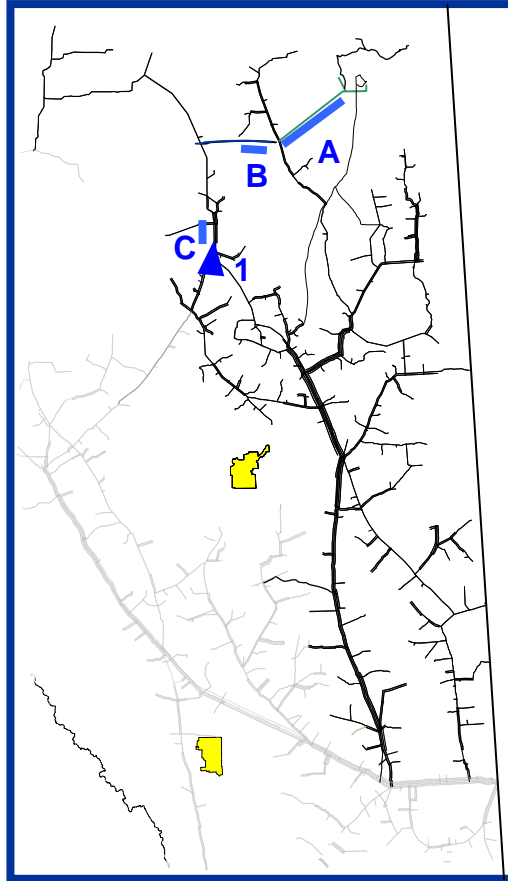
**Table 5.3.1
Peace River Project Area
June 2006 Design Forecast
Design Capability vs. Design Flow Requirements and Peak Expected Flows**

Gas Year and Season	Design Capability (% of Design Flow Requirements)	Design Capability (% of Peak Expected Flows)
2007/08 Winter	100	100
2007/08 Summer	100	100

5.4 North and East Project Area

The North and East Project Area comprises the North of Bens Lake Design Area and the South of Bens Lake Design Area as described in Section 2.3.2. The proposed facilities for the North and East Project Area are identified in Figure 5.4.1.

**Figure 5.4.1
North and East Project Area
Proposed Facilities**



**Table 5.4.1
North & East Project Area
Proposed Facilities**

Map Location	Proposed Facility	Description	Required In-Service Date	Capital Cost (\$Millions)	Facility Status
A	Fort McKay Mainline (Birchwood Section)	85 km NPS 36	April 2008	149.9	To Be Applied-for
B	North Central Corridor Loop (Buffalo Creek East Section)	28 km NPS 36	April 2008	51.7	To Be Applied-for
C	Marten Hills Lateral Loop #2 (McMullen Section)	34 km NPS 30	April 2008	52.5	To Be Applied-for
1	Paul Lake Compressor Station – Unit #2	15 MW	April 2008	27.7	To Be Applied-for
Capital Costs are in 2006 dollars and include AFUDC			TOTAL	281.8	

5.4.1 North of Bens Lake Design Area

In the North of Bens Lake Design Area, the facilities requirements are based on the flow through the area using the North of Bens Lake Design Area delivery assumption and the flow within the area using the North of Bens Lake maximum day delivery to the Fort McMurray area flow assumption as described in Section 2.6.1.2.

No additional facilities are required to be placed in-service based upon the June 2006 design forecast to transport the 2007/08 design flow requirements and peak expected flows, based on the flow through design area delivery assumption shown in Table 4.3.1.1 for the North of Bens Lake Design Area. Table 5.4.1.1 shows the design capability of existing facilities as a percentage of design flow requirements and peak expected flows.

**Table 5.4.1.1
North of Bens Lake Design Area
June 2006 Design Forecast
Design Capability vs. Design Flow Requirements and Peak Expected Flows**

Gas Year and Season	Design Capability (% of Design Flow Requirements)	Design Capability (% of Peak Expected Flows)
2007/08 Winter	100	100
2007/08 Summer	100	100

Additional facilities are required to be placed in-service based upon the June 2006 design forecast to transport the 2007/08 design flow requirements, based on the flow within the area design flow assumption, shown in Table 4.3.1.2 for the North of Bens Lake Design Area, maximum day delivery to the Fort McMurray area.

The Fort McKay Mainline (Birchwood Section) consisting of 85 km of NPS 36 pipeline, the North Central Corridor Loop (Buffalo Creek East Section) consisting of 28 km of NPS 36 pipeline, the Marten Hills Lateral Loop #2 (McMullen Section) consisting of 34 km of NPS 30 pipeline and an additional 15 MW of compression at

the Paul Lake Compressor Station are required to be placed in-service to meet the summer 2007/08 maximum day delivery to the Fort McMurray area. The summer 2007/08 in-service date is subject to the availability of the procurement of long lead time items and available labor required for construction in this heated market.

The next best alternative facilities are the Fort McKay Mainline (Birchwood Section) consisting of 85 km of NPS 30 pipeline, the North Central Corridor Loop (Buffalo Creek East Section) consisting of 28 km of NPS 30 pipeline, the Marten Hills Lateral Loop #2 (McMullen Section) consisting of 34 km of NPS 24 pipeline and an additional 15 MW of compression at the Paul Lake Compressor Station.

A comparison of the proposed facilities and the next best alternative facilities for the summer season of the 2007/08 Gas Year is shown in Table 5.4.1.2.

**Table 5.4.1.2
North and East Project Area
Facility Comparison for the 2007/08 Gas Year**

Proposed Facilities	Capital Cost (\$ millions)		CPVCOS ⁽¹⁾	km	NPS	MW
	First Year	Long Term				
Fort McKay Mainline (Birchwood Section)	149.9			85	36	
North Central Corridor Loop (Buffalo Creek East Section)	51.7			28	36	
Marten Hills Lateral Loop #2 (McMullen Section)	52.5			34	30	
Paul Lake Compressor Station Unit #2	27.7					15
Total	281.8	625.2	0.0	159		15
Alternative Facilities						
Fort McKay Mainline (Birchwood Section)	131.0			85	30	
North Central Corridor Loop (Buffalo Creek East Section)	43.8			28	30	
Marten Hills Lateral Loop #2 (McMullen Section)	41.2			34	24	
Paul Lake Compressor Station Unit #2	27.7					15
Total	243.7	638.4	+12.4	159		15

Note:

¹ CPVCOS is used as an economic tool for comparing design alternatives and is reported as a differential amount with zero being used as the reference point for the proposed facilities.

The proposed facilities were chosen over the next best alternative facilities because the cumulative present value cost of service is \$12.4 million lower than the alternative.

The installation of the proposed facilities will provide the design capability to transport 100% of forecasted North & East Project Area design flow requirements for the 2007/08 Gas Year as shown in Table 5.4.1.3.

**Table 5.4.1.3
North of Bens Lake Design Area
Maximum Day Delivery to the Fort McMurray Area June 2006 Design Forecast
Design Capability vs. Design Flow Requirements**

Gas Year and Season	Design Capability (% of Maximum Day Delivery)	Design Capability with Proposed Facilities (% of Maximum Day Delivery)
2007/08 Winter	100	100
2007/08 Summer	84	100

5.4.2 South of Bens Lake Design Area

No additional facilities are required to be placed in-service based upon the June 2006 design forecast to transport the 2007/08 design flow requirements and peak expected flows, shown in Section 4.3.2, for the South of Bens Lake Design Area.

Table 5.4.2 shows the design capability of existing facilities as a percentage of design flow requirements and peak expected flows.

**Table 5.4.2
South of Bens Lake Design Area
June 2006 Design Forecast
Design Capability vs. Design Flow Requirements and Peak Expected Flows**

Gas Year and Season	Design Capability (% of Design Flow Requirements)	Design Capability (% of Peak Expected Flows)
2007/08 Winter	100	100
2007/08 Summer	100	100

5.5 Mainline Project Area

The Mainline Project Area comprises the Mainline Design Area, the Rimbey-Nevis Design Area, the South and Alderson Design Area and the Medicine Hat Design Area as described in Section 2.3.3. The Mainline Design Area comprises four design sub areas: the Edson Mainline Design Sub Area; the Eastern Alberta Mainline Design Sub Area (James River to Princess); the Eastern Alberta Mainline Design Sub Area (Princess to Empress/McNeill); and the Western Alberta Mainline Design Sub Area.

There are no additional facilities required to be placed in-service based upon the June 2006 design forecast to transport the 2007/08 design flow requirements and peak expected flows shown in Sections 4.4.1.1, 4.4.2 and 4.4.3 for the Edson Mainline Design Sub Area, the Rimbey-Nevis Design Area and the South and Alderson Design Area.

Table 5.5.1.1 shows the design capability of existing facilities as a percentage of design flow requirements and peak expected flows in the Edson Mainline Design Sub Area, the Rimbey-Nevis Design Area, and the South and Alderson Design Area.

**Table 5.5.1.1
Edson Mainline Design Sub Area,
Rimbey-Nevis Design Area, and
South and Alderson Design Area
June 2006 Design Forecast
Design Capability vs. Design Flow Requirements and Peak Expected Flows**

Gas Year and Season	Design Capability (% of Design Flow Requirements)	Design Capability (% of Peak Expected Flows)
2007/08 Winter	100	100
2007/08 Summer	100	100

There are no additional facilities required to be placed in-service based upon the June 2006 design forecast to transport the 2007/08 design flow requirements shown in Sections 4.4.1.2, 4.4.1.3, 4.4.1.4 and 4.4.4 for the Eastern Alberta Mainline Design

Sub Area (James River to Princess), the Eastern Alberta Mainline Design Sub Area (Princess to Empress/McNeill), the Western Alberta Mainline Design Sub Area and the Medicine Hat Design Area.

Table 5.5.1.2 shows the design capability of existing facilities as a percentage of design flow requirements for the Eastern Alberta Mainline Design Sub Area (James River to Princess), the Eastern Alberta Mainline Design Sub Area (Princess to Empress/McNeill), the Western Alberta Mainline Design Sub Area and the Medicine Hat Design Area.

**Table 5.5.1.2
June 2006 Design Forecast
Eastern Alberta Mainline Design Sub Area (James River to Princess),
Eastern Alberta Mainline Design Sub Area (Princess to Empress/McNeill),
Western Alberta Mainline Design Sub Area
Medicine Hat Design Area
Design Capability vs. Design Flow Requirements**

Gas Year and Season	Design Capability (% of Design Flow Requirements)
2007/08 Winter	100
2007/08 Summer	100

5.6 Future Facilities

The status of the proposed future facilities on the Northwest Mainline is described in Section 5.6.1.

The North Central Corridor (“NCC”) concept is described in Section 5.6.2.

5.6.1 Northwest Mainline

NGTL identified the future Northwest Mainline (Dickins Lake Section) and the Northwest Mainline Loop (Vardie River Section) facilities in the December 2004 and 2005 Annual Plans. These proposed facilities are required on the Alberta System to

connect the proposed Mackenzie Valley pipeline. NGTL submitted a facilities application to the EUB in June 2006. The construction of the facilities, as filed, is proposed to begin in December 2010 with an on-stream date which aligns with the proposed completion of the Mackenzie Valley Pipeline in April 2011.

5.6.2 North Central Corridor

The NCC, as described in the December 1999 Annual Plan, remains the preferred facilities to meet system-wide receipt and delivery requirements. The NCC meets all of the following needs:

- Addresses the growth in Alberta deliveries in the North of Bens Lake Design Area;
- Establishes a plan to ensure the long term utilization of existing facilities in the North and East Project Area which enhances NGTL's delivery capability at the Empress and McNeill Export Delivery Points and therefore maximizes the flexibility of the system to deliver to a variety of Alberta Delivery Points and Export Delivery Points; and
- Transports the future growth in FS productive capability from the Peace River Project Area to the North and East Project Area, reducing the requirement for facilities that would otherwise be necessary in and downstream of the Peace River Project Area.

When compared to the evaluated alternatives, the NCC will reduce the overall distance of gas transportation in the Alberta System, which significantly lowers fuel consumption.

The NCC accommodates the growing maximum day delivery in the North of Bens Lake Design Area while accounting for declining FS productive capability in the

North & East Project Area. In 2006, NGTL executed long term transportation contracts with several of the oil sands and heavy oil developers in the North of Bens Lake Design Area including new projects in the Fort McMurray and the Kirby area. As the maximum day delivery continues to grow and FS productive capability continues to decline in the North of Bens Lake Design Area, significant additional facilities will be required for the summer season of the 2009/10 Gas Year. Since 2004, NGTL has made low cost modifications to existing compressor stations on the North Lateral to transport gas northward. By the summer season of the 2009/10 Gas Year, the low cost modifications to existing compressor stations will be completed, and pipeline looping projects would be required on the North Lateral to transport gas northward. The NCC is a more cost-effective alternative which replaces the need for the North Lateral pipeline looping projects.

The NCC ensures the long term utilization of existing facilities in the North and East Project Area which also enhances NGTL's delivery capability at the Empress and McNeill Export Delivery Points. The combination of increasing maximum day delivery and decreasing FS productive capability in the North & East Project Area has resulted in the decreased flow from the North & East Project Area at the Princess Compressor Station to the Eastern Alberta Mainline. The NCC will transport FS productive capability to the North & East Project Area which will directly enhance NGTL's delivery capability at the Empress and McNeill Export Delivery Points.

The NCC accommodates the future aggregate growth in FS productive capability in the Peace River Project Area which is forecast to increase beyond the capability of existing facilities. Additional pipeline loops will be required in the Peace River Project Area south of the Hidden Lake Compressor Station to transport incremental FS productive capability south to the Export Delivery Points. The NCC provides a more cost-effective alternative which eliminates the need for looping south of the Hidden Lake Compressor Station.

In the 2006 design review, NGTL evaluated several facility platforms to address the increasing maximum day delivery in the North of Bens Lake Design Area, maintaining/enhancing capability at the Empress and McNeill Export Delivery Points and the growth in FS productive capability in the Peace River Project Area. NGTL determined the NCC continues to be the most economic facility to accommodate all three integrated system requirements. The NCC eliminates the requirement for additional facilities in the South of Bens Lake Design Area and the Peace River Project Area, as well as reduces overall system fuel requirements by reducing the distance of haul to transport gas.

The NCC is currently proposed to be on-stream April 2010 and consists of 285 km of NPS 42 pipeline from the Meikle River Compressor Station located in the Upper Peace River Design Sub Area to the Woodenhouse Compressor Station located in the North of Bens Lake Design Area and two additional 15 MW compressor units at the Meikle River Compressor Station.

The NCC was chosen because the CPVCOS is \$550 million lower than the next best alternative. The next best alternative (South Corridor) consists of 390 km of NPS 36 pipeline from the Latornell Compressor Station located in the Lower Peace River Design Sub Area to the Bens Lake Compressor Station located in the North & East Project Area and two additional 15 MW compressor units at the Latornell Compressor Station.

A comparison of the proposed facilities and the next best alternative facilities for the summer season of the 2009/10 Gas Year is shown in Table 5.6.2.1.

Table 5.6.2.1
North Central Corridor

Proposed Facilities	Capital Cost (\$ millions) ⁽²⁾		CPVCOS ₍₁₎	km	NPS	MW
	First Year	Long Term				
North Central Corridor	478.0			285	42	
Meikle River Compressor Station Units 4 & 5	46.0					30
Total	524.0	674.0	0.0	285		30
Alternative Facilities						
South Corridor	507.0			390	36	
Latornell Compressor Station Units 2 & 3	46.0					30
Total	553.0	1346.0	+550.0	390		30

Notes:

- 1 CPVCOS is used as an economic tool for comparing design alternatives and is reported as a differential amount with zero being used as the reference point for the proposed facilities.
- 2 Capital costs are in 2006 dollars.

The NCC is being presented in this Annual Plan due to the lead time required for public involvement, land and environmental survey, route selection, and the long lead time required for materials to enable an April 2010 on-stream date.