

HISTORY OF NATURAL GAS SUPPLY IN THE GTA

1. The purpose of this evidence is to provide an explanation of the evolution of the XHP and HP infrastructure supplying the GTA and to assist in understanding the location, function, and reliance on these important assets. XHP pipelines carry the most capacity in the distribution network as a result of their higher pressures. The various pressure classes are further described in Exhibit A, Tab 3, Schedule 3.
2. Enbridge has been delivering energy in the GTA for over 160 years. From its start in 1848 until 1954 Enbridge distributed manufactured (coal) gas to its customers. Prior to the introduction of natural gas to Toronto in 1954, manufactured gas was delivered through Low Pressure (“LP”) cast iron mains, later augmented with Medium Pressure (“MP”) mains, originating at two gas manufacturing plants, Station “A” at Front and Parliament Streets and Station “B” at Eastern and Booth Avenues to the east of downtown Toronto.
3. Currently, Enbridge has a very high penetration rate in the areas it serves and its customers are largely temperature sensitive.
4. More than half of Enbridge’s customers reside in the GTA and are served off a single integrated network described in the rest of this section. The evolution of the XHP and HP infrastructure supplying the GTA was driven by customer growth, collaboration with Enbridge’s upstream suppliers on supply and optimal use of existing infrastructure, as well as the prudent planning and management of its distribution system.
5. In the early 1950’s, the Tennessee Gas Pipeline began delivering natural gas to the Buffalo, New York area. By the end of 1954 this natural gas transmission line had

been extended across the Niagara River to Mississauga, the western border of the Company's GTA franchise area. This line was owned by Western Pipelines, a predecessor of TransCanada Pipelines Limited ("TransCanada"), and leased to Niagara Gas Transmission Company. Enbridge took the first deliveries of natural gas at Sheridan Gate Station, the Company's first gate station, located near the intersection of Winston Churchill Boulevard and Sheridan Park Drive.

6. In order to supply the core distribution area in Toronto, natural gas had to be transported from Sheridan Gate Station to Stations "A" and "B". This was facilitated through the construction of a NPS 20 pipeline along Lakeshore Boulevard in 1954 as shown in Attachment, Figure 1. The distribution system was converted from manufactured gas to natural gas by 1955 and the TransCanada line (Western Pipelines) remained the only source of natural gas supply until the end of 1958.
7. By the end of 1958 TransCanada had completed the construction of its transmission pipeline (the "Mainline") from Empress, Alberta to Toronto and Montreal. Enbridge took its first deliveries of Western Canadian natural gas from the TransCanada Mainline at an interconnection at Sheridan Gate Station.
8. In the same year, Union Gas Limited ("Union Gas") had also completed the construction of the 229 km NPS 26 Trafalgar Line between Dawn and the Trafalgar Compressor Station, located just west of Toronto in Mississauga. This new line provided Union Gas with a connection both to TransCanada and to Enbridge through its newly constructed Lisgar Gate Station, located near Winston Churchill Boulevard and Derry Road in Mississauga. This line facilitated upstream access to the Union Gas "Dawn Hub", which provided gas supply from numerous supply basins, such as those located in Western Canada, and the lower 48 states. In addition, Union Gas' Dawn to Trafalgar Line also facilitated the use of natural gas

storage facilities for load balancing purposes. Natural gas was delivered to underground storage pools near Sarnia when not required during summer months and drawn upon in winter months to meet seasonal and peak day demands.

9. Union Gas had been developing underground storage pools since the 1940's, and in 1958, Enbridge entered into its own storage development. Tecumseh Gas Storage Limited, a jointly owned subsidiary of Imperial Oil Limited and Enbridge, began operating gas storage pools also in Sarnia. To better utilize its storage gas facilities, Enbridge constructed a NPS 20 pipeline linking Lisgar with Sheridan Gate Station. This facilitated the delivery of storage supplies to the NPS 20 pipeline along Lakeshore Boulevard which was the major source of supply into Toronto until 1961. This location of this pipeline and the natural gas infrastructure by the end of 1958 is shown in Attachment, Figure 2.
10. As a result of the abundance of deliveries from Western Canada, contracts importing natural gas from United States through the Tennessee Gas Pipeline were terminated and the flow in the Tennessee Gas Pipeline was reversed. Gas supply contracts were initiated to export natural gas to the United States.
11. In 1959, Markham Gate Station became the second interconnection with TransCanada's Mainline. This station, located near 9th Line and Elgin Mills Road East in Markham, was constructed to bring gas supply into the Scarborough area via a new NPS 16 pipeline constructed the same year.
12. In the early 1960's, the first phase of a NPS 30 pipeline system was constructed along Derry Road from Lisgar Gate Station toward the then northern perimeter of the Toronto market area. The pipeline continued past Albion Road Station towards

Highway 400. This system could move large quantities of gas at higher pressures across the top of the urban area to feed into the distribution system at key locations.

13. By 1967, a subsequent construction phase extended the NPS 30 pipeline from the northern perimeter of Toronto to Vaughan, and then a NPS 26 pipeline was continued further east to Markham as shown in Attachment, Figure 3. The NPS 26 would eventually tie into the NPS 30 Don Valley pipeline described in the next paragraph.
14. In 1971, a NPS 30 pipeline was constructed to bring natural gas supply from Victoria Square Gate Station, located near Woodbine Avenue and 19th Avenue in Markham, south to Station B in downtown Toronto. This pipeline is known as the “Don Valley” pipeline since it runs parallel to the Don Valley Parkway in sections of its route. The major pipeline infrastructure in 1971 is shown in Attachment, Figure 4. The pipeline was constructed predominantly in the Ontario Hydro corridor and was originally installed to serve the R.L. Hearn Generating Station, Canada’s first steam turbo-generator. Since its commissioning in 1951, the R.L. Hearn Generating Station was a coal powered facility until it was converted to natural gas in 1971. The gas demand required by the Hearn facility and customer growth necessitated the additional capacity offered by the Don Valley pipeline. The pipeline commissioning effectively completed the first Extra High Pressure (“XHP”) loop around the GTA and thus became a critical source of supply for the distribution system.
15. By 1977, the distribution facilities supplying gas from west to east had reached capacity. Downstream takeaway capacity from Lisgar Gate Station in Mississauga was limited relative to total receipts from Union Gas. Rather than install additional facilities, Enbridge entered into an agreement with Union Gas and TransCanada to have a portion of the Company’s storage volumes compressed by Union Gas and

injected into TransCanada's system for transportation. An equivalent volume would then be delivered by TransCanada to Enbridge at the recently built Victoria Square Gate Station in Markham. The agreements with Union Gas and TransCanada are collectively known as Storage Transportation Service ("STS"). This arrangement made use of the excess capacity that existed at the time on both Union Gas' and TransCanada's systems and allowed Enbridge to postpone the reinforcement of its major facilities. Attachment, Figure 5 shows the transportation route of the natural gas purchased from Union Gas, transported along TransCanada's infrastructure, and delivered to the Enbridge franchise via Victoria Square Gate Station. The figure represents the STS path in 1977. Today, the STS path begins at Parkway Gate Station, a facility that is described in Paragraph 20 below, and has delivery points across the Enbridge franchise areas.

16. Through the late 1970's and early 1980's, the distribution system continued to operate at capacity, hence Enbridge contracted for additional STS volumes to offset the capacity shortfall. Since the original agreement, the contracted STS volumes required each year varied based on customer growth and capacity expansion through continued XHP system reinforcement.
17. The R.L. Hearn Generating Station was decommissioned in 1983 and the capacity in the Don Valley pipeline was used to supply customer growth in the City of Toronto and surrounding area over the next few decades.
18. In the mid-1980's, as the distribution system continued to expand to meet customer growth of the GTA, it was no longer feasible to reinforce the areas with short sections of HP pipe due to constraints on the XHP system. Lisgar Gate Station, originally located in a rural area, became encroached by urban development and was unable to meet the continued demand due to its limited capacity and

undesirable location for expansion. In addition, Enbridge faced a shortfall in STS availability from Union Gas. Enbridge had relied on the surplus capacity and contracted STS on a short-term basis, but was now forced to seek a long-term solution.

19. The long term solution was to create a new entry point and associated XHP delivery infrastructure rather than increasing reliance on Lisgar Gate Station. The solution consisted of constructing two new XHP pipeline paths, one towards the northern area of the GTA and the other towards the southern area, and a new supply point (or exchange point for STS). The proposed infrastructure satisfied the overall system requirements of enhancing distribution capacity and security of supply. The additional supply point was placed in the area of the existing Union Gas and TransCanada pipeline infrastructure near Derry Road and 9th Line in Mississauga (today known as Parkway Gate Station) since no other location in the distribution area could achieve the same system benefits. Due to the magnitude of the northern reinforcement, the project was managed in phases, and therefore, the additional supply point and pipeline reinforcement became part of a broader project known as the "Parkway Belt". Through this phased approach, the project could be evaluated, managed, and timed to meet distribution system upstream and downstream requirements.
20. In 1986, Parkway Phase 1 commenced construction of Parkway Gate Station and a NPS 36 XHP pipeline. This NPS 36 pipeline runs east along the then northern perimeter of the GTA primarily through the designated Parkway Belt utility corridor to the new Albion Road Station located at Highway 427 and Albion Road. Upon completion of Phase 1, Parkway Gate Station became the third major natural gas supply source to the GTA.

21. In 1990, Parkway Phase 2 commenced construction of a NPS 36 XHP pipeline from Albion Road Station further east along the same designated Parkway Belt utility corridor to the new Keele/CNR Station located near Keele Street and Steeles Avenue West. The major XHP pressure distribution pipelines as they existed in 1991 are shown in Attachment, Figure 6.
22. In 1991, construction commenced on the MSL pipeline, which consisted of approximately 23 km NPS 36 XHP main and 5 km NPS 24 XHP main. The NPS 36 XHP MSL pipeline parallels the existing Highway 407 to Highway 403, and then parallels Highway 403 to just west of Etobicoke Creek at a valve compound near Audubon Boulevard. A NPS 24 XHP pipeline then travels south and terminates at West Mall Station near the Queensway and the West Mall. The MSL was required to meet customer growth and concerns with security of supply.
23. In 1992, construction began on further southern reinforcement through installation of NPS 24 XHP and NPS 30 HP pipelines and related facilities. The NPS 24 XHP pipeline extended from the valve site near Audubon Boulevard in Mississauga to Martin Grove Station near Martin Grove Road and Eglinton Avenue in Etobicoke. The NPS 30 HP pipeline was constructed from the new Martin Grove Station in Etobicoke to an existing NPS 24 HP line near the intersection of Harvie Avenue and St. Clair Avenue West in the City of Toronto. This project was known as the Metro West Reinforcement project which was required to meet the gas demand requirements for customer growth during the 1993 to 2012 timeframe in the Toronto and surrounding area.
24. In 1993, the Company initiated planning on the Parkway Phase 3 to construct a NPS 36 XHP pipeline from the Keele/CNR Station to the existing NPS 30 XHP Don Valley line. Following the additional procurement of STS capacity and the introduction of

the first Demand Side Management program in 1995, further system reinforcement through Parkway Belt Phase 3 was postponed. The Parkway Phase 3 was again contemplated in the 2007 Rate Case; however, the Company was successful in procuring additional Firm Transportation capacity from Parkway to Central Distribution Area (“CDA”) on the TransCanada system. Consequently, the project was again postponed.

25. In 2008, a natural gas fired power plant, Portlands Energy Centre (“PEC”), was constructed east of downtown Toronto to meet the increasing electricity demands of Ontario. NPS 36 and NPS 20 XHP reinforcement pipelines were constructed to match the incremental capacity required by the plant. The NPS 36 XHP was installed through the existing Hydro corridor paralleling Victoria Park Avenue from just north of Sheppard Avenue in Scarborough to Jonesville Station, just north of Eglinton Avenue East, in Toronto. The NPS 20 XHP was constructed from Station B near the intersection Eastern Avenue and Broadview Avenue and ran to the plant’s location.

26. The major pipeline infrastructure supplying the GTA and the corresponding decade of installation is shown in Attachment, Figure 7.

27. Enbridge has not had a major upgrade specific to the GTA Project Influence Area to support demand growth and reliability for 20 years and in that time the number of customers in the Enbridge franchise has almost doubled from 1.1 million (1992) to 2.0 million (2012) customers, with almost half of the existing customers in the area supplied by the GTA Project Influence Area. The GTA Project Influence Area is projected to surpass supplying 1.0 million customers within this area in 2014. The high rate of customer growth and intensification of customers within the GTA has resulted in almost half of Enbridge’s customers residing within GTA Project Influence

Area and served off the integrated XHP network described in this section. The GTA Project Influence Area is described in Exhibit A, Tab 3, Schedule 4.

28. The peak day natural gas flow through Enbridge's GTA XHP system exceeds 2.4 PJ¹, which on an hourly basis is equivalent to 95%² of highest electrical generation output ever achieved in the province of Ontario. The continued reliability of the GTA system is of primary importance given the reliance on natural gas, the large number of customers served on a single integrated network, and the manual restoration process associated with outages in natural gas networks.
29. The GTA is expected to experience continued growth and intensification. This proposed project is the next development in the continued evolution of the Company's distribution system. Further information is provided in the subsequent Schedules.

¹ Based on peak day actual flow through Enbridge's XHP system supplying the GTA Project Influence Area.

² Record Peak in Ontario based on the Independent Electricity System Operator ("IESO") website (http://www.ieso.ca/imoweb/siteShared/demand_price.asp?sid=ic). 1 GJ is equivalent to 0.28 MW hours of electricity based on the National Energy Board's website (<http://www.neb.gc.ca/clf-nsi/rnrgynfmtn/sttstc/nrgycnvrntbl/nrgycnvrntbl-eng.html>).