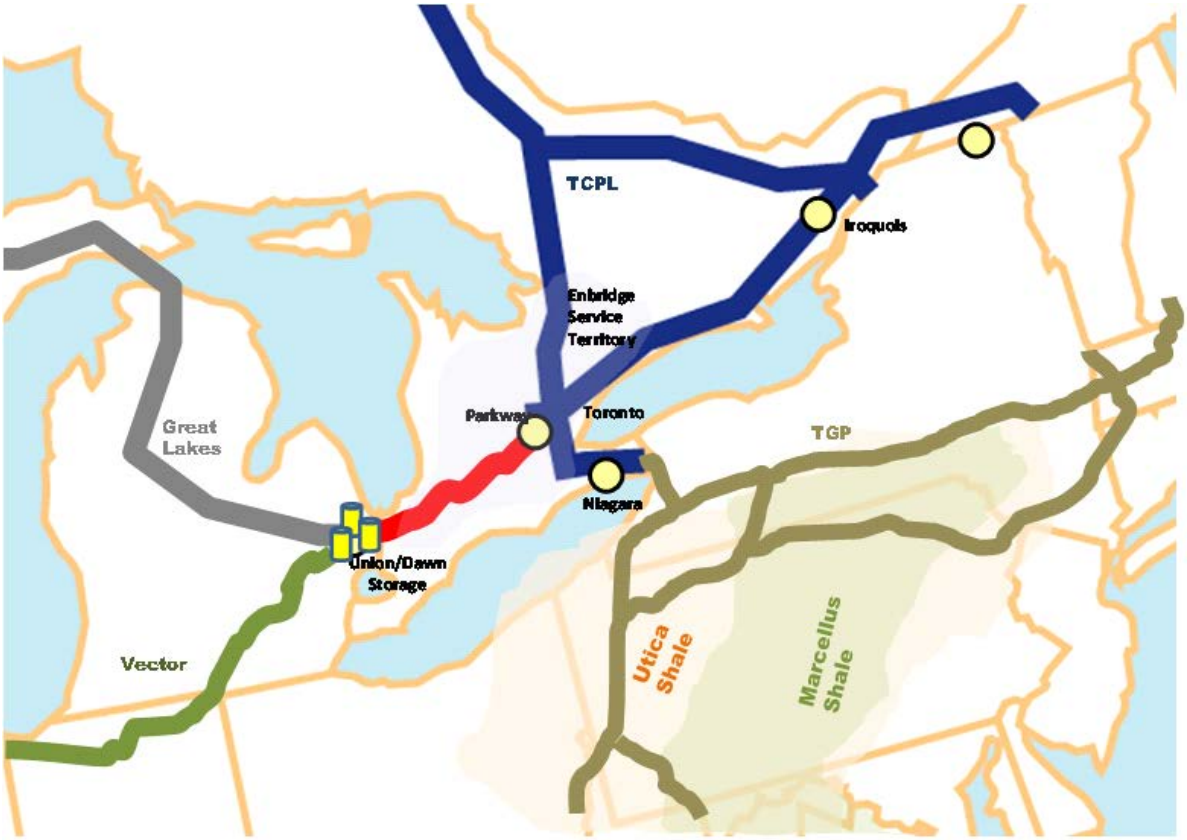
OPERATION AND LIMITATIONS OF EXISTING FACILITIES

1. The purpose of this evidence is to describe current operations and the inherent operational challenges the Company faces to ensure the continued safe and reliable delivery of natural gas without system reinforcement. These challenges relate to:
    - the Company's ability to continue to attach customers and maintain the reliable delivery of gas to its firm customers;
    - the Company's ability to address operational risks and constraints associated with distribution system and gas supply entry points; and,
    - the Company's ability to source and or take deliveries from new and emerging supply basins to the benefit of customers.

Current Operations

2. Enbridge currently procures natural gas from Western Canada, Chicago and Dawn. The supplies are ultimately transported to Enbridge's franchise area by TransCanada's Mainline and/or Union Gas' Dawn to Parkway system and delivered to one of the Company's gate stations. A map of the upstream supply system is shown in Figure 1.

Figure 1: Map of Upstream Supply System – Current and Potential Supply Paths



3. Gate stations interconnect to TransCanada and Union Gas transmission pipelines and supply the downstream XHP and HP distribution systems. Once in the distribution system, downstream XHP distribution pipelines move large volumes of gas from gate stations to key points across the system for further distribution. These key points are localized district stations where pressure is regulated down for distribution on the HP and lower pressure networks for ultimate delivery to

customers[1]. A few industrial customers such as large power generation facilities are served directly from the XHP system due to their pressure requirements.

4. The XHP distribution network consists of 221 km of large diameter XHP mains (NPS 24 or larger). Figure 1 shows a map of XHP and HP pipelines within the GTA. For reference, this map shows XHP and HP mains between NPS 16 to 36 in diameter. Station B is one of 11 large district stations in the GTA and is the furthest from a gate station or interconnections with upstream supply. It delivers XHP to PEC and HP gas to the downtown Toronto core and surrounding area, which further supplies the extensive IP network. For these reasons, Station B often experiences the lowest system pressures in the XHP network.

5. The XHP distribution system is the highest pressure class. It is considered to be the backbone of the distribution system since it brings supply to the thousands of kilometres of lower pressure mains in the system, much like the highways feed arterial roads and city streets. Adequate capacity in the XHP network is a prerequisite for maintaining minimum system pressures throughout the other pressure classes. Therefore, this pressure class will be the primary focus of this evidence.

6. The XHP distribution system in the GTA is predominantly fed by four gate stations: Parkway, Victoria Square, Lisgar, and Markham Gate Stations.
    - Parkway Gate Station is the largest gate station. It is primarily supplied by Union Gas' Dawn to Parkway transport system, but has some capability to be

[1] For reference, Enbridge defines its pressure classes with operating pressures as follows: XHP – above 1200 kPa (175 psig); HP – 450 to 1200 kPa (65 to 175 psig); Higher Pressure Polyethylene ("HPPE") –140 to 690 kPa (20 to 100 psig); Intermediate Pressure ("IP") – 70 to 440 kPa (10 psig to 64 psig); Medium Pressure ("MP") – 20 to 80 kPa (3 to 12 psig); and, Low Pressure, Regulated ("LP") – 3.5 to 14 kPa (0.5 to 2.0 psi).

fed by TransCanada. Parkway supplies the GTA system from the west via two NPS 36 XHP pipelines, the northern Parkway North pipeline and the southern Mississauga Southern Link ("MSL") pipeline[2].

- Victoria Square Gate Station is the second largest gate station. It is supplied solely by TransCanada. Victoria Square provides supplies to the GTA from the north via the NPS 30 XHP Don Valley pipeline[3]. The Don Valley pipeline is the only supply of XHP gas to the downtown core and is the only pipeline that currently has a pressure rating capable of serving PEC.

- Lisgar Gate Station is the oldest operating gate station in the GTA. Lisgar operates as a gate station in the winter and as a district station during the rest of the year. It is solely supplied by Union Gas during winter demand conditions and supplies the downstream system from the west via NPS 30 XHP, NPS 24 XHP, NPS 20 HP pipelines[4]. Lisgar receives supplies from the XHP network downstream from Enbridge's Parkway Gate Station via the NPS 24 XHP line during the non-winter months.

- Markham Gate Station is solely supplied by TransCanada. It connects into an XHP pipeline which supplies the very eastern part of the GTA. However, the Markham supplied system is essentially isolated from the rest of the XHP system that supplies the GTA because there is no XHP pipeline that ties the two XHP systems together.

[2] The north NPS 36 XHP from Parkway Gate Station currently operates up to 3344 kPa (485 psi). The South NPS 36 XHP from Parkway Gate Station currently operates up to 2416 kPa (350 psi).
[3] The NPS 30 XHP line supplied south from Victoria Square Gate Station currently operates up to 3103 kPa (450 psi).
[4] The NPS 20 HP line supplied from Lisgar Gate Station currently operates up to 1200 kPa (175 psi) and the NPS 30 XHP line up to 1896 kPa (275 psi). The NPS 24 XHP line is tied into the same network as Parkway Gate Station's NPS 36 XHP Parkway North line, and therefore operates up to 3344 kPa (485 psi).

7. The XHP distribution system is an integrated network. During off-peak conditions, the geographic area typically supplied by one gate station may be partially supplied by another gate station depending on weather and operating conditions. However, as the temperature approaches peak day conditions, the GTA network begins to operate more like three single source networks (with supply from the three largest gate stations) as opposed to an interconnected system. The gas flow during peak conditions is schematically represented in Figure 2. The general areas supplied by these gate stations during cold winter conditions is schematically represented in Figure 3.

8. Enbridge does not operate any compression facilities within its distribution areas; consequently natural gas flows only from higher pressure pipes to lower pressure pipes through interconnecting district stations as previously mentioned.

Obligation to Attach Customers

9. The Company has an obligation to attach customers within an area that is already being served by natural gas. Approximately 980,000 customers, out of 2.0 million customers franchise-wide, are located within the GTA Project Influence Area[5]. The GTA is well served with natural gas infrastructure in most city streets. In this type of area, customer additions are often attached through a new service and meter off an existing gas main. Once the capacity serving the geographic customer base is consumed, it may require reinforcement. Apart from large customers that may be served directly off the XHP system, the XHP distribution system is not often reinforced. The larger diameter and higher pressure results in discrete but significant capacity additions that are capable of serving several years of organic growth.

/u

[5] The GTA Project Influence Area is described in Exhibit A, Tab 3, Schedule 4.

10. The Company analyses its distribution system on a regular basis to assess its capability to meet anticipated future operating conditions. At a minimum, the network must be capable of maintaining adequate pressures to meet all firm customers' demands under peak day conditions. If system pressures are forecast to be below the minimum required pressures, main reinforcements may be required to add capacity to the system to support customer growth. Reinforcements are also sometimes required to address bottlenecks in the system. These reinforcements often occur by paralleling or looping existing infrastructure, a common practice among utilities.

11. As noted in Exhibit A, Tab 3, Schedule 2, the XHP system has not been reinforced since 1992 for organic growth other than for specific large volume customers. The area served by the GTA Project is experiencing densification of residential development through the redevelopment of brown-field sites and other low density sites. For example, Toronto currently has 15 buildings under construction that are 150 m or greater in height (44 to 70 floors), of which 12 are residential, one is residential-office, one is office, and one is a hotel. In 2015, Toronto will have four times as many tall buildings (greater than 150m) than it had in1995[6]. Growth in the downtown core served by Station B is schematically shown at Exhibit A, Tab 3, Schedule 4. The distribution system supplying the GTA Project Influence Area will reach its peak day capacity in 2015 as evidenced by system forecast models dropping below minimum operating pressures at Station B[7]. Increasing densification also has implications for reliability planning as explained in the following section.

[6] Source: Council on Tall Buildings and Urban Habitat Journal, 2012 Issue IV. In 1995, Toronto had 11 buildings greater than 150 m in height. In 2015, Toronto will have 45 buildings greater than 150 m in height.
[7] The minimum required inlet pressure to Station B is 1551 kPa (225 psi).

Safe and Reliable Delivery of Natural Gas

12. The following section describes the framework used by the Company to assess reliability. Criteria for assessing reliability requirements typically focus on the criticality of the need (essential versus non-essential), process, and timelines for restoration of service.

13. Energy delivery is an essential service, and natural gas in particular is relied upon by the majority of Ontario residents as a primary source of energy. As mentioned in Exhibit A, Tab 3, Schedule 2, the peak day natural gas flow through Enbridge's GTA XHP system exceeds 2.4 PJ/day. On an hourly equivalent basis of 0.12 PJ/hr, this equates to 95%[8] of the highest electrical generation output ever achieved in the province of Ontario. In addition, the XHP network provides natural gas to 775 MW[9] of large scale power generation in the GTA. PEC is supplied directly from the XHP system, downstream from Station B[10], and generates up to 550 MW of electricity.

14. Unlike electricity which can be automatically restored, customer outages pose a particular challenge on natural gas systems due to the need for manual restoration of service. First, the natural gas service must be manually turned off at the meter to "make safe". Gas cannot be reintroduced into the distribution system until it has been confirmed that all meters have been turned off. Once it has been confirmed and natural gas pressure in the main has been restored, each of the customer's natural gas appliances must be inspected and relit prior to turning the gas service

[8] 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/nrgycnvrsntbl/nrgycnvrsntbl-eng.html).

[9] The 775 MW of large scale power generation includes Portlands Energy Centre at 550 MW, Greater Toronto Airport Authority ("GTAA") at 117 MW, and TransAlta at 108 MW.

[10] Station B's inlet pressure is required to maintain the minimum contractual 1,379 kPa (200 psi) delivery pressure to serve PEC.

back on. This requires each customer to be visited twice during the outage. Depending on the size of the outage and available resources, it could take days, weeks or even months to safely restore service. For example, a manual restoration process to isolate and relight 25,000 to 50,000 customers could take between 6,600 to 13,200 person hours (performed by gas technicians)[11]. Industry outage examples of this magnitude are described below.

15. Large outages may require support from other utilities through the Canadian Gas Mutual Aid Assistance Agreement. This Agreement is a ready mechanism for Canadian natural gas industry companies to assist each other during emergencies. This type of agreement was recently used to respond to Hurricane Sandy. Hurricane Sandy struck the East Coast of the United States on the 29th of October, 2012, causing widespread damage across the eastern seaboard. One of the hardest hit areas was Long Island, New York. National Grid, a gas utility with customers in Long Island, had 70,000 gas services affected, leading to 200,000 customers being impacted by the storm. The recovery efforts began as soon as it was safe, with mutual aid assistance arriving from all parts of the United States and Eastern Canada. More than 570 mutual assistance crews from 46 companies took part in the restoration effort. In Suffolk County alone, over 120 gas crews were working on the recovery. As at December 14th, service had not been restored to all affected customers, nearly six weeks after the storm had struck.

16. In 2011, production losses in Texas resulted in an outage to 50,000 customers in parts of Texas, Arizona, and New Mexico. In this instance, restoration of service was completed in one week, as outlined in a Federal Energy Regulatory

[11] Based on Enbridge's Emergency Procedures Manual, it is estimated that a gas technician can turn off 15 residential meters per hour and relight 5 residential meters per hour. Therefore, for example, 25,000 residential customers would take approximately 1,600 person hours to turn off meters and 5,000 person hours to relight the affected customers.

Commission (FERC) report "Outages and Curtailments During the Southwest Cold Weather Event of February 1-5, 20011 – Causes and Recommendations".

17. An extended period of time without gas service in cold winter conditions would cause an immediate concern to residential customers due to loss of heat and risk of damage to homes (i.e., burst water pipes). At 35 DD, or -17 degrees Celsius, a typical home would drop below 0 degrees Celsius in approximately 14 hours, while at 19 DD, or -1 degrees Celsius, a typical home would drop below 0 degrees in two days[12]. Municipalities would likely need to invoke warming centers with another form of heat, emergency response plans, and potential evacuation of influenced areas.

18. Reliable service requires a robust supply chain. Flexibility, diversity, and the ability to manage operational risk must be prevalent in all aspects of the supply chain – downstream distribution, entry points into the distribution system, and upstream supply.
    - Flexibility is the ability to manage reliability in changed circumstances both short term and long term.
    - Diversity is the ability to manage reliability through dual or more supply sources and paths.
    - Operational risk management is the ability to recognize and mitigate threats to the safety and reliability of continued service.

19. These elements are managed differently in each aspect of the supply chain. On the infrastructure front, both downstream distribution and entry points must be assessed for strengths and limitations, requirements for integrity management and the

[12] Based on guidelines in Enbridge's Emergency Procedures Manual.

consequences of mechanical or supply failure. On the upstream supply front contracts must ensure diversity of suppliers and low risk of default. Ensuring that customer demand is met 24/7/365 requires a robust gas management system and processes that facilitate accurate demand forecasting, enable adequate supply to be procured and dispatched as needed, and permit real time monitoring of pressures and/or flow at key locations as a test of supply/demand balance.

20. The reliability of Enbridge's distribution system has become increasingly constrained. Customer growth has consumed available capacity within the XHP network since the last time it was reinforced in 1992. As a result, the XHP system has a diminished ability to provide operational flexibility, diversity, and risk mitigation measures, particularly in the winter months. These limitations are depicted in the order of distribution, entry point, and upstream supply in the Table 1 below and described in the remainder of this schedule.

Table 1: Summary of Limitations in the Supply Chain and Reliability Consequences

	Diversity Limitation	Flexibility Limitation	Operational Risk Limitation	Supply Consequence
Distribution	Single XHP line serving downtown Toronto core. Single XHP link between western and eastern parts of the GTA Project Influence Area.	Inadequate ability to manage planned and unplanned maintenance and integrity work in higher demand periods.	Limited ability to reduce pressures in order to reduce risk and maintain supply during winter period.	**Loss of minimum inlet pressure at Station B results in outage to firm customers at a 35 DD.**[13]
Entry Point	More than 50% of volumes from a single gate station.	Limited reserve capacity to compensate for reduced flows from a gate station.	Inability to maintain customers in the event of gate station failure in winter.	**Loss of Parkway results in outage of approximately 270,000 residential customers plus PEC at a 35 DD.**
Upstream Supply	Diversification opportunities are currently limited by upstream transport capacity.	Limited ability to replace lost supply due to constraints in upstream transport capacity.	Reliance on non-renewable long haul transport, and lack of Loss of Critical Unit ("**LCU**") protection for short haul transport creates portfolio risk in winter time.	**A 300 to 400 TJ/d loss of supply results in an outage of approximately 150,000 to 225,000 customers at a 41 DD.**[14]

[13] The results of the supply consequence are based on a single valve closure in network simulations. This type of network analysis was performed to understand system vulnerabilities under the respective scenarios and does not represent projected customer losses in conditions of a gas release (i.e. pipeline damage). Customer losses as a result of a gas release are expected to be higher due to the drawdown of the network.

[14] These customer losses are approximate and were determined using the "Enbridge Load Shed Report", which is a load shed plan developed to respond to a supply shortfall. The customer losses resulting from this scenario assumes that PEC is not consuming gas.

Limitations with Downstream Distribution

21. Daily operation of the GTA's XHP distribution system involves the intregration, coordination, and management of the following activities:

    - Integrity activities, such as inline or visual inspections, non-destructive testing, or corrosion evaluations;
    - Daily maintenance work, such as welding repairs and welding connections to the line;
    - Planned events, such as temporary or permanent relocations requested by municipalities under franchise agreements; and,
    - Unplanned events, such as third party construction activities and pipeline damages.

    The safe execution of the maintenance, inspection, and relocation activities requires flow and/or pressure reductions. Pressures are lowered below specific operating stress levels to perform work and are sometimes restricted to 80% of the normal operating pressure until further inspections and/or repairs can be performed. The system requires adequate diversity and flexibility for the rerouting of supply resulting from capacity losses due to these pressure and flow restrictions.

22. As shown in Figures 2 and 3, while the western part of the GTA has multiple lines extending east from the vicinity of the Parkway and Lisgar Gate Stations, the eastern part of the GTA has two critical XHP pipelines that lack diversity.

23. The NPS 30 Don Valley Pipeline is the only XHP pipeline extending south from Victoria Square Gate Station to the downtown Toronto core and surrounding area. It supplies a high concentration of customers, it is the only source of supply for PEC, and it also serves the largest economic centre in Canada. As it exists today, if this pipeline experienced a pipeline defect or damage in winter months, significant

customer outages would immediately occur. The Company would have to either temporarily reduce operating pressures or shut down the line. At a minimum, supply would have to be terminated to PEC, which is the equivalent to the demand of 100,000 residential customers. In the case of pipeline damage, a significant number of customers may lose gas supply, and as noted previously, would require two sites visits in order to both "make safe" and restore service once the system issue is remediated. The area served by Station B also has the highest density of customers in the Enbridge franchise area.

24. The NPS 26 line is currently the only XHP line that provides the ability to connect the western and eastern parts of the distribution system. The NPS 26 line operates at 2586 kPa (375 psi), is smaller in diameter and operates at a lower pressure than its interconnecting pipelines; the NPS 36 Parkway North operates up to 3344 kPa (485 psi) and the NPS 30 Don Valley up to 3103 kPa (450 psi). If maintenance was required on this pipeline, or if a damage occurred, the system would be at risk from the reduced capacity on this singular path. Current limitations on its ability to move gas from west to east or east to west, in conjunction with a supply restriction at either Parkway or Victoria Square Gate Stations could result in customer outages, which will be further described in the *Limitations on Upstream Supply* section below.

25. Gas Control Operations rely on the NPS 26 line for daily load balancing purposes under normal operating conditions. Daily load balancing refers to Gas Control's ability to accurately forecast demand and schedule supply such that any resulting imbalance at the end of the Gas Day is maintained within 2% in order to avoid financial penalties imposed by upstream pipelines. Gas Control has access to select transportation services (i.e., STS and firm short notice services) at Parkway and Victoria Square Gate Stations that offer greater access to scheduling windows to balance demand at the end of the Gas Day. The NPS 26 plays a critical role in

allowing Gas Control to swing supply from west to east and vice versa depending on demand and supply availability. In addition, Gas Control is also required to manage hourly demand within reasonable tolerances to contractual limits. The connectivity offered by the NPS 26 between the XHP systems at either end of the GTA allows the Company to manage hourly peaks. Pressure restrictions on this line would limit Gas Control's ability to manage its upstream portfolio within contract parameters.

26. As noted above, flexibility provides the ability to respond to changed conditions. When possible, maintenance and integrity activities are undertaken during periods of low demand, when there is greater reserve capacity. Planned maintenance activities usually extend from April to November, however, it may also be required in periods of higher demand. These activities include pressure/flow reductions for welding, tie-ins, or leak or damage repairs; to mitigate the risk of damage when construction or maintenance is executed in the immediate vicinity of the pipeline; or, to carry out integrity inspection activities. Temporary reductions can be required for an extended period of time based on results from the integrity management program or from an engineering assessment, ending only after the underlying condition identified can be safely remediated. In some instances, the duration may extend over the entire winter. In 2012, over 20 integrity inspections were performed across the Enbridge franchise. As per Company policies, governing regulations and standards, immediate indications[15] must be mitigated within one week of the discovery. However, if immediate indications cannot be mitigated within the specified timeframes, other actions may be required. For example, among the pipelines inspected this year, systemic pipeline defects were discovered in two pipelines. As a result, these two pipelines are currently reduced to 80% of the normal operating pressure until an additional assessment can be completed in 2013.

[15] Immediate indications are pipeline features discovered through integrity inspections that must be mitigated within a specific time frame. Otherwise, operating pressures may be restricted for longer periods of time.

Unplanned events such as third party construction activities and pipeline damages pose additional challenges. Overall, the Company is faced with diminished flexibility to handle its current level of planned and unplanned annual maintenance and integrity activities.

27. Operational risk management at times requires the permanent lowering of pipeline operating pressures. Permanent de-rating of pipeline pressures may be required to mitigate operational risk due to integrity or engineering assessments; to adhere to code requirements as a result of changes in class location; to lessen the dependence on infrastructure encroached upon by urban development; or, to reduce the consequences of a third party damage. The Company maintains pipelines in accordance with governing regulations and standards and takes steps to manage operational risk. In the past, the Company has elected to de-rate pipelines to reduced pressures as a result of some of the above operational risk factors in previous applications to the Board. A summary of these pipelines is outlined in Table 2.

Table 2: Summary of Pipeline Pressure Reductions Ppreviously Discussed in Applications to the Board

Pipeline (Installation Year)	Pressure Reduction
NPS 20 HP Lake Shore pipeline (1954)	2760 to 1200 kPa
NPS 20 HP Winston Churchill pipeline (1958)	3350 to 1200 kPa
NPS 30 XHP pipeline (1963-1967)	2340 to 1900 kPa

28. Proper operational risk management requires that risks are minimized and/or eliminated where they can be, and that is a goal of the Company. High stress pipelines have differing risk characteristics than lower stress pipelines. Categorization of pipelines by stress level is common; a brief description of the method used follows.

29. "Yield stress" is a material property and is the stress at which a material will permanently deform. The yield stress of steel used in a pipeline is commonly referred to as pipe grade, or Specified Minimum Yield Strength (SMYS). Typically, the dominant stress in pipeline operation is the "hoop stress". Hoop stress is produced by the internal pressure of a fluid (liquid or gas) with the pipe or component, any external hydrostatic pressure, or both, that acts in the circumferential direction. When hoop stress is calculated for a pipeline, it is often normalized as a ratio between the operating pressure and the designed strength of the pipeline. In pipeline operation, the ratio of "hoop stress" to SMYS is often used to evaluate operational risk. This ratio is often represented as a percentage, % SMYS.

30. In general, the specific reference to threshold 30% SMYS is important for three reasons. First, it is the generally accepted "leak-rupture boundary" in industry and in Canadian regulations and standards. This means that there is a general understanding that below 30% SMYS a pipeline defect is likely to result in a leak, whereas above 30% SMYS a pipeline defect is at risk of causing a pipeline rupture. Second, it is required by Ontario Regulation 223/01 that an Integrity Management Program be in place for all pipelines operating at or above 30% SMYS. Third, the Company's in-service welding procedures requires pipelines to operate below 30% SMYS to perform any welding on the mains while in operation.

31. The Company meets or exceeds pipeline design, maintenance, and operational requirements in accordance with governing regulations and standards. It also reviews, evaluates, and adopts best practices from industry. An example of a best practice from industry is the increased wall thickness on larger diameter, higher stress pipelines. Pipelines installed four decades ago, such as the NPS 26 and the NPS 30 Don Valley line, have wall thicknesses of 7.9 mm. Pipelines installed two decades ago, the NPS 36 Parkway North and MSL lines, have a wall thickness of 9.2 mm. In 2008, the NPS 36 line installed to supply PEC was installed with a wall thickness of 15.9 mm.

32. The NPS 26 and NPS 30 Don Valley lines both operate above 30% SMYS, both have a wall thickness that is thinner than a pipeline that would be installed today, and both are critical to system operation given the supply consequences of an outage of these pipelines. These factors are summarized in Table 3. The Company's ability to provide reliable service is at risk given the lack of diversity of the supply path in these two lines, the limited flexibility of other pipelines to back-feed the same geographic areas, and the unavailable capacity to reduce these lines to below 30% SMYS on a temporary or operational basis to mitigate operational risk

in normal operating conditions. The absence of diversity and flexibility in periods of higher demand increases the potential risk incurred by the Company as it may limit its ability to either respond in a timely manner or maintain reliable supply to customers. The choice between these two options is not considered to be reasonable when system reinforcement mitigates the risk with the existing infrastructure.

Table 3: XHP Pipeline Infrastructure Supplying the GTA

Pipeline	Year Installed	Wall Thickness	SMYS	Supply to GTA System
NPS 26 pipeline	1967-1971	7.9 mm	37%	N/A
NPS 30 Don Valley pipeline	1971	7.9 mm	36%	15-25%
NPS 36 Parkway North pipeline	1986–1992	9.2 mm	37%	30-35%
NPS 36 MSL pipeline	1992	9.2 mm	27%	20-25%

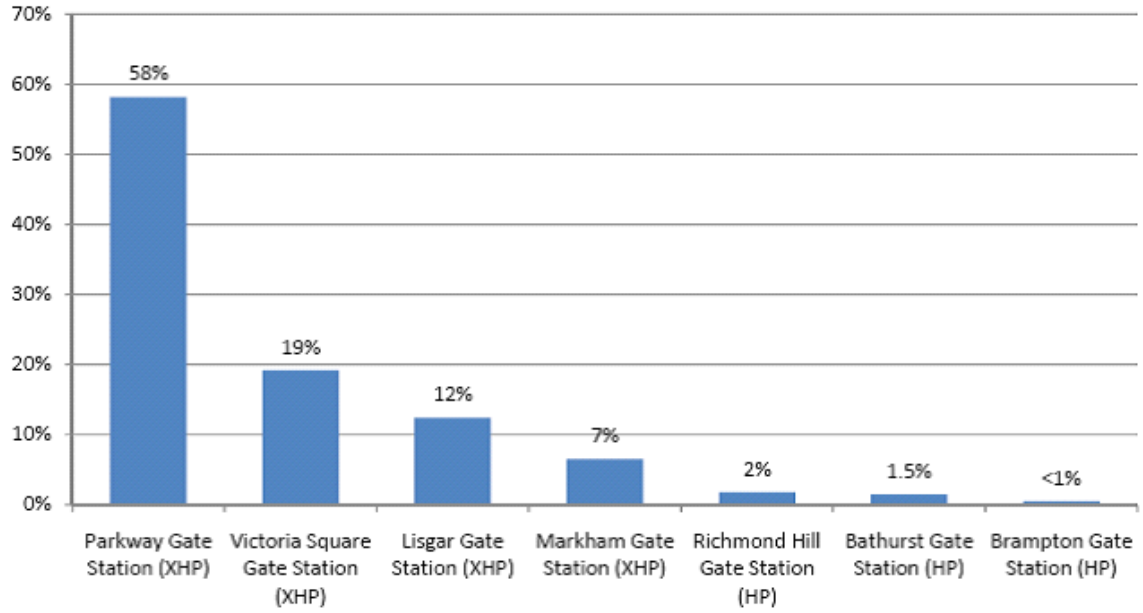
33. The Company believes that in order to ensure continued reliable and safe delivery of service, it should diversify the supply paths, increase the flexibility of the system, and reduce the operational risk associated with these two key pipelines by reducing the operating pressures below 30% SMYS. The Company plans to reduce the operating pressure of these two pipelines below 30% SMYS after the proposed facilities have been installed. It is expected that these lines would continue to be considered under the Company's Integrity Management Program.

Limitations with Entry Points into the Distribution System

34. The following section describes limitations with respect to diversity, flexibility and risk management for the entry points into the GTA system.

35. There are seven gate stations that provide natural gas supply to the broader GTA and surrounding area. Ostensibly, one might conclude that there is sufficient diversity in entry points in the GTA system. However these stations have a large variance in their capabilities. Four of the gate stations (Parkway, Victoria Square, Lisgar, and Markham) are connected into the XHP network and move 96% of the gas supply volumes from upstream transmission pipelines to downstream customers. Three of the gate stations (Brampton, Bathurst, and Richmond Hill) are connected into the HP network and move 4% of gas supply volumes. Figure 5 shows the percentage share of each gate station.

Figure 5[16]: Composition of Natural Gas Delivery through Gate Stations



36. Parkway, Victoria Square, and Lisgar Gate Stations – supply over 90% of the peak day demand flow. Parkway Gate Station currently supplies over half of the peak day requirements of the system, making Parkway a systemically important single facility for supply and system operation.

37. The Company considers the feed at Parkway, and the Parkway facility itself, as the single biggest risk in terms of consequences to system operations. Currently, the loss of the Parkway Gate Station during winter conditions would result in a

[16] The figure is based on un-normalized historical average deliveries on cold winter days from both TransCanada and Union Gas at gate stations supplying XHP or HP to the GTA Project Influence Area and surrounding area. The respective percentages are based on total station flows since an outage of a gate station may affect more than the Influence Area considered by this project.

significant level of outages. System modeling of this event at a 35 DD indicates losses exceeding 270,000 customers plus PEC[17].

38. Large losses would occur because of the limited capability of both Lisgar, the oldest operating gate station, and Victoria Square, the second largest gate station in the GTA. Due to urban encroachment, Lisgar's capabilities have not been expanded over the decades. In fact, Lisgar typically only operates as a gate station in winter months. The XHP grid in the GTA currently has relatively weak linkages between Victoria Square and Parkway, particularly on cold winter days. The current system restriction is the NPS 26 pipeline, constructed in 1967, that connects the NPS 36 Parkway North pipeline with the NPS 30 Don Valley pipeline. The NPS 26 pipeline is not only smaller diameter, but also operates at a lower pressure than either of the two lines it connects. Consequently there is limited offset capability between the two largest stations in the GTA.

39. Due to the higher systemic risk of the Parkway Gate Station, the Company does not believe that it should expand the facility any further, and will therefore look to source any forecast growth in demand from another entry point into the system. The addition of a new gate station would be able to provide some level of backup to Parkway and allow better management of gas supply in planned and unplanned events on both the upstream and downstream sides of the station.

40. Enbridge has commissioned a benchmarking study to compare Parkway Gate Station with entry points supplying natural gas to other major metropolitan areas in the North Eastern U.S. with similar climates. The benchmarking study has been filed as Attachment 4. High supply concentration at two gate stations and the inability to mitigate supply risk through flexibility in downstream distribution /u

[17] As previously indicated, the gas demand from PEC is equivalent to the gas demand of 100,000 residential customers.

infrastructure points is currently a systemic risk. From a supply perspective, expansion of Parkway or the Victoria Square Gate Stations is not desirable and diversification of the entry of supply into the system is a necessary measure.

Limitations with Upstream Supply

41. Enbridge seeks to continually enhance its gas supply portfolio through diversity of supply basin and path, and through flexibility in its ability to respond to demand variations both intra-day and seasonally. Enbridge also assesses operational risk by monitoring trends in gas production and trading at supply basins and market hubs and by monitoring the quality of the transportation arrangements that bring supply to its franchise.

42. From a supply perspective, the Company is witnessing a significant decline in production and exports from Alberta and substantial growth in emerging supply basins in close proximity to the franchise. These trends are expected to accelerate over the medium term and are described in greater detail in Exhibit A, Tab 3, Schedule 5, but are summarized below. A report issued by the Alberta government projects a 75% decline in conventional gas available for export from Alberta by 2021. The resulting level of Alberta exports in 2021, if this prediction materializes, would be slightly greater than Enbridge's current level of winter reliance on Alberta supply, leaving little supply for other shippers in Eastern Canada. While this report excludes prospects for Alberta and BC shale production from substantial known reserves, there is uncertainty around where this gas will ultimately flow (i.e., exports to Asia) and timing of development of these reserves.

43. At the same time shale gas production in the U.S. Northeast is projected to grow from approximately 1.8 PJ/d to 7.3 PJ/d between 2010 to 2021[18]. As of November 2012, approximately 0.4 PJ/d of Marcellus supply is flowing into Ontario. The increasing availability from emerging supply basins also provides the opportunity to procure gas supply more economically than western Canadian supply. However, infrastructure constraints east of Parkway and on Enbridge's distribution system limit access to such supply, resulting in higher cost supply and security of supply concerns.

44. Enbridge has also identified risks associated with the quality of both long haul and short haul transport required to meet winter demand. As identified at Table 2, Exhibit A, Tab 3, Schedule 5, the Company will require in excess of 500 TJ/d of Short Term Firm Transportation ("STFT") on the TransCanada Mainline in 2014, which is a less secure form of transport than Firm Transportation. In addition, approximately 300 TJ/d of supplies from direct purchase customers is not underpinned by known firm transportation arrangements. As a result, between 500 and 800 TJ/d of supply could arrive in the Enbridge franchise using "discretionary services" on the TransCanada Mainline. These services are either non-renewable, such as STFT or lower priority such as interruptible transport, and their availability is predicated on several factors. TransCanada is contemplating a reduction in its long haul capacity through conversion to oil and possible pressure de-rates on segments of its pipeline system as a result of changes to its integrity management program[19], which will affect the availability of discretionary transport relative to firm transport. Replacement of these discretionary services with year round firm transport will result in less efficient use of long haul pipe due to the seasonal nature of demand.

[18] Based on data interpolated from the projections provided in the Energy Information Administration ("EIA") Annual Energy Outlook 2012. The Company would note that other projections of Marcellus supplies alone are higher than the total EIA shale supply projections for the U.S. Northeast by 2021.
[19] Source: Evidentiary record in NEB proceeding in RH-3-2011

45. The Company has a long history of using short haul transport services to meet seasonal demand due to the lower costs of using short haul pipe at low load factors. However, vulnerabilities have also been identified in short haul transport services that are used to bring gas to Parkway for compression and further transport on the TransCanada system, for redelivery into the Enbridge franchise. Enbridge utilizes STS and short haul Parkway to Enbridge Central Distribution Area ("CDA") transport services amounting to approximately 450 TJ/d in the winter time. Union Gas has identified the absence of stand by compression at Parkway as a supply risk, consequently loss of compression at Parkway could result in a shortfall of approximately 900 TJ/d for shippers downstream of Parkway. If such a shortfall were to occur, Enbridge, as the single largest Local Distribution Company ("LDC") shipping gas east of Parkway, would expect to take a significant portion of the shortfall.

46. Diligent operational risk management requires that the Company plan for and address unusual but realistic system events. The Company prepared a load shed plan to respond to an upstream curtailment of supply from either TransCanada or Union Gas, known as the "Enbridge Load Shed Report". System modeling was performed to identify isolable zones to respond to an event of this nature. In situations where either Parkway Gate Station or Victoria Square Gate Station is affected by a 300 to 400 TJ/d upstream supply shortfall, it is projected that approximately 150,000 to 225,000 customer losses would occur at a 41 DD, respectively. This estimate assumes that PEC is not consuming gas.

47. The proposed GTA Project addresses the limitations identified above. Details on the proposed facilities, operation, and system benefits are described in Exhibit A, Tab 3, Schedule 6.