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Enbridge Gas Inc.
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February 22, 2022

VIA EMAIL and RESS

Nancy Marconi
Acting Registrar
Ontario Energy Board
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

Dear Nancy Marconi:

Re: Enbridge Gas Inc. (Enbridge Gas)
Ontario Energy Board (OEB) File: EB-2020-0293
St. Laurent Ottawa North Replacement Project
Enbridge Gas Responses to Interrogatories

In accordance with Procedural Order No.5, enclosed please find interrogatory responses of Enbridge Gas with respect to Enbridge Gas's responding evidence and FRPO's questions contained in its January 6, 2022 letter in the above noted proceeding.

Please contact the undersigned if you have any questions.

Yours truly,

(Original Signed)

Adam Stiers
Manager, Regulatory Applications – Leave to Construct

c.c. Guri Pannu (Enbridge Gas Counsel)
Charles Keizer (Torys)
Zora Crnojacki (OEB Staff)
Intervenors (EB-2020-0293)

ENBRIDGE GAS INC.

Answer to Interrogatory from
OEB Staff ("STAFF")

INTERROGATORY

Reference:

Enbridge Gas Responding Evidence, pages 3-4

Preamble:

Enbridge Gas estimates the potential peak design day reductions from the Cliff Street Heating Plant, City of Ottawa sites, and OCHC sites served by the St. Laurent pipeline.

Question:

a) Are the potential peak design day reductions shown in Table 1 equivalent to the historical demand from these buildings on a specific day? If not, please provide Enbridge Gas's methodology for converting actual historical demand data to peak design day demand.

b) Enbridge Gas notes that "Table 1 excludes peak design day demand for buildings cited in the Evidence where the Company was not able to confirm their address and location relative to the St. Laurent pipeline system." Please estimate the potential peak design day demand reductions if only buildings definitively known to not be served by the St. Laurent pipeline (e.g., the OC Transpo bus garage facilities) were excluded from this analysis, and buildings of uncertain status are included. If this is not feasible, please provide the supporting rationale for Enbridge Gas's statement that "the volumes associated with these excluded buildings would not materially change the Company's conclusions regarding peak design day demand or the design of the Project."

Response

a) & b)
Enbridge Gas compiled Table 1 using actual monthly customer billing/demand data (which is commercially sensitive) for buildings cited in the Sponsors' Evidence that

were readily identifiable based on the limited information provided.[1] The Company matched this billing data with corresponding St. Laurent pipeline system degree day weather information for the same time period and used a linear regression to extrapolate this data for design day condition.

Because of the limited information provided by the Sponsors, the Company cannot provide a more accurate estimate at this time. However, upon receipt of the additional address details sought from the City of Ottawa and OCH via its interrogatories the Company expects that it will be able to produce a more accurate version of Table 1 in advance of the forthcoming Technical Conference.

Enbridge Gas's rationale for the statement cited by OEB Staff is that the Company was able to identify with reasonable certainty the location and consumption data (billing data) for 86% of the buildings listed by the City of Ottawa and OCH within the Sponsors' evidence and reflected the same in Table 1 (excluding the OC Transpo bus garage facilities). The Company does not expect that the remaining 14% of the buildings listed, which it was unable to locate with certainty absent a street address, will materially change its conclusions in this regard.

[1] The Company was able to identify actual customer billing information for approximately 86% of the buildings cited in this manner.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario ("FRPO")

INTERROGATORY

Preamble:

In FRPO.1, we had asked for some mapping of pipelines and provision of simulated pressures. Our inquiry must have been misunderstood as most of the requested mapping information was included in the map attached to ED.16. However, what was not included was the data requested on system pressures before and after the proposed replacement (Winter 2021/22 and Winter 2023/2024). We believe Table 2 in FRPO. 2 provides the simulated pressures at stations inlets for the winter of 2021/22.

Question:

a) Please confirm that Table 2 in FRPO.2 provides simulated peak day station inlet pressures for 2021/22.

b) Please confirm that the NPS 12 pipe that runs north from the Rideau Heights station eventually inter-connects through the Hurdman & Queensway station to the St. Laurent pipeline.

c) Please provide a second table that exhibits the peak day station inlet pressures for the stations displayed in Table 2 in a peak-day simulation after the proposed replacement (to simplify, EGI can use the Winter 2021/22 simulated demands assuming the St. Laurent pipe is replaced as per the application).

Response

a) The simulated inlet pressures are peak winter conditions at the time of analysis (2020/2021). The Company does not expect pressures for 2021/2022 to be materially different.

b) The NPS12 pipeline that connects Harmer & Carling Station with Hurdman & Queensway Station is part of a 379 kPa (55 psig) network that supplies customers in downtown Ottawa. While both stations provide benefit to the 379 kPa (55 psig)

network there is no capability to directly flow from the Rideau Heights pipeline to the St Laurent pipeline.

c) The pipeline replacement was design to meet existing capacity requirements and as such these station inlet pressures will not change materially following the completion of construction of the Project.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario ("FRPO")

INTERROGATORY

Question:

Please provide the peak day flows out and outlet pressure of each station for the pre- and post-replacement simulations.

i) Please identify any system constraints that would restrict flow capability from the Rideau Heights station to St. Laurent.

ii) For the results provided in Table 2 of FRPO.2, what was the simulated pressure setting of the Rideau Heights station feeding the NPS 12 northbound line.

(1) If the simulated setting was not 275 psig, please re-run the simulation using 275 psig and provide the resulting pressures and flows at the stations pre- and post-proposed replacement.

Response

i) Please see the response at Exhibit I.FRPO.23 b).

ii) The NPS 12 northbound line is limited by its MOP of 250 psig and cannot be raised to 275 psig. Please also see the response at Exhibit I.FRPO.23 b).

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario ("FRPO")

INTERROGATORY

Preamble:

In FRPO.3 and FRPO.5, we asked EGI to file the study(ies). Instead, we received assorted assumptions that answered a few of our questions. We ask again that EGI file:

Question:

a) The study(ies)
b) The report(s) to management
c) The technical analysis document(s) and
d) Whatever EGI would call the information sources provided by analysts to management that documents the methodologies and assumptions used to determine for both Enbridge Gas and Gazifere:
    i) the assumptions – e.g., static or transient simulation
    ii) minimum pressures deemed to prompt an outage
    iii) methodology and assumptions employed in estimating the costs of:
        (1) actions for mitigation
        (2) repair
        (3) make safe and relight
        (4) customer claims

Response

a) - d)
The entirety of the details of the assessments completed by Enbridge Gas in support of the conclusions drawn within Exhibit B, which are based on the Company's historical experiences mitigating system outages, are set out in Tables 1 and 2 below for a 47 HDD and 1 HDD respectively.[1]

[1] Total customers lost are set out at Exhibit B, Tab 1, Schedule 1, Tables 1 & 2 for Customer Loss at 47 Degree Day and 1 Degree Day, respectively.

Table 1 – 47 HDD

Category	Item	Qty
Service Visits	**MAKE SAFE COSTS**	
	Fitter Assumptions	
	Total Number of Customers (ON only)	31,623
	Fitter Cost ($/hr) – approximate	$100
	Fitter Supervisor Cost ($/hr)	$150
	Number of Make Safe per Hour	15
	Per Diems and Hotel per Day	$200
	Mileage ($/km)	$0.50
	Make Safe Assumptions	
	Number of Person-Hours Making Safe	2108
	Number of Person-Days Making Safe	210.8
	Number of Fitters to Make Safe in 48 Hrs	105.4
	Make Safe Costs	
	Cost for Fitters to Make Safe (Salary Only)	$252,984
	Per Diems for Fitters to Make Safe	$42,164
	Supervision for Fitters (1 Supervisor/10 Fitters)	$39,600
	TOTAL MAKE SAFE	**$334,748**
	RE-LIGHT COSTS	
	Re-Light Assumptions	
	Number of Re-Lights per Hour	5
	Number of Person-Hours Re-Light	6325
	Number of Person-Days Re-Light	632
	Number of Fitters to Re-Light in 5 Days	126.5
	Re-Light Costs	
	Cost for Fitters to Re-Light (Salary Only)	$758,952
	Per Diems for Fitters to Re-Light	$126,492
	Supervision for Fitters (1 Supervisor/10 Fitters)	$117,000
	TOTAL RE-LIGHT	**$1,002,444**
	COSTS FOR FITTER TRAVEL	
	Travel (Salary)	$202,387
	Travel (Mileage)	$56,921
	Travel (Per Diems)	$50,597
	TOTAL FITTER TRAVEL	**$309,905**
Service Visit Costs		**$1,647,097**
Replacement Costs (Contractor)	**REPLACEMENT COSTS – CONTRACTOR**	
	Replacement Assumptions Cost assumed to be an average of a typical repair cost ($420,000) and actual 2018/2019 cost for replacement on St. Laurent ($3,182,417)	
	Replacement Cost – Contractor	$1,801,209
	TOTAL REPLACEMENT COST	**$1,801,209**
Replacement Costs (Contractor)		**$1,801,209**
Replacement Costs (Internal)	**REPLACEMENT COSTS – INTERNAL**	
	Replacement Assumptions – Field Staff	

	Number of Field Staff Responding	25
	Cost per Hour (OT Considered)	$62
	Hours per Day	10
	Per Diem	$75
	Hotel	$125
	Number of Days	10
	Replacement Assumptions – Supervision	
	Supervision (1 Supervisor/5 Staff)	5
	Cost per Supervisor per Day	$500
	Number of Days	10
	Replacement Assumptions – Liaison, Planning, Engineering	
	Number of EGI Liaisons	20
	Number of Planning/Engineering Support	20
	Number of Days	10
	Cost per Day	$500
	Transportation per Employee	$450
	Replacement Costs	
	Field Staff Costs	$205,000
	Supervisor Costs	$35,000
	Liaison, Planning, Engineering Costs	$298,000
	TOTAL REPLACEMENT COST – INTERNAL	**$538,000**
Replacement Costs (Internal)		**$538,000**
Claims	**COST OF CLAIMS**	
	Commercial/Industrial Claims Assumptions	
	Total Commercial/Industrial Customers Impacted	3,362
	Percentage of Customers with Claims	40%
	Cost of Commercial Claim per Day	$5,000
	Average Number of Days to Make Safe, Re-Light	5
	Residential Claims Assumptions	
	Total Residential Customers Impacted	28,261
	Percentage of Customers with Claims	30%
	Cost of Residential Claim per Day	$200
	Electric Heater Cost	$250
	Percentage of Customers with Supplied Heat	10%
	Average Number of Days to Make Safe, Re-Light	5
	Claims Costs	
	Commercial/Industrial Claims	$33,619,992
	Residential Claims	$9,184,825
	TOTAL CLAIMS COSTS	**$42,804,818**
Claims Costs		**$42,804,818**
Administrative	**ADMINISTRATIVE COSTS**	
	Administrative Cost Assumptions	
	Number of Staff	25
	Cost per Hour (OT Considered)	$62
	Hours per Day	10
	Number of Days	10
	Administrative Costs	
	Administrative Costs	$155,000
	TOTAL ADMINISTRATIVE COSTS	**$155,000**

Administrative Costs		**$155,000**
Temporary Facilities	**TEMPORARY FACILITIES COSTS** **Facilities Assumptions** Rental Trailers, Command Centers, Relief Centers **Facilities Costs** Facilities Costs **TOTAL FACILITIES COSTS**	 $200,000 **$200,000**
Temporary Facilities Costs		**$200,000**
Deferred Work	**DEFERRED MAINTENANCE/SERVICE WORK COST** **Deferred Work Assumptions** Total Hours Worked (Internal/Contractor) Percentage of Deferred Work Made-Up with OT OT Premium **Deferred Work Costs** Deferred Work Costs **TOTAL DEFERRED WORK COSTS**	 10,933 15% $31 $50,838 **$50,838**
Deferred Work Costs		**$50,838**
Contingency Costs (15%)		**$7,083,339**
TOTAL ESTIMATED COST		**$54,305,598**

Table 2 – 1 HDD

Category	Item	Qty
Service Visits	**MAKE SAFE COSTS**	
	Fitter Assumptions	
	Total Number of Customers (ON only)	16,676
	Fitter Cost ($/hr) – approximate	$100
	Fitter Supervisor Cost ($/hr)	$150
	Number of Make Safe per Hour	15
	Per Diems and Hotel per Day	$200
	Mileage ($/km)	$0.50
	Make Safe Assumptions	
	Number of Person-Hours Making Safe	1112
	Number of Person-Days Making Safe (12 hr day)	111.2
	Number of Fitters to Make Safe in 48 Hrs	55.6
	Make Safe Costs	
	Cost for Fitters to Make Safe (Salary Only)	$133,408
	Per Diems for Fitters to Make Safe	$22,235
	Supervision for Fitters (1 Supervisor/10 Fitters)	$21,600
	TOTAL MAKE SAFE	**$177,243**
	RE-LIGHT COSTS	
	Re-Light Assumptions	
	Number of Re-Lights per Hour	5
	Number of Person-Hours Re-Light	3,335
	Number of Person-Days Re-Light (12 hr day)	334
	Number of Fitters to Re-Light in 5 Days	66.7
	Re-Light Costs	
	Cost for Fitters to Re-Light (Salary Only)	$400,224
	Per Diems for Fitters to Re-Light	$66,704
	Supervision for Fitters (1 Supervisor/10 Fitters)	$63,000
	TOTAL RE-LIGHT	**$529,928**
	COSTS FOR FITTER TRAVEL	
	Travel (Salary)	$106,726
	Travel (Mileage)	$30,017
	Travel (Per Diems)	$26,682
	TOTAL FITTER TRAVEL	**$163,425**
Service Visit Costs		**$870,595**
Replacement Costs (Contractor)	**REPLACEMENT COSTS – CONTRACTOR**	
	Replacement Assumptions Cost assumed to be an average of a typical repair cost ($420,000) and actual 2018/2019 cost for replacement on St. Laurent ($3,182,417)	
	Replacement Cost – Contractor	$1,801,209
	TOTAL REPLACEMENT COST	**$1,801,209**
Replacement Costs (Contractor)		**$1,801,209**
Replacement Costs (Internal)	**REPLACEMENT COSTS – INTERNAL**	
	Replacement Assumptions – Field Staff	

	Number of Field Staff Responding	25
	Cost per Hour (OT Considered)	$62
	Hours per Day	10
	Per Diem	$75
	Hotel	$125
	Number of Days	10
	Replacement Assumptions – Supervision	
	Supervision (1 Supervisor/5 Staff)	5
	Cost per Supervisor per Day	$500
	Number of Days	10
	Replacement Assumptions – Liaison, Planning, Engineering	
	Number of EGI Liaisons	20
	Number of Planning/Engineering Support	20
	Number of Days	10
	Cost per Day	$500
	Transportation per Employee	$450
	Replacement Costs	
	Field Staff Costs	$205,000
	Supervisor Costs	$35,000
	Liaison, Planning, Engineering Costs	$298,000
	TOTAL REPLACEMENT COST – INTERNAL	**$538,000**
Replacement Costs (Internal)		**$538,000**
Claims	**COST OF CLAIMS**	
	Commercial/Industrial Claims Assumptions	
	Total Commercial/Industrial Customers Impacted	1,303
	Percentage of Customers with Claims	40%
	Cost of Commercial Claim per Day	$5,000
	Average Number of Days to Make Safe, Re-Light	5
	Residential Claims Assumptions	
	Total Residential Customers Impacted	15,373
	Percentage of Customers with Claims	15%
	Cost of Residential Claim per Day	$200
	Electric Heater Cost	$250
	Percentage of Customers with Supplied Heat	10%
	Average Number of Days to Make Safe, Re-Light	5
	Claims Costs	
	Commercial/Industrial Claims	$13,029,959
	Residential Claims	$2,690,276
	TOTAL CLAIMS COSTS	**$15,720,235**
Claims Costs		**$15,720,235**
Administrative	**ADMINISTRATIVE COSTS**	
	Administrative Cost Assumptions	
	Number of Staff	25
	Cost per Hour (OT Considered)	$62
	Hours per Day	10
	Number of Days	10
	Administrative Costs	
	Administrative Costs	$155,000
	TOTAL ADMINISTRATIVE COSTS	**$155,000**

Administrative Costs		**$155,000**
Temporary Facilities	**TEMPORARY FACILITIES COSTS** **Facilities Assumptions** Rental Trailers, Command Centers, Relief Centers **Facilities Costs** Facilities Costs **TOTAL FACILITIES COSTS**	 $200,000 **$200,000**
Temporary Facilities Costs		**$200,000**
Deferred Work	**DEFERRED MAINTENANCE/SERVICE WORK COST** **Deferred Work Assumptions** Total Hours Worked (Internal/Contractor) Percentage of Deferred Work Made-Up with OT OT Premium **Deferred Work Costs** Deferred Work Costs **TOTAL DEFERRED WORK COSTS**	 6,947 15% $31 $32,303 **$32,303**
Deferred Work Costs		**$32,303**
Contingency Costs (15%)		**$2,899,602**
TOTAL ESTIMATED COST		**$22,230,286**

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario ("FRPO")

INTERROGATORY

Preamble:

In FRPO.13, we asked for the condition of the St. Laurent pipe to be compared with the recently examined pipelines that Enbridge proposed for replacement. We understand that the Windsor Line and London Lines were not reviewed under the Asset Health Review Process. Nonetheless, we believe the investment of time to use this model to compare lines deemed to need replacement would be helpful to the Board.

Question:

a) Using the process described in paragraph 58 and 59 and using the data for the respective Windsor and London Lines, please produce the comparison[2].

Response

As stated in the response at Exhibit I.FRPO.13, this type of Asset Health and Reliability Engineering was not conducted on the Windsor Line and London Lines projects as the Company had not yet implemented the Asset Health Review ("AHR") process for Union Rate Zone assets at the time of those project applications.

Enbridge Gas is currently working to process the failure data and respective attributes of the Legacy Union Gas pipelines in order to develop an AHR model that incorporates the same. The expected timeframe for the model to be finalized is 2023. Accordingly, it is not possible to complete this work as part of this response.

The Windsor Line and London Lines projects, like all integrity related applications to the OEB for leave to construct, were reviewed and approved based on evidence submitted reflecting their respective unique system attributes and conditions at the time.

[2] EB-2020-0181 Asset Management Plan: 2021-2025 pg. 90: A reliability model accounting for pipe attributes has been developed through the Asset Health Review (AHR) program under DIMP to forecast the number of corrosion leaks based on statistical analysis of corrosion leak history from the past 10 years (including factors that accelerate degradation).

Although the Windsor Line and the London Line projects were integrity applications, the characteristics, geographic locations and conditions of the line are not exactly the same. Modelling these two projects using the AHR process now in hindsight will not produce results that are directly comparable to the St. Laurent pipeline. Using this analysis in hindsight is not a like for like comparison. Further, Enbridge Gas reiterates that the AHR results reflect only one of many metrics relied upon by the Company to support its decision to replace the existing pipeline(s).

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario ("FRPO")

INTERROGATORY

Preamble:

In FRPO.15, we asked "Please file all internal EGI written communication including reports, emails and memos that relate to the topic of this decision to replace and the timing of the replacement." While we appreciate that EGI has provided high-level presentations, we asked for reports, emails and memos that relate to the topic of the decision to replace and the timing of the replacement.

Question:

We respectfully request a more fulsome response.

Response

The "decision to replace and the timing of the replacement" was made as a direct result of presentation of the materials referenced within and attached to the Company's response at Exhibit I.FRPO.15. As stated in that response:

> Enbridge Gas staff met with senior management multiple times between February-April 2019, where verbal approval was provided to commence the project management process. Please see Attachment 2 for a presentation provided to Enbridge Gas management at various meetings over the course of 2019, containing a description of Enbridge Gas's approach regarding the management of Vintage Steel mains.
>
> The Project progressed through the project management process and obtained Enbridge Gas Board of Directors approval initially in July 2020 and again (for the updated project) on April 27, 2021. Please see Attachment 3 for the presentation made to the Enbridge Gas Board of Directors.

No additional communications were required in order to receive approvals to proceed with the Project as currently proposed from either senior management or the Company's Board of Directors.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario ("FRPO")

INTERROGATORY

Reference:

Exhibit M, pg. 3

Preamble:

EGI evidence states: "*Based on Enbridge Gas's design day modeling for the pipelines proposed to be replaced by the Project, peak design day demand is 139,800 m3/h. Current capacity of the pipelines proposed to be replaced by the Project is 157,900 m3/h. Future capacity of the proposed pipelines is projected to be 155,300 m3/h. Enbridge Gas models capacities of the St. Laurent pipeline system as a whole for the purposes of determining peak design demand…*

…Using the best-case scenario of removing load from the end of the network/system, a reduction 32,500 m3/h is required to downsize the NPS 16 portion to NPS 12.."

We would like to understand more about the analysis that determined these values. For the interrogatories below, we refer to station inlet pressures collectively for the stations described in Table 1 & 2 of Exhibit I.FRPO.2 AND additionally the Rockcliffe Control Station.

Question:

In the determination of the current capacity above, please file the analyst report, simulation documentation and other internal reporting that informed the above figures in the evidence. If not answered in this documentation, please provide the following:

a) Is the current peak day demand and current capacity for Winter of 2021/22?
   i) If not, please provide the station inlet pressures for the design day peak hour of 139,800 m3/hr.
b) Please provide a map showing the locations of the stations including THE Rockcliffe Control station.
c) Please provide the inlet pressures for the stations when the current pipelines have a peak hour demand of 157,900 m3/hr?

d) Please confirm that there is no physical limitation (beyond system demands) to flow gas from the Rideau Heights station to the St. Laurent Line.
   i) If there is any physical limitation, please provide the cost to eliminate the limitation.
   ii) If there is no physical limitation, what was the outlet pressure of Rideau Heights station for the above simulations?
      (1) If not 275 psig, please re-run the simulations using at 275 psig outlet pressure at Rideau Heights and provide the inlet pressures for the Table 2 stations and the resulting capacity.

e) What are the control point and conditions that EGI uses to define the limit of 157,900 m3/hr as capacity (i.e., what and where is the pressure constraint and where is the additional hourly demand added to reach that capacity and pressure)?
   i) If the pressure constraint is the required pressure for capacity through a station:
      (1) What station provides the constraint?
      (2) Please provide the cost to upgrade the station to eliminate the constraint and provide the resulting incremental capacity.
      (3) With station upgraded to allow lower inlet pressure, what is the next constraint and resulting capacity?

Response

a) Yes, peak day demand and current capacity are for Winter of 2021/2022.

b) Please see Exhibit B, Tab 1, Schedule 1, Figure 1.

c) Station inlet pressures for the St Laurent pipeline system at peak hour demand of 157,900 m^3/hr are set out in Table 1 below.

Table 1

Description	Inlet Pressure (psig)
BELFAST AT ST. LAURENT DISTRICT	235
BIRCH @ SANDRIDGE DISTRICT	207
CLAREMONT & ST. LAURENT DISTRICT	216
COVENTRY & BELFAST DISTRICT	244
HURDMAN & QUEENSWAY DISTRICT	239
KAREN WAY & ST. LAURENT DISTRICT	219
LANDSDOWNE RD N & HILLSDALE DISTRICT	200
OGILVIE & CUMMINGS DISTRICT	247
ROCKCLIFFE CONTROL DISTRICT	200
ST LAURENT & MONTREAL DISTRICT	225
ST. LAURENT & DUNBARTON DISTRICT	221

d) Not confirmed. There is a physical limitation preventing the flow of natural gas as the Rideau Heights station is not directly connected to the St. Laurent pipeline system. The Rideau Heights station and a station fed by the St. Laurent pipeline both supply a nearby lower pressure system.

i) To eliminate the physical limitation discussed, a new NPS 16 pipeline a minimum of 9 km in length (direct point-to-point alignment) would need to be constructed to connect the Rideau Heights inlet to the Hurdman Station inlet. The construction of such a pipeline through this alignment would be very challenging as the route is heavily developed (urban). Thus, Enbridge Gas expects that the cost to construct a new NPS 16 pipeline to connect the Rideau Heights inlet to the Hurdman Station inlet would be similar in magnitude to the proposed Project.

Importantly, such a pipeline would only provide enough incremental capacity to reduce the initial portion of the proposed Project from NPS 16 to NPS 12 and would not resolve the integrity concerns associated with the ongoing deterioration and degradation of the existing St. Laurent pipeline system. As previously stated by Enbridge Gas in its response at Exhibit I.ED.12:

> In Enbridge Gas's experience, the majority of costs associated with projects of this nature relate to labour and construction activities/equipment that would be incurred regardless of the ultimate size of pipeline installed.

Said another way, eliminating the physical limitation as described above would nearly double the total cost to ratepayers.

ii) N/A.

e) To determine the limit of 157,900 m^3/hr the system was assumed to have an increased demand at the end of the pipeline.

i)

(1) Rockcliffe Station

(2) Please see the response at Exhibit I.M.2.FRPO.29.

(3) Rockcliffe Station would remain the constraint on the St. Laurent pipeline system despite any adjustments considered as it has the highest outlet pressure requirement.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario ("FRPO")

INTERROGATORY

Reference:

Exhibit M, pg. 3

Preamble:

EGI evidence states: "*Based on Enbridge Gas's design day modeling for the pipelines proposed to be replaced by the Project, peak design day demand is 139,800 m3/h. Current capacity of the pipelines proposed to be replaced by the Project is 157,900 m3/h. Future capacity of the proposed pipelines is projected to be 155,300 m3/h. Enbridge Gas models capacities of the St. Laurent pipeline system as a whole for the purposes of determining peak design demand…*

…Using the best-case scenario of removing load from the end of the network/system, a reduction 32,500 m3/h is required to downsize the NPS 16 portion to NPS 12.."

We would like to understand more about the analysis that determined these values. For the interrogatories below, we refer to station inlet pressures collectively for the stations described in Table 1 & 2 of Exhibit I.FRPO.2 AND additionally the Rockcliffe Control Station.

Question:

Using the simulation that derived the capacity of 155,000 m3/hr for the proposed system, please provide the resulting pressures at the stations in Table 2.

a) Please re-run the simulation with Rideau Heights set at 275 psig and provide the resulting Table 2 pressures and the resulting capacity.
b) Please re-run the simulation with Rideau Heights set at 275 psig and with the NPS 16 proposed section reduced to NPS 12 and provide the resulting pressures at the stations in Table 2 and the resulting capacity (NB. Please provide the results even if the station inlet pressures drop below the constraints shown in Table 1 and/or capacity is 0).

c) With the NPS 16 reduced to NPS 12, what is the reduction in hourly demand required at the Rockcliffe control station to maintain contracted pressure of 175 psi?
   i) Please provide the inlet pressure to the Rockcliffe Control point to maintain 175 psi?
   ii) What would the cost be to install control valves that reduce/minimize the inlet pressure required?

Response

a) & b)
The outlet of Rideau Heights Station has a maximum operating pressure ("MOP") of 250 psig. As such, the scenario requested by FRPO is not possible and would not provide the OEB any useful information in deciding the current Application.

c) The reduction in hourly demand required at Rockcliffe Control to downsize the initial portion of NPS 16 is 32,500 m^3/hr.

   i) The minimum inlet pressure of Rockcliffe Control is 200 psig.

   ii) Reduction/minimization of the inlet pressure at the Rockcliffe Control point would not be made feasible simply by installing control valves to replace existing pressure regulating equipment.

   Rather, in order to reduce/minimize station inlet pressures, Enbridge Gas would need to: (i) complete a full evaluation of all existing equipment on site; (ii) acquire additional lands; (iii) relocate the station; and (iv) receive approval of the NCC for the same. The new station would require new components including but not limited to: pressure regulators/control valves; heaters; telemetry; and metering. Enbridge Gas anticipates that such a solution would cost between $8,000,000 - $10,000,000 and would do nothing to address the known integrity concerns of the existing St. Laurent pipeline system that are the subject of the current Application.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario ("FRPO")

INTERROGATORY

Reference:

Exhibit M, pg. 3

Preamble:

EGI evidence states: "*Based on Enbridge Gas's design day modeling for the pipelines proposed to be replaced by the Project, peak design day demand is 139,800 m3/h. Current capacity of the pipelines proposed to be replaced by the Project is 157,900 m3/h. Future capacity of the proposed pipelines is projected to be 155,300 m3/h. Enbridge Gas models capacities of the St. Laurent pipeline system as a whole for the purposes of determining peak design demand…*

…Using the best-case scenario of removing load from the end of the network/system, a reduction 32,500 m3/h is required to downsize the NPS 16 portion to NPS 12.."

We would like to understand more about the analysis that determined these values. For the interrogatories below, we refer to station inlet pressures collectively for the stations described in Table 1 & 2 of Exhibit I.FRPO.2 AND additionally the Rockcliffe Control Station.

Question:

For the contractual obligations to Gazifere:

a) Please confirm that there is an NPS 16 from the Rockcliffe Control point to the delivery point in Gazifere territory.
b) Where is the custody transfer point?
    i) Please confirm that is location where the minimum pressure requirement must be met.
c) What was the peak hourly volume assumed to be moving through the Rockcliffe Control station for the base simulation for the peak day capacity of 139,800 m3/hr?

d) Did EGI explore with Gazifere if that amount could be reduced by 16, 000 to 32,000 m3/hr?
   i) Please provide the correspondence (letter, email, etc.) for the inquiry and response?
e) For the scenario that includes the peak day, how much flow was assumed to move through the second, more easterly feed to Gazifere?
   i) Please provide the actual peak hour flow through both feeds (i.e., Rockcliffe and east feed) and the actual hourly flow that went through each for each of the last 3 years.
f) What is the design capacity of the easterly crossing?
   i) What is the constraint that limits the capacity?
   ii) What would be cost to increase the flow through that crossing to allow a reduction in the Rockcliffe crossing?

Response

a) Confirmed.

b) The custody transfer point of the NPS 16 pipeline to Gazifére is Gatineau Station in Gatineau, Quebec.

   i) Not confirmed. The minimum pressure requirement must be met on the inlet-side of the NPS 16 Ottawa River crossing.

c) Please see the response at Exhibit I.PP.3 b), for a breakdown of peak demand required to serve customers in each of Ottawa and Gatineau.

d) The proposed Project was designed to meet current firm contracted and general rate customer demands in both Ottawa and Gatineau. As far as Enbridge Gas is aware, Gazifére (an affiliate of Enbridge Gas) has no intentions to reduce its firm contractual demands for service from the Company under Rate 200 in the future.

e) Table 1 below provides the actual peak flow for the past 3 years for each crossing.

Table 1

Year	Jacques Cartier Station Flow NPS 16 Rockcliffe Crossing (m^3/h)	Gatineau Station Flow NPS 20 Orleans Crossing (m^3/h)
2020	34,982	51,119
2021	34,985	56,117
2022	37,248	65,224

While there are two Ottawa River crossings that supply Gazifére, the crossing from the Rockcliffe Control point is better suited to meet peak demands in Gatineau as it is located: (i) geographically closer, by approximately 11 km, to the point of supply in Ontario; and (ii) more centrally relative to customer demands within the Gazifère service territory in Gatineau. Moreover, Enbridge Gas understands that the crossing at Rockliffe is also needed for security of supply reasons by Gazifère, in case the Gazifère/NGTL XHP system ever sustains damage.

f) The capacity of the NPS 20 Orleans crossing to the east is approximately 123,750 m^3/h.

i) There are several factors that limit achieving this capacity. The primary factor is Gatineau Control Station located in the Gazifère service territory. The other factors include: (i) downstream system reinforcements required in Gazifère service territory to distribute the increased/incremental flow through Gatineau Control; and (ii) potential restrictions at Ottawa Gate.

ii) As stated in the response at Exhibit I.ED.13, a demand reduction of 32,500 m^3/h would be required to reduce the NPS 16 portion of the proposed Project to NPS 12. Shifting the 32,500 m^3/h to the NPS 20 Orleans Crossing would require reinforcement of the Gazifère system. While the Company has not completed a thorough analysis of such reinforcement, it expects that the loss of flow at Jacques Cartier Station would need to be replaced with an equivalent flow through Gatineau Control, and a project of approximately 4 km of NPS 12 plus significant station costs would be required to maintain consistent service to Gazifère.

Importantly, such a pipeline reinforcement would only provide enough incremental capacity to reduce the initial portion of the proposed Project from NPS 16 to NPS 12 and would not resolve the integrity concerns associated

with the ongoing deterioration and degradation of the existing St. Laurent pipeline system. As previously stated by Enbridge Gas in its response at Exhibit I.ED.12:

In Enbridge Gas's experience, the majority of costs associated with projects of this nature relate to labour and construction activities/equipment that would be incurred regardless of the ultimate size of pipeline installed.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario ("FRPO")

INTERROGATORY

Reference:

Exhibit M, pg. 7-8

Preamble:

EGI evidence states: "*Finally, the potential demand reductions cited, if realized: …*

(iv) in no way mitigate the increasing probability of critical system failure or the severity of consequences, including risks to public health and safety, resulting from the ongoing deterioration of the St. Laurent pipeline system.

We would like to understand what alternatives are available to reduce the possibility of failure and mitigate the on-going deterioration.

Question:

Has EGI studied or analyzed the possibility of adding or enhancing cathodic protection measures?

a) If so, what measures have been considered and what are the costs?
b) If not, why not?

Response

a) & b)
Please see the response at Exhibit I.Ottawa.8.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario ("FRPO")

INTERROGATORY

Reference:

Exhibit M, pg. 7-8

Preamble:

EGI evidence states: "*Finally, the potential demand reductions cited, if realized: …*

(iv) in no way mitigate the increasing probability of critical system failure or the severity of consequences, including risks to public health and safety, resulting from the ongoing deterioration of the St. Laurent pipeline system.

We would like to understand what alternatives are available to reduce the possibility of failure and mitigate the on-going deterioration.

Question:

Has EGI attempted to use in-line inspection to find discontinuities associated compression couplings as a manner of locating the couplings? Please explain.

Response

No. As described in both its pre-filed evidence at Exhibit B, and in its responses to interrogatories, the Company has repeatedly explained that the St. Laurent pipeline(s) system that is the subject of the current Application is not designed to facilitate in-line inspection ("ILI"). Further, in order to modify the existing pipeline(s) for the same, the Company must complete a total of 28 retrofits and install 10 in-line filters at a cost of approximately $30.2 million.[1]

Please also see the response at Exhibit I.STAFF.5, for the conclusions of the Company's assessment of the Retrofit + Repair Option.

[1] Exhibit B, Tab 1, Schedule 1, pp. 37-38

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario ("FRPO")

INTERROGATORY

Reference:

Exhibit M, pg. 7-8

Preamble:

EGI evidence states: "*Finally, the potential demand reductions cited, if realized: …*

(iv) in no way mitigate the increasing probability of critical system failure or the severity of consequences, including risks to public health and safety, resulting from the ongoing deterioration of the St. Laurent pipeline system.

We would like to understand what alternatives are available to reduce the possibility of failure and mitigate the on-going deterioration.

Question:

What other enhancements or improvements has EGI undertaken to reduce the risks and mitigate deterioration?

Response

Please see the response at Exhibit I.ED.10 c), for a description of the Company's ongoing operational activities and programs designed to mitigate against safety and reliability concerns in the short-term. Importantly, the measures described in that response do not address the ongoing deterioration and degradation of the existing St. Laurent pipeline(s) or the increasing risk to public health and safety (including the Company's ability to meet its obligation to safely and reliably meet the needs of its customers) that are the subject of the current Application.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence ("ED")

INTERROGATORY

Reference:

Exhibit M (EGI Reply Evidence), p. 2

Preamble:

Enbridge states:

> "The Sponsors claim that their plans may result in total annual natural gas reductions of up to 12,086 103 m3 in the area served by the Project by 2050.
> …
> The Sponsor's evidence is incongruent with the basic principles of natural gas system design in that it relies upon 2019 annual natural gas demand volumes to support its conclusions, whereas Enbridge Gas's pipeline systems are designed to serve the current peak design day demands of existing natural gas consumers."

Question:

(a) Please provide the annual demand (m3) and design day demand (m3/d) for the area served by the project. Please also express these as a ratio of annual demand to demand on a design day. Does Enbridge have any reason to believe that the ratio of annual demand to demand on a design day would differ as between the stock of all buildings in the area and those owned by the City of Ottawa?
(b) To assist us in assessing how consistently annual and design day demands track together, please complete the following table based on the latest Annual Gas Supply Plan Update.

	Annual Demand (m3)	Design Day Demand (m3/d)	Ratio of Annual Demand to Design Day Demand
Year 1			
EGD			
Union North West			
Union North East			
Union South			
… Year n[1]			
EGD			
Union North West			
Union North East			
Union South			

Response

(a) & (b)

Annual demand (m^3) and design day demand (m^3/d) are not incorporated into distribution system modelling. Rather the Company's distribution systems are designed to meet customers' firm demands on a peak hour basis (m^3/hr) for a design day condition. There is no direct correlation between annual demand (m^3), design day demand (m^3/d), and peak hour demand (m^3/hr) as each are highly dependent on temperature and individual customer demand profiles through the respective periods. Accordingly, the annual and design day demand information sought by ED is not relevant to the proposed Project and would provide no value to the OEB in assessing the need for or the design or scope of the same.

[1] The available information is likely 2020/21 to 2024/25 per the latest gas supply plan.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence ("ED")

INTERROGATORY

Reference:

Exhibit M (EGI Reply Evidence), p. 2-5

Question(s):

(a) Why has Enbridge expressed the design day demand as m3/h instead of m3/d?
(b) Please provide a list of the 5 most recent leave to construct applications and for each (i) indicate whether the design demands were described as m3/h or m3/d in Enbridge's evidence, and (ii) provide citations to where this is stated.
(c) What is the design day demand for the pipelines proposed to be replaced (m3/d)?
(d) What is the design day capacity of the pipelines to be replaced (m3/d)?
(e) Please recalculate Table 1 on page 4 as design day demand (m3/d).
(f) Please describe at a high level the instances in which Enbridge uses m3/h instead of m3/d for design demand calculations.

Response

(a) & (f)
Please see the response at Exhibit I.M.1.ED.21. The distribution system is designed to meet customers firm demand on a peak hour which is stated in m^3/hr. The peak hour is the highest hourly demand that occurs on the design day and is the standard for how distribution systems are designed. The transmission systems and gas supply plan are designed to meet customers firm demand on a design day which is stated in m^3/d.

(b) Enbridge Gas provided a table which included 8 recent leave to construct applications in its response to Interrogatories on December 13, 2021, at Exhibit I.STAFF.7 part a). All Projects identified in the table are distribution projects, and as such are designed based on the firm demand on peak hour basis (m^3/h) for a design day condition (consistent with the proposed Project).

For example, please see the Company's response to ED's interrogatories in the London Lines Replacement Project proceeding (EB-2020-0192) at Exhibit I.ED.5 where the Company states:

> Enbridge Gas conducted the analysis based on peak hour because all distribution pipeline systems are designed to meet customer requirements on a peak hourly basis, not on the basis of design day.[1]

Please also see the Company's pre-filed evidence in the Windsor Line Replacement Project proceeding (EB-2019-0172) at Exhibit C, Tab 3, Schedule 1, page 5, where the Company states:

> The Design Day demand is the peak hourly demand of the customers served by the pipeline.[1]

Enbridge Gas went on to provide the forecasted demand for the Windsor Line Replacement project in m^3/h in response to ED's interrogatories at Exhibit I.ED.6.

(c) - (e)

Please see the response at Exhibit I.M.1.ED.21. As described, the distribution system is designed to meet customers' firm demand on a peak hour (m^3/hr) which is its design day condition. Accordingly, the annual and design day demand information sought by ED is not relevant to the proposed Project and would provide no value to the OEB in assessing the need for or the design or scope of the same.

[1] [Emphasis Added]

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence ("ED")

INTERROGATORY

Reference:

Exhibit M (EGI Reply Evidence), p. 2

Question(s):

(a) The evidence from Ottawa states that: "The ESAP plans to reduce GHG emissions in the National Capital Region to 35% of 2005 baseline by 2025 and to less than 10% by 2030." Please quantify the impact of this on the St. Laurent pipeline expressed in terms of design day demand and annual demand (m3).
(b) The evidence from Ottawa describes plans to reduce consumption of fossil gas in Ottawa Community Housing to zero in 2040 (see e.g. page 8 of Ottawa's evidence). Please quantify the impact of this on the St. Laurent pipeline expressed in terms of design day demand and annual demand (m3).
(c) The evidence from Ottawa describes plans to reduce consumption of fossil gas in all City of Ottawa buildings to net-zero in 2040. Please quantify the impact of this on the St. Laurent pipeline expressed in terms of design day demand and annual demand (m3).
(d) What is the threshold (or thresholds) at which pipelines in question can be safely downsized?
(e) Please express the figures calculated pursuant to questions (a), (b), and (c) as a percent of the total demand on the St. Laurent pipeline, both design day demand and annual throughput.

Response

(a) The quote referenced by ED regarding the ESAP plans, which comes from the Sponsors' evidence, was made in isolation without significant qualification or details regarding: the specific sources of GHG emissions reductions (i.e., diesel, gasoline, heating oil, propane, or natural gas), actions taken to implement reductions, actual GHG emission reductions realized, approved funding to support such actions, or assessment of the impact of the same upon regional energy systems, residents, businesses and institutions.

The impact of GHG emissions reduction plans on future natural gas demands is dependent upon a variety of factors including but not limited to: (i) the source and precise timing of actual (not planned) emission reductions; (ii) availability of alternative energy sources; (iii) actual reductions in energy savings realized through approved programming or actions (including approved funding to realize the same); (iv) the use of renewable natural gas; and (iii) hydrogen (H_2) blending into the natural gas stream. Absent such details, it is not reasonably possible to accurately quantify the impacts on natural gas distribution systems, including the St. Laurent pipeline, on a forecast basis.

(b) & (c)
Please see the response at Exhibit I.M.1.ED.21.

(d) Please see the response at Exhibit I.ED.13.

(e) N/A.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence ("ED")

INTERROGATORY

Reference:

Exhibit M (EGI Reply Evidence), p. 4

Preamble:

Table 1: Peak Design Day Demand Reduction[5]

Customer Group	Peak Design Day Demand (m^3/h)
Cliff Street Heating	7,565
City of Ottawa Sites	667
OCHC Sites	1,797
Total	10,029

Footnote 5: Conservatively, the peak design day demand impacts in Table 1 were calculated using the assumption that demand reduction is 100% effective immediately, with no use of methane (including natural gas or renewable natural gas). The calculation also assumes that the demand reduction is located in the most optimal part of the St. Laurent pipeline system. Table 1 excludes peak design day demand for buildings cited in the Evidence where the Company was not able to confirm their address and location relative to the St. Laurent pipeline system. The volumes associated with these excluded buildings would not materially change the Company's conclusions regarding peak design day demand or the design of the Project.

Question(s):

(a) Please request a list of addresses of buildings owned by the City of Ottawa and calculate the gas demand (m3) from those buildings (e.g. from billing data) that are served by the St. Laurent pipeline both in terms of design day demand and annual demand. Please provide a complete breakdown on a building-by-building. Note that

we have asked Ottawa an interrogatory requesting that they provide this information to Enbridge.

(b) Please also describe how the design day demand was calculated in responding to (a) and include all calculations and equations. Please describe in detail how this exercise was conducted in comparison to Enbridge's methodology for design day forecasting as part of LTC applications (e.g. whether modelled data or actual billing data is used).

(c) Please provide a complete breakdown of the data underlying table 1 above. For each building, please also provide the annual demand.

Response

(a) As discussed in the response at Exhibit I.M.1.ED.21, the information sought by ED (annual and design day natural gas demand) is not relevant to the current proceeding or the design of the proposed Project. As stated in the Company's Reply Evidence:[1]

> While much is made in the Evidence of potential annual natural gas demand reductions, Enbridge Gas does not design its system based on forecasted annual demands. Further, when assessed on the basis of potential aggregate impact to peak design day demands the potential reductions contemplated in the Sponsors' Evidence do not justify a reduction in Project scope by even a single pipeline size. Finally, the potential demand reductions cited, if realized:
>
> (i) will in no way alter the operation of the St. Laurent pipeline system;
>
> (ii) do nothing to enhance or make the repair option considered by the Company more feasible;
>
> (iii) do not change the Company's conclusion that reactively repairing leaks/failures exposes ratepayers and the general public to an unacceptable level of risk;[10] and
>
> (iv) in no way mitigate the increasing probability of critical system failure or the severity of consequences, including risks to public health and safety, resulting from the ongoing deterioration of the St. Laurent pipeline system.

For these reasons, the Company respectfully declines ED's request.

(b) The information provided in Table 1 was calculated using actual billing data from the identified customers, projected for the peak design condition of -29°C (49 HDD). Please also see the response at Exhibit I.M.1.ED 21, for a description of Enbridge

[1] EB-2020-0293, Enbridge Gas Reply Evidence (2022-01-27), pp. 6-7

Gas designs its distribution systems and the response at Exhibit I.M.ED.25, for design day criteria used to determine peak requirements.

(c) The actual customer billing detail sought by ED, on a building-by-building basis, is commercially sensitive and unnecessary for making a determination regarding the current Application. As discussed in the response at part (b) above, Enbridge Gas makes system design decisions based on aggregated actual customer billing data. Accordingly, Enbridge Gas respectfully declines to provide the customer-specific details sought.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence ("ED")

INTERROGATORY

Reference:

Exhibit M (EGI Reply Evidence), p. 5

Preamble:

Enbridge states:

> As the Sponsors are opposed to the replacement Project which is required to ensure that the Company can safely and reliably meet the peak design day demands of existing customers served via the St. Laurent pipeline system, it is essential that the OEB also consider the scale of investment into construction of new electricity infrastructure that would be required to eliminate the same. The equivalent amount of energy from electricity required to replace the energy provided by the proposed Project over the course of 1 hour is approximately 1.64 GW.[2]
> …
> In other words, electricity generation, transmission and/or distribution infrastructure amounting to up to double the current peak demands for the City of Ottawa (served via Hydro Ottawa) or more than half of the generation capacity of the Pickering Nuclear Generating Station would need to be built and placed into service in order to eliminate the St. Laurent pipeline system.

Question(s):

(a) Enbridge describes the energy provided by the project as 1.64 GW. However, fossil gas is combusted at efficiencies less than 100% and therefore it generates less than 1.64 GW of heat. Approximately how many GW of heat would be generated by 1.64 GW of gas? Please provide an answer on a best estimate basis with whatever simplifying assumptions and caveats are necessary. For example, please consider any data that Enbridge has access to on average customer equipment efficiencies

[2] (155,300 m3/h × 1h × 37.98 MJ/m3) ÷ 3,600 MJ/MWh = 1,638.415 MW -or- 1.64 GW

for furnaces and water heaters. Please provide all calculations and explain the basis for the answer.

(b) The 1.64 GW figure is based on the capacity of the pipeline (155,300 m3/h), not the forecast demand. Enbridge states that the peak design day demand is 139,800 m3/h. Please calculate the energetic value (GW) of the peak hour demand of 139,800 m3/h and the heat that would be created via equipment of average efficiency (GW).

(c) What is the temperature and other criteria for design day demand calculations?

(d) Please confirm that the energy required for heating can be reduced through cost-effective energy efficiency measures, which pay for themselves over time in avoided energy costs.

(e) Please confirm that NRCan states that "On a seasonal basis, the heating seasonal performance factor (HSPF) of market available units can vary from 7.1 to 13.2 (Region V). It is important to note that these HSPF estimates are for an area with a climate similar to Ottawa."[3] Does Enbridge disagree with NRCan?

(f) Please confirm that HSPF 13.2 (region 5) is equivalent to a seasonal Co-efficient of Performance (sCOP) of 3.86. Please also confirm that the sCOP is the kWs of heat created by 1 kW of electricity input over an average heating season. Please also confirm that this is sometimes described as an efficiency of 386%. If any of this is not confirmed, please explain in detail and provide the correct answer.

(g) Please confirm that cold climate air-source heat pumps can have a COP greater than 2 even at -21 degrees Celsius.[4]

(h) Please confirm that NRCan states that the range of available ground-source heat pumps goes up to a heating COP of 4.2 for closed loop applications and 5 for open loop applications. [5]

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[3] https://www.nrcan.gc.ca/energy-efficiency/energy-star-canada/about/energy-star-announcements/publications/heating-and-cooling-heat-pump/6817

[4] E.g.
https://mylinkdrive.com/viewPdf?srcUrl=http://enter.mehvac.com.s3.amazonaws.com/DAMRoot/Original/10006\M_SUBMITTAL_MSZ-FS06NA_MUZ-FS06NAH_en.pdf
https://mylinkdrive.com/viewPdf?srcUrl=http://enter.mehvac.com.s3.amazonaws.com/DAMRoot/Original/10006\M_SUBMITTAL_MSZ-FS09NA_MUZ-FS09NAH_en.pdf
https://mylinkdrive.com/viewPdf?srcUrl=http://enter.mehvac.com.s3.amazonaws.com/DAMRoot/Original/10006\M_SUBMITTAL_MSZ-FS12NA_MUZ-FS12NAH_en.pdf
https://mylinkdrive.com/viewPdf?srcUrl=http://enter.mehvac.com.s3.amazonaws.com/DAMRoot/Original/10006\M_SUBMITTAL_MSZ-FS15NA_MUZ-FS15NAH_en.pdf
https://mylinkdrive.com/viewPdf?srcUrl=http://enter.mehvac.com.s3.amazonaws.com/DAMRoot/Original/10006\M_SUBMITTAL_MSZ-FS18NA_MUZ-FS18NAH_en.pdf

[5] https://www.nrcan.gc.ca/energy-efficiency/energy-star-canada/about/energy-star-announcements/publications/heating-and-cooling-heat-pump/6817

(i) Please confirm that a $10,000 incentive is available to customers in Quebec with fossil fuel based central heating (including fossil gas) to convert to an electric thermal storage system.[6]
(j) Please confirm that incentives are available in Nova Scotia for electric thermal storage systems.[7]
(k) Please confirm that electric thermal storage systems are intended to reduce peak electrical heating demand.
(l) Please provide any analysis that Enbridge is capable of generating on the degree to which Enbridge's calculation of 1.64 GW peak demand for electrifying the buildings in the project area would be decreased by accounting for following:
    i. The implementation of all cost-effective energy efficiency and demand management measures;
    ii. The efficiency levels of existing gas-fired equipment being less than 100%;
    iii. The efficiency levels of ground-source heat pumps being up to 500%;
    iv. The efficiency levels of the latest air-source heat pumps being up to 386% seasonally and around 200% at -20 Celsius; and/or
    v. The implementation of electric thermal storage to reduce peak demand.

(m) If Enbridge cannot provide the estimates described in the above question, please explain how it is qualified to opine on the feasibility of electrification or the transmission, distribution, and generation capacity that would be needed to replace the St. Laurent pipeline system.

Response

(a) It is not possible to accurately calculate the efficiency factor sought by ED as it is entirely dependent upon the specific appliances utilized by and consumption patterns of the thousands of customers (residents, businesses and institutions) currently served by the St. Laurent pipeline system. Absent this information, Enbridge Gas provided a direct energy conversion for illustrative purposes to the OEB to give a sense of scale.

One means by which ED might calculate appliance efficiencies might be to consider the current 95% efficiency rating of furnaces which would reduce the amount of energy from electricity required to replace the energy provided by the proposed Project over the course of 1 hour to approximately 1.56 GW.

[6] https://www.hydroquebec.com/residential/energy-wise/windows-heating-air-conditioning/thermal-storage/
[7] https://www.nspower.ca/your-home/energy-products/electric-thermal-storage

(b) The equivalent amount of energy from electricity required to replace the energy demand forecasted under design day conditions for the proposed Project over the course of 1 hour is approximately 1.47 GW.

Please see the response at part (a) above for discussion regarding the efficiency of natural gas consumption by customers in the area served by the proposed Project.

(c) The design day criteria used to determine peak requirements are:

- Design temperature condition = -29℃ (47 HDD);
- Firm contract demands On; and
- Interruptible customer demands Off.

(d) – (m)

Enbridge Gas respectfully declines to respond to ED's questions as they appear to exceed the scope of this proceeding. Enbridge Gas provided a direct energy conversion for illustrative purposes to the OEB to give a sense of scale of the energy delivered via its St. Laurent pipeline system, and thus the resulting importance of resolving the known integrity concerns that pose a serious threat to public health and safety, including the Company's obligation to serve the existing firm demands of its customers.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe ("PP")

INTERROGATORY

Question:

a) How many times has the area serviced by the St. Laurent pipeline met or exceeded design day conditions (i.e. 47 DD) in the past year?
b) How many times has the area serviced by the St. Laurent pipeline met or exceeded design day conditions (i.e. 47 DD) in the 10 years?
c) How many times has the area serviced by the St. Laurent pipeline met or exceeded design day conditions (i.e. 47 DD) in the 40 years?

Response

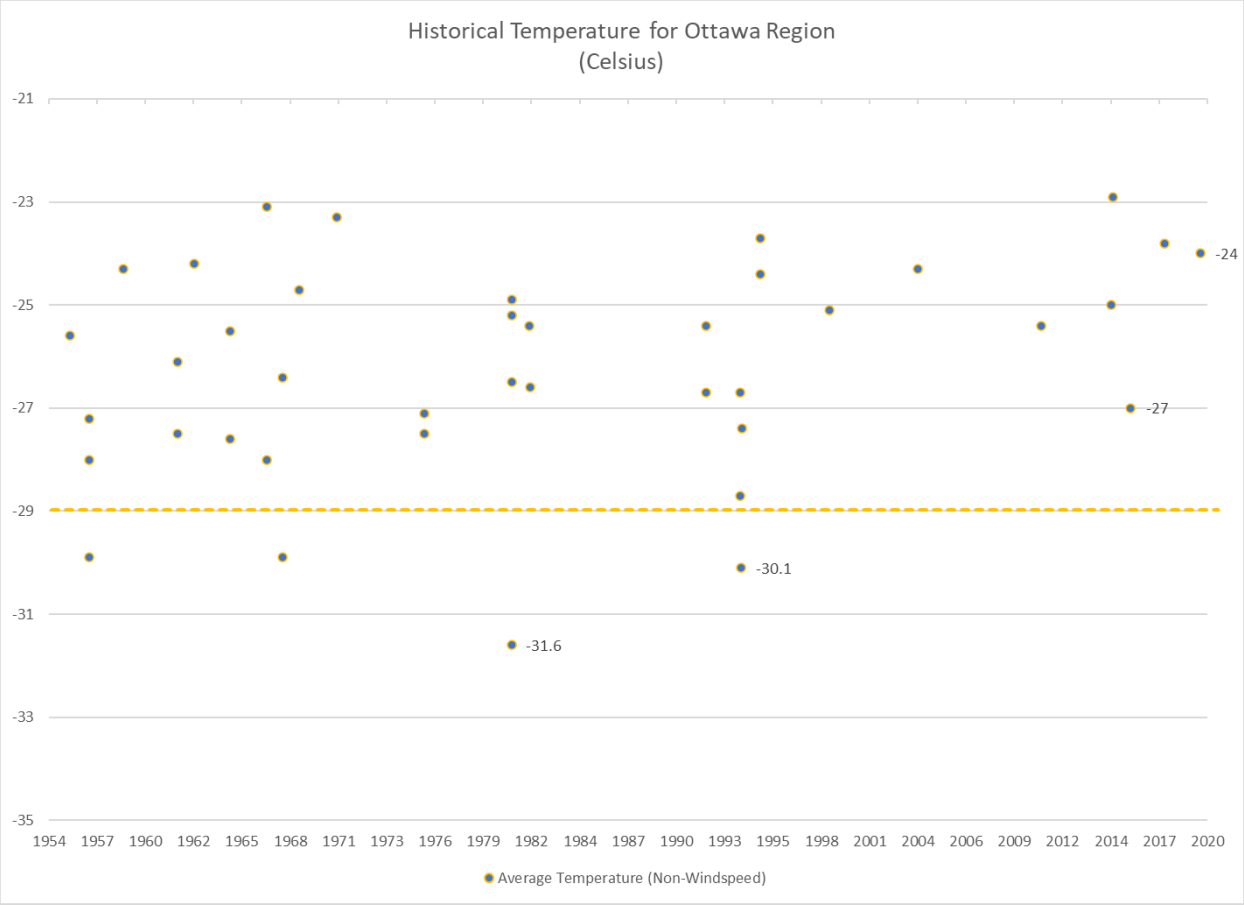
a) The design day condition of 47 HDD (-29˚C) was not met or exceeded in the past year. However, a temperature of -24˚C (42 HDD) was reached on February 12, 2022.

b) The design day condition of 47 HDD (-29˚C) was not met or exceeded in the past 10 years. However, a temperature of -27˚C (45 HDD) was reached on February 13, 2016.

c) The design day condition of 47 HDD (-29˚C) was exceeded twice in the last 40 years:
   - January 3, 1981: -31.6˚C (49.6 HDD); and
   - January 15, 1994: -30.1˚C (48.1 HDD).

   For further information, please see Figure 1 below which shows the 40 coldest temperatures in the Ottawa region from 1954-2020.

Figure 1: Historical Temperature for Ottawa Region



ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe ("PP")

INTERROGATORY

Question:

a) How many times has the St. Laurent pipeline met or exceeded it design day flow (i.e. 139,800 m3 /h) in the past year?
b) How many times has the St. Laurent pipeline met or exceeded it design day flow (i.e. 139,800 m3 /h) in the 10 years?
c) How many times has the St. Laurent pipeline met or exceeded it design day flow (i.e. 139,800 m3 /h) in the 40 years?

Response

a) - c)
It is not possible to provide the historical flow measurement requested by PP because the Company does not rely on (and thus does not maintain) such historical records for the purposes of designing its system. Rather, demand and capacity are calculated using a hydraulic model that relies upon continuously updated and validated gate station flows upstream and pressure monitoring points downstream of the St. Laurent pipeline(s) system. Similarly, flow demands from individual customers contained within that same hydraulic model are also continuously updated.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe ("PP")

INTERROGATORY

Question:

Please confirm that the design day assumptions and flow rate for the St. Laurent pipeline are based on the original design assumptions when the pipeline was designed and installed. If they have been updated with more recent information, please provide details on those updates and how they vary from the original design assumptions.

Response

Not confirmed. Enbridge Gas does not have a record of the original design assumptions and flow rate for the existing St. Laurent pipeline system.

Design methodologies have evolved since the St. Laurent pipeline(s) was originally installed in 1958, and as stated in the response at Exhibit I.M.1.PP.2, are continuously updated.

Currently, a sophisticated hydraulic modelling software is used to model the system which combines a number of inputs including weather data, detailed pipeline system attributes from a GIS system, and actual load demands from customer billing systems etc.

Please also see the response at Exhibit I.M.1.ED.25, for a description of the design day criteria used to determine peak requirements.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe ("PP")

INTERROGATORY

Question:

Please confirm that ex-franchise (e.g. Quebec) peak demand represents approximately 49% of the St. Laurent pipeline peak demand on a design day. If that is incorrect, please provide the correct percentage and information used to calculate the percentage.

Response

Not confirmed.

As discussed in the response at Exhibit I.PP.3 b), Gazifère demands in Gatineau, Québec represent approximately 29% of total peak demand during design day conditions.[1]

[1] 1,519 m^3/hr ÷ 5,206 m^3/hr

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe ("PP")

INTERROGATORY

Reference:

Attachment 1 – Quebec Fossil Fuel Ban

Question:

Quebec has announced a ban on fossil fuels starting with heating oil and expanding to all fossil fuels including natural gas by 2024. Please explain what considerations this would have for future natural gas demand from the St. Laurent pipeline feeding Quebec.

Response

The proposed Project was designed to meet current firm contracted and general rate customer demands. As stated in the response at Exhibit I.Ottawa.3, Enbridge Gas's OEB-approved demand forecasting methodology includes known and quantifiable data, such as: economic forecast data, public policy information, municipal planning data, individual customer data, tacit knowledge, and historical growth rates in geographic areas.

As of today, no legislation has been enacted to ban natural gas consumption by 2024 in the province of Québec. Enbridge Gas understands that heating oil consumers will no longer be permitted to convert from heating oil to fossil natural gas effective in 2024 but this will have no impact on actual/current demands for Gazifère (which is reliant upon the St. Laurent pipeline system for natural gas supply).

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition ("SEC")

INTERROGATORY

Reference:

[General, also p.5]

Question:

Please provide a detailed description of the ways in which the Applicant included planning reductions in use by major customers in its forecast of the future need for the St. Laurent pipelines. Please provide the original working papers, including all documents, memos, spreadsheets, models, and other materials that forecast declining use by major customers, and/or the impact of that declining use on the over forecast of total and peak demand on the St. Laurent pipeline.

Response

Please see the response at Exhibit I.Ottawa.3.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition ("SEC")

INTERROGATORY

Reference:

[p.3]

"Using the best-case scenario of removing load from the end of the network/system, a reduction 32,500 m3/h is required to downsize the NPS 16 portion of NPS 12."

Question:

Please provide a detailed explanation for the above conclusion, and include any data and calculations relied upon.

Response

As stated by the Company in its Reply Evidence, in order to reduce the initial portion of the proposed pipeline from NPS 16 to NPS 12 a reduction in system demand of 32,500 m^3/h is required at Rockcliffe Control.[1] If the reduction in demand was to occur at a location other than Rockcliffe Control (i.e., upstream), a larger reduction would be required dependent upon the location.

[1] The Company is unable to simply provide a calculation that totals the 32,500 m3/h reduction required to downsize the NPS 16 portion of the pipeline to NPS 12 because the reduction is an output from a hydraulic modeling software which, as described in the response at Exhibit I.M.1.PP.3, combines a number of inputs including from the Company's GIS system and customer billing systems.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition ("SEC")

INTERROGATORY

Reference:

[p.4, Table 1]

Question:

Please provide underlying data and calculations relied upon to reach the conclusions in the Table 1.

Response

Please see the response at Exhibit I.M.1.ED.24.