

ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act 1998*,
Schedule B, and in particular, section 90(1) thereof;

AMD IN THE MATTER OF the *Ontario Energy Board Act 1998*,
Schedule B, and in particular, section 36 thereof;

AND IN THE MATTER OF an Application by Union Gas
Limited for an Order or Orders granting leave to construct natural
gas pipelines and ancillary facilities in the Town of Milton and the
Town of Oakville;

AND IN THE MATTER OF an Application by Union Gas
Limited for an Order or Orders for approval of recovery of the cost
consequences of all facilities associated with the development of
the proposed Burlington Oakville Project.

CROSS-EXAMINATION COMPENDIUM OF THE SCHOOL ENERGY COALITION

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Counsel to the School Energy Coalition

1 Pipeline.⁴

2

3 There are three fundamental issues with the Alternative Proposal, which are discussed in more
4 detail later in this evidence:

5 1. The Alternative Proposal would disconnect the Burlington Oakville System from Dawn,
6 thus eliminating the benefits of the integrated Dawn Parkway System and the strategic
7 Dawn Hub.

8 2. The Alternative Proposal does not align with Union's Gas Supply Planning Principles as
9 it:

10 a. would move up to 77% of Union's upstream transportation and supply portfolio
11 away from Dawn, the number one market hub in the Great Lakes region, and
12 would force Union to rely on Niagara, which is the least liquid point in Union's
13 current supply portfolio;

14 b. cannot be operationalized without using additional assets, which when those costs
15 are incorporated, make the Alternative Proposal more expensive, not less
16 expensive, than the proposed Burlington Oakville Pipeline; and,

17 c. would decrease the diversity and security of Union's upstream transportation and
18 supply portfolio.

19 3. The Alternative Proposal omits the \$8.25 million annual cost of a contract with
20 TransCanada for 135 TJ/d of Kirkwall to the Amended Union CDA transportation
21 capacity ("Kirkwall Contract") to serve an area adjacent, but not attached, to the

⁴ EB-2014-0182 Technical Conference transcript, May 21, 2015, pp. 6-8

1 Burlington Oakville System.

2

3 The notion of using third party services, rather than Union's own facilities, is also counter to the
4 trend that Union has been following elsewhere on its system. Union has been working to move
5 Union South delivery obligations to Dawn, a change which has been requested repeatedly by
6 Union's customers. The Alternative Proposal, including contracting up to 77% of the upstream
7 supply portfolio at a single point, would require the reinstatement of vertical slice and/or
8 obligated deliveries at the Union CDA or Niagara. It is not equitable to require only sales service
9 customers to purchase such a large portion of supplies at Niagara to support all customers'
10 needs.⁵ The Alternative Proposal runs counter to what Union's customers actually want and what
11 was the result of the settlement regarding the elimination of the Parkway Delivery Obligation.⁶

12

13 In addition, both OGVG/FRPO and CME filed submissions in EB-2014-0289 (2014 Natural Gas
14 Market Review) which included comments on the Dawn Reference Price. In its submission
15 (dated January 16, 2015), OGVG/FRPO⁷ identified the merits of a Dawn Reference Price.
16 Although CME said there was not enough information presented to provide a position, CME did
17 agree that OGVG/FRPO made a persuasive case for changing the reference price location to

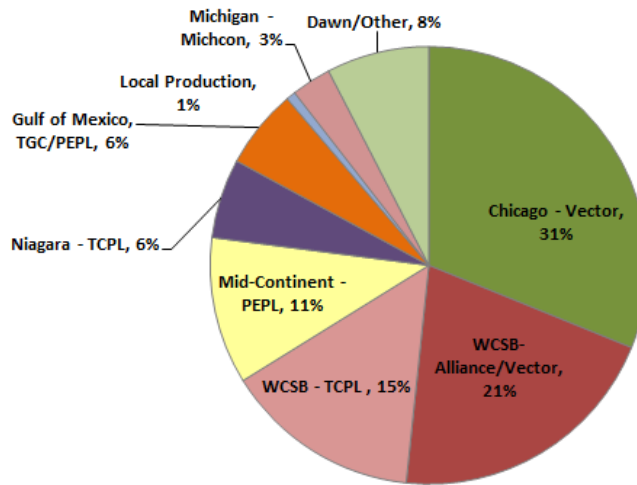
⁵ The Alternate Proposal is similar to Union disconnecting the Windsor/Leamington market from Dawn and requiring those customers to provide gas at Ojibway (Union's interconnection point with Panhandle Eastern Pipeline in Windsor).

⁶ The Parkway Delivery Obligation has been the subject of numerous contentious regulatory proceedings. In 2014, after lengthy discussions, Union and intervenors agreed to a process that will result in the elimination of the Parkway Delivery Obligation. The agreement was filed on June 3, 2014 and approved by the Board as part of EB-2013-0365 (Union's 2014 Rates proceeding) in a decision issued June 16, 2014.

⁷ FRPO – Federation of Rental-housing Providers of Ontario

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Figure 3-2
January 2015 South Portfolio

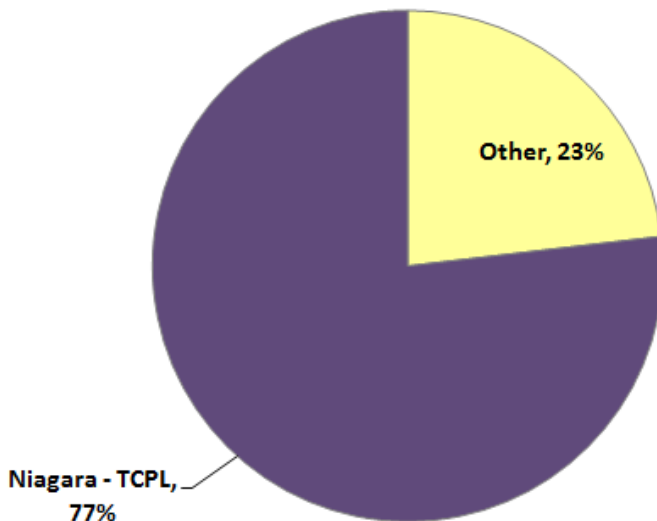


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5 Figure 3-3 below demonstrates how the current Union South upstream transportation portfolio
6 would look if 276 TJ/d of supply was contracted at Niagara. In order to do so, Union would
7 have to reduce or terminate transportation capacity contracted with most of the upstream
8 pipelines that currently serve the Union South sales service portfolio leaving only 23% of the
9 Union South portfolio contracted outside of Niagara.

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Figure 3-3
Projected Portfolio as per the Alternative Proposal



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OGVG/CME state that the Alternative Proposal will allow Union to “*encourage new sources of supply as well as new infrastructure to Union's service territory*”¹⁸. This assertion is somewhat misleading as infrastructure exists to and from Niagara and it is a source of supply today for Union and its customers. Union currently contracts for 21 TJ/d of upstream transportation capacity from Niagara to Kirkwall.

10 In their interrogatory response, OGVG/CME asserts that Union should apply for pre-approval of
11 the new Niagara contract(s) that would result from the Alternative Proposal¹⁹. Union had
12 previously applied for pre-approval of the 21 TJ/d long term TransCanada contract in 2010 (EB-
13 2010-0300). In that proceeding, the Board ruled that this path is not considered new

¹⁸ OGVG/CME Alternative Proposal, p. 6, paragraph 16
¹⁹ OGVG/CME response to Board Staff interrogatory 5 a)

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition (“SEC”)

Reference: Exhibit C, pp.17-18

Union states that the Alternative Proposal would move up to 77% of Union’s upstream transportation and supply portfolio away from Dawn.

- a) If the proposed facilities are approved, what percentage of Union’s forecasted upstream transportation and supply portfolio would not be connected to Dawn in 2016 and 2035?
- b) In the Alternative Proposal, what percentage of Union’s forecast upstream transportation and supply portfolio would not be connected to Dawn in 2016, and 2035?

Response:

- a) If Union’s proposed facilities are approved and in service for November 1, 2016, 100% of the Union South portfolio would be connected to Dawn (and Union’s storage) either directly or via Union’s transmission systems. This includes Union’s Niagara to Kirkwall transportation contract which connects to Dawn through the Dawn Parkway System. Union does not have forecast information out to 2035.
- b) For the Alternative Proposal, Figure 3-3 on page 18 of Exhibit C illustrates that for 2016, 77% of the Union South portfolio would be sourced from Niagara which, as explained in Exhibit C, would be disconnected from Union’s storage and transmission system, including the Dawn Hub. The Alternative Proposal suggests using a Niagara to Union CDA transportation service that would not connect to the Dawn Parkway System. Therefore only 23% of the Union South supply would be connected to Dawn (and Union’s storage). Union does not have forecast information out to 2035.

Figure 3-1
Measures of Liquidity at Niagara and Dawn

Platts Average Daily Traded Volumes (GJ/day)				
	2012	2013	2014	2012-2014 Average
Dawn Hub	686,156	661,101	665,151	670,803
Niagara	10,238	<1	3	3,414

(Source: Platts, May 28th 2015)

Average Number of Daily Transactions				
	2012	2013	2014	2012-2014 Average
Dawn Hub	66	60	68	65
Niagara	<1	<1	<1	<1

(Source: NGI, May 28th 2015)

Figure 3-1 demonstrates that Niagara is far less liquid than the Dawn Hub. From Figure 3-1, it is clear that daily transacted quantities are far greater at Dawn than Niagara (670,803 GJ/d vs. 3,414 GJ/d, respectively): As well, the number of daily transactions at Dawn are far greater than at Niagara (on average 65 at Dawn vs. less than 1 at Niagara).

Since Union began purchasing supplies at Niagara in 2012, an average of only three parties have responded to each Request For Proposal that Union has issued. The lack of counterparties, and liquidity, at Niagara becomes an even larger issue as the quantity being purchased increases.

UNION GAS LIMITED

Answer to Interrogatory from
Board Staff

Reference: Union's Reply Evidence, Exhibit C /page 2/ lines 14-18

In the event that the Burlington-Oakville project is not approved, what would be the implications, financial or otherwise of Union's proposed plan to contract for capacity on the NEXUS pipeline?

Response:

The need for the proposed Burlington Oakville Pipeline is independent of Union's plan to contract for capacity on the NEXUS pipeline. As stated at Exhibit C, page 2, lines 11-12, "...supply is not the issue that Union is addressing through the proposed Burlington Oakville Pipeline." The proposed Burlington Oakville Pipeline is simply a reinforcement of the high pressure distribution system that is currently being served in part through contracted third party services and that serves a rapidly growing market.

As noted at Exhibit A, Tab 7, page 16, the proposed Burlington Oakville Pipeline provides the required capacity to meet the long term design day demands of the Burlington Oakville System at the lowest cost to Union's ratepayers.

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**Figure 5-1
 Union's Adjustments to the Alternative Proposal**

	Operational Issues with Alternative Proposal	Union's Variation of the Alternative Proposal
1	The Alternative Proposal would disconnect the Burlington Oakville System from Dawn. To properly serve the heat sensitive Burlington Oakville System and avoid the need to purchase variable supply, access to Dawn storage is required.	Include both Union and TransCanada firm transportation assets that would be required for the Niagara supply to have access to Dawn.
2	The Alternative Proposal over-supplies the Burlington Oakville System. A more appropriate way to operationalize the Alternative Proposal is to buy the average day amount rather than the design day amount.	Reduce volumes contracted at Niagara to the average day requirements of the Burlington Oakville System and use assets to connect the Burlington Oakville System to Dawn. This is the way Union currently buys supply and is the way other bundled direct purchase customers (i.e. greenhouses and manufacturing plants) procure their gas.
3	The Alternative Proposal omits the \$8.25 million annual cost of the Kirkwall Contract.	Include \$8.25 million annual cost of the Kirkwall Contract into the economic evaluation of the Alternative Proposal.
4	The Alternative Proposal suggests that Union should no longer use the 54 TJ/d of capacity that is provided by the existing NPS 8 Milton Line and the NPS 12 Parkway Line between the Dawn Parkway System and Burlington Oakville System. If Union were to no longer flow gas from the Dawn Parkway System into those pipelines as suggested by the Alternative Proposal, the operating pressure of the NPS 8 Milton Line would decrease resulting in the loss of approximately 1/3 of its original capacity. Since the NPS 8 Milton Line serves a growth area on Union's system, decreasing capacity does not make sense.	Use the NPS 8 Milton Line and NPS 12 Parkway Line to flow 54 TJ/d from the Dawn Parkway System into the Burlington Oakville System.
5	The Alternative Proposal assumes that quantities greater than 200 TJ/d can be	Use Kirkwall to Parkway path to evaluate the Alternative Proposal.

shipped from Niagara to Parkway using the Domestic Line. TransCanada has confirmed that 200 TJ/d is the maximum capacity and that incremental capacity requests would use the Kirkwall to Parkway path.	
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 2 As mentioned previously, Union contracts for its Union South upstream transportation capacity
 3 based on average day demands, similar to other bundled direct purchase customers. Daily and
 4 seasonal demand swings are managed by using Dawn storage. To explain the scenario described
 5 in Figure 5-3, the following assumptions in Figure 5-2 are based on Burlington Oakville System
 6 demands forecasted in 2035:²⁷

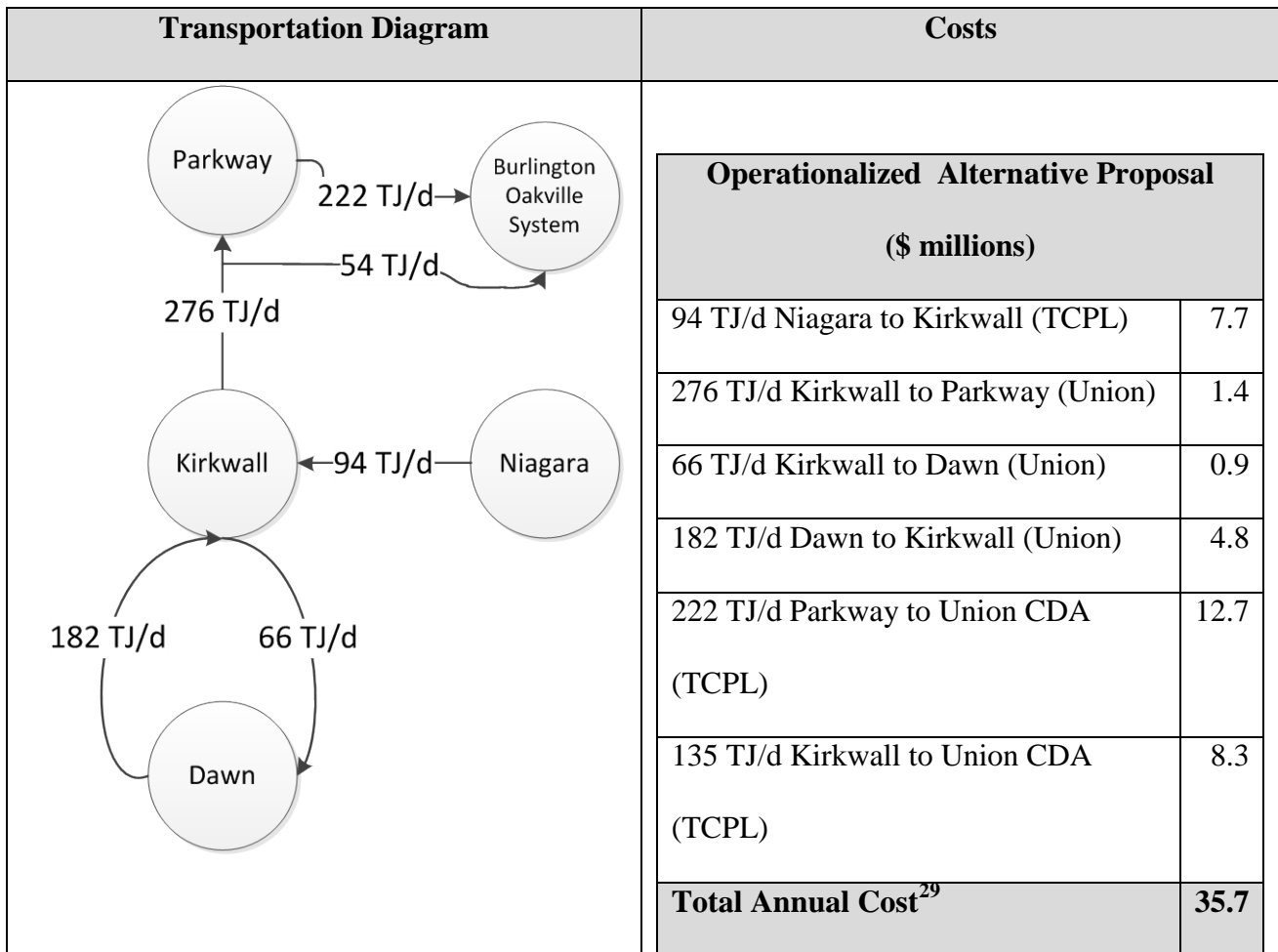
7 **Figure 5-2**
 8 **Assumptions for Operationalizing the Alternative Proposal**
 9 **(Forecasted in 2035)**
 10

Design Day Demand	276 TJ/d
Annual Average Demand	94 TJ/d
Minimum Summer Demand	28 TJ/d

11
 12 Under this scenario, Union would contract 94 TJ/d of TransCanada Niagara to Kirkwall
 13 transportation capacity to meet the average day demands of the Burlington Oakville System.
 14 Contracting the capacity to Kirkwall will get the gas into the Dawn Parkway System and allow
 15 Union to leverage the integrated assets at Dawn. Union would use the Niagara to Kirkwall
 16 transportation capacity at 100% load factor throughout the year. Union would then require firm

²⁷ For the purpose of this comparison, the annual average demand was estimated as 34% of design day demand, while the minimum summer demand was estimated as 10% of design day demand.

**Figure 5-3
 Operationalized Alternative Proposal (2035)**



4

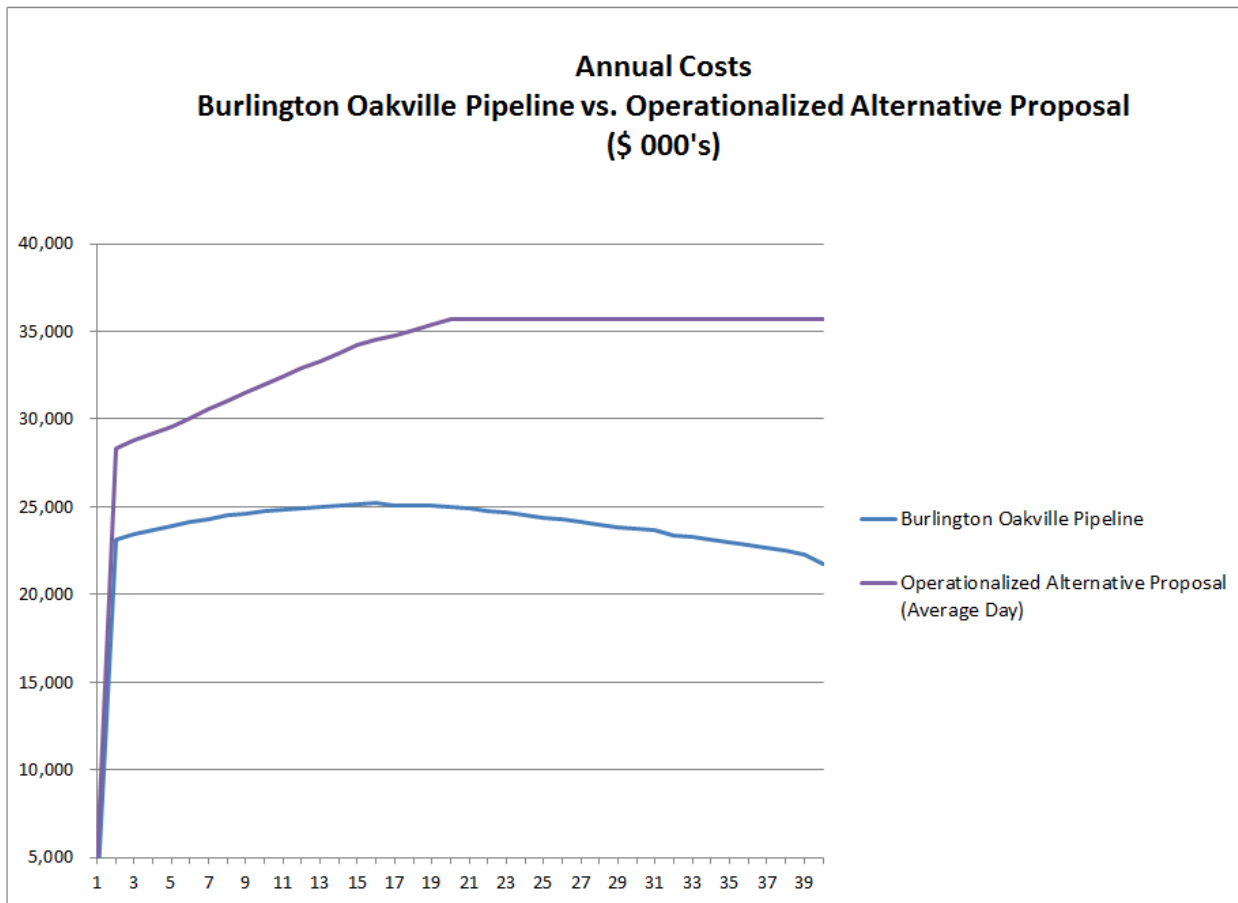
5 When all costs are considered, this variation to the Alternative Proposal results in annual costs
 6 \$9.7 million higher than the proposed Burlington Oakville Pipeline (\$35.7 million - \$26.04
 7 million = \$9.7 million).

8

²⁹ Total Annual Cost is the same if 182 TJ/d of Dawn to Parkway capacity and 94 TJ/d of Kirkwall to Parkway capacity is held (same cost as segmented capacity in the diagram).

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Figure 5-4



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4 As demonstrated in Figure 5-4, the annual cost of the Burlington Oakville Pipeline is less than
5 the annual cost of the operationalized Alternative Proposal in all years.

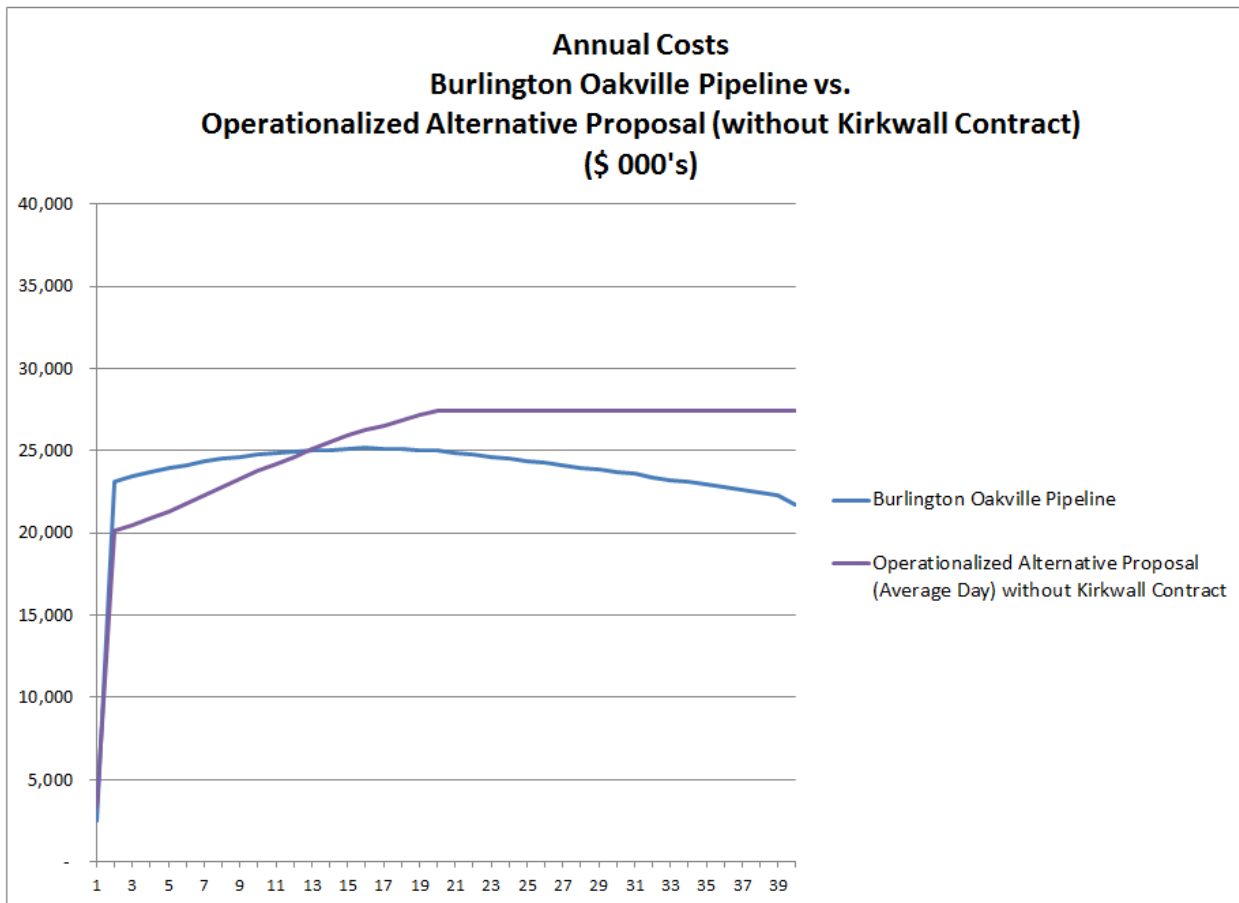
6

7 In the unlikely event that TransCanada does not require Union to hold the Kirkwall Contract if
8 the proposed Burlington Oakville Pipeline is not approved, Union has also provided Figure 5-5
9 below. This figure provides a conservative comparison between the proposed Burlington
10 Oakville Pipeline and the operationalized Alternative Proposal without the Kirkwall Contract.

11 (see section 4).

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Figure 5-5



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4 Although the annual cost of the proposed Burlington Oakville Pipeline is higher than the
5 Alternative Proposal in 2016, the annual cost of the proposed Burlington Oakville Pipeline
6 becomes less starting in 2029 as the revenue requirement of the pipeline continues to decrease
7 and the amount of transportation services increase with design day growth. The difference
8 between the annual cost of the proposed Burlington Oakville Pipeline and the operationalized
9 Alternative Proposal (without the Kirkwall Contract) continues to grow to 2035.

10

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**2015/16 Gas Supply Plan Memorandum
 Appendix B**

Union Gas Limited - System Sales Supply Demand Balance - November 2015 to October 2016

Particulars (TJ)	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Total
South													
Demands													
System Sales	13,010	19,341	22,219	20,568	17,372	10,956	6,132	3,004	3,171	3,073	4,347	7,886	131,079
South Co. Use, UFG, Comp. Fuel	874	1,017	1,416	1,587	1,010	646	330	357	472	488	696	651	9,543
Less: Customer Supplied Fuel	(795)	(691)	(1,041)	(735)	(647)	(429)	(216)	(341)	(334)	(278)	(477)	(788)	(6,770)
Total Demands	13,089	19,667	22,594	21,419	17,735	11,174	6,246	3,021	3,309	3,282	4,566	7,749	133,853
Supplies													
TCPL Empress-Union CDA	1,506	1,556	1,556	1,455	1,555	1,509	1,560	1,509	1,560	1,560	1,509	1,560	18,394
Alliance/Vector	2,242	-	-	-	-	-	-	-	-	-	-	-	2,242
Vector	3,346	3,434	3,434	3,213	3,434	3,323	3,434	3,323	3,434	3,434	3,323	3,434	40,568
TCPL Niagara-Kirkwall	633	654	654	612	654	633	654	633	654	654	633	654	7,723
Trunkline	633	654	654	612	654	633	654	633	654	654	633	654	7,723
Panhandle	1,171	1,210	1,210	1,132	1,210	1,171	1,210	1,171	1,210	1,210	1,171	1,210	14,288
Local Production	44	45	45	42	45	44	45	44	45	45	44	45	533
DTE	317	2,289	2,289	2,142	2,289	2,216	2,289	2,216	2,289	2,289	2,216	2,289	25,131
Market Based Transport	633	654	654	612	654	633	654	633	654	654	633	654	7,723
Dawn	671	693	693	649	693	781	807	781	807	807	781	807	8,972
Total Supplies	11,190	11,190	11,190	10,468	11,190	10,943	11,308	10,943	11,308	11,308	10,943	11,308	133,297
Change in Inventory - wd/(inj)	1,895	8,476	11,404	10,951	6,545	231	(5,062)	(7,922)	(7,999)	(8,026)	(6,377)	(3,559)	555
Total Supplies + Inventory Change	13,089	19,667	22,594	21,419	17,735	11,174	6,246	3,021	3,309	3,282	4,566	7,749	133,853
North													
Demands													
System Sales	361	505	634	529	442	284	173	78	77	73	120	219	3,494
Union NCDA	1,263	1,751	2,172	1,819	1,550	1,013	612	276	278	268	424	762	12,189
Union EDA	52	75	93	79	66	42	24	11	10	10	15	31	508
Union MDA	1,468	2,084	2,720	2,152	1,817	1,162	699	360	323	300	482	944	14,511
Union NDA	644	668	887	615	571	360	229	169	427	153	283	380	5,389
Union SSMIDA	838	1,177	1,546	1,249	1,030	680	421	217	208	186	279	491	8,322
Union WDA	9	2	7	5	3	14	32	30	31	31	30	31	225
North Comp Fuel	4,636	6,262	8,059	6,448	5,479	3,556	2,190	1,141	1,354	1,022	1,634	2,858	44,639
Supplies													
TCPL Empress-Union NCDA	159	164	163	152	-	65	67	65	67	67	65	67	1,100
TCPL Empress-Union EDA	1,298	1,342	1,342	1,256	-	30	31	30	31	31	30	31	5,452
TCPL Empress-Union MDA	55	82	103	85	70	43	21	5	3	3	9	28	508
TCPL Empress-Union NDA	1,194	1,233	1,237	1,156	1,216	1,084	1,120	1,084	1,120	1,120	1,084	1,120	13,770
TCPL Empress-Union SSMIDA	151	156	156	146	-	152	157	109	157	81	152	157	1,572
TCPL Empress-Union WDA	980	1,304	1,304	1,220	126	784	470	211	190	171	284	552	7,593
TCPL Parkway-Union EDA	-	-	-	-	-	1,402	1,448	1,402	1,448	1,448	1,402	1,448	9,998
TCPL Parkway-Union NDA	-	-	-	-	-	108	112	108	112	112	108	112	772
Dawn North	-	-	-	-	-	514	531	514	531	531	514	531	3,666
Total Supplies	3,837	4,281	4,305	4,015	1,412	4,181	3,957	3,528	3,660	3,564	3,647	4,046	44,432
Change in Inventory - wd/(inj)	799	1,981	3,754	2,433	4,067	(626)	(1,766)	(2,387)	(2,306)	(2,542)	(2,013)	(1,188)	206
Total Supplies + Inventory Change	4,636	6,262	8,059	6,448	5,479	3,556	2,190	1,141	1,354	1,022	1,634	2,858	44,639
Total Demands													
South	13,089	19,667	22,594	21,419	17,735	11,174	6,246	3,021	3,309	3,282	4,566	7,749	133,853
North	4,636	6,262	8,059	6,448	5,479	3,556	2,190	1,141	1,354	1,022	1,634	2,858	44,639
Total Supplies	17,725	25,928	30,653	27,868	23,214	14,730	8,437	4,162	4,663	4,304	6,200	10,607	178,491
Change in Inventory - wd/(inj)													
South	1,895	8,476	11,404	10,951	6,545	231	(5,062)	(7,922)	(7,999)	(8,026)	(6,377)	(3,559)	555
North	799	1,981	3,754	2,433	4,067	(626)	(1,766)	(2,387)	(2,306)	(2,542)	(2,013)	(1,188)	206
	2,694	10,457	15,157	13,384	10,611	(395)	(6,828)	(10,310)	(10,305)	(10,567)	(8,390)	(4,747)	762
Total Supplies + Inventory Change	17,725	25,928	30,653	27,868	23,214	14,730	8,437	4,162	4,663	4,304	6,200	10,607	178,491

**Gas Supply Plan Memorandum
 Appendix D**

UNION GAS LIMITED

**Summary of November 1, 2015 Upstream Transportation Contracts
 as at September 2015**

Southern Operations Areas

Line No.	Upstream Pipeline	Primary Receipt Point	Primary Delivery Point	Contract Quantity	Contract Units	Contract Termination Date	Unitized Demand Charge (\$Cdn/GJ)	Commodity Charge (\$Cdn/GJ)	100% LF Toll (\$Cdn/GJ)	Rate Type
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h=f+g)	
TransCanada Pipeline										
1	Dawn to Union CDA FT	Dawn	Union CDA	60,000	GJ	31-Oct-2017	0.330		0.330	Tariff
2	Empress to Union CDA FT	Empress	Union CDA	46,682	GJ	31-Oct-2017	1.939		1.939	Tariff
3	Empress to Union CDA FT	Empress	Union CDA	20,645	GJ	31-Dec-2017	1.939		1.939	Tariff
4	Niagara to Kirkwall	Niagara	Kirkwall	21,101	GJ	31-Oct-2022	0.228		0.228	Tariff
5	TCPL FT - Total			148,428	GJ					
Alliance Pipelines/Vector Pipelines										
6	Alliance	Northern Alberta	Cdn/US Interconnect	2,266.2	103M3	30-Nov-2015	0.939		0.939	Tariff
7	Alliance (L.P.)	Cdn/US Interconnect	Vector	80,000	MCF	30-Nov-2015	0.692		0.692	Tariff
8	Vector (L.P.) FT1	Chicago	Cdn/US Interconnect	80,000	DTH	30-Nov-2018	0.287	0.002	0.289	Fixed
9	Vector Canada FT1	Cdn/US Interconnect	Dawn (Union)	84,405	GJ	30-Nov-2018	0.019	0.000	0.019	Fixed
10	Alliance/Vector - Total			84,405	GJ		1.936	0.002	1.939	
Panhandle Eastern Pipe Line Field Zone										
11	PEPL FT	Panhandle Field Zone	Ojibway (Union)	25,000	DTH	31-Oct-2017	0.529	0.054	0.584	Tariff
12	PEPL EFT	Panhandle Field Zone	Ojibway (Union)	2,000	DTH	31-Oct-2017	0.399	0.054	0.454	Fixed
13	PEPL FT	Panhandle Field Zone	Ojibway (Union)	10,000	DTH	31-Oct-2016	0.529	0.054	0.584	Tariff
14	PEPL - Total			39,037	GJ					
Trunkline Gas Company/Panhandle Eastern Pipe Line										
15	Trunkline FT	East Louisiana	Bourbon	20,467	DTH	31-Oct-2017	0.144	0.018	0.161	Fixed
16	PEPL EFT	Bourbon	Ojibway (Union)	20,000	DTH	31-Oct-2017	0.093	0.015	0.108	Fixed
17	TGC/PEPL FT - Total			21,101	GJ		0.237	0.033	0.270	
Vector Pipelines										
18	Vector (L.P.) FT1	Chicago	Cdn/US Interconnect	81,000	DTH	30-Nov-2015	0.312	0.002	0.314	Fixed
19	Vector Canada FT1	Cdn/US Interconnect	Dawn (Union)	85,460	GJ	30-Nov-2015	0.000	0.000	0.000	Fixed
20	Vector - Total			85,460	GJ		0.312	0.002	0.314	
21	Vector (L.P.) FT1	Chicago	Cdn/US Interconnect	25,000	DTH	31-Oct-2017	0.225	0.002	0.227	Fixed
22	Vector Canada FT1	Cdn/US Interconnect	Dawn (Union)	26,376	GJ	31-Oct-2017	0.010	0.000	0.010	Fixed
23	Vector - Total			26,376	GJ		0.235	0.002	0.237	
Michigan Consolidated Gas Company (MichCon)										
24	MichCon	MichCon Generic	St. Clair (Union)	10,000	DTH	31-Oct-2016	0.004		0.004	Fixed
25	MichCon	MichCon Generic	St. Clair (Union)	60,000 *	DTH	31-Oct-2018	0.006		0.006	Fixed
26	MichCon - Total			73,854	GJ					
27	Market Based Transportation	Dominion South Point	Union Dawn	20,000	DTH	31-Oct-2016	1.568		1.568	Fixed
28	Market Based Transportation - Total			21,101	GJ					
Other:										
29	St.Clair Pipelines L.P. (St.Clair Pipeline)	St. Clair/Intl Border	St. Clair/Intl Border	214,000	GJ	31-Oct-2023	0.004		0.004	Fixed
30	St.Clair Pipelines L.P. (Bluewater Pipeline)	Bluewater/Intl Border	Bluewater/Intl Border	127,000	GJ	31-Oct-2023	0.022		0.022	Fixed

* Contract start date is December 1, 2015

Exchange Rate 1 US = 1.3157 CAD
 Conversion Factor 1.055056
 Heat Content (as of April 1/15) 38.55

Bank of Canada USD Close August 31, 2015

Questions for TCPL:

1) If Union seeks a new FT contract from Niagara to ECDA totalling 276 TJ/day:

a) Please confirm that TCPL will not need to build any new pipeline or compression facilities between Niagara and ECDA to provide the new FT service

Response: Confirmed. The Settlement Agreement recognized that 200 TJ/d of transportation capacity would be offered to the market on the path from Niagara to Enbridge Parkway CDA using TransCanada's Domestic Line. Enbridge successfully bid on this capacity in TransCanada's 2015 new capacity open season. The facilities required to provide this service were the subject of the recently approved Greater Golden Horseshoe Project and included modifications to facilities between Niagara/Chippawa and Parkway on TransCanada's Domestic Line. No further capacity is available on this path from TransCanada using the Domestic Line without facility expansion. Any additional capacity required on this path would flow from Niagara to Kirkwall to Parkway to Union ECDA.

b) Please provide a high level cost estimate for modifications required to provide the new FT service.

Response: With the work that is currently being done by Union and TCPL at the new Parkway West site, no additional cost would be incurred to flow 276 Tj/day on the Niagara to Kirkwall to Parkway to Union ECDA path.

c) If the estimated costs are significant, how much of the 276 TJ/day could be provided without any significant costs?

Response: There is no expected capital cost (see b) to flow additional volumes on the Niagara to Kirkwall to Parkway to Union ECDA path. TransCanada's toll is the same from Niagara/Chippawa to Union ECDA whether using: i) the TransCanada Domestic Line from Niagara/Chippawa to Union ECDA; or ii) using the path from Niagara/Chippawa to Kirkwall on TransCanada, Kirkwall to Parkway on Union's Dawn Parkway System and then Parkway to Union ECDA on TransCanada.

2) Will TCPL be able to provide the new FT contract beginning November 1, 2016?

Response: Provided Union can provide the incremental Kirkwall to Parkway capacity, TCPL can provide the service effective Nov 1, 2016 on the Niagara/Kirkwall/Parkway/ECDA path. Union will be using the Kirkwall to Parkway path (as part of the Dawn to Parkway path) as described in Union's application. To the extent that Union does not build the Burlington to Oakville pipeline, capacity would be available on Nov 1, 2016 for others.

3) If TCPL is unable to provide the new FT contract beginning November 1, 2016:

a) Please provide the earliest date the new FT contract can begin

Response: See response to 2) above.

b) Please confirm that a temporary bridging mechanism can be discussed between TCPL and Union for the period between November 1, 2016 and the earliest date the new FT contract can begin.

Response: See response to 2) above.

4) Please provide the MAOP of the Domestic Line between MLV 209 and MLV 207.

Response: The MOP of the Domestic Line between MLV 209 and MLV 207 is 4480 kPag (650 psig).

UNION GAS LIMITED

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

Reference: page 29, Figure 5-5

- a) Please provide all of the assumptions and costs that went into this depiction of the comparative assessment.
- b) Using the data from the May 2015 Transportation Contracting Analysis (from EB-2015-0166), please provide the respective annual costs for gas supply of 150 TJ/day sourced at Niagara vs. via Nexus
 - i) for the first five years starting in 2017
 - ii) the average annual cost over the 20 years starting in 2017

Response:

- a) Please see Attachments 1, 2 and 3.

Attachment 1 – Burlington Oakville Pipeline Annual Revenue Requirements
Attachment 2 – Calculation of Costs (Burlington Oakville Pipeline) – Alternative Proposal Adjusted for Operations
Attachment 3 – Comparison of Proposed Project (Build) vs. Alternative Proposal

The TransCanada tolls used are the Settlement tolls effective January 1, 2015. This is the same data used by Ms. Aggie Cheung for the Alternative Proposal.

Noted below are the line numbers of Attachment 3 that the charts were created from.

	Data for Figure 5-4	Data for Figure 5-5
Union Build	Line 4	Line 13
Alternative Proposal	Line 11	Line 17

- b) The information requested is not relevant to EB-2014-0182. The proposed Burlington Oakville Pipeline is independent of Union's proposed NEXUS contract and the May 2015 Transportation Contracting Analysis (EB-2015-0166). The annual costs for gas supply at Niagara versus NEXUS is not relevant to meeting the design day demands of the Burlington Oakville System and are not relevant to any commercial alternatives evaluated by Union.

**Burlington Oakville Pipeline
 Annual Revenue Requirements**

Line	(\$000's CDN except for tolls \$(GJ))	2016 1	2017 2	2018 3	2019 4	2020 5	2021 6	2022 7	2023 8	2024 9	2025 10
Rate Base Investment											
1	Capital Expenditures	117,710	1,767	-	-	-	-	-	-	-	-
2	Cummulative Capex	117,710	1,767	-	-	-	-	-	-	-	-
3	Average Investment	13,584	116,312	114,697	112,290	109,882	107,475	105,067	102,659	100,252	97,844
Total Cost of Service											
4	Operating Costs:										
5	O&M Expenses	3	16	16	17	17	17	18	18	18	19
6	Depreciation Expense	1,186	2,390	2,408	2,408	2,408	2,408	2,408	2,408	2,408	2,408
7	Municipal Taxes	20	117	120	122	125	127	130	132	135	138
8	Total Operating Costs	1,208	2,523	2,544	2,546	2,549	2,552	2,555	2,558	2,561	2,564
9	Required Return	819	7,014	6,916	6,771	6,626	6,481	6,336	6,190	6,045	5,900
10	Income Taxes	(1,951)	(1,254)	(930)	(676)	(415)	(190)	5	175	321	449
11	Required Return and Taxes	(1,132)	5,760	5,986	6,095	6,211	6,291	6,341	6,365	6,367	6,349
12	Total Cost of Service	77	8,283	8,530	8,641	8,760	8,843	8,896	8,923	8,927	8,913
Demands											
14	Demand Level	148.6	148.6	148.6	148.6	148.6	148.6	148.6	148.6	148.6	148.6
15	Add Growth	3.7	7.4	11.1	14.8	18.5	22.9	27.3	31.7	36.1	40.5
16	Demands Existing Connections (Milton + Pkwy)	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
17	Total Peak Day Demands	206.3	210.0	213.7	217.4	221.1	225.5	229.9	234.3	238.7	243.1
Allocated Dawn Parkway Tolls											
13	Yr 1 Demand Proration Factor (2 / 12)	0.1667									
18	Dawn to Kirkwall M12 Toll	0.0721	5,527	5,625	5,722	5,820	5,935	6,051	6,166	6,282	6,398
19	Kirkwall to Parkway	0.0135	1,035	1,053	1,071	1,090	1,111	1,133	1,155	1,176	1,198
20	Total Dawn Parkway M12 Toll	0.0856	1,074	6,678	6,794	6,909	7,047	7,184	7,321	7,458	7,596
Kirkwall CDA 135 TJ											
21	Kirkwall - CDA (Amended) Toll	0.1674									
22	Yr 1 Demand Proration Factor (2/12)	0.1667									
23	Demand Level (TJ)	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0
24	Kirkwall to Amended CDA allocated cost	1,374.8	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6

**Burlington Oakville Pipeline
 Annual Revenue Requirements**

Line	(\$000's CDN except for tolls \$(GJ))	2026 11	2027 12	2028 13	2029 14	2030 15	2031 16	2032 17	2033 18	2034 19	2035 20
Rate Base Investment											
1	Capital Expenditures	-	-	-	-	-	-	-	-	-	-
2	Cummulative Capex	-	-	-	-	-	-	-	-	-	-
3	Average Investment	95,437	93,029	90,622	88,214	85,807	83,399	80,992	78,584	76,177	73,769
Total Cost of Service											
4	Operating Costs:										
5	O&M Expenses	19	20	20	20	42	130	22	22	22	23
6	Depreciation Expense	2,408	2,408	2,408	2,408	2,408	2,408	2,408	2,408	2,408	2,408
7	Municipal Taxes	140	143	146	149	152	155	158	161	164	168
8	Total Operating Costs	2,567	2,570	2,573	2,577	2,602	2,692	2,587	2,591	2,594	2,598
9	Required Return	5,755	5,610	5,464	5,319	5,174	5,029	4,884	4,739	4,593	4,448
10	Income Taxes	561	657	742	815	879	934	981	1,022	1,056	1,085
11	Required Return and Taxes	6,315	6,267	6,206	6,134	6,053	5,963	5,865	5,760	5,650	5,533
12	Total Cost of Service	8,882	8,837	8,780	8,711	8,655	8,655	8,452	8,351	8,244	8,131
Demands											
14	Demand Level	148.6	148.6	148.6	148.6	148.6	148.6	148.6	148.6	148.6	148.6
15	Add Growth	44.5	48.5	52.5	56.5	60.5	63.2	65.9	68.5	71.2	73.9
16	Demands Existing Connections (Milton + Pkwy)	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
17	Total Peak Day Demands	247.1	251.1	255.1	259.1	263.1	265.8	268.5	271.2	273.9	276.5
Allocated Dawn Parkway Tolls											
13	Yr 1 Demand Proration Factor (2 / 12)										
18	Dawn to Kirkwall M12 Toll	0.0721	6,608	6,714	6,819	6,924	6,995	7,066	7,136	7,207	7,278
19	Kirkwall to Parkway	0.0135	1,237	1,257	1,277	1,296	1,310	1,323	1,336	1,349	1,363
20	Total Dawn Parkway M12 Toll	0.0856	7,846	7,971	8,096	8,221	8,305	8,388	8,472	8,556	8,640
Kirkwall CDA 135 TJ											
21	Kirkwall - CDA (Amended) Toll										
22	Yr 1 Demand Proration Factor (2/12)										
23	Demand Level (TJ)	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0
24	Kirkwall to Amended CDA allocated cost	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6

**Burlington Oakville Pipeline
 Annual Revenue Requirements**

Line	(\$000's CDN except for tolls \$(/GJ))	2036 21	2037 22	2038 23	2039 24	2040 25	2041 26	2042 27	2043 28	2044 29	2045 30
Rate Base Investment											
1	Capital Expenditures	-	-	-	-	-	-	-	-	-	-
2	Cummulative Capex	-	-	-	-	-	-	-	-	-	-
3	Average Investment	71,362	68,954	66,547	64,139	61,732	59,324	56,917	54,509	52,102	49,694
Total Cost of Service											
4	Operating Costs:										
5	O&M Expenses	23	24	24	25	25	26	26	27	27	50
6	Depreciation Expense	2,408	2,408	2,408	2,408	2,408	2,408	2,408	2,408	2,408	2,408
7	Municipal Taxes	171	174	178	181	185	189	193	196	200	204
8	Total Operating Costs	2,602	2,606	2,610	2,614	2,618	2,622	2,626	2,631	2,635	2,662
9	Required Return	4,303	4,158	4,013	3,868	3,722	3,577	3,432	3,287	3,142	2,997
10	Income Taxes	1,109	1,129	1,144	1,156	1,165	1,170	1,173	1,173	1,171	1,167
11	Required Return and Taxes	5,412	5,287	5,157	5,024	4,887	4,748	4,605	4,460	4,313	4,164
12	Total Cost of Service	8,014	7,892	7,767	7,638	7,505	7,370	7,232	7,091	6,948	6,825
Demands											
14	Demand Level	148.6	148.6	148.6	148.6	148.6	148.6	148.6	148.6	148.6	148.6
15	Add Growth	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9
16	Demands Existing Connections (Milton + Pkwy)	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
17	Total Peak Day Demands	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5
Allocated Dawn Parkway Tolls											
13	Yr 1 Demand Proration Factor (2 / 12)										
18	Dawn to Kirkwall M12 Toll	0.0721	7,278	7,278	7,278	7,278	7,278	7,278	7,278	7,278	7,278
19	Kirkwall to Parkway	0.0135	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363
20	Total Dawn Parkway M12 Toll	0.0856	8,640	8,640	8,640	8,640	8,640	8,640	8,640	8,640	8,640
Kirkwall CDA 135 TJ											
21	Kirkwall - CDA (Amended) Toll										
22	Yr 1 Demand Proration Factor (2/12)	0.1674									
23	Demand Level (TJ)	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0
24	Kirkwall to Amended CDA allocated cost	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6	8,248.6

CALCULATION OF COSTS
Burlington Oakville Project

Alternative Proposal Adjusted for Operations (Ave Day)

Calculations based on Calendar Years

Alternative Proposal Average Day

Description of calculations: Burlington Oakville Pipeline ("BOP")
 Ship Niagara to Kirkwall for 34% of Peak demand = average day, starting at current level and adding growth. Apply TCPL Toll Minimum Demand (10% of Design Day demand) always ships direct Kirkwall to Parkway

Average minus Minimum; Contract to ship to Dawn, and apply M12 toll Days demand more than average ship Dawn to Kirkwall to equate to full demand at Kirkwall. Apply M12 toll.

Ship Kirkwall to Parkway at M12 toll for peak day requirement Drop 54 TJ at Existing Interconnects (Milton & Parkway) Contract TCPL Parkway to CDA for Peak Day less existing interconnect demands (54TJ), apply CDA Toll

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	3.7	3.7	3.7	3.7	3.7	4.4	4.4	4.4	4.4	4.4	4.0	4.0	4.0	4.0
2	148.6													
3	54.0													
4	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6
5	3.7	7.4	11.1	14.8	18.5	22.9	27.3	31.7	36.1	40.5	44.5	48.5	52.5	56.5
6	206.3	210.0	213.7	217.4	221.1	225.5	229.9	234.3	238.7	243.1	247.1	251.1	255.1	259.1
7														
8	70.2	71.4	72.7	73.9	75.2	76.7	78.2	79.7	81.2	82.7	84.0	85.4	86.7	88.1
9														
10	20.6	21.0	21.4	21.7	22.1	22.6	23.0	23.4	23.9	24.3	24.7	25.1	25.5	25.9
11	49.5	50.4	51.3	52.2	53.1	54.1	55.2	56.2	57.3	58.3	59.3	60.3	61.2	62.2
12	206.3	210.0	213.7	217.4	221.1	225.5	229.9	234.3	238.7	243.1	247.1	251.1	255.1	259.1
13	70.2	71.4	72.7	73.9	75.2	76.7	78.2	79.7	81.2	82.7	84.0	85.4	86.7	88.1
14	136.2	138.6	141.1	143.5	146.0	148.9	151.8	154.7	157.5	160.4	163.1	165.7	168.4	171.0
15	206.3	210.0	213.7	217.4	221.1	225.5	229.9	234.3	238.7	243.1	247.1	251.1	255.1	259.1
16	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
17	152.3	156.0	159.7	163.4	167.1	171.5	175.9	180.3	184.7	189.1	193.1	197.1	201.1	205.1
18	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0

CALCULATION OF COSTS

Burlington Oakville Project

Alternative Proposal Adjusted for Operations (Ave Day)

Calculations based on Calendar Years

Alternative Proposal Average Day

Description of calculations: Burlington Oakville Pipeline ("BOP")
 Ship Niagara to Kirkwall for 34% of Peak demand = average day, starting at current level and adding growth. Apply TCPL Toll Minimum Demand (10% of Design Day demand) always ships direct Kirkwall to Parkway

Average minus Minimum; Contract to ship to Dawn, and apply M12 toll Days demand more than average ship Dawn to Kirkwall to equate to full demand at Kirkwall. Apply M12 toll.

Ship Kirkwall to Parkway at M12 toll for peak day requirement Drop 54 TJ at Existing Interconnects (Milton & Parkway) Contract TCPL Parkway to CDA for Peak Day less existing interconnect demands (54TJ), apply CDA Toll

Note: Year 1 costs prorated to 2 months to align with Calendar Yr Revenue Requirement COS alternative 2 Month Factor 0.1667

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	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Niagara - Kirkwall (TCPL)														
Average Day (Line 8)														
Niagara - Kirkwall (TCPL) CDA Toll	70.2	71.4	72.7	73.9	75.2	76.7	78.2	79.7	81.2	82.7	84.0	85.4	86.7	88.1
Cost Niagara - Kirkwall (TCPL) CDA Toll	\$956	\$5,836	\$5,939	\$6,042	\$6,145	\$6,267	\$6,389	\$6,511	\$6,633	\$6,755	\$6,866	\$6,977	\$7,088	\$7,200
Kirkwall - Dawn (Union)														
Ave Day minus Minimum (Ship to Dawn) (Line 11)														
Kirkwall - Dawn (Union) Toll	49.5	50.4	51.3	52.2	53.1	54.1	55.2	56.2	57.3	58.3	59.3	60.3	61.2	62.2
Cost to Ship Kirkwall to Dawn	\$112	\$683	\$695	\$707	\$719	\$733	\$747	\$762	\$776	\$790	\$803	\$816	\$829	\$842
Dawn to Kirkwall (Union)														
Peak Day Ship Dawn to Kirkwall (Line 14)														
Dawn to Kirkwall (Union) Toll	136.2	138.6	141.1	143.5	146.0	148.9	151.8	154.7	157.5	160.4	163.1	165.7	168.4	171.0
Cost to Ship to Dawn to Kirkwall	\$597	\$3,648	\$3,712	\$3,777	\$3,841	\$3,917	\$3,994	\$4,070	\$4,146	\$4,222	\$4,292	\$4,361	\$4,431	\$4,500
Kirkwall - Parkway (Union)														
Kirkwall to Parkway (Line 15)														
Kirkwall - Parkway (Union) Toll	206	210	214	217	221	226	230	234	239	243	247	251	255	259
Cost to Ship to Kirkwall to Parkway	\$169	\$1,035	\$1,053	\$1,071	\$1,090	\$1,111	\$1,133	\$1,155	\$1,176	\$1,198	\$1,218	\$1,237	\$1,257	\$1,277
Parkway to Burlington/Oakville (CDA via TCPL)														
Parkway to Burl/Oakville Net of Line 17														
Parkway to CDA Toll (TCPL)	152	156	160	163	167	172	176	180	185	189	193	197	201	205
Cost to Ship to Parkway to CDA (TCPL)	\$1,448	\$8,901	\$9,113	\$9,324	\$9,535	\$9,786	\$10,036	\$10,287	\$10,538	\$10,788	\$11,017	\$11,245	\$11,473	\$11,701
Kirkwall - CDA (Amended)														
Ship Kirkwall to CDA (Line 18)														
Kirkwall - CDA (Amended) Toll	135	135	135	135	135	135	135	135	135	135	135	135	135	135
Cost to Ship to Kirkwall to CDA	\$1,375	\$8,249	\$8,249	\$8,249	\$8,249	\$8,249	\$8,249	\$8,249	\$8,249	\$8,249	\$8,249	\$8,249	\$8,249	\$8,249
Summary Alternative Proposal Average Day														
Cost Niagara - Kirkwall (TCPL) CDA Toll	956	5,836	5,939	6,042	6,145	6,267	6,389	6,511	6,633	6,755	6,866	6,977	7,088	7,200
Cost to Ship Kirkwall to Dawn	112	683	695	707	719	733	747	762	776	790	803	816	829	842
Cost to Ship to Dawn to Kirkwall	597	3,648	3,712	3,777	3,841	3,917	3,994	4,070	4,146	4,222	4,292	4,361	4,431	4,500
Cost to Ship to Kirkwall to Parkway	169	1,035	1,053	1,071	1,090	1,111	1,133	1,155	1,176	1,198	1,218	1,237	1,257	1,277
Cost to Ship to Parkway to CDA (TCPL)	1,448	8,901	9,113	9,324	9,535	9,786	10,036	10,287	10,538	10,788	11,017	11,245	11,473	11,701
Alternative Proposal Average Day Total Cost	3,282	20,103	20,512	20,920	21,329	21,814	22,299	22,784	23,269	23,754	24,195	24,637	25,079	25,520
Cost to Ship to Kirkwall to CDA	1,375	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249
Alternative Proposal Average Day Total Cost With Kirk CDA Cost	4,657	28,352	28,760	29,169	29,578	30,063	30,548	31,033	31,517	32,002	32,444	32,886	33,327	33,769

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CALCULATION OF COSTS
Burlington Oakville Project
Alternative Proposal Adjusted for Operations (Ave Day)

Calculations based on Calendar Years

Alternative Proposal Average Day

Description of calculations: Burlington Oakville Pipeline ("BOP")
 Ship Niagara to Kirkwall for 34% of Peak demand = average day, starting at current level and adding growth. Apply TCPL Toll Minimum Demand (10% of Design Day demand) always ships direct Kirkwall to Parkway

Average minus Minimum; Contract to ship to Dawn, and apply M12 to Days demand more than average ship Dawn to Kirkwall to equate to full demand at Kirkwall. Apply M12 toll.

Ship Kirkwall to Parkway at M12 toll for peak day requirement Drop 54 TJ at Existing Interconnects (Milton & Parkway) Contract TCPL Parkway to CDA for Peak Day less existing interconnect demands (54TJ), apply CDA Toll

	2030 15	2031 16	2032 17	2033 18	2034 19	2035 20	2036 21	2037 22	2038 23	2039 24	2040 25	2041 26
1 Growth	4.0	2.7	2.7	2.7	2.7	2.7	-	-	-	-	-	-
2 Current Peak Demand (2015 demand)												
3 Supply through Existing Connections (Milton + Pkwy)												
4 Demand Sub Total	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6
5 Add Growth	60.5	63.2	65.9	68.5	71.2	73.9	73.9	73.9	73.9	73.9	73.9	73.9
6 Peak Demand	263.1	265.8	268.5	271.2	273.9	276.5	276.5	276.5	276.5	276.5	276.5	276.5
7 Factor for Average vs Peak Day												
8 Average Day = (Factor * Peak Demand)	89.5	90.4	91.3	92.2	93.1	94.0	94.0	94.0	94.0	94.0	94.0	94.0
9 Minimum day as % of Peak Demand												
10 Minimum day (Summer flow to Burl/Okville)	26.3	26.6	26.8	27.1	27.4	27.7	27.7	27.7	27.7	27.7	27.7	27.7
11 Ave Day minus Minimum (Ship to Dawn)	63.1	63.8	64.4	65.1	65.7	66.4	66.4	66.4	66.4	66.4	66.4	66.4
12 Peak Demand (Line 6)	263.1	265.8	268.5	271.2	273.9	276.5	276.5	276.5	276.5	276.5	276.5	276.5
13 Less Average Day @ Kirkwall (Line 8)	89.5	90.4	91.3	92.2	93.1	94.0	94.0	94.0	94.0	94.0	94.0	94.0
14 Peak Day Ship Dawn to Kirkwall	173.7	175.4	177.2	179.0	180.7	182.5	182.5	182.5	182.5	182.5	182.5	182.5
15 Kirkwall to Parkway (Peak Demand Line 6)	263.1	265.8	268.5	271.2	273.9	276.5	276.5	276.5	276.5	276.5	276.5	276.5
16 Supply through Existing Connections (Milton + Pkwy)	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
17 Parkway to CDA Net of Line 3	209.1	211.8	214.5	217.2	219.9	222.5	222.5	222.5	222.5	222.5	222.5	222.5
18 Kirkwall to CDA Demands	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0

CALCULATION OF COSTS
Burlington Oakville Project
Alternative Proposal Adjusted for Operations (Ave Day)

Calculations based on Calendar Years
Alternative Proposal Average Day
 Description of calculations: Burlington Oakville Pipeline ("BOP")
 Ship Niagara to Kirkwall for 34% of Peak demand = average day, starting at current level and adding growth. Apply TCPL Toll Minimum Demand (10% of Design Day demand) always ships direct Kirkwall to Parkway
 Average minus Minimum; Contract to ship to Dawn, and apply M12 to Days demand more than average ship Dawn to Kirkwall to equate to full demand at Kirkwall. Apply M12 toll.
 Ship Kirkwall to Parkway at M12 toll for peak day requirement Drop 54 TJ at Existing Interconnects (Milton & Parkway)
 Contract TCPL Parkway to CDA for Peak Day less existing interconnect demands (54TJ), apply CDA Toll
 Note: Year 1 costs prorated to 2 months to align with Calendar Yr Revenue Requirement COS alternative 0.1667
 2 Month Factor

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
	15	16	17	18	19	20	21	22	23	24	25	26
Niagara - Kirkwall (TCPL)												
Average Day (Line 8)	89.5	90.4	91.3	92.2	93.1	94.0	94.0	94.0	94.0	94.0	94.0	94.0
Niagara - Kirkwall (TCPL) CDA Toll	0.2239	0.2239	0.2239	0.2239	0.2239	0.2239	0.2239	0.2239	0.2239	0.2239	0.2239	0.2239
Cost Niagara - Kirkwall (TCPL) CDA Toll	\$7,311	\$7,385	\$7,460	\$7,535	\$7,609	\$7,684	\$7,684	\$7,684	\$7,684	\$7,684	\$7,684	\$7,684
Kirkwall - Dawn (Union)												
Ave Day minus Minimum (Ship to Dawn) (Line 11)												
Kirkwall - Dawn (Union) Toll	63.1	63.8	64.4	65.1	65.7	66.4	66.4	66.4	66.4	66.4	66.4	66.4
Cost to Ship Kirkwall to Dawn	\$855	\$864	\$873	\$881	\$890	\$899	\$899	\$899	\$899	\$899	\$899	\$899
Dawn to Kirkwall (Union)												
Peak Day Ship Dawn to Kirkwall (Line 14)												
Dawn to Kirkwall (Union) Toll	173.7	175.4	177.2	179.0	180.7	182.5	182.5	182.5	182.5	182.5	182.5	182.5
Cost to Ship to Dawn to Kirkwall	0.0721	0.0721	0.0721	0.0721	0.0721	0.0721	0.0721	0.0721	0.0721	0.0721	0.0721	0.0721
	4,570	4,617	4,663	4,710	4,757	4,803	4,803	4,803	4,803	4,803	4,803	4,803
Kirkwall - Parkway (Union)												
Kirkwall to Parkway (Line 15)												
Kirkwall - Parkway (Union) Toll	263	266	268	271	274	277	277	277	277	277	277	277
Cost to Ship to Kirkwall to Parkway	0.0135	0.0135	0.0135	0.0135	0.0135	0.0135	0.0135	0.0135	0.0135	0.0135	0.0135	0.0135
	1,296	1,310	1,323	1,336	1,349	1,363	1,363	1,363	1,363	1,363	1,363	1,363
Parkway to Burlington/Oakville (CDA via TCPL)												
Parkway to Burl/Oakville Net of Line 17												
Parkway to CDA Toll (TCPL)	209	212	214	217	220	223	223	223	223	223	223	223
Cost to Ship to Parkway to CDA (TCPL)	0.1563	0.1563	0.1563	0.1563	0.1563	0.1563	0.1563	0.1563	0.1563	0.1563	0.1563	0.1563
	11,930	12,083	12,236	12,389	12,543	12,696	12,696	12,696	12,696	12,696	12,696	12,696
Kirkwall - CDA (Amended)												
Ship Kirkwall to CDA (Line 18)												
Kirkwall - CDA (Amended) Toll	135	135	135	135	135	135	135	135	135	135	135	135
Cost to Ship to Kirkwall to CDA	0.1674	0.1674	0.1674	0.1674	0.1674	0.1674	0.1674	0.1674	0.1674	0.1674	0.1674	0.1674
	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249
Summary Alternative Proposal Average Day												
Cost Niagara - Kirkwall (TCPL) CDA Toll	7,311	7,385	7,460	7,535	7,609	7,684	7,684	7,684	7,684	7,684	7,684	7,684
Cost to Ship Kirkwall to Dawn	855	864	873	881	890	899	899	899	899	899	899	899
Cost to Ship to Dawn to Kirkwall	4,570	4,617	4,663	4,710	4,757	4,803	4,803	4,803	4,803	4,803	4,803	4,803
Cost to Ship to Kirkwall to Parkway	1,296	1,310	1,323	1,336	1,349	1,363	1,363	1,363	1,363	1,363	1,363	1,363
Cost to Ship to Parkway to CDA (TCPL)	11,930	12,083	12,236	12,389	12,543	12,696	12,696	12,696	12,696	12,696	12,696	12,696
Alternative Proposal Average Day Total Cost	25,962	26,258	26,555	26,851	27,148	27,444	27,444	27,444	27,444	27,444	27,444	27,444
Cost to Ship to Kirkwall to CDA	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249
Alternative Proposal Average Day Total Cost With Kirk CDA Cost	34,211	34,507	34,803	35,100	35,396	35,693	35,693	35,693	35,693	35,693	35,693	35,693

CALCULATION OF COSTS
Burlington Oakville Project

Alternative Proposal Adjusted for Operations (Ave Day)

Calculations based on Calendar Years

Alternative Proposal Average Day

Description of calculations: Burlington Oakville Pipeline ("BOP")
 Ship Niagara to Kirkwall for 34% of Peak demand = average day, starting at current level and adding growth. Apply TCPL Toll Minimum Demand (10% of Design Day demand) always ships direct Kirkwall to Parkway

Average minus Minimum; Contract to ship to Dawn, and apply M12 to Days demand more than average ship Dawn to Kirkwall to equate to full demand at Kirkwall. Apply M12 toll.

Ship Kirkwall to Parkway at M12 toll for peak day requirement Drop 54 TJ at Existing Interconnects (Milton & Parkway)
 Contract TCPL Parkway to CDA for Peak Day less existing interconnect demands (54TJ), apply CDA Toll

	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055
1 Growth	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 Current Peak Demand (2015 demand)	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ
3 Supply through Existing Connections (Milton + Pkwy)	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6	202.6
4 Demand Sub Total	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9
5 Add Growth	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5
6 Peak Demand	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0
7 Factor for Average vs Peak Day	34%													
8 Average Day = (Factor * Peak Demand)	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ
9 Minimum day as % of Peak Demand	10%													
10 Minimum day (Summer flow to Burl/Okville)	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ
11 Ave Day minus Minimum (Ship to Dawn)	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4
12 Peak Demand (Line 6)	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5	276.5
13 Less Average Day @ Kirkwall (Line 8)	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0
14 Peak Day Ship Dawn to Kirkwall	182.5	182.5	182.5	182.5	182.5	182.5	182.5	182.5	182.5	182.5	182.5	182.5	182.5	182.5
15 Kirkwall to Parkway (Peak Demand Line 6)	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ
16 Supply through Existing Connections (Milton + Pkwy)	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ
17 Parkway to CDA Net of Line 3	222.5	222.5	222.5	222.5	222.5	222.5	222.5	222.5	222.5	222.5	222.5	222.5	222.5	222.5
18 Kirkwall to CDA Demands	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ

**Comparison Proposed Project
 (Build) vs Alternative Proposal**

Burlington Oakville Project

Calculations based on Calendar Years
 Particulars \$,000's CAD)

Line	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	1	2	3	4	5	6	7	8	9	10
Union Reply Evidence Figure 5-4										
Proposed Project (Build) Case										
1	77	8,283	8,530	8,641	8,760	8,843	8,896	8,923	8,927	8,913
2	1,074	6,562	6,678	6,794	6,909	7,047	7,184	7,321	7,458	7,596
3	1,375	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249
4	2,526	23,094	23,457	23,684	23,918	24,138	24,328	24,492	24,634	24,757

Build References

- 5 Revenue Requirement: FRPO Q10 Attachment 1, Line 12
- 6 Allocated DP Tolls: FRPO Q10 Attachment 1, Line 20
- 7 Allocated Kirkwall: FRPO Q10 Attachment 1, Line 24)

Operationalized Alternative Proposal

8	2,404	14,737	15,052	15,366	15,680	16,053	16,425	16,798	17,171	17,543
9	878	5,366	5,460	5,555	5,649	5,762	5,874	5,986	6,098	6,210
10	1,375	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249	8,249
11	4,657	28,352	28,760	29,169	29,578	30,063	30,548	31,033	31,517	32,002
12	(2,131)	(5,257)	(5,304)	(5,485)	(5,660)	(5,924)	(6,219)	(6,540)	(6,883)	(7,245)

Union Reply Evidence Figure 5-5

**Proposed Project (Build) Case:
 Same data as Figure 5-4**

13	2,526	23,094	23,457	23,684	23,918	24,138	24,328	24,492	24,634	24,757
Operationalized Alternative Proposal										
14	2,404	14,737	15,052	15,366	15,680	16,053	16,425	16,798	17,171	17,543
15	878	5,366	5,460	5,555	5,649	5,762	5,874	5,986	6,098	6,210
16	-	-	-	-	-	-	-	-	-	-
17	3,282	20,103	20,512	20,920	21,329	21,814	22,299	22,784	23,269	23,754
18	(757)	2,991	2,945	2,763	2,589	2,324	2,029	1,708	1,366	1,004

References

Alternative Proposal TCPL Costs

- Reference: FRPO Q10, Attachment 2, Lines 38,42)
- Cost Niagara - Kirkwall (TCPL) CDA Toll
- Cost to Ship to Parkway to CDA (TCPL)
- 2,404 Alternative Proposal Total Paid to TCPL

Alternative Proposal Allocated Dawn-Parkway Tolls

- Reference: FRPO Q10, Attachment 2, Lines , Lines 39-41)
- Cost to Ship Kirkwall to Dawn
- Cost to Ship to Dawn to Kirkwall
- Cost to Ship to Kirkwall to Parkway
- 878.5 Alternative Proposal Total Allocated Dawn-Parkway Tolls

19	956	5,836	5,939	6,042	6,145	6,267	6,389	6,511	6,633	6,755
20	1,448	8,901	9,113	9,324	9,535	9,786	10,036	10,287	10,538	10,788
21	2,404	14,737	15,052	15,366	15,680	16,053	16,425	16,798	17,171	17,543
22	111.8	682.6	694.6	706.7	718.7	733.0	747.3	761.5	775.8	790.1
23	597.3	3,648.0	3,712.3	3,776.6	3,841.0	3,917.3	3,993.6	4,069.9	4,146.2	4,222.5
24	169.4	1,034.9	1,053.2	1,071.4	1,089.7	1,111.3	1,133.0	1,154.6	1,176.3	1,197.9
25	878.5	5,365.5	5,460.1	5,554.7	5,649.3	5,761.5	5,873.8	5,986.0	6,098.2	6,210.4

**Comparison Proposed Project
 (Build) vs Alternative Proposal**

Burlington Oakville Project

Calculations based on Calendar Years

Line Particulars \$,000's CAD)

Union Reply Evidence Figure 5-4

Proposed Project (Build) Case

1	Build: Revenue Requirement	8,882	2026	11	8,837	2027	12	8,780	2028	13	8,711	2029	14	8,655	2030	15	8,655	2031	16	8,452	2032	17	8,351	2033	18	8,244	2034	19	8,131	2035	20
2	Allocated Dawn-Parkway Tolls	7,721		7,846		7,971		8,096		8,221		8,305		8,388		8,472		8,556		8,640		8,729		8,814		8,898		8,982		9,066	
3	Kirkwall to Amended CDA allocated cost	8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249	
4	Figure 5-4 Total Build	24,852		24,932		24,999		25,055		25,124		25,208		25,283		25,357		25,431		25,505		25,579		25,653		25,727		25,801		25,875	

Build References

- 5 Revenue Requirement: FRPO Q10 Attachment 1, Line 12
- 6 Allocated DP Tolls: FRPO Q10 Attachment 1, Line 20
- 7 Allocated Kirkwall: FRPO Q10 Attachment 1, Line 24)

Operationalized Alternative Proposal

8	Total Paid to TCPL (Line 21)	17,883		18,222		18,562		18,901		19,240		19,468		19,696		19,924		20,152		20,380		20,608		20,836		21,064		21,292		21,520	
9	Allocated DP Tolls (Line 25)	6,313		6,415		6,517		6,619		6,722		6,790		6,859		6,927		6,996		7,065		7,134		7,203		7,272		7,341		7,410	
10	Allocated Kirkwall to CDA cost (Line 3)	8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249	
11	Figure 5-4 Total Operationalized Alternative	32,444		32,886		33,327		33,769		34,211		34,507		34,803		35,100		35,396		35,692		35,988		36,284		36,580		36,876		37,172	
12	Figure 5-4 difference (Line 4 - 11)	(7,592)		(7,954)		(8,328)		(8,713)		(9,087)		(9,299)		(9,714)		(10,028)		(10,348)		(10,668)		(10,988)		(11,308)		(11,628)		(11,948)		(12,268)	

Union Reply Evidence Figure 5-5

**Proposed Project (Build) Case:
 Same data as Figure 5-4**

13 Same data Figure 5-4 Total Build (Line 4)

Operationalized Alternative Proposal

14	Total Paid to TCPL (Line 21)	17,883		18,222		18,562		18,901		19,240		19,468		19,696		19,924		20,152		20,380		20,608		20,836		21,064		21,292		21,520	
15	Allocated DP Tolls (Line 25)	6,313		6,415		6,517		6,619		6,722		6,790		6,859		6,927		6,996		7,065		7,134		7,203		7,272		7,341		7,410	
16	Allocated Kirkwall to CDA cost (Line 3)	8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249		8,249	
17	Figure 5-5 Total Operationalized Alternative	24,195		24,637		25,079		25,520		25,962		26,258		26,555		26,851		27,148		27,444		27,740		28,036		28,332		28,628		28,924	
18	Figure 5-5 difference (Line 13-17)	656		295		(80)		(465)		(838)		(1,051)		(1,466)		(1,779)		(2,099)		(2,424)		(2,749)		(3,074)		(3,400)		(3,725)		(4,050)	

References

Alternative Proposal TCPL Costs

- Reference: FRPO Q10, Attachment 2, Lines 38,42)
- Cost Niagara - Kirkwall (TCPL) CDA Toll
- Cost to Ship to Parkway to CDA (TCPL)
- Alternative Proposal Total Paid to TCPL

Alternative Proposal Allocated Dawn-Parkway Tolls

- Reference: FRPO Q10, Attachment 2, Lines , Lines 39-41)
- Cost to Ship Kirkwall to Dawn
- Cost to Ship to Dawn to Kirkwall
- Cost to Ship to Kirkwall to Parkway
- Alternative Proposal Total Allocated Dawn-Parkway Tolls

19	6,866	6,977	7,088	7,200	7,311	7,385	7,460	7,535	7,609	7,684
20	11,017	11,245	11,473	11,701	11,930	12,083	12,236	12,389	12,543	12,696
21	17,883	18,222	18,562	18,901	19,240	19,468	19,696	19,924	20,152	20,380
22	803.1	816.1	829.1	842.1	855.1	863.8	872.6	881.3	890.0	898.7
23	4,292.0	4,361.4	4,430.9	4,500.4	4,569.9	4,616.6	4,663.2	4,709.9	4,756.5	4,803.2
24	1,217.6	1,237.3	1,257.0	1,276.8	1,296.5	1,309.7	1,322.9	1,336.2	1,349.4	1,362.7
25	6,312.7	6,414.9	6,517.1	6,619.3	6,721.5	6,790.1	6,858.7	6,927.4	6,996.0	7,064.6

