

FOR DISCUSSION ONLY - PROPOSE NO ACTIVITY

Hedging Plan for Winter 2018-19
 Total Company

		Winter Season					Total Contracts
		Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	
Strike Prices*		\$3.500	\$3.750	\$4.000	\$4.000	\$4.000	
Scheduled Option Purchases	04/27/17	23					23
	05/29/17		34				34
	06/28/17			44			44
	07/27/17				39		39
	08/29/17					32	32
	09/28/17						0
	10/27/17						0
	11/28/17						0
	12/28/17						0
	01/29/18						0
02/26/18						0	
03/29/18						0	
Expiration Schedule	04/26/18						0
	05/29/18						0
	06/28/18						0
	07/27/18						0
	08/29/18						0
	09/27/18						0
	10/29/18	-23					-23
	11/28/18		-34				-34
	12/27/18			-44			-44
	01/29/19				-39		-39
02/26/19					-32	-32	
03/28/19						0	
Scheduled		23	34	44	39	32	172

Futures Price*	\$2.961	\$3.096	\$3.202	\$3.175	\$3.119	Avg Future \$3.13
7.50%	\$0.2221	\$0.2322	\$0.2402	\$0.2381	\$0.2339	
Option Price	\$0.2141	\$0.2029	\$0.2325	\$0.2313	\$0.2187	
Option Budget	\$49,243	\$68,986	\$102,300	\$90,207	\$69,984	\$380,720

* Futures prices, strike prices and option prices shown reflect market prices on February 10, 2017. Actual futures, strike and options prices would reflect market conditions when transactions are made.

Northern believes an option budget of 7.5 percent of the value of futures contracts at the time options are purchased would be most viable, see Page 2 of 5. The calculations above provide the expected dollar budget using recent market data, assuming a 7.5 percent budget. HOWEVER, as discussed in written testimony, Northern proposes to suspend the program for the Winter 2018-19 period.

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Comparison of Hedging Program Budget Alternatives
 Period: November 2018 - March 2019

No. Contracts

Budget Percentage	Option Budget	Option Budget Delta	Cost per Dth	Average Strike Price	Strike Price Delta	Break-Even Price
2.5%	\$ 119,381		\$ 0.07	\$ 5.97		\$ 6.04
5.0%	\$ 250,788	\$ 131,407	\$ 0.15	\$ 4.48	\$ (1.49)	\$ 4.63
7.5%	\$ 380,720	\$ 129,932	\$ 0.22	\$ 3.88	\$ (0.60)	\$ 4.11
10.0%	\$ 483,356	\$ 102,636	\$ 0.28	\$ 3.60	\$ (0.29)	\$ 3.88

Notes:

Each option contract equals 10,000 Dth

Average Strike Price projections reflect NYMEX trading of European options on February 10, 2017

Contracts that settle below actual Strike Prices expire worthless

Contracts that settle above actual Strike Prices pay the delta between the Strike Price and settle price

Break-Even Price equals Strike Price plus Cost per Dth

As shown on Page 1 of 5, average Futures Prices for the period were \$3.13 on February 10, 2017.

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3-Year Outlook for Winter Hedging Plans
 Total Company

Line	Description	WINTER 2018-19			WINTER 2019-20			WINTER 2020-21		
		City-Gate Volumes	Percent of Sendout	Financial Contracts	City-Gate Volumes	Percent of Sendout	Financial Contracts	City-Gate Volumes	Percent of Sendout	Financial Contracts
	WINTER PERIOD									
1	Sendout Requirement (Nov-Mar)	7,470,017			7,671,702			7,863,495		
2	Target Hedged Volume (70%)	5,229,012	70%		5,370,192	70%		5,504,446	70%	
3	Dawn Storage	3,291,389	44%		3,291,389	43%		3,291,389	42%	
4	Tennessee Storage	218,335	3%		218,335	3%		218,335	3%	
5	Fixed Price Physical Contracts	0	0%		0	0%		0	0%	
6	Physically Hedged Volume (=3+4+5)	3,509,724	47%		3,509,724	46%		3,509,724	45%	
7	Financial Hedge Volume (=2-6)	1,720,000	23%	172	1,860,000	24%	186	1,990,000	25%	199
8	Total Hedged Volume (=6+7)	5,229,724	70%		5,369,724	70%		5,499,724	70%	

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Bill Impact Summary
 Hedging Plan Period: November 2018 - March 2019

The table below projects the total bill impact for a typical residential customer under a variety of scenarios. Bill impact scenarios include a "Baseline" which assumes no program costs, the "Options Budget" which reflects the expected cost of options, a "Break-Even" which shows the amount by which underlying futures contracts must appreciate to offset the Options Budget, and expected impacts assuming the futures contracts were to expire at prices that are various percentages above the strike prices. Since Northern proposes to suspend the program for one year, the "Baseline" scenario below would apply.

Scenario	Futures Price Increase	Net (Cost) / Value	Typical Bill	Typical Bill Impact	PCT Impact vs Baseline
Baseline (No Hedging Activity)	NA	\$0	\$1,076.23		0.0%
Options Budget	NA	(\$380,720)	\$1,079.59	\$3.36	0.3%
Expire 1% over Strike Price	25%	(\$313,920)	\$1,079.00	\$2.77	0.3%
Expire 5% over Strike Price	30%	(\$46,720)	\$1,076.64	\$0.41	0.0%
Break-Even 5.7% over Strike Price	31%	\$0	\$1,076.23	\$0.00	0.0%
Expire 10% over Strike Price	37%	\$287,280	\$1,073.70	(\$2.53)	-0.2%
Expire 20% over Strike Price	49%	\$955,280	\$1,067.80	(\$8.43)	-0.8%

Notes:

Rate Impact based on projected 2016-2017 winter demand of 45,815,465 therms.

Typical Bill based on projected costs for the 2016-2017 Winter Period.

Typical Bill Impact is based on typical residential usage of 695 therms during Nov - Apr.

Monthly Changes in Option Contract Value
 Hedging Plan Period: November 2017 - March 2018

		Winter Season					Total / Value
		Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	
Quantity		12	20	29	30	25	116
	Actual Premium	\$0.230	\$0.237	\$0.248	\$0.247	\$0.240	\$280,875
Option Premium	Apr 2016 Rpt	\$0.216					\$25,968
	May 2016 Rpt	\$0.265	\$0.220				\$75,720
	Jun 2016 Rpt	\$0.279	\$0.224	\$0.249			\$150,500
	Jul 2016 Rpt	\$0.294	\$0.237	\$0.250	\$0.224		\$222,407
	Aug 2016 Rpt	\$0.261	\$0.210	\$0.222	\$0.205	\$0.193	\$247,575
	Sep 2016 Rpt	\$0.224	\$0.179	\$0.193	\$0.180	\$0.173	\$215,685
	Oct 2016 Rpt	\$0.273	\$0.205	\$0.245	\$0.237	\$0.226	\$272,504
	Nov 2016 Rpt	\$0.334	\$0.257	\$0.268	\$0.254	\$0.232	\$302,949
	Dec 2016 Rpt	\$0.459	\$0.339	\$0.329	\$0.311	\$0.279	\$381,052
	Jan 2017 Rpt	\$0.332	\$0.252	\$0.261	\$0.255	\$0.243	\$303,242
	Strike Prices	\$3.500	\$4.000	\$4.300	\$4.500	\$4.650	
Futures Prices	Apr 2016 Rpt	\$3.019					\$0
	May 2016 Rpt	\$3.057	\$3.201				\$0
	Jun 2016 Rpt	\$3.146	\$3.279	\$3.385			\$0
	Jul 2016 Rpt	\$3.163	\$3.294	\$3.395	\$3.358		\$0
	Aug 2016 Rpt	\$3.117	\$3.247	\$3.349	\$3.311	\$3.228	\$0
	Sep 2016 Rpt	\$3.077	\$3.205	\$3.307	\$3.268	\$3.186	\$0
	Oct 2016 Rpt	\$3.172	\$3.319	\$3.410	\$3.377	\$3.306	\$0
	Nov 2016 Rpt	\$3.308	\$3.436	\$3.527	\$3.481	\$3.384	\$0
	Dec 2016 Rpt	\$3.604	\$3.703	\$3.780	\$3.728	\$3.616	\$1,040
	Jan 2017 Rpt	\$3.348	\$3.470	\$3.553	\$3.519	\$3.429	\$0
Futures Prices v. Strike Prices	Apr 2016 Rpt	86%					
	May 2016 Rpt	87%	80%				
	Jun 2016 Rpt	90%	82%	79%			
	Jul 2016 Rpt	90%	82%	79%	75%		
	Aug 2016 Rpt	89%	81%	78%	74%	69%	
	Sep 2016 Rpt	88%	80%	77%	73%	69%	
	Oct 2016 Rpt	91%	83%	79%	75%	71%	
	Nov 2016 Rpt	95%	86%	82%	77%	73%	
	Dec 2016 Rpt	103%	93%	88%	83%	78%	
	Jan 2017 Rpt	96%	87%	83%	78%	74%	