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BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of the Application of Questar Gas Company to File a General Rate Case	**Docket No. 07-057-13**

PREFILED DIRECT TESTIMONY OF ROBERT H. MCKENNA

[RATE OF RETURN]

The UAE Intervention Group hereby submits the Prefiled Direct Testimony of Robert H. McKenna on rate of return issues.

DATED this 31st day of March, 2008.

/s/ _____
Gary A. Dodge,
Attorneys for UAE

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing was served by email this 28th day of January, 2008, to the following

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BEFORE

THE PUBLIC SERVICE COMMISSION OF UTAH

Direct Testimony of Robert H. McKenna

on behalf of

UAE

Docket No. 07-057-13

[Rate of Return]

March 31, 2008

DIRECT TESTIMONY OF ROBERT H. MCKENNA

<u>**Introduction**</u>

3 **Q.** **Please state your name and business address.**

4 A. Robert H. McKenna, 215 South State Street, Suite 200, Salt Lake City, Utah,

5 84111.

6 **Q.** **By whom are you employed and in what capacity?**

7 A. I am a Senior Consultant in the firm of Energy Strategies, LLC. Energy Strategies

8 is a private consulting firm specializing in economic and policy analysis applicable to

9 energy production, transportation, and consumption.

10 **Q.** **On whose behalf are you testifying in this proceeding?**

11 A. My testimony is being sponsored by the Utah Association of Energy Users

12 Intervention Group (UAE).

13 **Q.** **Please describe your professional experience and qualifications.**

14 A. My academic background is in finance and strategy development and I hold a

15 Master of Business Administration from Indiana University in Bloomington, Indiana. I

16 joined Energy Strategies in 2007, where I assist private and public sector clients in the

17 areas of project development services, market analytics and economic valuation of

18 alternatives.

19 Prior to joining Energy Strategies, I held various business development and

20 strategic marketing roles in multiple Fortune 500 companies. I fulfilled the responsibility

21 of strategic and economic valuation of acquisition, product licensing and product

22 development opportunities incorporating, along with other factors, the impact of

23 uncertainty on the strategic value to the companies.

1 **Q. Have you previously testified before this Commission?**

2 A.   No, I have not.

3 **Q. Have you testified previously before any other state utility regulatory commissions?**

4 A.   No, I have not.

5 **Q. What is the purpose of your testimony in this proceeding?**

6 A.   My testimony addresses the implications of revenue decoupling for Questar Gas

7 Company (QGC) with respect to rate of return in this proceeding.

8 **Q. What are your conclusions and recommendations?**

9 A.   My conclusion is that QGC's Conservation Enabling Tariff ("CET") that provides

10 for revenue decoupling is essentially a hedge position that protects QGC against

11 variations in usage per customer that has been awarded to the company. My

12 recommendation is that the Commission should consider what it might cost a company

13 like QGC to replicate this hedge position in the financial markets and utilize this

14 information to assess the appropriate allowed ROE for the company. Historically, if the

15 annual change in usage per customer per year had been equally distributed around zero

16 percent, with an average annual change in usage per customer of zero percent, one could

17 argue that this hedge position would be free, i.e. the cost of protecting against downside

18 risk would be the same as the lost value from missing out on the upside potential. The

19 historical average decline in usage per customer has not been zero percent, though. Nor

20 has it been equally distributed around zero percent. From 1981 through 2006, the

1   average annual change in usage per customer has been minus 1.61%. As will be

2   illustrated, purchasing a hedge position that replicates the protection provided to the

3   company by the CET would result in a net cost to the company, given this historical

4   downward trend.

5   **Q.**   **What steps did you take in your analysis to arrive at your conclusion?**

6   A.   The following steps were taken to conduct the analysis; First, I evaluated the

7   historical trend in usage per customer since 1981. Second, I evaluated what the potential

8   variability in the projected June 2009 net operating income (NOI) published by QGC

9   might be without the CET, given this historical trend in usage per customer. Third, I

10   evaluated what it might cost QGC to purchase a hedge portfolio that replicates the impact

11   of the CET on QGC's NOI. Fourth, I calculated the resulting acceptable ROE after

12   purchasing the hedge position, assuming QGC equity holders were willing to take an

13   adjustment in ROE in exchange for the cost of purchasing a risk-free position relative to

14   change in usage per customer.

15   **Q.**   **What has been the historic variability and trend in usage per customer since 1981?**

16   A.   According to information provided by QGC in its response to Data Request MDR

17   A.4U on March 7, 2008 (spreadsheet MDR A.4 U attach.xls), annual usage per customer

18   has declined from 174.5 Dth per customer for the 12 months ending January 1981 to

19   108.52 Dth per customer for the 12 months ending October 2007 (Exhibit UAE ROE

20   2.1). Using information from the full calendar years available, the average annual

1   decrease in usage per customer over this time period has been 1.61% with a maximum

2   increase in usage of 3.38% and a maximum decrease in usage of 7.33%. An increase in

3   usage per customer was experienced in only 6 of the 25 years represented (Exhibit UAE

4   ROE 2.2).

5   **Q.** **What is the potential variability in the projected NOI for QGC, given this historic**

6   **variability in usage per customer?**

7   A.   QGC has published its revenue requirement, cost of service and rate design model

8   for the test period representing the twelve months ending June 2009 in the spreadsheet

9   QGCMODEL_01_18_08.xls. According to this model, QGC is projecting a NOI of

10   67,593,225 to achieve an "allowed" ROE of 11.25% for this test period. This projected

11   NOI assumes that QGC receives $145,894,067 of DNG Volumetric Charges from GS1

12   customers (Exhibit UAE ROE 2.3). This is the revenue stream protected by the CET.

13   The overall NOI and ROE for the company are of course subject to uncertainty from

14   many sources, one of which is actual annual usage per customer. In the QGC model, it is

15   assumed that usage per customer is 103.10 Dth for the test period. Considering only the

16   uncertainty associated with usage per customer and assuming that all of the historical

17   annual variations in usage per customer are equally likely as representations for potential

18   future variations in usage per customer, QGC's actual NOI could be as high as

19   $70,649,940 (Exhibit UAE ROE 2.4) and as low as $60,970,940 (Exhibit UAE ROE 2.5).

20   Without the CET in place, the expected NOI based on the average change in usage per

1   customer would be $66,139,109. This expected NOI would result in a ROE of 10.88%,

2   37 basis points below the proposed "allowed" ROE of 11.25% (Exhibit UAE ROE 2.6).

3 **Q.**   **You stated that the CET is essentially a hedge position that protects QGC from**

4   **variations in usage per customer. Please explain.**

5 A.   The CET provides a perfect hedge position against variations in usage per

6   customer. Specifically, if usage per customer is more or less than projected the CET

7   offsets the change so that the net variance in NOI is zero (Exhibit UAE ROE 2.7). This is

8   a risk-free position relative to variations in usage per customer. While there are certain

9   limitations built into the CET as currently written, e.g. effectively a revenue adjustment

10   cap at 5 percent of DNG revenues, these limitations will not likely be experienced after

11   the setting of new rates.

12 **Q.**   **How could a company potentially replicate this hedge position in the financial**

13   **markets?**

14 A.   This hedge position can be represented by a portfolio of financial derivatives with

15   the underlying asset for the derivatives being QGC's NOI and the only source of

16   uncertainty in the value of the underlying asset being the variation in usage per customer

17   as illustrated in Exhibit UAE ROE 2.6. Specifically, the CET can be replicated by a

18   portfolio that contains 1) a purchased put option contract, with an exercise price at

19   QGC's "allowed" NOI, that would protect QGC against any decrease in usage per

20   customer and 2) a written call option contract, again with an exercise price at QGC's

1   "allowed" NOI, that would require QGC to pay the difference in the case of increased

2   usage per customer. The payoff of this portfolio (Exhibit UAE ROE 2.18) exactly equals

3   the payoff from QGC's CET described above and illustrated in Exhibit UAE ROE 2.8.

4   This portfolio results in the same risk-free position relative to variations in usage per

5   customer as QGC's CET.

6 **Q.**   **How much might a company expect to pay to acquire the CET replicating portfolio?**

7 A.   Valuing options can be very complex, especially when, as in this case, the options

8   are based on underlying assets that are not publicly traded assets that have a long

9   recorded history of pricing behavior (volatility) and a known current price. That said,

10   theoreticians have developed methods of valuing so-called "real options" that attempt to

11   approximate the value of an option when the underlying asset is a non- publicly traded

12   asset such as a potential project, a product development opportunity or a potential cash

13   flow stream, as is the case here. The first step in the process, as described by Martha

14   Amram and Nalin Kulatilaka in their book *Real Options*, is to understand the "cone of

15   uncertainty" or the distribution of possible outcomes (Figure 1).

16

Figure 1

(a) The Cone of Uncertainty   (b) The Distribution of Outcomes
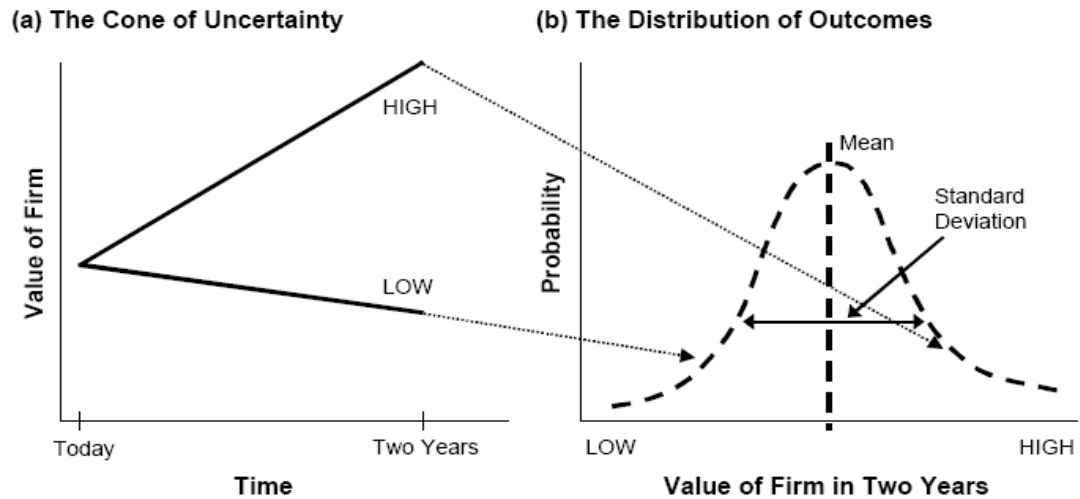
Source: *Real Options*, Martha Amram and Nalin Kulatilaka, Harvard Business School Press, 1999.

1   As described above and illustrated in Exhibit UAE ROE 2.2, for the purposes of

2   this analysis I have assumed that the historic distribution of variation in usage per

3   customer per year defines the set of possible outcomes for the test year ending June 2009.

4   I will assume that each of the historical annual changes in usage per customer has an

5   equal probability of occurring. When this possible range in variation in usage per

6   customer is translated into variation in NOI and ROE the result is what is described in

7   Exhibits UAE ROE 2.4, 2.5 and 2.6 where the possible NOI outcomes range from as high

8   as $70,649,940 to as low as $60,970,940. The entire discrete set of assumed potential

9   NOI outcomes is graphically described in Exhibit UAE ROE 2.9 and represented in

10   Exhibit UAE ROE 2.10, column E.

11   The next step in the "real option" valuation process is to model the payoff of the

12   option portfolio relative to the variation in the underlying asset. As described previously,

13   the assumed CET replicating hedge position consists of a held put and a written call. The

14   put gives the holder the "right to sell an asset at a specified exercise price". The put

1   holder pays up front for this right. In this case the asset is the QGC NOI as impacted by

2   changes in usage per customer and the exercise price is the "allowed" NOI to reach the

3   "allowed" ROE; $67,593,224. If the actual NOI is less than this, QGC has the right to

4   sell the asset to the ratepayers at the specified exercise price of $67,593,224 and the

5   ratepayers, the entity writing the put, make up the difference. A call option on the other

6   hand gives the holder the "right to buy an asset at a specified exercise price". Because

7   QGC would be writing this position, not holding it, it would receive a cash inflow upfront

8   from the holder of the option. In exchange for this upfront cash inflow, if the QGC NOI

9   is greater than anticipated then the ratepayer, the call holder, can buy the asset at the

10   specified exercise price of $67,593,224 and QGC is responsible to pay ratepayers the

11   surplus NOI value. Exhibit UAE ROE 2.9 illustrates what the net payoff/payout of

12   QGC's option positions would be given the historical changes in usage per customer.

13   The values are also represented in Columns H and I of Exhibit UAE ROE 2.10.

14   The final step in valuing the options is to model the current values of the options.

15   This is done using the "risk-neutral approach to option valuation" described by Martha

16   Amram and Nalin Kulatilaka in their book *Real Options*. They state that:

17   "The risk-neutral approach to valuation, introduced by Cox, Ross, and
18   Rubinstein in 1976, is based on the same arguments that underlie the
19   option valuation model. The authors recognized that because the hedge
20   position earns a risk-free rate of return, it would have the same value
21   under any preferences for risk….Hence, for valuation purposes Cox, Ross,

1   and Rubinstein could assume that everyone is risk neutral, eliminating the

2   need to estimate any sort of risk premium[1]."

3   This is done by summing the present value of the products of each of the potential

4   option payoffs and the probability of each of the potential payoffs, using the risk-free rate

5   for discounting to present values. For this analysis I have assumed 5% as the risk-free

6   rate of return and that the hedge position is purchased at the beginning of the test year,

7   i.e. values will be discounted to July 1, 2008. Columns J and K of Exhibit UAE ROE 2.9

8   illustrate the results of this calculation.

9   Now that each option is valued, it can be calculated that a company such as QGC

10   might expect to pay approximately $1,833,664 to purchase a put option protecting against

11   downward movements in usage per customer. QGC might also expect to receive

12    $382,471 for writing a call option requiring the company to pay the ratepayer in the case

13   of upward movements in usage per customer. As modeled here, the post-tax net cost of

14   this CET replicating hedge position would be $1,451,162, as shown on Exhibit UAE

15   ROE 2.9. As described above, if the potential upward and downward movements in

16   usage per customer were equally distributed around zero percent with an expected value

17   of zero percent it is expected that the net cost of this hedge portfolio would be zero. This

18   has not been the case, though, and it will cost more to protect against downward

---

[1] *Real Options*, Martha Amram and Nalin Kulatilaka, Harvard Business School Press, 1999.

1   movements in usage per customer than the potential upfront benefit for taking a position

2   against upward movements since downward movements are more likely.

3 **Q.**   **What is the potential impact of purchasing this position on QGC's "allowed" NOI**

4   **and ROE?**

5 A.   The calculated $1,451,162 cost of purchasing the portfolio would reduce the QGC

6   post-tax NOI resulting in a post-hedge, post-tax ROE of 10.88%, 37 basis points below

7   the "allowed" ROE of 11.25%. This variance is roughly equivalent to the previously

8   described expected ROE variance of 37 basis points when the CET is not in place. The

9   difference is that the original expected value has been discounted one year to July 1, 2008

10   at the risk-free rate using the methodology described above.

11 **Q.**   **What is your recommendation to the Commission on this matter?**

12 A.   I recommend that the Commission use this information as it considers its decision

13   on QGC's allowed return on equity. Specifically, this information should be factored

14   into the Commission's decision on where within the range of reasonable returns QGC's

15   return on equity should be set.

16 **Q.**   **Does this conclude your direct testimony with respect to rate of return?**

17 A.   Yes, it does.

Exhibit UAE ROE 2.1 – Utah GS-1 Temperature-Adjusted Usage per Customer
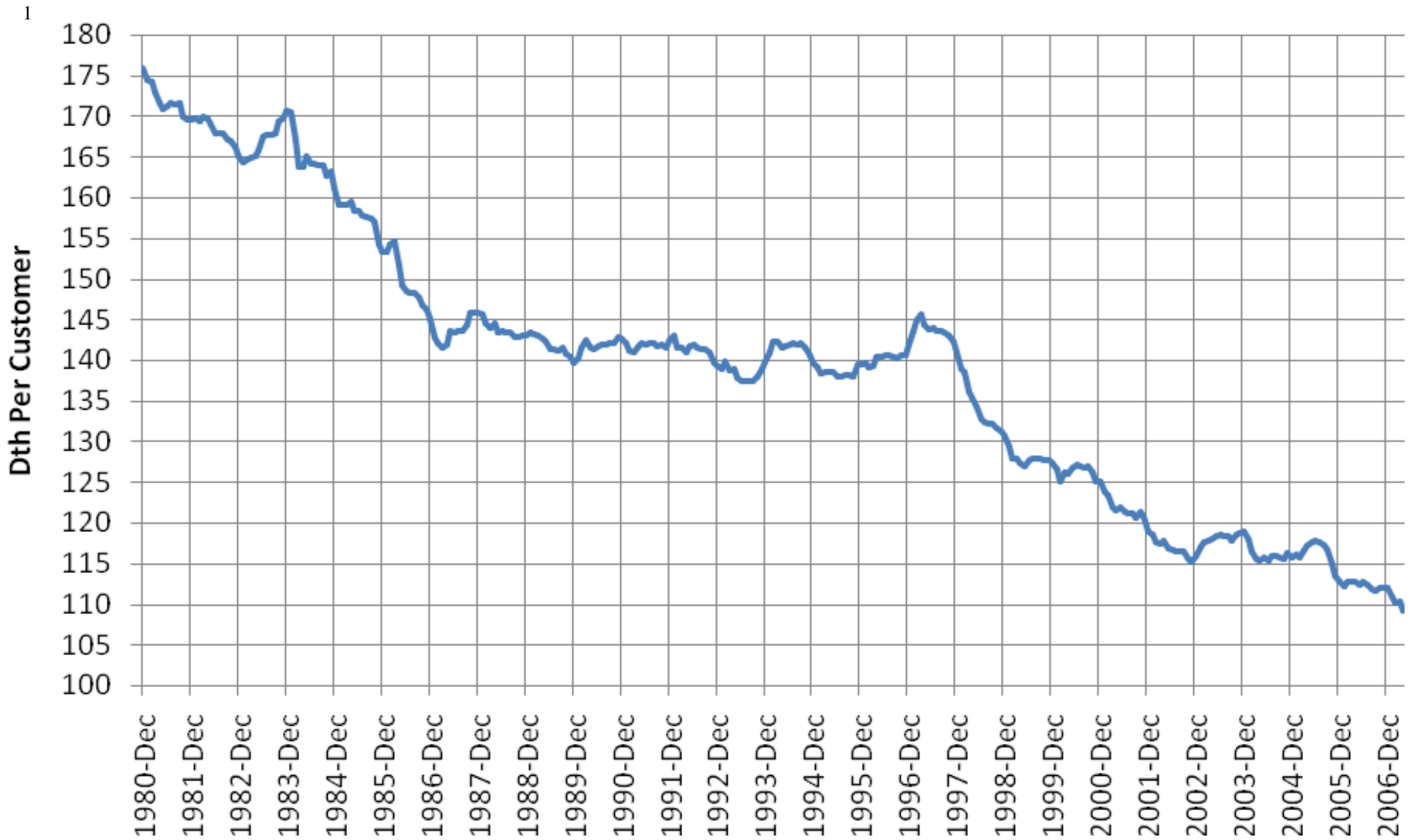
Source: adapted from MDR A.4 U attach.xls, Sheet: DMC EXHIBIT C

Exhibit UAE ROE 2.2 – Annual Change in Usage per Customer

1

Calendar Year	Usage per Customer (Dth/Year)	% Change
1981	169.48	
1982	165.02	-2.63%
1983	170.60	3.38%
1984	161.15	-5.54%
1985	153.38	-4.82%
1986	145.14	-5.37%
1987	145.75	0.42%
1988	143.06	-1.85%
1989	139.65	-2.38%
1990	142.62	2.13%
1991	142.55	-0.05%
1992	139.37	-2.23%
1993	139.82	0.32%
1994	139.62	-0.14%
1995	139.50	-0.09%
1996	141.88	1.71%
1997	141.01	-0.61%
1998	130.68	-7.33%
1999	127.37	-2.53%
2000	125.00	-1.86%
2001	118.97	-4.82%
2002	115.84	-2.63%
2003	118.90	2.64%
2004	115.67	-2.72%
2005	112.70	-2.57%
2006	111.98	-0.64%
Average Change in Usage:		**-1.61%**
Maximum Increase in Usage:		**3.38%**
Maximum Decrease in Usage:		**-7.33%**
Years with Increasing Usage:		**6**
Years with Declining Usage:		**19**

Source: adapted from MDR A.4 U attach.xls, Sheet: DMC EXHIBIT C

Exhibit UAE ROE 2.3C – QGC Forecasted GS1 DNG Volumetric Charges Under Current Rates

Current DNG Rates & Revenues

Utah GSR Volumetric Rates			Dth	From Revenue Run Output		
				Dth	Curr. Rate	Revenues
Winter	Block 1	All Over	0	44,049,364	1.95993	86,333,670
Summer	Block 1	All Over	0	17,949,721	1.65073	29,630,143
Total Volumetric Charges				61,999,085		115,963,813

Customers

	Avg customers	794,748

Utah GSC Volumetric Rates			Dth	From Revenue Run Output		
				Dth	Curr. Rate	Revenues
Winter	Block 1	First	45	6,069,322	1.95993	11,895,446
	Block 2	Next	155	5,644,945	0.81370	4,593,292
	Block 3	All Over	200	7,039,452	0.81370	5,728,002
Summer	Block 1	First	45	3,170,494	1.65073	5,233,630
	Block 2	Next	155	2,179,181	0.61279	1,335,380
	Block 3	All Over	200	1,867,693	0.61279	1,144,504
Total Volumetric Charges				25,971,087		29,930,254

Customers

	Avg customers	58,487

Summary

Total Expected GS1 DNG Volumetric Charges:	$145,894,067
Average GS1 Customers:	853,235
Avg Usage per Customer (Dth):	103.10
Average Volumetric Charges Customer:	$170.99
Average Volumetrc Charges per Dth:	$1.66

Source: QGCMODEL_01_18_08.xls, Sheet: Rate Design

Exhibit UAE ROE 2.4 – Potential Maximum NOI With Maximum Historic Increase in Usage per Customer

	Projected by QGC	Potential Values per Historical Change in Usage	Potential Variance from Projected
GS1 DNG Volumetric Charges	$145,894,067	$150,827,341	$4,933,274
Average Customers	853,235	853,235	0
Annual Volume (Dth)	87,970,172	90,944,803	2,974,631
Expected Usage per Customer (Dth/Cust)	103.10	106.59	3.49
Change in Annual Usage (Dth/Cust)		3.38%	**Historical Maximum**
Charges per Dth	$1.66	$1.66	$0.00
Charges per Customer	$170.99	$176.77	$5.78

Impact on ROE of Variation in DNG Volumetric Charges			Source for Projected Value:
Change in GS1 DNG Volumetric Charges:	$4,933,274		
Combined Federal & State Tax Rate:	38.04%		QGCMODEL_01_18_08.xls, Sheet: Taxes, Cell: J23
Impact on NOI:	$3,056,716		

	Projected by QGC	Potential Values per Historical Change in Usage	Potential Variance from Projected	Source
Net Operating Income	**$67,593,225**	**$70,649,940**	**$3,056,716**	QGCMODEL_01_18_08.xls, Sheet: Report, Cell: K49
Rate Base	$750,206,444	$750,206,444	$0	QGCMODEL_01_18_08.xls, Sheet: Report, Cell: K77
Return on Rate Base	9.01%	9.42%	0.41%	QGCMODEL_01_18_08.xls, Sheet: Report, Cell: K80
Weighted Cost of Long Term Debt	3.13%	3.13%		QGCMODEL_01_18_08.xls, Sheet: Capital Str, Cell: F7
Percent Common Equity	52.29%	52.29%		QGCMODEL_01_18_08.xls, Sheet: Capital Str, Cell: D9
Return on Equity	11.25%	12.03%	0.78%	QGCMODEL_01_18_08.xls, Sheet: Report, Cell: K82

Exhibit UAE ROE 2.5 – Potential Minimum NOI With Maximum Historic Decrease in Usage per Customer

	Projected by QGC	Potential Values per Historical Change in Usage	Potential Variance from Projected
GS1 DNG Volumetric Charges	$145,894,067	$135,206,274	($10,687,793)
Average Customers	853,235	853,235	0
Annual Volume (Dth)	87,970,172	81,525,722	-6,444,450
Expected Usage per Customer (Dth/Cust)	103.10	95.55	-7.55
Change in Annual Usage (Dth/Cust)		-7.33%	**Historical Minimum**
Charges per Dth	$1.66	$1.66	$0.00
Charges per Customer	$170.99	$158.46	($12.53)

Impact on ROE of Variation in DNG Volumetric Charges				Source for Projected Value:
Change in GS1 DNG Volumetric Charges:		($10,687,793)		
Combined Federal & State Tax Rate:		38.04%		QGCMODEL_01_18_08.xls, Sheet: Taxes, Cell: J23
Impact on NOI:		($6,622,285)		

	Projected by QGC	Potential Values	Potential Variance	Source
Net Operating Income	**$67,593,225**	**$60,970,940**	**($6,622,285)**	QGCMODEL_01_18_08.xls, Sheet: Report, Cell: K49
Rate Base	$750,206,444	$750,206,444	$0	QGCMODEL_01_18_08.xls, Sheet: Report, Cell: K77
Return on Rate Base	9.01%	8.13%	-0.88%	QGCMODEL_01_18_08.xls, Sheet: Report, Cell: K80
Weighted Cost of Long Term Debt	3.13%	3.13%		QGCMODEL_01_18_08.xls, Sheet: Capital Str, Cell: F7
Percent Common Equity	52.29%	52.29%		QGCMODEL_01_18_08.xls, Sheet: Capital Str, Cell: D9
Return on Equity	11.25%	9.56%	-1.69%	QGCMODEL_01_18_08.xls, Sheet: Report, Cell: K82

Exhibit UAE ROE 2.6 – Expected NOI With Average Historic Change in Usage per Customer

	Projected by QGC	Potential Values per Historical Change in Usage	Potential Variance from Projected	
GS1 DNG Volumetric Charges	$145,894,067	$143,547,251	($2,346,816)	
Average Customers	853,235	853,235	0	
Annual Volume (Dth)	87,970,172	86,555,105	-1,415,067	
Expected Usage per Customer (Dth/Cust)	103.10	101.44	-1.66	
Change in Annual Usage (Dth/Cust)		-1.61%	**Historical Average**	
Charges per Dth	$1.66	$1.66	$0.00	
Charges per Customer	$170.99	$168.24	($2.75)	

Impact on ROE of Variation in DNG Volumetric Charges				Source for Projected Value:
	Change in GS1 DNG Volumetric Charges:	($2,346,816)		
	Combined Federal & State Tax Rate:	38.04%		QGCMODEL_01_18_08.xls, Sheet: Taxes, Cell: J23
	Impact on NOI:	($1,454,115)		

	Projected by QGC	Potential Values per Historical Change in Usage	Potential Variance from Projected	Source
Net Operating Income	**$67,593,225**	**$66,139,109**	**($1,454,115)**	QGCMODEL_01_18_08.xls, Sheet: Report, Cell: K49
Rate Base	$750,206,444	$750,206,444	$0	QGCMODEL_01_18_08.xls, Sheet: Report, Cell: K77
Return on Rate Base	9.01%	8.82%	-0.19%	QGCMODEL_01_18_08.xls, Sheet: Report, Cell: K80
Weighted Cost of Long Term Debt	3.13%	3.13%		QGCMODEL_01_18_08.xls, Sheet: Capital Str, Cell: F7
Percent Common Equity	52.29%	52.29%		QGCMODEL_01_18_08.xls, Sheet: Capital Str, Cell: D9
Return on Equity	11.25%	10.88%	-0.37%	QGCMODEL_01_18_08.xls, Sheet: Report, Cell: K82

Exhibit UAE ROE 2.7 – Net Impact of Variations in Usage per Customer on NOI with GQC's CET

Variance from Projected Usage per Customer

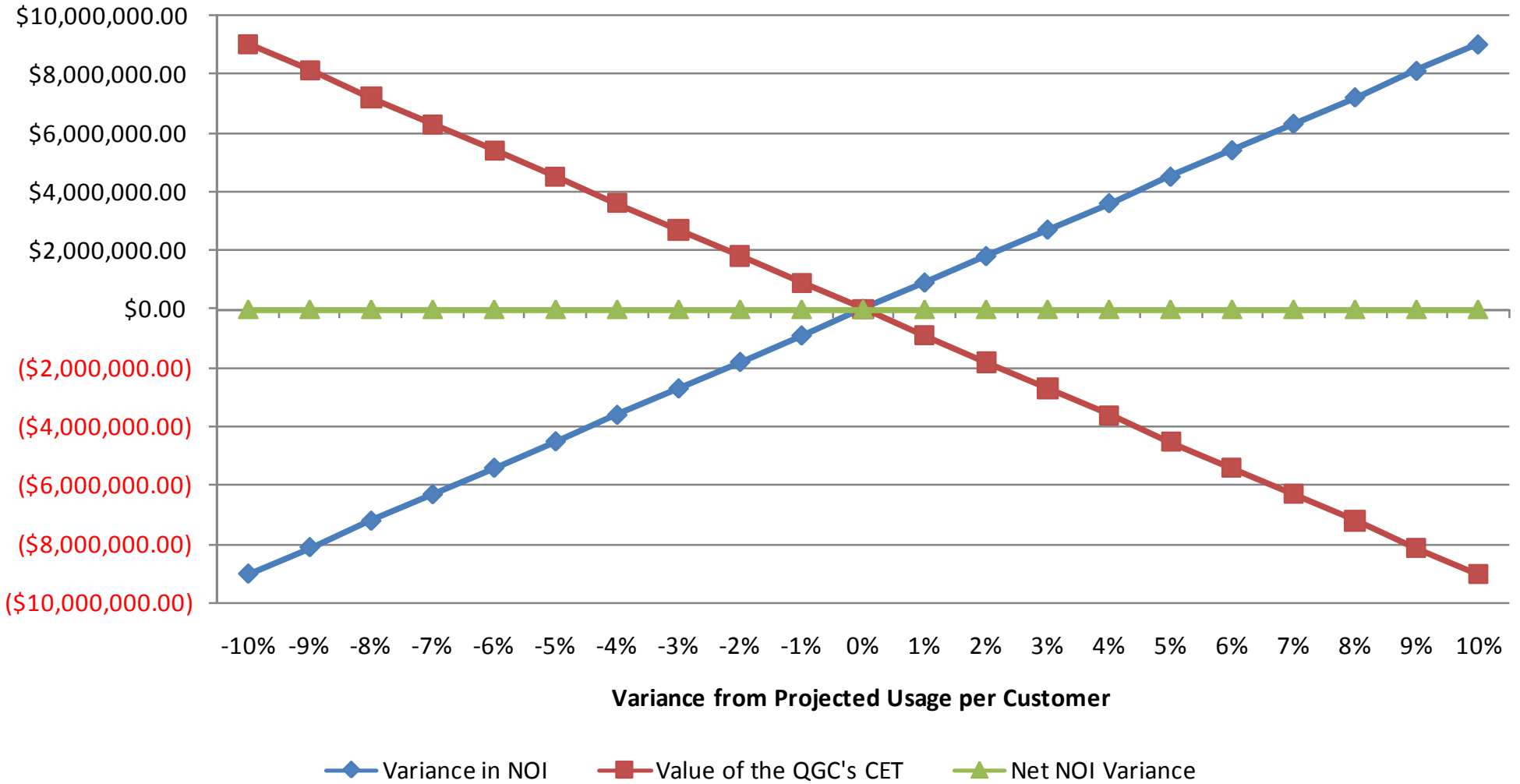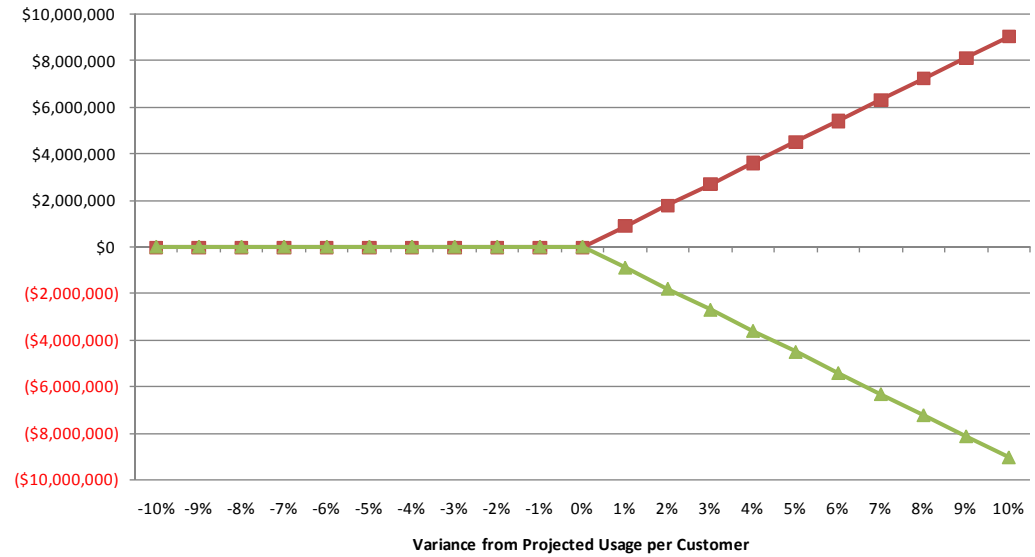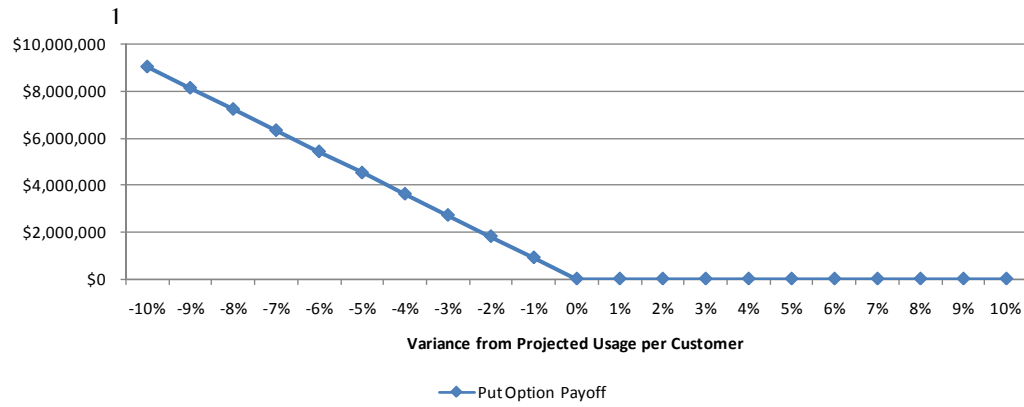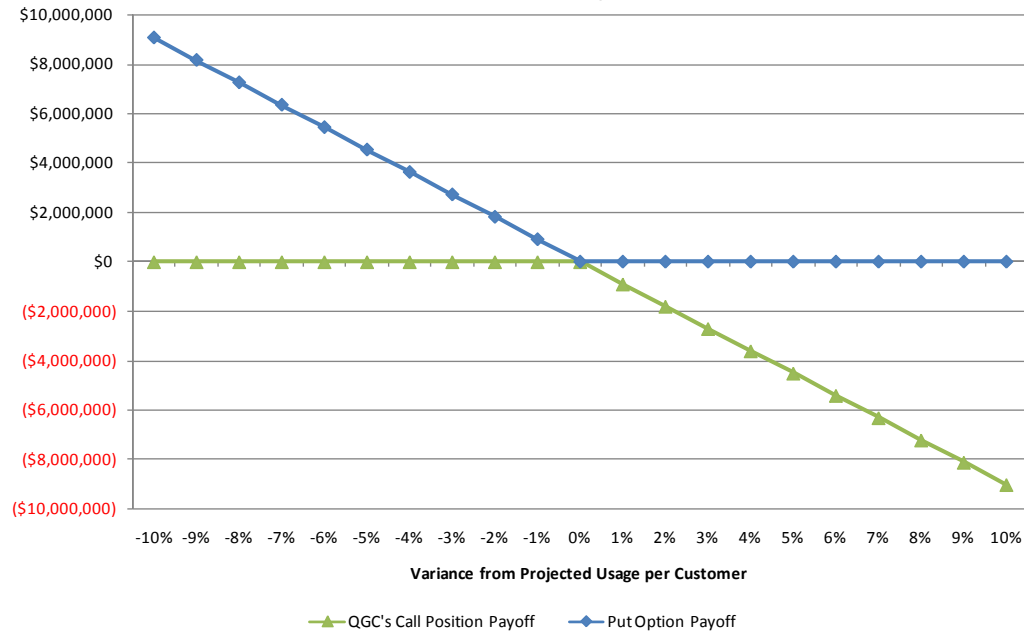— Variance in NOI   — Value of the QGC's CET   — Net NOI Variance

Exhibit UAE ROE 2.8 – Illustration of an Options Portfolio that Replicates QGC's CET

Combined Portfolio Payoff to QGC

Exhibit UAE ROE 2.9 – Illustration of Potential QGC NOI Variance Based in Historical Changes in Usage per Customer

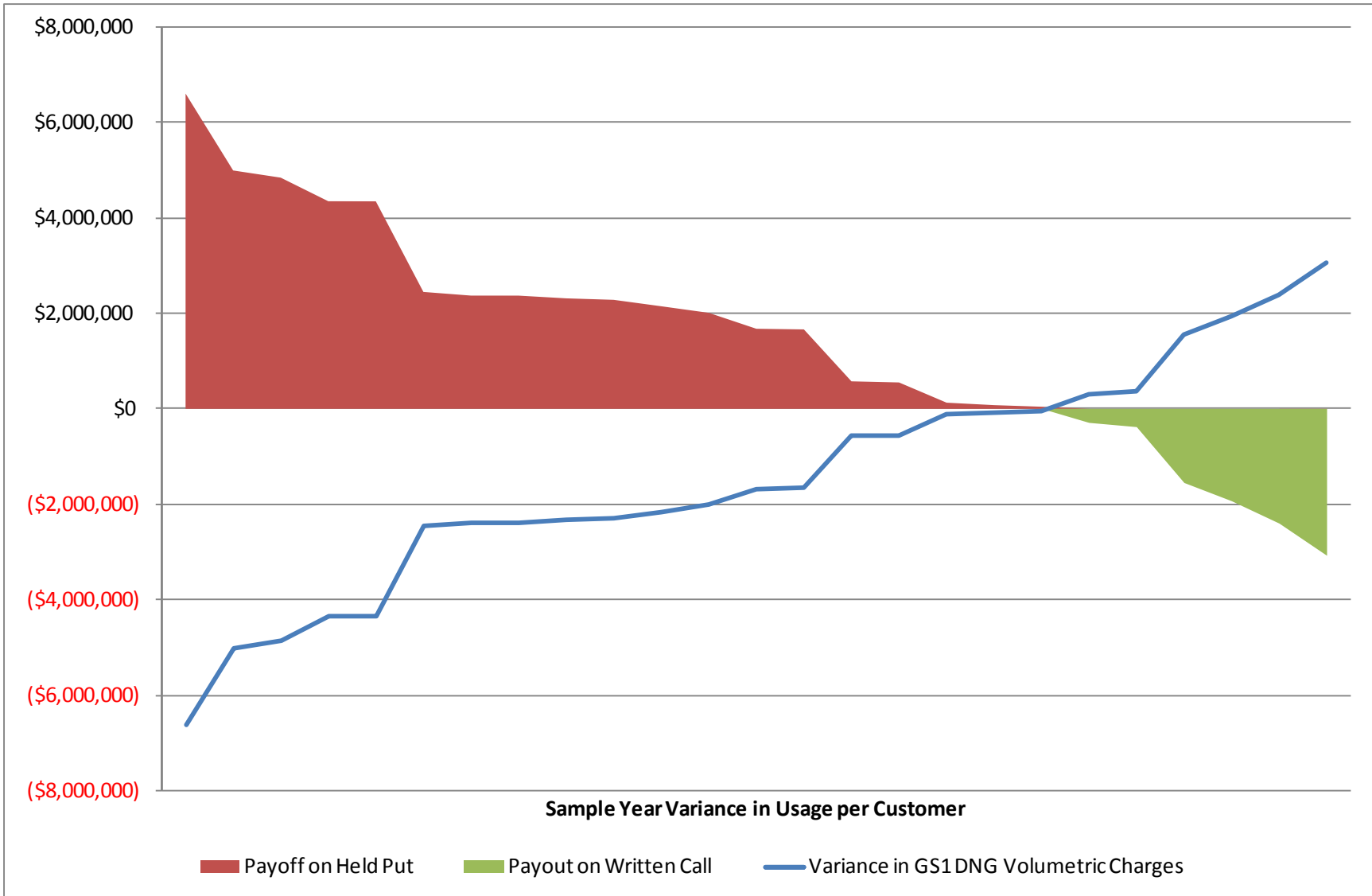Sample Year Variance in Usage per Customer

■ Payoff on Held Put   ■ Payout on Written Call   — Variance in GS1 DNG Volumetric Charges

Exhibit UAE ROE 2.10 – Possible Cost of CET Replicating Hedge Position and Impact on QGC NOI

A	B	C	D	E	F	G	H	I	J	K
Change in Usage - Sample Year	Change in Usage per Customer	Expected Usage Per Customer	Usage Per Customer	Test Year Possible NOI	"Allowed" NOI	Variance in GS1 DNG Volumetric Charges	Payoff on Held Put [max(-Column G,0)]	Payout on Written Call -[max(Column G,0)]	Current Value of Put [(Column H * p) / (1+rf)]	Current Value of Call [(Column I * p) / (1+rf)]
1998	-7.3%	103.10	95.55	$60,970,940	$67,593,225	($6,622,285)	$6,622,285	$0	$264,353	$0
1984	-5.5%	103.10	97.39	$62,585,848	$67,593,225	($5,007,376)	$5,007,376	$0	$199,888	$0
1986	-5.4%	103.10	97.56	$62,736,808	$67,593,225	($4,856,417)	$4,856,417	$0	$193,862	$0
2001	-4.8%	103.10	98.13	$63,232,439	$67,593,225	($4,360,786)	$4,360,786	$0	$174,077	$0
1985	-4.8%	103.10	98.13	$63,234,613	$67,593,225	($4,358,611)	$4,358,611	$0	$173,990	$0
2004	-2.7%	103.10	100.30	$65,137,509	$67,593,225	($2,455,716)	$2,455,716	$0	$98,029	$0
1982	-2.6%	103.10	100.39	$65,214,337	$67,593,225	($2,378,887)	$2,378,887	$0	$94,962	$0
2002	-2.6%	103.10	100.39	$65,214,937	$67,593,225	($2,378,287)	$2,378,287	$0	$94,938	$0
2005	-2.6%	103.10	100.45	$65,272,128	$67,593,225	($2,321,096)	$2,321,096	$0	$92,655	$0
1999	-2.5%	103.10	100.49	$65,303,537	$67,593,225	($2,289,688)	$2,289,688	$0	$91,402	$0
1989	-2.4%	103.10	100.64	$65,438,491	$67,593,225	($2,154,734)	$2,154,734	$0	$86,014	$0
1992	-2.2%	103.10	100.80	$65,576,636	$67,593,225	($2,016,589)	$2,016,589	$0	$80,500	$0
2000	-1.9%	103.10	101.18	$65,911,176	$67,593,225	($1,682,049)	$1,682,049	$0	$67,145	$0
1988	-1.8%	103.10	101.20	$65,924,821	$67,593,225	($1,668,404)	$1,668,404	$0	$66,601	$0
2006	-0.6%	103.10	102.44	$67,015,706	$67,593,225	($577,519)	$577,519	$0	$23,054	$0
1997	-0.6%	103.10	102.47	$67,038,911	$67,593,225	($554,314)	$554,314	$0	$22,128	$0
1994	-0.1%	103.10	102.95	$67,463,919	$67,593,225	($129,306)	$129,306	$0	$5,162	$0
1995	-0.1%	103.10	103.01	$67,515,530	$67,593,225	($77,695)	$77,695	$0	$3,101	$0
1991	0.0%	103.10	103.05	$67,548,856	$67,593,225	($44,369)	$44,369	$0	$1,771	$0
1993	0.3%	103.10	103.43	$67,885,102	$67,593,225	$291,878	$0	($291,878)	$0	($11,651)
1987	0.4%	103.10	103.54	$67,973,152	$67,593,225	$379,927	$0	($379,927)	$0	($15,166)
1996	1.7%	103.10	104.86	$69,135,494	$67,593,225	$1,542,269	$0	($1,542,269)	$0	($61,565)
1990	2.1%	103.10	105.29	$69,515,754	$67,593,225	$1,922,529	$0	($1,922,529)	$0	($76,745)
2003	2.6%	103.10	105.83	$69,981,148	$67,593,225	$2,387,923	$0	($2,387,923)	$0	($95,323)
1983	3.4%	103.10	106.59	$70,649,940	$67,593,225	$3,056,716	$0	($3,056,716)	$0	($122,020)
								Current Value of Option [sum of column]:	($1,833,634)	$382,471

	L	M
Post-tax Net Cost of Hedge Position [L + M]:	($1,451,162)	
Pre-Hedge "Allowed" NOI:	$67,593,225	
Post-Hedge NOI:	$66,142,062	
Rate Base:	$750,206,444	
Return on Rate Base:	8.82%	
Weighted Cost of Long Term Debt:	3.13%	
Percent Common Equity:	52.29%	
Post-Hedge "Acceptable" Return on Equity:	10.88%	
Variance from "Allowed" ROE:	-0.37%	

Definitions:

p = probability of outcome occurring. All points have a probability of 1/25.

rf = risk-free rate of return. This analysis assumes 5%.

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